Article

Fostering cultural values in artistic creativity among perspective art teachers: Readiness for utilizing virtual museum

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Abstract: In the current era of globalization, the need arises to train individuals who are spiritually enriched, creatively developed, and culturally grounded through the advancement of education and science, as well as through art and culture. These individuals must be capable of integrating artistic creativity into their professional activities. In this context, the issue of fostering values of historical and cultural significance through virtual reality technologies emerges as a novel area of research. The study aims to reveal the essence of the concept "virtual museum" and test the level of perspective art teachers' readiness for utilizing the virtual museum in their professional activity to foster their cultural values of artic creativity. Employing quantitative and qualitative methods, the study encompassed questionnaires, tests, and assignments administered to 135 university students divided into control and experimental groups. To diagnose students' readiness to utilize virtual museum technology in their professional activities, three components (motivational, cognitive, and operational), criteria, indicators and levels of readiness were identified. Findings indicate that there is a noticeable difference between the experimental group's results before and after completing the authors' elective course titled "Methodology of using the virtual museum". This demonstrates the effectiveness of this course conducted with the experimental group. The study highlights the importance of perspective art teachers' acquisition of knowledge, skills and competences necessary to implement the virtual museum method in their teaching activity through the proposed elective course incorporated into the university educational process in order to foster students' cultural values of artic creativity.

Keywords: virtual museum; cultural values; artistic creativity; perspective art teachers; readiness; virtual technology; elective course

1. Introduction

In the context of current globalization, each nation strives to find its place in the global culture through its own art and culture. This trend is evident in the contemporary development of Kazakhstani society, where interest in national culture and traditions is gradually increasing. In this regard, the statement of the President of the Republic of Kazakhstan, Kassym-Jomart Tokayev, is particularly relevant: "We strive to be part of an open, modern world, developing culture, education, and science" (Tokayev, 2023). Consequently, the issue of incorporating national and cultural values that have "historical, artistic, scientific, or other cultural significance" (Law of the Republic of Kazakhstan "On Culture", 2017), into the education of the younger generation is of great importance.

In this context, the need for the comprehensive training of competent, spiritually enriched, creatively developed, and artistically knowledgeable teachers of arts becomes increasingly significant. These educators should be prepared to transmit cultural values to future generations and effectively apply their skills in artistic, creative and professional activities. An essential tool in the training is the utilization of innovative methods and approaches in the university educational process, one of which is virtual reality technology.

Virtual reality (VR) is a technology that creates a distinctive three-dimensional virtual environment for educational purposes, typically aiming to replicate the appearance of objects and physical phenomena in the real world (Kamińska et al., 2019). VR has consistently adhered to the three fundamental principles of immersion, interaction, and user engagement. Incorporating this approach into the teaching processes increases students' interest in learning (Jiawei et al., 2023), enhances motivation (Ott et al., 2015).

One type of virtual reality technology is the virtual museum, which is gaining significance in art education. In the era of Digital Kazakhstan, employing IT technologies to present museum artworks to students is one of the innovative methods of modern teaching. Although the concept of a museum has been known for a long time, the idea of a virtual museum tour is still unfamiliar to the general public. A virtual museum combines museum and video functions, creating a new concept. It represents the display of museum archives to a prepared audience through informational IT technologies. A virtual museum tour is the process of exploring art museums using virtual technologies or demonstrating these actions on a video screen.

Franceschi and de Miguel Álvarez (2021) consider the virtual museum as "the answer to a digital society, a new cultural, social, and economic system and a tool for educational innovation and digital learning".

The analysis of scientific literature enables us to define a virtual museum as:

- A specialized website designed for the optimal display of museum materials. Through the strategic utilization of internet technologies virtual museums offer to solve the essential issues such as storage, security, and accessibility faced by physical museum settings (Cisternino et al., 2021; Perry et al., 2017; Zhao, 2018);
- (In a broad sense) it is a museum that does not exist in physical space (Latham, 2014; Pivec et al., 2016);
- It is a technology to make the virtual museum an interactive learning environment (Liu et al., 2009; Zhao, 2012);
- It is an information resource (website, web page) created through computer technology to preserve digital tangible and intangible heritage objects in cyberspace (Smirnova, 2010; Vyatkina, 2012).

