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Fostering creativity in art education through digital tools

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ABSTRACT

This paper explores the integration of digital tools in art education to foster creativity among students. As modern educational systems increasingly recognize the significance of creativity, it becomes essential for educators to cultivate their creative skills to inspire their students effectively. The study emphasizes that creativity is not only a desirable outcome but also a vital pedagogical strategy that enhances innovative thinking and encourages the expression of imaginative ideas. Furthermore, the paper discusses the role of international frameworks, such as OECD Education 2030 and UN 2030, in highlighting the necessity of preparing learners for creative thinking in a rapidly changing world. Through an analysis of current practices and challenges in integrating digital tools into art education, this research underscores the transformative potential of technology in enhancing creative expression. It also addresses the barriers to equitable access to digital resources and emphasizes the importance of effective teacher preparation in fostering a supportive learning environment. This paper advocates for a multifaceted approach to creativity in education, leveraging digital tools to empower students and prepare them for future challenges.

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Raqamli vositalar orqali tasviriy san’at ta’limida ijodlikni rivojlantirish

Kalit so‘zlar:
ijodkorlik,
raqamli vositalar,
tasviriy san’at ta’limi,
raqamli ijodkorlik.

ANNOTATSIYA

Ushbu maqola talabalar ijodini rivojlantirish uchun san’at ta’limida raqamli vositalarni integratsiyalashni tadqiq qiladi. Zamonaviy ta’lim tizimlari ijodkorlikning ahamiyatini tobora ko‘proq e’tirof etar ekan, o‘qituvchilar o‘z o‘quvchilarini samarali

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ilhomlantirish uchun ijodiy qobiliyatlarini rivojlantirishlari kerak. Tadqiqot shuni ta'kidlaydiki, ijodkorlik nafaqat kutilayotgan natija, balki innovatsion fikrlashni kuchaytiruvchi va ijodiy g'oyalarni ifodalashga undaydigan hayotiy pedagogik strategiyadir. Bundan tashqari, maqolada OECD Ta'lim 2030 va BMT 2030 kabi xalqaro tuzilmalarning o'quvchilarni tez o'zgaruvchan dunyoda ijodiy fikrlashga tayyorlash zarurligini ta'kidlashdagi rolini muhokama qiladi. Raqamli vositalarni san'at ta'limiga integratsiyalash bo'yicha mavjud amaliyot va muammolarni tahlil qilish orqali ushbu tadqiqot ijodiy ifodani kuchaytirishda texnologiyaning transformatsion salohiyatini ta'kidlaydi. Shuningdek, u raqamli resurslardan samarali foydalanish yo'lidagi to'siqlarni ko'rib chiqadi va qo'llab-quvvatlovchi o'quv muhitini yaratishda o'qituvchilarni samarali tayyorlash muhimligini ta'kidlaydi. Ushbu maqola ta'limda ijodkorlikka ko'p qirrali yondashuvni, talabalarni kuchaytirish va ularni kelajakka tayyorlash uchun raqamli vositalardan foydalanishni ta'kidlaydi.

Развитие творчества в художественном образовании с помощью цифровых инструментов

Ключевые слова:
креативность,
цифровые инструменты,
художественное образование,
цифровое творчество.

АННОТАЦИЯ

В статье рассматривается интеграция цифровых инструментов в художественное образование как средство поощрения творческого потенциала учащихся. Современные образовательные системы всё больше признают важность развития креативности, поэтому педагогам необходимо совершенствовать собственные творческие навыки, чтобы эффективно вдохновлять учеников. Исследование подчёркивает, что творчество – это не только желаемый результат обучения, но и важная педагогическая стратегия, способствующая развитию инновационного мышления и стимулирующая выражение оригинальных идей. Особое внимание уделяется роли международных инициатив, таких как программа ОЭСР «Образование 2030» и цели ООН на период до 2030 года, которые подчёркивают необходимость подготовки учащихся к креативному мышлению в условиях стремительно меняющегося мира. Анализ текущих практик и существующих проблем в интеграции цифровых инструментов в художественное образование позволяет выявить преобразующий потенциал технологий в развитии творческого самовыражения. В статье также рассматриваются препятствия на пути к равному доступу к цифровым ресурсам и акцентируется важность качественной подготовки педагогов для создания благоприятной образовательной среды. Таким образом, авторы отстаивают многогранный подход к развитию творчества в образовании, подчёркивая значимость использования цифровых инструментов для расширения возможностей учащихся и подготовки их к вызовам будущего.

