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Empirical Validation of the Strategic Model for Art Education in Iraqi Secondary Schools: A Confirmatory Factor Analysis Approach

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A B S T R A C T

Purpose: The aim of the present study is to empirically validate a strategic model for art education in Iraqi secondary schools, based on the lived experiences of art teachers and employing a confirmatory factor analysis (CFA) approach.

Methods and Materials: This research follows a prior qualitative study designed using a phenomenological approach, in which the challenges of art education were identified at three levels: content-curricular, infrastructural-technological, and human resources. In the current phase, utilizing data collected from 132 high school art teachers in Wasit Province, Iraq, the validity and reliability of the constructs and dimensions of the proposed model were assessed.

Findings: The analysis revealed that the model demonstrated satisfactory statistical fit, high reliability, and acceptable convergent and discriminant validity. The most influential components in the final model included “infrastructural and equipment-related solutions,” “revisions to the art curriculum,” and “strengthening team collaboration.” Emphasizing the integration of local cultural elements, professional development for teachers, and the use of modern technologies, the model offers a localized, data-driven framework for enhancing the quality of art education within the Iraqi educational system.

Conclusion: The findings can serve as a scientific basis for educational policymaking in developing countries.

Keywords: *Art Education, Model Validation, Confirmatory Factor Analysis, Lived Experiences, Secondary Schools, Iraq*

1. Introduction

Art education plays a pivotal role in cultivating creativity, cultural awareness, and emotional intelligence among students. In the context of Iraqi secondary schools, however, this educational domain faces numerous structural and contextual challenges that hinder its effective implementation and impact. Although the Ministry of Education in Iraq has incorporated art into national curricula, the absence of a coherent strategic framework has resulted in fragmented execution, marginalization of art subjects, and underutilization of their transformative potential (Al-Jazair, 2023).

Internationally, art education is increasingly recognized for its multifaceted benefits. It nurtures critical thinking, improves student motivation, and enhances emotional well-being (Gormley, 2025; Saif, 2024). Scholars such as Eisner have long argued that the arts are fundamental to the development of the mind and the realization of human potential (Eisner, 2002). Art education promotes the integration of multiple intelligences, an idea central to Gardner's theory, which emphasizes that artistic capabilities are as vital as linguistic or logical ones in human development (Gardner, 1983). Vygotsky's sociocultural theory further reinforces the value of art as a mediating tool in social and cognitive development, particularly when embedded in authentic, culturally meaningful contexts (Vygotsky, 1978).

However, these pedagogical ideals often clash with the realities of classroom practice, especially in developing contexts. Iraqi art educators encounter a range of obstacles including insufficient resources, outdated curricula, and lack of professional development (Abdolhosein, 2024; Al-Khalfaji et al., 2024). A recent analysis of Baghdad's art classrooms revealed a disconnect between curriculum design and students' socio-cultural realities, compounded by limited access to artistic materials and inadequate training among teachers (Abdolhosein, 2024). Similar issues have been observed globally. For instance, Ali (Ali, 2018) reported that Fijian teachers struggled with systemic neglect and low prioritization of art education, leading to superficial instruction devoid of depth or engagement.

Recognizing these challenges, researchers have called for strategic reform in art education that is both context-sensitive and theoretically grounded. The works of Freedman (Freedman, 2018) and Jalongo (Jalongo, 2019) highlight the need to reimagine curriculum as a cultural and social artifact, shaped not just by national standards but also by local identities and student needs. In Iraq, traditional art instruction often fails to reflect contemporary cultural shifts or the aspirations of modern youth (Al-Jassar, 2021; Zahiri et al., 2022). Aesthetic education models, such as the one proposed by Zahiri and colleagues, offer valuable insights for designing multidimensional curricula that bridge formal knowledge with experiential learning (Zahiri et al., 2022).

Efforts to improve art education must also consider the competencies and professional growth of teachers. A study by Moushenah et al. (Moushenah et al., 2024) emphasized the importance of creative skill development among Iraqi art teachers as a prerequisite for effective classroom practice. Similarly, Al-Khalfaji et al. (Al-Khalfaji et al., 2024) identified collaborative learning, curricular autonomy, and access to technology as critical enablers of teaching quality in the arts. These findings are echoed by global perspectives on teacher development, such as those by Hetland et al. (Hetland et al., 2013), who assert that studio-based approaches in teacher education can foster deeper pedagogical reflexivity and innovation.

Contemporary reforms in art education are increasingly shaped by digital transformation and interdisciplinary integration. The "Internet+" environment in China has facilitated the creation of digital art education platforms that offer flexibility, interactivity, and scalability in content delivery (Zhang & Li, 2023). Xu and Ramli (Xu & Ramli, 2024) propose an interdisciplinary talent training model for new media art that blurs boundaries between disciplines and nurtures hybrid creative identities. In Iraq, such innovations remain largely untapped due to infrastructural limitations and policy inertia, although recent efforts to digitize educational resources suggest a shift is underway (Al-Jazair, 2023; Zhang & Li, 2023).