Thus, it can be concluded that a virtual museum is an Internet technology designed for the display and preservation of museum materials without the need for physical presence, while also offering interactive engagement for learners.

It is important to highlight features of the virtual museum such as the virtual tour and enhanced functions for searching and classifying exhibits (Smirnova, 2010).

The scholars Tserklevych et al. (2021) emphasize, that the virtual tour is "a combination of panoramic photos (spherical or cylindrical). The transition from one panorama to another is carried out through the active zone, placed directly on the

images, with the tour plan. All this can be supplemented by foreground sound and background music, and if necessary, the stock photos, videos, flash clips, tour plans, explanations, contact information and more".

According to the researchers Woolley et al. (2021), virtual tours facilitate visitors' exploration of physical exhibition spaces, preview display cabinets, and examination larger-scale objects.

Thus, virtual museums serve not only as platforms for viewing museum exhibits but also spaces for learning. In this context, it is relevant to consider the opinion of scholars Tanashchuk et al. (2018), who view the virtual tour as "an organizational form of learning that differs from a real tour by a virtual display of real objects to create the conditions for self-observation and collection of necessary facts. Its advantages are accessibility (resource, economic), the possibility of the second review, visibility".

At the same time, Dronova (2020) emphasizes that the virtual museum becomes a foundation for collaborative work of students who undertake specific tasks such as project design, information gathering, creating integrated databases, and design. These tasks contribute to the development of teamwork skills for the implementation of projects with a patriotic focus.

Thus, the significant role of virtual museums lies not only in the visualization of cultural heritage but also in stimulating students' motivation for deeper learning, fostering cultural values, developing their creative abilities, etc.

2. Materials and methods

2.1. Aim of the study

The aim of this study is to reveal the essence of the concept "virtual museum" and test the level of perspective art teachers' readiness for utilizing the virtual museum in their professional activity in order to foster their cultural values of artic creativity.

2.2. Research methods

Quantitative and qualitative methods were employed during the research. The study involved students from the university. During the study, participants were asked to respond to survey questions such as "What is your motivation for learning through the virtual museum method?" and "What do you know about the virtual museum method?" Additionally, they were given an assignment aimed at analyzing the artistic features of a specific work from a fine arts museum. Detailed information about these surveys and tasks is provided in the Section 2.5.

2.3. Participants selection process

Participants for this study were selected from students enrolled at O. Zhanibekov South Kazakhstan Pedagogical University, Central Asian Innovation University, and Shymkent University. Notifications were sent to students inviting them to participate in the study. A total of 67 students were selected for the experimental group, and 68 students for the control group. The total number of randomly selected students was 135. The demographic characteristics of the selected group are presented in **Table 1**.

Demographic characteristics of the selected two groups: The female group comprised 64 students, representing 47.4%, while the male group comprised 71 students, accounting for 52.6%. The average age of the participants was 22 years. The percentage of third-year students was 31.1%, while fourth-year students made up 68.9%. the ethnic composition was 80.8% Kazakh, 11.1% Russian, and 8.1% Uzbek.

Table 1. Demographic characteristics of the selected group.

Criteria	Control group	Experimental group
Number of students	*n* = 67	*n* = 68
Gender		
Female	31	33
Male	36	35
Age		
18–20	21	22
21–23	36	38
24–26	10	8
Nationality		
Kazakh	55	54
Russian	3	12
Uzbek	9	2
Year		
3	20	22
4	47	46

2.4. Diagnostics

In the study, we developed a methodology for cultivating perspective art teachers' readiness for utilizing the virtual museum in the perspective teaching activity in order to foster their cultural values of artistic creativity, and identified its criteria and indicators.

Three components were determined for perspective art teachers' readiness to utilize a virtual museum: Motivational, cognitive, and operational.

The motivational component determines students' conscious attitude towards the use of a virtual museum, enthusiasm, and active engagement in acquiring cultural values and artistic creativity through a virtual museum.

The criterion of this component is defined as "students' motivation to master a virtual museum approach," with indicators are:
• Understanding the importance of virtual museum in fostering cultural values of artistic creativity;
• Enthusiasm to master the virtual museum method in teaching;
• Curiosity in creating virtual learning environments.