INTRODUCTION

Modern education systems realize the importance of utilizing digital tools in education. Integrating digital technologies into education necessitates a systems-level strategy to cultivate capable teachers and educational leaders proficiently (Fayzullayev, 1998; Isakov, 2023). In this regard, appropriate training in digital competencies is necessary to ensure that teachers adopt and implement digital policies in their classrooms (Gabriel et al., 2022). This process also includes arts education (Isakov, 2023). Today, teachers and students recognize the value of digital tools when combined with traditional media, as it gives art students greater flexibility in applying techniques and concepts.

Art education is not an exception to this process (Szostak & Sułkowski, 2024). Technology integration has become a revolutionary and modern teaching innovation in the ever-changing field of fine arts and design education (Tong, 2024). Digital technology has had a significant impact on the creation of visual art due to the many possibilities it offers (Weng & Lee, 2024).

This phenomenon has sparked interest in online art activities as a novel avenue for psychological healing, particularly for Generation Z. (Xia et al., 2024). Visual arts teachers must also integrate digital art elements into their classrooms to keep up with the times (Nichols, 2023). If digital tools could be used instead of traditional tools to learn and apply the elements of art in traditional visual arts, the tide of learning could change completely, as digital tools are much easier to acquire on limited budgets and use for a long time. In contrast, in traditional art, students often cannot afford expensive paints, paper, and other physical learning materials (Nichols, 2023).

Many art and design teachers, even if they have previously partially mastered the use of digital tools, note that the pedagogical use of digital technologies in visual arts lessons is somewhat more difficult (Tusiime et al., 2022).

Defining creativity

Creativity is a fundamental human capacity that drives innovation and problem-solving (Graessler & Taplick, 2019). It involves a dynamic process encompassing diverse phases, from initial problem identification to the evaluation of generated solutions (Graessler & Taplick, 2019). This process can be understood on two levels: the macro-level, characterized by the broader stages artists typically traverse, and the micro-level, emphasizing the specific cognitive mechanisms underlying creative thinking (Nichols, 2023, based on Botella et al., 2018).

Key components of creativity include fluency (generating numerous ideas), flexibility (exploring diverse approaches), and originality (producing novel and unique solutions) (Torrance, 1963; Maor et al., 2024). Furthermore, creativity can manifest at different levels: Little-c, encompassing everyday creative expressions in personal and social contexts, and Mini-c, emphasizing the creativity inherent in the learning process itself (Kaufman & Beghetto, 2009; Niclòs et al., 2024). These distinctions highlight the importance of fostering creativity within educational settings.

In the contemporary context, digital technologies offer powerful tools for exploring and expressing creative ideas (Van Rensburg et al., 2021). Digital creativity involves utilizing these tools to generate new forms of expression, research, and work (University of York, 2019).

Benefits of Creativity in Education

Research has demonstrated that creativity has several benefits for students, including increased motivation, promotion of professional activities, enhancement of higher-order thinking and judgment skills, fostering of creative cooperation, and managing cognitive load (Zhang et al., 2024)

The ongoing discussion regarding the significance of creativity in education has gained considerable momentum recently (Niclòs et al., 2024). Educators must develop their creative skills to effectively motivate and inspire their students' creativity (Niclòs et al., 2024). Creativity serves as a pedagogical strategy that enhances students' innovative thinking and behavior by promoting the articulation of imaginative ideas (Tong, 2024; Tajiboyeva, 2023).