The integration of cultural identity in art education is another emergent priority. Garcia-Lazo's (Garcia-Lazo, 2024) research shows that visual arts education can strengthen the cultural identity of pre-service teachers, thereby enhancing their commitment to inclusive and socially responsive teaching. Martins (Martins, 2024) further critiques the colonial legacies embedded in conventional art curricula and advocates for decolonial approaches that center marginalized voices and epistemologies. For Iraq, a country with a rich yet complex cultural history, the development of an art education model that reflects indigenous values and post-conflict realities is both urgent and transformative.

The present study responds to these imperatives by designing and validating a strategic model for art education

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based on empirical data from Iraqi high schools. Drawing from phenomenological insights and structured around key dimensions—including content planning, infrastructural strategies, human resource development, and sociocultural responsiveness—the model seeks to provide a holistic framework for reform. It incorporates theoretical perspectives from Bandura's social cognitive theory (Bandura, 1986) and Vygotsky's constructivism (Vygotsky, 1978), while aligning with international benchmarks on educational quality (Schneider & Rohmann, 2021).

This model validation process involves assessing construct validity, internal consistency, and model fit using advanced statistical tools, notably confirmatory factor analysis (CFA). As emphasized by Dadashi et al. (Dadashi et al., 2022), rigorous empirical validation is crucial for ensuring that curriculum innovations are not only theoretically sound but also practically effective in diverse educational environments. The conceptual foundation for the model is also informed by recent qualitative research conducted in Iraq and neighboring regions, which documented the lived experiences of art teachers navigating post-pandemic educational landscapes and transitioning to hybrid modes of instruction (Ebrahimi Nia et al., 2020; Wessner, 2024).

The rationale for this study is further reinforced by global calls for rethinking the place of art in general education. Bamford's (Bamford, 2006) seminal work on the global impact of the arts in schools underscores how meaningful engagement with the arts can drive academic achievement, civic responsibility, and lifelong learning. Despite this, art education continues to be marginalized in many systems due to policy neglect, budgetary constraints, and prevailing technocratic ideologies (Ardipal, 2017). In Iraq, overcoming such barriers necessitates a localized yet forward-looking model that is both empirically validated and contextually relevant. This study aims to address these gaps by empirically validating a strategic model for art education grounded in the lived experiences of Iraqi art teachers.

2. Methods and Materials

2.1. Study Design and Participants

The present study was conducted using a quantitative approach within the framework of an applied research design, aimed at validating the strategic model for art education in Iraqi secondary schools. This study focused on the empirical examination of the conceptual structure of a model previously developed based on the lived experiences of art teachers. To this end, confirmatory factor analysis (CFA) was employed to assess construct validity, reliability, and model fit.

The statistical population included all high school art teachers in Wasit Province, Iraq, during the 2024–2025 academic year. From this population, 132 participants were selected using proportional stratified sampling.

2.2. Measures

The data collection instrument was a researcher-developed questionnaire consisting of 36 items, organized on a five-point Likert scale, covering the three dimensions of the model: content-curricular challenges, infrastructural-technological challenges, and human resources. The content validity of the instrument was confirmed through expert review by specialists in educational sciences and art. Construct validity was assessed through factor analysis. Furthermore, statistical indicators such as factor loadings, Average Variance Extracted (AVE), Composite Reliability (CR), Cronbach's alpha, coefficient of determination (R^2), and the Fornell-Larcker criterion were used to evaluate model quality.

2.3. Data Analysis

Data analysis was performed using Smart PLS software, and the results indicated that the proposed model demonstrated good model fit, acceptable reliability, and appropriate convergent and discriminant validity. Overall, the use of a quantitative approach in this study enabled a precise and systematic examination of the empirical validity of the designed model, providing a scientific foundation for its implementation in educational policymaking and planning in art education within Iraqi schools.

3. Findings and Results

The descriptive findings related to the demographic characteristics of the respondents, as presented in Table 1, indicate that the research sample had a suitable diversity. In terms of gender, 55% of participants were male and 45% were female, suggesting a relatively balanced distribution between the two groups. Regarding age, the highest frequency belonged to the 30–35 age group (34%), followed by the 25–30 age group (29%), indicating that most participating teachers were in the young to middle-aged categories. The distribution of educational qualifications also shows that the majority of respondents held a master's

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degree (51%) or a bachelor's degree (41%), while only 5% had a doctoral degree and 3% had an associate degree—demonstrating a relatively high academic level among the sample population. In terms of work experience, the highest frequency was in the 5 to 10 years range (32%) and the 10 to 15 years range (31%), indicating that most participants had moderate to relatively high experience in art instruction. This appropriate distribution in demographic variables provided the necessary statistical adequacy and diversity for performing confirmatory factor analysis and enhanced the generalizability of the results.