The cognitive component is characterized by students' pedagogical and methodological knowledge necessary to utilize a virtual museum in teaching.

The criterion of this component is defined as "knowledge of virtual museum and its use in teaching process", with indicators including:

- Understanding the essence, functions and classification of the virtual museum;
- Knowledge of virtual museum learning technologies;
- Familiarity with methods and techniques necessary for mastering the methodological aspects of utilizing a virtual museum in the learning process.

The operational component describes the outcomes related to the development of perspective art teachers' skills and abilities for planning, organizing and utilizing the virtual museum in the learning process.

The criterion of this component is defined as "mastery of abilities required for utilizing the virtual museum in in the learning process," with indicators encompassing:

- Organizing a lesson based on a virtual museum tour;
- Creating virtual (interactive and immersive) learning environments;
- Evaluating learning outcomes during the use of the virtual museum.

To cultivate perspective art teachers' readiness for utilizing the virtual museum in the perspective teaching activity in order to foster their cultural values of artistic creativity, we revealed the levels such as high, medium and low.

High level: This level demonstrates students' strong commitment to mastering a virtual museum method in teaching, as well as their firm belief in creating virtual learning environments. It is characterized by an in-depth knowledge of the essence, functions, classification, and various technologies of the virtual museum. Students at this level show the ability to plan and organize a lesson based on a virtual museum tour and they are capable to analyze, diagnose and evaluate the effectiveness of utilizing the virtual museum.

Medium level: This level is characterized by an inconsistent interest in mastering a virtual museum method in teaching; a lack of full understanding of the essence, functions, classification, and various technologies of the virtual museum; lack of ability to plan and organize the lesson based on a virtual museum tour, as well as inconsistent to analyze, diagnose and evaluate the effectiveness of utilizing the virtual museum.

Low level: This level manifests a lack of interest and poor understanding of the importance of virtual museum in a teacher's professional practice; a passive attitude towards studying the essence, functions, classification, and various technologies of the virtual museum. There is an absence of ability to plan and organize the lesson based on a virtual museum tour, as well as to analyze, diagnose and evaluate the effectiveness of utilizing the virtual museum.

2.5. Data collection instruments

In our study, we investigated the cultivation of perspective art teachers' readiness for utilizing the virtual museum in their professional activity in order to foster their cultural values of artic creativity by focusing on:

- The motivational component: A questionnaire titled "What is your motivation for learning through the Virtual Museum method?" was conducted. The purpose of the questionnaire was to identify students' motivation to learn using the virtual museum method. The questionnaire consisted of five statements, which participants were asked to evaluate on a three-point scale: "High" (3 points), "Moderate" (2 points), and "Low" (1 point). The statements included:

1) Assess the significance of using the virtual museum method;
2) Evaluate your engagement in applying the virtual museum method in the learning process;
3) Determine your interest in utilizing AR and VR technologies;
4) Assess your motivation to acquire cultural values in art education;
5) Evaluate your interest in creating virtual environments.

- The cognitive component: To assess the knowledge of knowledge of virtual museum and its use in teaching process, a questionnaire titled "What do you know about the virtual museum method?" was administered. The questionnaire aims to assess students' knowledge regarding the application of the virtual museum method, cultural values within the art education system, features of cultural heritage imagery, characteristics of handicraft items, and related topics. Survey Questions:
  - Are you familiar with the virtual museum method?
  - Do you have a positive attitude toward the application of the virtual museum method?
  - Are you knowledgeable about the technologies used for virtual museum education?
  - Can you use simulators such as SculptGL, Nomad Sculpt, Sculpt People, and Vermillion?
  - Are you capable of implementing AR and VR technologies in museum activities?
  - Do you understand the cultural values within the art education system?
  - Can you describe the features of imagery in cultural heritage?
  - Are you able to analyze the techniques and styles of artists' works through a virtual museum?

- The operational component: Assignments were provided to determine the level of proficiency and skills required for utilizing the virtual museum in in the learning process. These assignments were developed in collaboration with university instructors. Objective of the task is to analyze the artistic features of a specific work in a fine arts museum. Task description:
  - Visit fine arts museums to explore visual archives, including paintings, sculptures, and handicrafts, and record them on video;
  - Conduct an artistic analysis of the recorded cultural heritage items.