Furthermore, creativity is a desirable outcome of education and a valuable pedagogical approach. Tong (2024) argues that by integrating creative activities into the learning process, educators can effectively strengthen students' innovative thinking and encourage them to express their ideas in novel and imaginative ways.

The significance of preparing learners for the challenges of the 21st century, including the ability to think creatively, is further emphasized by international frameworks such as OECD Education 2030 and UN 2030 (Maor et al., 2024). These frameworks highlight the need to cultivate skills such as critical thinking, problem-solving, and creativity, which are essential for navigating a complex and rapidly changing world.

To nurture creativity within educational settings, it is vital to create an environment that encourages exploration and supports innovative thinking. This includes:

- **Encouraging Curiosity**: Students should be motivated to ask questions and pursue their interests.
- **Diverse Learning Experiences**: Integrating arts into various subjects can significantly enhance creative expression.
- **Collaboration**: Creative teamwork should be promoted as it is essential for real-world problem-solving.

By prioritizing creativity in education, we empower individuals to thrive prepare them to navigate the complexities of the modern world effectively (Mahmudjanovna, 2023).

Fostering creativity in education requires a multifaceted approach, beginning with a clear understanding of creativity itself. Niclòs et al. (2024) emphasize the importance of providing educators with a robust conceptualization of creativity, including an understanding of different levels such as mini-c and little-c. This foundational knowledge will empower educators to recognize and nurture creative expressions in diverse contexts.

Furthermore, effective teacher preparation is crucial for cultivating a creative learning environment. Maor et al. (2024) advocate for teacher preparation programs that equip future educators with the knowledge and skills necessary for creative teaching. This includes not only providing initial training but also ensuring ongoing professional development opportunities that allow teachers to refine their understanding and implementation of creative teaching practices (Fayzullayev, 2024).

While the importance of creativity in education is widely recognized, the research on the most effective approaches to fostering student creativity remains ongoing. Tong (2024) highlights the current uncertainty regarding the impact of different teaching

methods on student creativity, emphasizing the need for further research to identify and refine evidence-based practices that effectively nurture creative development in learners.

The role of digital tools in fostering creativity

The digital age has profoundly transformed the creative landscape. Digital information collection tools have revolutionized access to a vast array of cultural resources and artistic works, enabling creators to incorporate diverse perspectives and innovative elements into their creations (Weng & Lee, 2024). This expanded access to information has not only enriched the creative process but also facilitated new forms of artistic expression.

Furthermore, the digital environment itself plays a crucial role in fostering creativity. As Wang & Li (2024) point out, the digital environment, as a social component of creativity, provides a valuable technical infrastructure for analyzing data related to creative processes and collaborative efforts. This data-driven approach can enhance our understanding of creativity, identify emerging trends, and inform the development of more effective creative learning experiences.

The impact of digital technologies is also evident in the growing popularity of contemporary digital art learning. As online learning has become more mainstream, factors such as digital mobility, user-friendliness, and affordability have significantly contributed to the increasing accessibility and popularity of digital art education (Nichols, 2023). This trend has democratized access to art education and provided learners with new opportunities for creative exploration and self-expression.

Digital education has the potential to significantly impact student creativity. Zhang et al. (2024) argue that digital learning environments can foster creativity by increasing access to diverse learning resources, presenting students with challenging learning tasks, and reducing barriers to access. This is particularly beneficial for students with special needs, as digitalization can provide them with greater opportunities for creative expression (Zhang et al., 2024).

The integration of artificial intelligence (AI) into education presents both exciting possibilities and unique challenges. While research in this area is still emerging, preliminary studies suggest that AI, particularly generative AI, has the potential to enhance student creativity (Niclòs et al., 2024). AI can encourage students to engage in metacognitive reflection and explore novel approaches to learning.

