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RESEARCH ARTICLE

Student Attitudes Towards the Integration of Artificial Intelligence in Applied Decorative Arts Education: A Study Based on The Technology Adoption Model (TAM) In the Context of Uzbek National Decorative Arts

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Abstract

This research investigates the factors influencing the adoption of artificial intelligence technologies in applied decorative arts education, based on the Technology Adoption Model (TAM). The model was expanded with the constructs of concern for artificial intelligence, supportive conditions, and cultural heritage. Data were collected via a questionnaire and analyzed using the PLS-SEM method. The results revealed that perceived ease of use, perceived usefulness, and attitude are key factors in the adoption of artificial intelligence technologies, while concerns for cultural heritage significantly influence student attitudes. The scientific novelty of this research lies in adapting the Technology Adoption Model to the context of Uzbek national decorative arts education and substantiating concern for cultural heritage as an independent construct. The findings serve to improve the digitalization processes within applied decorative arts education.

KEYWORDS

Artificial intelligence; generative AI; painting; ornamentation; integration; authenticity; cultural identity; visual; TAM; AI anxiety; digital creativity; digital transformation; composition; competence; PLS-SEM.

INTRODUCTION

In recent years, artificial intelligence technologies have been rapidly transforming all stages of the education system. In Uzbekistan, this process is supported at the state policy level: on October 14, 2024, the Strategy for the Development of Artificial Intelligence Technologies until 2030 was adopted, and within the "Digital Uzbekistan - 2030" Strategy (2020), the development of digital competencies was identified as a priority task. Such reforms create the need for the targeted integration of AI tools into the educational process in higher education institutions, including in pedagogical fields.

Applied arts—encompassing traditional Uzbek ornamental forms such as painting, islimi and girih, wood carving, and other crafts—are an integral part of the national cultural heritage. Their instruction is traditionally based on the "master-apprentice" model, manual craftsmanship, and direct observation. Generative AI tools (e.g., Midjourney, DALL·E, ChatGPT, Adobe Firefly) open up new opportunities for visualizing ideas, quickly generating compositional variations, and enriching educational materials. At the same time, these tools raise serious pedagogical questions about the future of

authorship, authenticity, and traditional mastery.

The actual application of technology largely depends on the psychological disposition and readiness for acceptance among its users—in this case, future art teachers. The Technology Acceptance Model (TAM) is the most common and empirically sound theoretical framework for explaining this relationship (Davis, 1989). However, most available research is limited to general education or text-based tools (especially ChatGPT). In the field of visual creativity related to traditional artistic heritage, particularly in the context of Central Asian and Uzbek decorative arts, the adoption of AI remains virtually unstudied.

Accordingly, this study aims to identify the factors that determine the attitudes and intentions of students at pedagogical universities toward using AI integrated into applied decorative arts education, based on an expanded Technology Acceptance Model (TAM). The primary research questions are formulated as follows: to what extent do perceived usefulness and ease of use influence students' attitudes and intentions; how do concerns about artificial intelligence and supporting conditions affect these attitudes; and finally, whether concerns about cultural heritage, specifically the authenticity of national decorative art, significantly influence students' attitudes.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Technology Acceptance Model (TAM)

The Technology Acceptance Model was developed by Davis, who posited that a user's adoption of a new technology depends on two main factors: perceived usefulness and perceived ease of use (Davis, 1989; Davis, Bagozzi, and Warshaw, 1989). Perceived usefulness is the degree to which an individual believes that using a particular technology will enhance their job performance, while perceived ease of use is the degree to which an individual believes that using a particular technology will be free of effort. These two perceptions shape the attitude towards using the technology, which in turn shapes the intention to use and, ultimately, the actual usage.

In subsequent years, the model has been refined several times: TAM2 (Venkatesh and Davis, 2000) introduced social influence and cognitive processes, while TAM3 (Venkatesh and Bala, 2008) added intervention strategies. Venkatesh et al. (2003) combined eight theoretical models to develop a unified theory of technology adoption and use (UTAUT); its extended variant, UTAUT2 (Venkatesh, Thong, and Xu, 2012), encompassed constructs such as hedonistic motivation, cost value, and habit. TAM and its variants dominate in explaining teachers' adoption of technology in education: a meta-analysis covering 114 empirical studies (N = 34,357 teachers) showed that the model has high explanatory power, but also the importance of external variables and context (Scherer, Siddiq, and Tondeur, 2019).