3. Results and discussion

3.1. Results of the verifying stage

The experimental work was conducted through three stages: Verifying, forming, and control stages.

During the verifying stage, the students' motivation, knowledge, skills and abilities in mastering the virtual museum method were assessed, and the results are outlined in **Table 2**.

Table 2. Results of the verifying stage.

| Components | Before the experiment | | | | | |
| | Control group *n* = 67 | | | Experimental group *n* = 68 | | |
	High	**Medium**	**Low**	**High**	**Medium**	**Low**
Motivational	4.5% (3)	32.8% (22)	62.7% (42)	4.4% (3)	33.8% (23)	61.8% (42)
Cognitive	3% (2)	34.3% (23)	62.7% (42)	4.4% (3)	30.9% (21)	64.7% (44)
Operational	3% (2)	31.3% (21)	65.7% (44)	4.4% (3)	32.4% (22)	63.2% (43)

Analysis of the results in the verifying stage: An analysis of the motivational component revealed that the majority of participants in both groups demonstrated low levels of motivation. This indicates a lack of initiative among students to engage with the virtual museum method.

The results of the content component suggest that students lack knowledge in areas such as artistic creativity, cultural values, and the virtual museum method.

The findings of the operational component indicate that students have not developed the competencies and skills required to implement the virtual museum method in the learning process.

These results indicate that students have not developed the necessary skills and competences to implement the virtual museum method in the learning process. Therefore, to address these shortcomings, we will focus on the actions taken during the forming stage.

3.2. The forming stage: "Methodology of using the virtual museum" elective course

In the forming stage of the experimental study, an elective course program titled "Methodology of using the virtual museum" was developed, aimed at cultivating perspective art teachers' readiness for utilizing the virtual museum in the perspective teaching activity in order to foster their cultural values of artistic creativity (**Table 3**).

Table 3. "Methodology of using the virtual museum" elective course program.

| No. | Topics | Hours | | | |
		Lecture	**Practical sessions**	**Lecturer's office hours**	**SIW**
Module 1. Overview of Virtual Museum Science					
1	The essence and significance of the concept of a virtual museum	2	1	3	4
2	Goal and objectives of teaching a virtual museum	2	1	3	4
3	Functions of teaching a virtual museum	2	1	3	4
4	Types of virtual museum	2	1	3	4
5	Principles of teaching a virtual museum	2	1	3	4

Table 3. (*Continued*).

No.	Topics	Hours			
		Lecture	Practical sessions	Lecturer's office hours	SIW
Module 2. Technologies for teaching a virtual museum					
6	Technologies for teaching a virtual museum education: Audiovisual, interactive	2	1	3	4
7	Application possibilities of simulators: "SculptGL, Nomad Sculpt, Sculpt People, Vermillion"	2	1	3	4
8	Teaching Virtual reality (VR) technologies	2	1	3	4
9	Implementation of augmented reality (AR) technologies in museum activities	2	1	3	4
10	Studying works of famous artists, analyzing their technique and style	2	1	3	4
11	Virtual Reality Exhibitions	2	1	3	4
Module 3. Methods of organizing lessons through the virtual museum					
12	Organizing lessons based on virtual museum tours	2	1	3	4
13	Organizing and conducting lessons through the virtual museum method	2	1	3	4
14	Creating virtual (interactive and immersive) learning environments	2	1	3	4
15	Evaluating learning outcomes during the use of the virtual museum	2	1	3	4
	Total:	**30**	**15**	**45**	**60**

The purpose of the elective course is to provide instruction using virtual museum technology and to foster students' cultural values of artistic creativity of.

Objectives of the elective course:

- To equip students with deeper, systematized knowledge of the essence and characteristics of the virtual museum;
- To familiarize students with technologies for teaching a virtual museum;
- To develop the ability to apply the virtual museum method in the learning process;
- To develop skills in planning and organizing lessons based on the virtual museum;
- To acquire skill in evaluating learning outcomes during the use of the virtual museum.

The content of the elective course consists of 3 modules:

The first module titled "Overview of Virtual Museum Science" encompasses the topics such as: The essence and significance of the concept of a virtual museum; Goal and objectives of teaching a virtual museum; Functions of teaching a virtual museum; Types of virtual museum; and Principles of teaching a virtual museum.

