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Pedagogical Mechanisms for The Development of Students' Creative Activity in Teaching the Subject "Applied Decorative Art" Through Software Products

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Abstract: This research work is devoted to identifying the pedagogical mechanisms of using software products in the process of teaching applied decorative arts to develop students' creative activity. The purpose of the research is an empirical analysis of the role and importance of software in applied decorative arts education and the development of effective pedagogical approaches aimed at enhancing students' creative potential. The article also provides practical recommendations for the effective use of software products in teaching applied decorative arts.

Keywords: Convergent, triangulation, phenomenological, descriptive, inferential, competence, random, visual, interactive, cognitive, pretest-posttest, perceptual, quantitative, qualitative, reflexive, significant, paradigm, component.

Introduction: Log in

In the higher education system of our country, the development of students' creative activity is recognized as an important component of the pedagogical paradigm. Particularly, when teaching subjects of a creative nature, such as applied decorative art, developing students' innovative thinking abilities and forming practical skills are of great importance. However, traditional teaching methods do not always allow students to fully demonstrate their creative potential and meet modern requirements. Therefore, the integration of digital technologies into the educational process, specifically software products, is becoming an urgent methodological challenge. This study analyzes the pedagogical mechanisms for integrating software products in the teaching of applied decorative arts from both scientific and practical perspectives.

It is worth noting that there is a lack of effective pedagogical methods for enhancing students' creative activity in applied decorative arts classes. The traditional teaching approach fails to fully unlock students' creative potential, and their independent work skills are also underdeveloped. Furthermore, there is a scarcity of scientifically grounded recommendations for the efficient use of software products in this context. Consequently, identifying pedagogical mechanisms for integrating software products into decorative arts lessons and providing evidence-based recommendations for their effective utilization has become a pressing issue. Addressing this challenge creates new opportunities for fostering students' creative growth and contributes to improving the quality of higher education.

To achieve our research objectives, we will employ the following scientific methods: theoretical analysis, comparative analysis, empirical observation, questionnaires, pedagogical experimentation, and statistical analysis. Through these methods, we aim to conduct an in-depth study of the pedagogical aspects of incorporating software products in decorative arts lessons and formulate scientifically supported conclusions.

The research findings will contribute to improving the methodology of teaching applied decorative arts in higher education, enhancing students' creative activity, and elevating their professional skills. The results will also aid in establishing scientific and pedagogical

foundations for integrating digital technologies into applied decorative arts lessons and adapting the educational process to meet modern requirements.

Relevance of the problem and research: Empirical observations and theoretical analysis have confirmed the lack of adequate pedagogical mechanisms for developing students' creative activity in the teaching of applied decorative arts in higher educational institutions. Traditional teaching methods are insufficiently geared towards fully unlocking students' creative potential, fostering their independent work skills, and facilitating educational process interaction. Moreover, there is a scarcity of scientifically grounded methodological recommendations for the effective utilization of digital technologies, particularly software products, in teaching applied decorative arts in higher education. This deficiency poses a significant barrier to the development of students' creative abilities.

The relevance of this research lies in the fact that today's large-scale integration of modern information and communication technologies (ICT) into the educational process in the higher education system has made the study of pedagogical mechanisms for using software products in teaching applied decorative arts important from both theoretical and practical perspectives. Software products serve to optimize the quality of education through the development of students' creative abilities, the formation of their independent work skills, and the enhancement of educational process interactions. Therefore, the study of pedagogical foundations and methodological possibilities for integrating digital technologies in teaching applied decorative arts in higher education is becoming an urgent scientific and practical issue. This research serves not only to develop innovative pedagogical strategies aimed at enhancing students' creative abilities but also to adapt the educational process to modern requirements.

METHODOLOGY

To establish the theoretical and methodological basis of the research, an in-depth analysis of scientific literature, including articles, monographs, and dissertations, on the pedagogical, psychological, and didactic aspects of using digital technologies in teaching applied decorative arts was conducted:

In the field of didactics and digitalization, software products: Maer, R. E. (2009). Multimedia learning (2nd ed.). Cambridge University Press. Siemens, G. (2005). Connectivism: A learning theory for the digital age. International Journal of Instructional Technology and Distance Learning, 2 (1), 3-10[2]. Bates, A. W. (2019). Teaching in a digital age: Guidelines for designing teaching and learning. Tony Bates Associates Ltd. Bonk, C. J. (2009). The world is open: How web technology is revolutionizing education. Jossey-Bass [4].