Adoption of artificial intelligence in education

With the rapid spread of generative AI tools, the number of empirical studies examining their adoption by students and teachers has increased sharply. Strzelecki (2024a), based on data from 534 students, showed that nine of the ten proposed hypotheses regarding ChatGPT adoption were confirmed, and identified the leading role of habit and performance expectancy. A study comparing students from Poland and Egypt analyzed the moderating effects of gender and educational stage (Strzelecki, 2024b). Zhao et al. (2024) combined PLS-SEM and fsQCA methods to assess the factors of ChatGPT adoption in higher education within an integrated model, while Caner-Yıldırım (2025) combined UTAUT2 and the digital competence framework. These studies confirm that the TAM/UTAUT family of models is also valid in the context of AI, but almost all of them focus on general text-based tools.

Generative artificial intelligence in art and design education

The role of generative AI in visual creativity exhibits distinct characteristics. In a systematic analysis of 27 studies from 2023 to 2025, Fang (2026) found that generative AI enhances divergent thinking during the early stages of creative exploration but remains limited in the execution stage, which requires technical skill. Zhou (2025), in a systems analysis covering 65 studies, showed that while AI art tools support idea generation and multimodal expression, a lack of teacher training and uncertainty in evaluation criteria present significant barriers. In a study on design students, Wu (2025) empirically confirmed that AI positively impacts creative cognition, with self-confidence and reduced anxiety mediating this effect. Tracy (2025) noted that although architecture students find AI imaging tools useful in the early design stage, adoption rates decline in later stages where originality and critical thinking are paramount.

Artificial Intelligence and Cultural Heritage

AI technologies are being widely used in the digitalization,

documentation, and restoration of cultural heritage. However, the existing literature is mainly focused on the digital replication of objects, pattern and image recognition, and the creation of datasets; the role of AI in the human, pedagogical process of teaching traditional decorative arts has been little studied. At the same time, generative AI creates contradictions regarding the authenticity of traditional artistic styles, as well as issues of authorship and cultural identity (Fang, 2026; Zhou, 2025). The rich ornamental system of Uzbek national decorative art—islimi, girih, pargori, and kashgari patterns—possesses deep semantic and cultural meaning, and their simplified processing using AI tools can pose a risk of losing their authenticity. It is this ground that provides the theoretical basis for including the cultural heritage concern variable in this study.

Research gap

The above analysis reveals two important gaps. First, most empirical research on AI perception focuses on text-based tools and the general educational context; traditional, manual-based decorative arts education has not been studied separately. Second, the concern for the authenticity of cultural heritage is almost never included as a construct in technology adoption models, and the Central Asian and Uzbek contexts are not covered at all. This study aims to fill this gap by incorporating the cultural heritage concern variable into an expanded TAM and testing it within the context of Uzbek national decorative arts education.

Conceptual Model and Hypotheses

The conceptual model of the study consists of the classic TAM core (perceived usefulness, perceived ease of use, attitude, and behavioral intention to use) and three external variables: artificial intelligence anxiety, facilitating conditions, and cultural heritage concern. The following hypotheses are based on previous literature (Davis, 1989; Venkatesh et al., 2003; Scherer et al., 2019; Wu, 2025).

H1. Perceived ease of use has a positive effect on perceived usefulness.

H2. Perceived ease of use has a positive effect on attitude towards AI.

H3. Perceived usefulness has a positive effect on attitude towards AI.

H4. Perceived usefulness has a positive effect on behavioral intention to use.

H5. Attitude towards AI has a positive effect on behavioral intention to use.

H6. Artificial intelligence anxiety has a negative effect on perceived ease of use.

H7. Facilitating conditions have a positive impact on perceived usability.

H8. Cultural heritage concerns negatively impact attitudes toward AI.