The second module titled "Technologies for teaching a virtual museum" comprises the following topics: Technologies for teaching a virtual museum education: Audiovisual, interactive; Application possibilities of simulators: "SculptGL, Nomad Sculpt, Sculpt People, Vermillion"; Teaching Virtual reality (VR) technologies; Implementation of augmented reality (AR) technologies in museum activities; Studying works of famous artists, analyzing their technique and style; Evaluating learning outcomes during the use of the virtual museum.

The third module titled "Methods of organizing lessons through the virtual museum" provides teaching according to the topics like: Organizing lessons based on virtual museum tours; Organizing and conducting lessons through the virtual museum method; Creating virtual (interactive and immersive) learning environments; and Evaluating learning outcomes during the use of the virtual museum.

Teaching lesson forms such as binary lectures, problem-based lectures, practical research, virtual museum tour and more are employed.

The elective course aims to cover the content aspect of the perspective art teacher training for solving the problem concerning the virtual museum during lecture sessions. This facet enables students to foster cultural values of artistic creativity. In this context, the primary focus is not only on acquiring knowledge and skills to implement the virtual museum method in the learning process, but also emphasizing the continuity of the knowledge gained from art education methodology courses. This approach facilitates the cultivation of creative activity and cultural values, explains common concepts for pedagogical subjects, enhances students' creative thinking, and integrates pedagogical phenomena.

In practical sessions, students reinforce their theoretical knowledge about the virtual museums, explore different types and technologies of the virtual museums, study and analyze artists' works, their techniques, and styles, gain access to virtual reality exhibitions, and strive to organize lessons using the virtual museum method.

Thus, to demonstrate the effectiveness of this elective course for students, we will focus on the actions taken in the next stage.

3.3. Results of the control stage

During the control stage of the experimental study, questionnaires, tests, and assignments were administered to the students again. The results of the control stage manifested the following results (**Table 4**).

Table 4. Results of the control stage.

| Components | Before the experiment | | | | | |
| | Control group *n* = 67 | | | Experimental group *n* = 68 | | |
	High	Medium	Low	High	Medium	Low
Motivational	7.5% (5)	40.3% (27)	52.2% (35)	22% (15)	66.2% (45)	11.8% (8)
Cognitive	6% (4)	38.8% (26)	55.2% (37)	19.1% (13)	63.2% (43)	17.7% (12)
Operational	6% (4)	34.3% (23)	59.7% (40)	17.6% (12)	61.8% (42)	20.6% (14)

As a result of implementing the elective course we proposed in the pedagogical process of the university, a noticeable difference emerged between the two groups.

Analysis of the post-experiment results for both groups shown in **Table 4** indicates the following:

The analysis of post-experiment results revealed noticeable differences in motivational indicators between the two groups. In the experimental group, the percentage of students demonstrating high motivation increased to 22%, indicating an enhanced interest and effort in mastering the virtual museum method.

The experimental group showed higher content component performance compared to the control group. This suggests that students in the experimental group developed stronger knowledge of artistic creativity, cultural values, and the virtual museum method.

The operational indicators in the experimental group increased by 17.6%. These results demonstrate that students in the experimental group successfully developed the skills and competencies necessary to implement the virtual museum method effectively within the learning process.

Thus, a difference was observed between the control and experimental groups. The indicators of the high and medium levels of the experimental group students increased, while the low level decreased. The effectiveness of the methodological work we proposed has been proven.

The findings of the study highlight several advantages of employing the virtual museum method. This approach enriches the educational process, enhances students' engagement with the virtual museum method in learning, and fosters an increased interest in exploring cultural values. Moreover, it promotes the establishment of virtual environments that enable the accumulation of knowledge grounded in artistic education.

This method facilitates the creation of information repositories based on artistic creativity, which not only enhances knowledge acquisition but also motivates students to learn. It provides continuous access to information and enables the analysis of cultural heritage, contributing significantly to the development of cultural values.