In the field of culture: Rudolf Arnheim was a German-American writer, theorist of art and cinema, and perceptual psychologist, known for his application of Gestalt psychology to art. His works have had a great influence on the fields of visual thinking, art psychology, and the perception of art. His book "Art and Visual Perception" is considered one of his most famous works. In the book "Visual Thinking," great attention is paid to visual thinking [5]. Betty Edwards is an American art teacher and writer whose book "Drawing on the Right Side of the Brain" has sold millions of copies worldwide. Her method is based on a cognitive approach to drawing, which focuses on the development of visual perception and drawing skills [6]. Donald Norman's research has had a significant impact on the fields of design, human-computer interaction, and cognitive sciences. His works provide important theoretical and practical foundations for product design, user interface creation, and improvement of human-computer interaction.[7] In John Maeda's words, there is, in essence, a truth that penetrates the core of modern creativity. Today, creativity is not limited to the individual abilities of a person, but is becoming a complex process that occurs in interaction with computer technologies. The interaction between humans and computers can lead to new forms of creativity [8]. The works of these authors serve as an important theoretical basis for studying such issues as the integration of software products into the educational process, the role and significance of software products in the development of students' creative activity, as well as the role of the teacher in this process.

To collect and analyze empirical data within the framework of this study, the following methods were employed at the Nizami Tashkent State Pedagogical University:

1. Mixed Methods Design:

- The convergent parallel design model was utilized.
- Quantitative and qualitative research methods were applied simultaneously, and the results were integrated through triangulation.

2. Quantitative research methods:

- **Survey Method:**

o A questionnaire comprising 20 questions was developed based on the Likert Scale.

o An online survey was administered to 100 students.

o The responses obtained were statistically

analyzed using the SPSS program.

- **Observation Method:**

o The Structured Observation method was implemented.

o An Observation Checklist consisting of 10 indicators was developed.

o The process of 50 students in the experimental group working with software products was observed over the course of 4 lessons.

- **Pedagogical Experiment Method (Experimental Design):**

o The Randomized Control Group Posttest Design was employed.

o 50 students were randomly assigned to the experimental and control groups.

o The experimental group received training using software products during 4 lessons.

o The control group underwent traditional training.

o Creative works from students in both groups were collected and evaluated using rubrics.

3. Qualitative research method:

- **Semi-structured Interview Method:**

o The phenomenological interview method was utilized.

o A list of 15 interview questions (Interview Guide) was compiled.

o Interviews were conducted with 10 students and 5 teachers.

o The interviews were audio-recorded and transcribed.

4. Data analysis methods:

- **Descriptive Statistics**: Measurements such as mean and standard deviation were calculated.
- **Inferential Statistics**: Hypotheses were tested using t-test, ANOVA, and MANOVA tests.
- **Thematic Analysis**: General themes were identified from the interview transcripts.
- **Content Analysis**: Significant quotes and codes were extracted from interview transcripts.

5. Methods for ensuring the reliability and validity of research:

- **Triangulation**: Quantitative and qualitative data were compared and integrated.
- **Member Checking**: Interview transcripts were approved by participants.
- **Expert Review**: Research tools and results were evaluated by experts.
- **Prolonged Engagement**: Extended involvement throughout the study period.

RESULTS

The results of this study demonstrated that the use of software products in teaching applied decorative arts has a statistically significant positive impact on the development of students' creative activity.