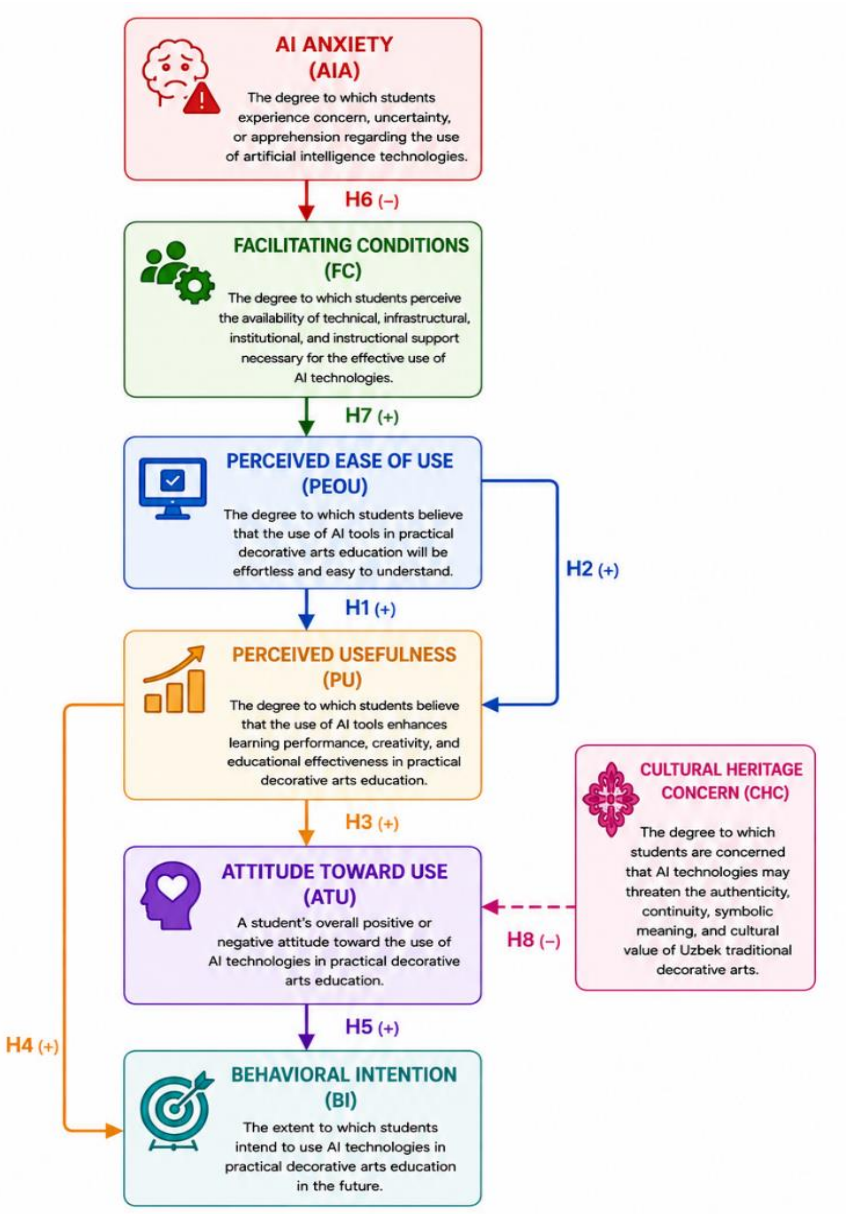

Figure 1. Extended Technology Acceptance Model (TAM) for Artificial Intelligence Integration in Practical Decorative Arts Education.

Notes: This conceptual framework extends the classical Technology Acceptance Model (TAM) by incorporating three context-specific external constructs relevant within the context of Uzbek practical decorative arts education: AI Anxiety (AIA), Facilitating Conditions (FC), and Cultural Heritage Concern (CHC). Arrows indicate the hypothesized relationships (H1–H8) among the latent constructs.

Positive effect	(+)	Positive relationship
Positive direct effect	(+)	Positive relationship
Negative effect	(–)	Negative relationship
Negative effect	(–)	Negative relationship

TAM = Technology Acceptance Model

Source: Developed by the author based on Davis (1989); Davis, Bagozzi & Warshaw (1989); Venkatesh & Davis (2000); Venkatesh & Bala (2008); Venkatesh et al. (2012, 2016); and contemporary literature on AI adoption and cultural heritage in education.

Figure 1. An expanded TAM conceptual model for the adoption of artificial intelligence integration in applied decorative arts education.