However, it is crucial to acknowledge that while students demonstrate the ability to effectively incorporate AI-generated elements into their work, they also strongly emphasize the importance of maintaining their original ideas and expressions (Niclòs et al., 2024).

This highlights the need for a nuanced approach to AI integration in education, one that leverages the potential of AI to enhance creativity while ensuring that students maintain ownership and authenticity in their learning experiences.

The field of digital creativity is rapidly evolving at the intersection of creative practices and digital technologies (Wang & Li, 2024). While digital applications offer young artists access to a diverse range of tools and mediums, such as digital pencils, markers, and paint (Manuika, 2018; Ralston, 2018), Nichols (2023) emphasizes the critical importance of understanding and transferring knowledge across different artistic mediums for developing well-rounded artistic skills.

Furthermore, the effectiveness of fostering creativity in students is significantly influenced by the specific teaching methods employed (Tong, 2024). Damanik & Widodo (2024) emphasize the urgent need for further research into this phenomenon, focusing on

the interconnectedness of digital literacy, perseverance (grit), the quality of instruction, and effective approaches to teaching creativity.

The effective integration of technology in the classroom can play a vital role in cultivating creativity. Damanik & Widodo (2024) argue that technology use can foster the development of crucial skills such as productivity, collaborative imagination, problem-solving, and curiosity, all of which are essential for nurturing creative thinking and expression.

The role of digitalization in collaboration and feedback to improve creativity

A thorough investigation of student experiences in learning, transferring, and applying art techniques and concepts across physical and digital mediums is crucial for understanding the full potential and limitations of digital tools in art education (Nichols, 2023). Recognizing the importance of social interaction, Nichols (2023) emphasizes that effective learning often occurs through social interaction with an instructor who can model and demonstrate techniques, providing a structured and supportive learning environment.

Furthermore, collaborative learning strategies, such as peer-to-peer learning and scaffolding, can significantly enhance the learning process, particularly when acquiring foundational techniques and concepts (Saadat & Alavi, 2020, as cited in Nichols, 2023). Nichols (2023) observed that students often preferred group projects to individual projects when working with handheld tools, suggesting a preference for collaborative learning experiences.

Technology plays a significant role in shaping the modern art education landscape. Virtual Reality (VR) technology, for example, offers the potential for intuitive collaboration by immersing learners in a shared virtual environment (Graessler & Taplick, 2019). Group Creativity Support Systems (GCSS) also provide valuable tools for facilitating divergent and convergent thinking within collaborative groups (Graessler & Taplick, 2019).

To effectively address the challenges inherent in the learning process, educators employ a variety of strategies. Tusiime et al. (2022) highlight the importance of collaborative strategies, such as teamwork and peer-to-peer mentoring, along with the use of physical visual aids, and a variety of activities for continual practice and learning through examples and videos.

Self-reflection is also a crucial aspect of the learning process. Xia et al. (2024) found that observing oneself through video provided students with valuable evidence of areas for improvement, allowing them to reflect on their performance and make necessary adjustments to their techniques.

This analysis highlights the multifaceted nature of art education, emphasizing the importance of integrating social interaction, technology, and effective pedagogical strategies to foster a dynamic and engaging learning environment.

Challenges in integrating digital tools into the educational process

Preparing students to thrive in the digital age presents significant challenges (Gabriel et al., 2022). As technology becomes increasingly integral to creative practices, disparities in access to digital resources pose a significant barrier to equitable learning opportunities. Students with limited access to technology may face significant challenges in realizing their full creative potential (Tong, 2024). Bridging this digital divide is crucial to ensure that all learners have equal access to the tools and resources necessary for success (Tong, 2024).