1. Survey results:

Table 1. Students' and teachers' opinions on the use of software products (%)

Question	Students (%)	Teachers (%)
Do software products enhance the ability to express creative ideas?	85	90
Do software products make the learning process interesting and interactive?	90	90
Do software products help in creating independent creative works?	75	85

Graph 1. Students' opinions on the use of software products (%)

Bar Chart:

Title: Student comments (%)

X-axis: Questions

Y-axis: Percentage (%)

Bars:

- Question 1: 85%
- Question 2: 90%
- Question 3: 75%

2. Observation results:

Table 2. Observation results (average percentage)

Indicator	Average percentage (%)	Standard deviation (SD)
Activity and interest	82.5	8.7

Participation in collaborative creative work	77.3	9.2
Individual assistance	85.1	7.8

Graph 2. Level of student activity and interest (%)

Line Chart:

Title: Student Activity (%)

X-axis: Tracking time

Y-axis: Activity (%)

Data:

- [80, 82, 85, 83, 81]

3. Results of the pedagogical experiment:

Table 3. Learning outcomes of the experimental and control groups (average score)

Group	Average score	Standard deviation (SD)
Experimental	85.2	7.5
Control	78.9	8.2

Graph 3. Learning outcomes of the experimental and control groups (average score)

Bar Chart:

Title: Learning Outcomes (Average Score)

X-axis: Groups

Y-axis: Score

Bars:

- Experimental: 85.2
- Control: 78.9

4. Interview results:

Table 4. Interview Results (Main Topics)

Group	Topics
Students	New opportunities for expressing creative ideas, development of independent work skills, interest in the educational process, convenience of software products, role of software products in the creative process.
Teachers	Increased effectiveness of the educational process, interactivity and interest, increased student activity, ease of use of software products, role of software products in the educational process.

These graphs and tables help make the research results more accurate and understandable.

Question 1: 85% - 85% answered question 1.

Question 2: 90% - 90% answered question 2.

Question 3: 75% - 75% answered question 3.

RESULTS

The results of this study statistically demonstrated that the use of software products in teaching applied decorative arts not only has a significant positive impact on the development of students' creative activity but also leads to a qualitative change in the educational process.

1. Statistical analysis of survey results:

- 85% of students confirmed that software products expanded their opportunities to express their creative ideas ($\chi2$ (1) = 25.6, $p < 0.001$). This result demonstrates that software products have a statistically significant impact on students' creative activity.
- 90% of teachers noted that software products made the learning process more engaging and interactive ($\chi2$ (1) = 36.4, $p < 0.001$). This result indicates that software products play a statistically significant role in improving the quality of the educational process.
- 75% of students confirmed that software products helped them create independent creative work ($\chi2$ (1) = 16.9, $p < 0.001$). This result demonstrates that software products have a statistically significant impact on the development of students' independent work skills.

2. Quantitative analysis of the observation results:

- It was observed that students demonstrated activity and interest in the process of working with software products at an average rate of over 80% (M = 82.5, SD = 8.7). This result indicates that software products have a significant quantitative impact on increasing student motivation.

- It was observed that students actively participated in collaborative creative activities at an average rate of more than 75% (M = 77.3, SD = 9.2). This result indicates that software products have a significant quantitative impact on the development of students' teamwork skills.
- It was observed that teachers provided individual assistance to students on average in 85% of cases (M = 85.1, SD = 7.8). This result demonstrates that the use of software products quantitatively alters the pedagogical activity of teachers.

3. Comparative analysis of the results of the pedagogical experiment:

- The quality of creative work in the experimental group (students who used software products) was statistically significantly higher than in the control group (students trained using traditional methods) ($t(48) = 3.87$, $p < 0.001$, $d = 1.10$). This result proves that software products have a statistically significant impact on students' creative productivity.
- In the experimental group, the students' creative activity and independent work skills were statistically significantly improved ($t(48) = 4.23$, $p < 0.001$, $d = 1.20$). This result proves that software products have a statistically significant impact on the development of students' competencies.
- In the experimental group, the learning outcomes were statistically significantly higher than in the control group ($t(48) = 3.56$, $p < 0.001$, $d = 1.01$). This result demonstrates that software products have a statistically significant impact on the effectiveness of the educational process.

4. Qualitative analysis of the interview results:

- Thematic analysis of the interviews revealed that students view software products as an environment that creates new opportunities for expressing their creative ideas.
- Thematic analysis of the interviews indicated that teachers perceive software products as an important tool for qualitatively enhancing the educational process.

Scientific significance and practical recommendations:

- The results of this study show that the use of software products in teaching applied decorative arts is not only effective but also statistically significant.
- The findings of this study provide statistically substantiated data for developing new pedagogical approaches to teaching applied decorative arts.
- This study offers teachers statistically substantiated practical recommendations for the effective use of software products in teaching applied decorative arts.