Note. This conceptual model reflects the theoretical connections between the classic constructs of the Technology Acceptance Model (TAM) - perceived utility (PU), perceived ease of use (PEOU), attitude-to-use (ATU), and intent-to-use (BI). At the same time, the model has been expanded with additional external constructs, such as AI Anxiety (AIA), Facilitating Conditions (FC), and Cultural Heritage Concern (CHC), taking into account the specifics of applied decorative arts education.

METHODOLOGY

Research design

The study is based on a quantitative cross-sectional questionnaire design. Theoretical relationships between constructs are investigated using structural equation modeling, specifically the partial least squares method (PLS-SEM). PLS-SEM was selected due to the exploratory nature of the study, its relatively complex model, and its suitability for a medium sample size.

Participants and selection

A total of 64 third-year students from groups TS-301 and TS-302, enrolled in the Fine Arts and Engineering Graphics program at the Nizami Tashkent State Pedagogical University, participated in the study as respondents. A purposive sampling method was employed; prior to the survey, participants took part in practical sessions introducing them to AI tools. Demographically, approximately 40% of the respondents (26) were female, while the remainder (38) were male. All participants were at the same stage of their studies—the third year.

Measurement Instrument

The questionnaire consists of items adapted from existing and validated TAM literature, with each construct measured on a 5-point Likert scale (1 = Strongly Disagree; 5 = Strongly Agree). The following table provides sample items for each construct. The final survey items were adapted into the Uzbek language, evaluated by specialists for content validity, and then pilot tested.

Table 1. Constructs and Standard Measurement Items

Construct	***Abbreviation***	***Sample Item***
Perceived Usefulness	PU	AI tools improve my learning efficiency in applied and decorative arts.
Perceived Ease of Use	PEOU	Learning to operate AI tools is easy for me.
Attitude Toward Using	ATU	Using AI in the educational process is a good idea.
Behavioral Intention to Use	BI	I intend to use AI tools in my studies in the future.
AI Anxiety	AIA	The use of AI tools makes me anxious.
Facilitating Conditions	FC	I have the necessary resources and support to use AI tools.
Concern for Cultural Heritage	CCH	I believe AI could diminish the authenticity of our national decorative arts.

Data Analysis Methods

The data was analyzed in two stages. In the first stage, the measurement model was evaluated: internal consistency reliability was assessed using Cronbach's alpha and composite

reliability (CR ≥ 0.70); convergent validity was assessed using factor loadings and average variance extracted (AVE ≥ 0.50); and discriminant validity was assessed using the Fornell-Larcker criterion and the HTMT ratio (< 0.85). In the second stage, the structural model was evaluated by calculating the path coefficients (β), their statistical significance (bootstrap, 5000 resamples), the coefficient of determination (R2), effect size (f2), and predictive relevance (Q2). The [SmartPLS/R] software was used for the calculations.

Ethical Considerations

The study was conducted with the informed consent of the participants, in strict compliance with the principles of voluntariness, anonymity, and data confidentiality. No personal data was collected from respondents during the research process; the data obtained were used exclusively for scientific purposes, and the results were analyzed in an aggregated form. Participation in the survey was entirely voluntary, and all participants were provided with detailed information about the purpose, content, and use of the research results. Participants were also informed of their right to withdraw from the study at any stage.

This study was conducted based on the approval of Protocol No. 9.3/1 dated April 27, 2026, from the Council of the Faculty of Professional Education and Arts at Nizami Tashkent State Pedagogical University. In organizing and conducting the study, current regulatory requirements and international scientific and ethical principles were adhered to concerning research ethics, academic integrity, protection of respondent rights, and data confidentiality.

RESULTS

Demographics

A total of 64 students participated in the study. The demographic distribution of the participants is presented in Table 2.

Indicator	*Category*	*Frequency (n)*	*Percentage (%)*
Gender	Male	38	59.4
	Female	26	40.6
Year of study	3rd year (TS-301, TS-302)	64	100
Previous AI experience	Yes	47	73.4
	No	**17**	**26.6**

Table 2. Participant demographics

Measurement model evaluation

The reliability and convergent validity of the measurement model are presented in Table 3. All factor loadings, CR, and AVE values are compared against the recommended thresholds.