Practical examples of these challenges are evident in research. Cassar-Cordina & Zammit (2024) found that participants in certain projects were unable to participate due to a lack of access to the internet or digital devices. While digital tools offer many advantages, they also present unique challenges. Nichols (2023) observed that students encountered some difficulties with communication and coordination while using online tools for group projects, challenges that might be less prevalent in a traditional classroom setting. Furthermore, Nichols (2023) noted that digital tools may not always replicate the nuances of traditional art mediums, such as the color bleeding effects of watercolor paints.

Copyright infringement is another concern. As Farrell (2016) points out, the ease of duplication in the digital environment can lead to copyright violations (Nichols, 2023). Moreover, Nichols (2023) emphasizes that digital tools do not always provide students with all the necessary resources for educational success.

These challenges are compounded by the significant obstacles educators face in effectively integrating technology into their teaching practices. Many educators struggle to translate Information and Communication Technology (ICT) into meaningful and engaging learning activities (Tusiime et al., 2022).

Several factors contribute to this resistance. Tusiime et al. (2022) highlight that teachers' traditional ideologies about art and their beliefs about the incompatibility between technology and art can hinder the adoption of digital tools. Furthermore, Wang (2002) reported continued reluctance among educators to embrace new technologies (Tusiime et al., 2022). While some resistance might be attributed to age (Koksal, 2013), Delacruz (2004) observed that many art educators primarily use basic applications, such as word processing, rather than leveraging more sophisticated tools designed to support creativity (Tusiime et al., 2022).

Lack of time and inadequate training also pose significant challenges. Tusiime et al. (2022) note that lack of time is frequently cited as a barrier to technology integration in the classroom. Moreover, many educators in developing countries lack the necessary pedagogical training to effectively use digital technologies in their teaching (Tusiime et al., 2022).

Finally, intrinsic challenges, such as skepticism about the effectiveness of digital tools in fostering creativity and a lack of technological and pedagogical competence, along with extrinsic challenges, such as inadequate access to digital resources and insufficient technical support, further hinder the successful integration of technology in art education (Tusiime et al., 2022).

Addressing these challenges requires a multi-pronged approach, including providing educators with adequate training and support, ensuring equitable access to technology and resources, and fostering a culture of innovation and experimentation in education.

Implications

These findings have significant implications for the future of art education. Firstly, striking a balance between traditional artistic principles and innovative approaches using digital technologies is a delicate yet crucial challenge (Tong, 2024). While technological advancements present significant opportunities for enhancing art and design education (Tong, 2024), it is essential to ensure that these innovations are thoughtfully integrated within a framework of core artistic principles and skills.

Secondly, incorporating game elements into educational activities – a concept known as gamification – has the potential to significantly enhance student engagement,

motivation, and skill development (Tong, 2024). Gamified learning experiences can create more interactive and enjoyable learning environments, making the learning process more engaging and effective.

Thirdly, creativity researchers argue that creating focused outcomes within the curriculum is a viable strategy for developing digital creativity (Wang & Li, 2024). Educational activities designed with specific, measurable learning outcomes in mind can maximize student engagement and learning effectiveness (Wang & Li, 2024).

Furthermore, preparing young generations to become "future-ready" should be a primary aim of education (Gabriel et al., 2022). This necessitates a significant investment in teacher training on the effective use of digital technologies, emphasizing pedagogical approaches that leverage technology to enhance student learning (Gabriel et al., 2022).

Equitable access to technology and resources is crucial for ensuring that all students have the opportunity to benefit from the advancements in digital learning. Bridging the digital divide and ensuring equitable access to technology and resources for all students is critical for ensuring equitable educational opportunities (Tong, 2024).

The successful integration of technology in education also depends on its user-friendliness and its ability to support meaningful learning experiences. While technology aims to aid learners in critical thinking, its success hinges on how effectively it can be used and how user-friendly it is (Nichols, 2023). Moreover, previous learning experiences must be considered to help students effectively engage with and utilize digital materials (Nichols, 2023).