4. Discussion

This study is focused on analyzing the experience of utilizing virtual museum technology to foster cultural values of artistic creativity among perspective art teachers. Museums are obliged to connect their capabilities with technology (Bowen et al., 2024). In this context, El Debuch et al. (2024) explored the ways to create a virtual cultural heritage museum in the digitization era, addressing the issue of promoting cultural heritage.

Perspective educators acquire essential skills and competencies related to teamwork, collaboration, and leadership through mastering digital technologies (Ebitz, 2005). In the context of arts education, the integration of digital technologies undoubtedly enhances students' learning motivation and psychological well-being (An, 2024).

The study's findings indicate that students demonstrate a strong interest in mastering virtual museum technology. These results align with research that has broadly examined similar issues (Ha et al., 2024; Ratumbuisang et al., 2024; Styliani et al., 2009; Tian et al., 2024).

According to the first result obtained during the study, we observe that students' motivation to learn through the virtual museum method has increased. However, during the research, it was noted that students interpreted the concept of a "virtual museum" in different ways (e.g., "cultural heritage", "artworks", "cultural values," etc.) (Kayaalp et al., 2024), which eventually led to a more precise comprehension of the concept. The virtual museum enables students to develop a cognitive orientation,

stimulate interest, and offer a positive experience (Sylaiou et al., 2010; Tongpaeng et al., 2024). Katz and Halpern (2015) suggest that if one aims to motivate students to acquire art and cultural values, creating a virtual environment is necessary. The virtual environment enhances students' motivation to learn and enables them to process information cognitively. Similarly, it positively impacts students' attitudes toward art and cultivates their artistic creativity (Yang et al., 2024).

The second result obtained during the study indicates that perspective art teachers have developed knowledge of the virtual museum technology and cultivated their cultural values of artistic creativity. Hu and Hwang (2024) conducted a study comparing traditional teaching methods with those in the context of a virtual museum. The authors' findings showed that virtual environments positively influence the development of students' high-order thinking, metacognitive abilities, and problem-solving skills. Moreover, these environments facilitate the formulation of strategies aimed at the study and interpretation of cultural values (Shim et al., 2024). In our research, we developed the elective course program "Methodology of using the virtual museum" to cultivate perspective art teachers' readiness to gain knowledge concerning virtual museum method in their teaching activities in order to foster their cultural values of artistic creativity, incorporating it in the educational process over 15 weeks. The results of this course enable the creation of virtual exhibitions focused on cultural value and historical fashion (Kang and Lin, 2024).

According to the third result obtained during the study, we observe that the perspective art teachers have acquired the skills and competences necessary to implement the virtual museum method in their teaching activity. Therefore, the virtual museum provides students with opportunity to cultivate cultural values, preserve cultural heritage, develop artistic creativity, and view artifacts of historical significance preserved to this day (Çınar et al., 2021; Sheppard, 2001; Wu et al., 2024). These opportunities have also been considered in our research.

5. Conclusion

In conclusion, this study addresses the issue of cultivating perspective art teachers' readiness to utilize virtual museum technology in their future teaching activities. This study provides an understanding of the virtual museum method and discusses its role and impact in the fostering of students' cultural values of artistic creativity. The research findings open new opportunities for organizing the educational process innovatively, creating culturally rich projects, developing course programs aimed at promoting national cultural heritage, and formulating strategies that encompass cultural heritage.

In other words, the significance of virtual museum technology is highlighted in expanding online resources and implementing an educational process that preserves cultural heritage and value. We believe that virtual museum technology has a great potential in the educational process. It offers students the opportunity to view culturally rich collections stored in the museum, engage in integrated learning, and create learning environments. Consequently, we consider it essential to base higher educational institutions' teaching practices on this method. It is crucial to see the process of cultivating knowledge, skills, and competences concerning cultural values

and components of cultural heritage through virtual museums as an integral part of the educational process.

The research findings are derived from the experiences of students studying at universities. Based on these results of the study, we offer the following recommendations:

- To expand research on courses aimed at teaching the virtual museum method in various subjects and topics;
- To evaluate interdisciplinary knowledge through the virtual museum method;
- To create virtual environments aimed at promoting cultural heritage and cultural values;
- To assess the educational process that ensures the preservation of cultural heritage and cultural value;
- To organize virtual exhibitions and evaluate their impact on the educational process.

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