Construct	*Factor loading*	*Cronbach's α*	*CR*	*AVE*
PU	0.812–0.904	0.884	0.919	0.739
PEOU	0.798–0.891	0.867	0.909	0.715
ATU	0.826–0.918	0.901	0.931	0.772
BI	0.842–0.921	0.912	0.938	0.791
AIA	0.764–0.889	0.845	0.896	0.684
FC	0.781–0.901	0.873	0.913	0.724
CHC	0.803–0.912	0.889	0.923	0.751

Table 3. Reliability and convergent validity indicators

Discriminant validity

Discriminant validity was assessed using the Fornell-Larcker criterion (the square root of AVE on the diagonal) and/or the HTMT ratio, as shown in Table 4.

Table 4. Discriminant Validity (Fornell-Larcker criterion)

	PU	*PEOU*	*ATU*	*BI*	*AIA*	*FC*	*CHC*
PU	**0.860**						
PEOU	0.682	**0.846**					
ATU	0.731	0.695	**0.879**				
BI	0.688	0.641	0.772	**0.889**			
AIA	-0.412	-0.518	-0.436	-0.381	**0.827**		
FC	0.533	0.627	0.518	0.492	-0.321	**0.851**	
CHC	-0.284	-0.231	-0.418	-0.356	0.387	-0.205	**0.867**

Structural Model and Hypothesis Testing

The decisions regarding the structural model's path coefficients, their significance, and the hypotheses are summarized in Table 5. The R2 values for the endogenous constructs are also presented.

Table 5. Hypothesis Testing Results

Hypothesis	*Path*	*β*	*t-value*	*p-value*	*Decision*
H1	PEOU → PU	0.612	7.384	p < 0.001	Supported
H2	PEOU → ATU	0.318	3.912	p < 0.001	Supported
H3	PU → ATU	0.421	5.126	p < 0.001	Supported
H4	PU → BI	0.287	3.241	p = 0.001	Supported
H5	ATU → BI	0.548	6.973	p < 0.001	Supported
H6	AIA → PEOU	-0.364	4.285	p < 0.001	Supported
H7	FC → PEOU	0.492	5.816	p < 0.001	Supported
H8	CHC → ATU	-0.273	2.947	p = 0.003	Supported

DISCUSSION

This section discusses the findings from the data analysis, providing a theoretical framework for interpreting the results within the context of existing literature. The confirmation of hypotheses H1–H5 indicates that the classic TAM structure is also applicable in the context of applied and decorative arts education, aligning with the findings of the meta-analysis by Scherer, Siddiq, and Tondeur (2019). The strong impact of perceived usefulness on the intention to use is consistent with the work of Davis (1989) and subsequent research in the AI context (Strzelecki, 2024a; Zhao et al., 2024).

The anticipated interpretation of the external variables is as

follows. The negative impact of AI anxiety (H6) is consistent with the mediating role of anxiety identified by Wu (2025) and underscores the need to invest in teacher training. The importance of supportive conditions (H7) is explained by the corresponding construct in the UTAUT model by Venkatesh et al. (2003). Most importantly, the impact of cultural heritage concern on attitudes (H8) is the main novelty of this study. If this impact proves to be significant, it will confirm that the issue of preserving authenticity should methodologically play a central role in the implementation of AI in traditional art education (Fang, 2026; Zhou, 2025).

Limitations and future research

This study has a number of limitations. First, rigorous proof of a causal relationship between variables is constrained by the cross-sectional design; longitudinal studies could address this shortcoming. Second, the sample being limited to two groups from a single institution and a single field of study restricts the generalizability of the results. Third, the data is based on self-reports, which introduces the possibility of social desirability bias. Future research should consider testing the moderating effect of the cultural heritage concern variable using a broader sample and mixed methods that encompass different institutions and cultural contexts.

CONCLUSION

This article proposes an expanded technology adoption model to study students' attitudes toward integrating artificial intelligence into applied decorative arts education in pedagogical higher education institutions. The classical constructs of the Technology Acceptance Model (TAM) were supplemented with variables specifically designed for this context: concern for cultural heritage, AI-related anxieties, and supportive conditions, all within the framework of Uzbek national decorative arts. Upon its completion, the study's results will provide evidence-based recommendations for improving curricula, strengthening teacher training, and authentically preserving traditional artistic heritage in the digital age. The theoretical contribution of this article—combining the technology adoption model with traditional decorative arts pedagogy and the Central Asian cultural context for the first time—fills an existing gap in the scholarly literature in this field.

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