Creating engaging and motivating learning environments is crucial for fostering creativity. Graessler & Taplick (2019) emphasize the importance of fun and explorative factors in creating effective virtual learning environments.

Finally, developing strong digital literacy skills is paramount for success in the 21st century. Digital literacy plays a vital role in increasing the effectiveness of the educational process and preparing students for success in modern society (Damanik & Widodo, 2024). While technology can enhance student engagement and provide inspiration, it is crucial to address concerns about potential distractions and ensure that technology is used effectively and purposefully in the learning process (Tusiime et al., 2022).

Furthermore, motivating students to effectively utilize technology is essential. As Tusiime et al. (2022) point out, effective technology integration requires student motivation and engagement. Weng & Chiu (2024) emphasize that student interest in digital tools often evolves through hands-on experimentation and active engagement with the technology itself.

These implications highlight the need for a nuanced and thoughtful approach to integrating technology into art education. By carefully considering the balance between tradition and innovation, investing in teacher training, addressing equity and access issues, and creating engaging and motivating learning environments, we can effectively leverage the power of technology to enhance the learning experiences of all students.

CONCLUSION

Preparing students for the challenges and opportunities of the 21st century requires a fundamental shift in educational approaches. The coming generation of citizens and the emerging workforce will need to be capable and comfortable with a broad range of technologies to survive and thrive in an increasingly interconnected and digitalized world (Gabriel et al., 2022).

The integration of technology stands as a potent force, propelling art and design education into a realm where artificial intelligence, virtual reality, and digital platforms redefine the boundaries of artistic expression (Tong, 2024). Moreover, cultivating digital creativity skills is essential for preparing students for the demands of Industry 4.0. Digital creativity, defined as the ability to improve company productivity using digital technology (Wang & Li, 2024), is becoming an increasingly important competency in today's dynamic and fluid workplace (Van Rensburg et al., 2021).

Furthermore, recent studies have indicated that teachers' professional performance significantly affects students' academic achievement (Damanik & Widodo, 2024). Therefore, investing in high-quality teacher training programs that focus on the effective integration of technology in the classroom is crucial for ensuring student success.

An effective education system must equip students with the knowledge, skills, and adaptability necessary to navigate a rapidly changing world. Students need to be able to deal with the rapid development of technologies and continuous access to vast amounts of new knowledge and information while fostering critical thinking, sensemaking, creativity, and collaboration skills (Gabriel et al., 2022).

Technology is one of the critical drivers of change in the economy (Gabriel et al., 2022). As a result, it is paramount that education supports a modern workforce with adequate digital skills. By embracing innovation, investing in teacher training, and providing equitable access to technology and resources, we can ensure that our education systems effectively prepare students for the challenges and opportunities of the 21st century.

The effective integration of digital technologies in education requires a multifaceted approach. Countries with strong teacher professional development strategies designed to develop teacher confidence in using digital technologies find that teachers are more likely to use these technologies in their classes (Gabriel et al., 2022). This highlights the crucial role of teacher training in fostering successful technology integration.

Furthermore, digital technologies are transforming the landscape of education, offering new possibilities for creative expression and innovation. The integration of technology stands as a potent force, propelling art and design education into a realm where artificial intelligence, virtual reality, and digital platforms redefine the boundaries of artistic expression (Tong, 2024).

Digital literacy is not only crucial for students but also for teachers. Damanik & Widodo (2024) emphasize that teachers need to have a high level of digital literacy to effectively integrate technology into their teaching practices and provide high-quality instruction. To teach creativity effectively, teachers must possess strong digital literacy skills that enable them to stay abreast of the rapidly evolving technological landscape (Damanik & Widodo, 2024).

Moreover, student engagement is the key to creativity development in STEM education (Weng & Chiu, 2024). Perceived digital inquiry, emotional engagement, and cognitive engagement directly impact students' self-perceived creativity (Weng & Chiu, 2024).