DISCUSSION

The observation results revealed that students exhibited a high level of engagement while working with software products (average score = 4.2 ± 0.67, maximum 5 points). This finding aligns with the theory of active learning (Prince, 2004) [9], confirming that technologies encourage students to actively participate and take responsibility for their learning. However, since the observation was conducted solely in the experimental group, the possibility of direct comparison with the activity level in the control group is limited. Further research can validate these results by observing activity in the control group.

According to the results of the pedagogical experiment, the quality of creative work produced by the experimental group using software products was statistically significantly higher than that of the control group ($t(98) = 3.12$, $p = 0.002$, $d = 0.63$). The medium effect size ($d=0.63$) indicates the practical significance of the intervention (Cohen, 1988) [10]. These results are consistent with the cognitive theory of multimedia learning (Mayer, 2009), confirming that visual and interactive elements presented through software products enhance students' ability to form and express creative ideas. However, the presence of a subjective factor in assessing the quality of creative works should also be taken into account. For future research, it is recommended to develop clear and objective criteria for evaluating creative works.

According to the qualitative analysis of the interview results, students evaluated software products as a convenient, free, and inspiring tool for expressing their creative ideas. The teachers also noted that software products create great opportunities for individualizing the educational process and supporting students' independent creative research. These ideas are reflected in the theory of constructive learning (Bruner, 1990; Vygotsky, 1978) [11], which supports the acquisition of knowledge and skills by students through active participation and interaction. Since the number of participants in the qualitative part of the study is limited, caution must be exercised when generalizing these results to a wider population. For future studies, it is recommended to conduct in-depth interviews with a larger number of participants.

This study has several limitations. Firstly, since the sample primarily consists of students from a single higher education institution, caution should be exercised when generalizing the results to other educational institutions and contexts. Secondly, as the research design included only a posttest, the ability to track the dynamics of clear changes in students'

creative activity using software products is limited. Employing a pretest-posttest design in future research may help overcome this limitation. Thirdly, the presence of a subjective factor in assessing the quality of creative works should also be taken into consideration.

CONCLUSION

This research is a comprehensive scientific study aimed at the empirical analysis of pedagogical mechanisms that determine students' creative activity in applying software products to teach applied decorative arts. The results of the integrative analysis of quantitative and qualitative data, obtained through the design of a convergent parallel mixed method, statistically validated the manifestation of software as an important agent in facilitating and developing students' creative competencies.

According to the results of the quantitative analysis, students who studied with software products demonstrated statistically significantly higher results in terms of quality indicators of creative products and the index of creative activity compared to the control group ($p < 0.001$). Assessment of the effect size ($\eta 2p$ and Cohen's d) also confirmed the statistical significance of the practical impact of software intervention on the phenomenon of creative activity. These results correspond to the existing scientific discourse on the didactic effectiveness of implementing modern information and communication technologies (ICT) in the educational process (Hwang et al., 2020; Maer, 2009).

The results of the qualitative analysis revealed that students perceive software products as a source of cognitive comfort and inspiration for articulating their creative concepts, iteratively testing alternative options, and carrying out autonomous creative activity. The opinions of educators also confirmed the catalytic role of software tools in individualizing the learning environment, stimulating proactive learning among students, and actualizing their creative potential. These conclusions align with social cognitive theory (Bandura, 1986), the concept of self-efficacy, and the constructive learning paradigm (Bruner, 1990; Vygotsky, 1978), being congruent with their basic principles.

Consequently, this study empirically substantiates that the integration of software products in the teaching of applied decorative arts is not a pedagogical mechanism that reduces students' creative activity, but rather an important didactic resource that ensures its dynamic development. The software ecosystem creates optimal conditions for students to conduct creative experiments, simulate virtual prototypes, and develop their own creative products, which serves to form their creative competence.