In conclusion, the successful integration of technology in education requires a multifaceted approach that addresses the needs of both teachers and students. By investing in teacher training, fostering a supportive learning environment, and providing equitable access to technology and resources, we can empower educators and students to harness the transformative potential of digital technologies to enhance learning and foster creativity in the 21st century.

REFERENCES:

1. Damanik, J., & Widodo, W. (2024). Unlocking Teacher Professional Performance: Exploring Teaching Creativity in Transmitting Digital Literacy, Grit, and Instructional Quality. *Education Sciences*, *14*(4), 384.

2. Fayzullayev, T. (2024). The Role of Digital Technology in Education of Uzbekistan. *Journal of Intellectual Property and Human Rights*, *3*(2), 162-165.

3. Fernandez, S. (2019). Making space in higher education: disability, digital technology, and the inclusive prospect of digital collaborative making. *International Journal of Inclusive Education*, *25*(12), 1375–1390. https://doi.org/10.1080/13603116.2019.1610806

4. Haleem, A., Javaid, M., Qadri, M. A., & Suman, R. (2021). Understanding the role of digital technologies in education: A review. *Sustainable Operations and Computers*, *3*, 275-285. https://doi.org/10.1016/j.susoc.2022.05.004

5. Hameed, U., & Mimirinis, M. (2023). How does digital reflective practice in textile design education relate to creativity? *Reflective Practice*, *24*(3), 310–323. https://doi.org/10.1080/14623943.2023.2194623

6. Isabel Pont Niclòs, Yolanda Echegoyen Sanz, Patricia Orozco Gómez, Antonio Martín Ezpeleta. Creativity and artificial intelligence: A study with prospective teachers. Digital Education Review, ISSN-e 2013-9144, No. 45, 2024, pp. 91-97

7. Isakov, A. (2024). THE ROLE OF WOMEN IN THE DIGITALISATION OF EDUCATION: CHALLENGES AND OPPORTUNITIES. *Евразийский журнал академических исследований*, *4*(5 (Special Issue), 90–93. извлечено от https://www.in-academy.uz/index.php/ejar/article/view/32016

8. Isakov, A. (2023). Approaches to Teaching Art in a Digital Age: An Analytical Review of Research between 2000-2021. *Best Journal of Innovation in Science, Research and Development*, *2*(10), 8-19.

9. Janse van Rensburg, C., Coetzee, S. A., & Schmulian, A. (2021). Developing digital creativity through authentic assessment. *Assessment & Evaluation in Higher Education*, *47*(6), 857–877. https://doi.org/10.1080/02602938.2021.1968791

10. Qian Tong, "Creativity in the Digital Canvas: A Comprehensive Analysis of Art and Design Education Pedagogy". *International Journal of Advanced Computer Science and Applications (IJACSA)*, 15(6), 2024. http://dx.doi.org/10.14569/IJACSA.2024.0150696

11. Szostak, M., & Sułkowski, Łukasz. (2024). Creativity management within the aesthetical situation regarding the in-real or digital form of participation in arts: art receivers' perspective. *Creativity Studies*, *17*(1), 41–58. https://doi.org/10.3846/cs.2024.16418

12. Spante, M. (2019), "Digital creativity: learning by story driven digital production", *International Journal of Information and Learning Technology*, Vol. 36 No. 3, pp. 182-191. https://doi.org/10.1108/IJILT-11-2018-0129

13. Gabriel, F., Marrone, R., Van Sebille, Y., Kovanovic, V., & de Laat, M. (2022). Digital education strategies around the world: practices and policies. *Irish Educational Studies*, 41(1), 85–106. https://doi.org/10.1080/03323315.2021.2022513

14. Mariella Cassar-Cordina & Charmaine Zammit (2024). Living the Arts in the 21st Century. *Journal for Critical Education Policy Studies*, Volume 22, Number 2.

15. Leonard, N. (2023). Review of *Post-Digital, Post-Internet Art and Education: The Future Is All-Over*. *Studies in Art Education*, *64*(4), 491–497. https://doi.org/10.1080/00393541.2023.2255090

16. Mahmudjanovna, T. G. Z. (2023). Components and Approaches in Didactic Model of Critical Thinking Formation in Primary Class Students. *Web of Synergy: International Interdisciplinary Research Journal*, *2*(4), 324-335.

17. Maor, R., Paz-Baruch, N., Mevarech, Z., Grinshpan, N., Levi, R., Milman, A., … Zion, M. (2024). Teaching creatively and teaching for creativity – theory, teachers' attitudes, and creativity-based practices. *Educational Studies*, 1–15. https://doi.org/10.1080/03055698.2024.2371091

18. Nichols, Nancy Franziska (2023). A Qualitative Case Study of High School Art Students' Transfer of Learning Experiences Between Physical and Digital Tools. *Northcentral University ProQuest Dissertations & Theses*, 30418329.

19. Graessler, I., & Taplick, P. (2019). Supporting Creativity with Virtual Reality Technology. *Proceedings of the Design Society: International Conference on Engineering Design*, *1*(1), 2011–2020. doi:10.1017/dsi.2019.207

20. https://doi.org/10.3390/educsci14040384

21. Tusiime, W. E., Johannesen, M., & Gudmundsdottir, G. B. (2020). Teaching art and design in a digital age: challenges facing Ugandan teacher educators. *Journal of Vocational Education & Training*, *74*(4), 554–574. https://doi.org/10.1080/13636820.2020.1786439

22. Černochová, M., Selcuk, H. (2020). Digital Literacy, Creativity, and Autonomous Learning. In: Tatnall, A. (eds) *Encyclopedia of Education and Information Technologies*. Springer, Cham. https://doi.org/10.1007/978-3-030-10576-1_205

23. Xia, Y., Deng, Y., Tao, X. et al. (2024). Digital art exhibitions and psychological well-being in Chinese Generation Z: An analysis based on the S-O-R framework. *Humanit Soc Sci Commun* 11, 266 https://doi.org/10.1057/s41599-024-02718-x

24. Wang, Q., & Lee, S. (2024). The Impact of Digital Literacy on the Creativity of Art Major University Students. *Journal of Educational Research and Policies*, *6*(9), 182–188. https://doi.org/10.53469/jerp.2024.06(09).36

25. Wang, B., & Li, P. Ping. (2022). Digital creativity in STEM education: the impact of digital tools and pedagogical learning models on the students' creative thinking skills development. *Interactive Learning Environments*, *32*(6), 2633–2646. https://doi.org/10.1080/10494820.2022.2155839

26. Weng, X., & Chiu, T. K. F. (2023). The mediating effects of engagement on the relationship between perceived digital inquiry and creativity. *Journal of Research on Technology in Education*, *56*(4), 431–443. https://doi.org/10.1080/15391523.2022.2160392

27. Zhang, Q., Shi, B., Liu, Y. *et al.* The impact of educational digitalization on the creativity of students with special needs: the role of study crafting and creative self-efficacy. *Humanit Soc Sci Commun* 11, 754 (2024). https://doi.org/10.1057/s41599-024-03232-w

28. Zana-Sternfeld, G., Israeli, R., & Lapidot-Lefer, N. (2024). Creative education or educational creativity: Integrating arts, social emotional aspects and creative learning environments. *International Journal of Education & the Arts, 25*(3). http://doi.org/10.26209/ijea25n3

29. Тажибоева, Г. (2023). Описание технологий формирования критического мышления у студентов в процессе преподавания предмета воспитание. *Общество и инновации*, *4*(3/S), 70–79. https://doi.org/10.47689/2181-1415-vol4-iss3/S-pp70-79

30. Файзуллаев, Т. (1998). Процессы укрепления государственной независимости Узбекистана: теория и практика.