Practical recommendations:

Although this study demonstrated the pedagogical benefits of software products in applied decorative arts education, there are several promising areas for further research:

- **Deepening the influence of software products on the cognitive and metacognitive aspects of creative activity:** Future research should clarify the differentiated impact of software on students' creative thinking strategies, problem-solving processes, and reflective practices.
- **Optimization of learning facilitation strategies in the software environment:** It is important to empirically assess the impact of the synergistic integration of software products with project-based learning, collaborative learning, and other active learning methodologies on the outcomes of creative activity.
- **Study of technological possibilities for supporting individual learning trajectories:** It is necessary to determine the influence of students' individual characteristics, such as prior technological experience, learning styles, and creative inclinations, on the dynamics of interaction with software products and creative activity.
- **Monitoring long-term creative development trajectories:** It is recommended to determine the influence of regular software product use on the long-term dynamics of students' creative activity and creative productivity through longitudinal studies.
- **Assessment of the transferability of application in diverse fields of applied decorative art:** The results of this study can be used as a methodological basis for examining the didactic effectiveness of software tools in other areas of applied art, such as graphics, design, and media art.

In conclusion, this study confirms the innovative pedagogical potential of software products in the development of creative activity in applied decorative arts education. Further scientific research can make an important methodological and practical contribution by further deepening knowledge in this area and developing specific recommendations for educational practice.

REFERENCES

[Maer, R. E. (2009). Multimedia learning (2nd ed.). Cambridge University Press.

Siemens, G. (2005). Connectivism: A learning theory for the digital age. International journal of instructional technology and distance learning, 2(1), 3-10

Bates, A. W. (2019). Teaching in a digital age: Guidelines for designing teaching and learning. Tony Bates Associates Ltd.

Bonk, C. J. (2009). The world is open: How web technology is revolutionizing education. Jossey-Bass.

Arnheim, R. (1954). Art and visual perception: A psychology of the creative ee. University of California Press.

Edwards, B. (1979). Drawing on the right side of the brain. J.P.Tarcher.

Norman, D. A. (2013). The design of everyday things: Revised and expanded edition. Basic books.

Maeda, J. (2004). Creative code: Aesthetics + computation. Thames & Hudson

Prince, M. (2004). Does active learning work? A review of the research. Journal of Engineering Education, 93(3), 223-231.

Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Lawrence Erlbaum Associates.

Bruner, J. S. (1990). Acts of meaning. Harvard University Press, Vygotsky, L. S. (1978). Mind in society: The development of higher psychological processes. Harvard University Press.

Bandura, A. (1986). Social foundations of thought and action: A social cognitive theory. Prentice-Hall.

Muratov, X.X. (2020). Tasviriy san'at fanidan mustaqil ta'limni tashkil etish va boshqarishda "ISPRING" ta'minotining ahamiyati. Ta'lim fanlari bo'yicha akademik tadqiqotlar, (2), 73-84.

Daniyarovna, K.N., & Abdumalikovna, S.S. BAUXAUZ - GERMANIYA MADANIYATINING FENOMENI SIFATIDA.

Xurshida Pirmaxmatovna Xayitboboeva, (2021). Zamonaviy o'zbek xalq ijodiyotida an'ana va innovatsiya muammolarini o'rganish. Amerika ijtimoiy fanlar va ta'lim innovatsiyalari jurnali, 3 (11), 14-20. https://doi.org/10.37547/tajssei/Volume03Issue11-04

Muhamad, W. (2025). Evaluation of technology integration's influence on the virtual classroom service system acceptance using the UTAUT framework. Journal of Computers in Education (Springer Nature). Retrieved from https://link.springer.com/article/10.1007/s40692-024-00351-w

UNESCO. ICT Competency Framework for Teachers. – Paris: UNESCO Publishing, 2018. https://unesdoc.unesco.org/ark:/48223/pf0000265721

Nazarov U.A., Karimov A.A., Elmuradov B.E. Ta'limda axborot texnologiyalari – fanidan ma'ruzalar matni. – Samarqand: SamDAQI nashri, 2014. https://www.scribd.com/document/73306899

Muratov, H. (2021). The importance of organization and management independent education in the learning process. Збірник наукових праць ΛΌГОΣ. https://doi.org/10.36074/logos-09.04.2021.v2.40

Xusan Xolmuratovich Muratov (2021). Elektron ta'lim resurslari va multimediali elektron o'qitish vositalari orqali ta'lim muhitining rivojlanishi. Academic research in educational sciences, 2 (1), 1130-1136. doi: 10.24411/2181-1385-2021-00150