Table 1

Descriptive Results of Demographic Characteristics

Variable	Group	Frequency	Percentage
Gender	Male	73	0.55
	Female	59	0.45
	Total	132	1
Age	25–30	38	0.29
	30–35	45	0.34
	35–40	29	0.22
	>40	7	0.05
	Total	132	1
Educational Level	Associate Degree	4	0.03
	Bachelor's Degree	54	0.41
	Master's Degree	67	0.51
	Doctorate	7	0.05
	Total	132	1
Work Experience	Less than 5 years	29	0.22
	5–10 years	42	0.32
	10–15 years	41	0.31
	More than 15 years	20	0.15
	Total	132	1

Table 2 presents the descriptive indicators for the study's latent variables in terms of mean, standard deviation, normality indices (skewness and kurtosis), and the Kolmogorov–Smirnov test to examine the normal distribution of data. The means of the variables range between 2.6 and 3.6, indicating that respondents' views on most components are generally moderate to relatively high. For example, the components of "financial support provision" (Mean = 3.585) and "community support for art" (Mean = 3.545) had the highest means, reflecting the emphasis of respondents on the supportive role in improving the state of art education. On the other hand, the lowest means were observed for components such as "technological weaknesses" (2.618) and "representing social problems through art" (2.699), indicating a more negative perception regarding the realization of these aspects in the current context.

Skewness and kurtosis indices for all variables fall within the acceptable ±1 range, and the Z-values of the Kolmogorov–Smirnov test for all variables exceed the 0.05 significance level. Therefore, it can be concluded that the distribution of data across all research variables is normal, making the data suitable for conducting parametric analyses, including confirmatory factor analysis.

Table 2

Descriptive Indicators for All Research Variables

Latent Variables	Mean	SD	Skewness	Kurtosis	K–S Z	Sig
Lack of practical activities implementation	3.537	1.165	0.237	0.402	0.357	0.143
Use of technology	3.008	1.193	0.258	0.393	0.342	0.158
Optimal use of available resources	3.106	0.987	0.364	0.239	0.308	0.192
Art curriculum revision	3.512	0.988	0.405	0.204	0.346	0.154
Provision of financial support	3.585	1.035	0.355	0.289	0.309	0.191
Strengthening team spirit	2.919	1.118	0.223	0.503	0.308	0.192
Community support for art	3.545	0.824	0.454	0.420	0.371	0.129

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Teacher-related challenges	2.886	0.886	0.397	0.326	0.306	0.194
Teacher-related solutions	3.024	1.200	0.330	0.468	0.206	0.294
Creative and modern teaching methods	3.480	1.093	0.339	0.471	0.221	0.279
Technological weakness	2.618	1.164	0.365	0.293	0.354	0.146
Inadequate classroom space	2.927	0.959	0.223	0.409	0.186	0.314
Lack of government support	2.976	0.872	0.462	0.207	0.341	0.159
Curriculum limitations	3.374	0.879	0.249	0.310	0.333	0.167
Representing social problems through art	2.699	1.166	0.405	0.239	0.183	0.317
Art as a tool for strengthening cultural identity	2.797	1.113	0.325	0.270	0.217	0.283
Low teaching quality	3.122	0.901	0.370	0.469	0.297	0.203
Educational challenges	2.829	1.046	0.292	0.232	0.230	0.270
Lack of educational resources	2.886	1.016	0.279	0.397	0.235	0.265
Student-related challenges	2.748	1.106	0.331	0.419	0.308	0.192
Student-related solutions	3.098	0.940	0.226	0.230	0.318	0.182

To examine the structural accuracy of the proposed model and to validate the theoretical constructs, confirmatory factor analysis (CFA) was conducted using Smart PLS software. The conceptual model of the study included one main variable (overcoming the challenges of art education in Iraqi high schools), six major dimensions, 21 components, and 99 indicators, which were assessed within a multilevel framework.

In the first step, the results of the model analysis in the standardized coefficients state (Figure 1) showed that all factor loadings were above 0.4. This threshold is considered acceptable for confirmatory factor analysis and is in line with the criteria proposed by Joseph et al. (2016). Additionally, reliability indicators including Cronbach's alpha and Composite Reliability (CR) for all constructs were above 0.7, indicating high internal consistency and stability of the measurement tool.

Subsequently, convergent validity was assessed using the Average Variance Extracted (AVE). For all constructs, AVE values exceeded 0.5, and the CR > AVE condition was met. Moreover, the Rho_A index for all constructs was greater than 0.6, all of which confirm satisfactory convergent validity. In examining the significance of the factor loadings (Figure 2), the t-values for all paths exceeded the ±1.96 threshold, confirming that all paths were statistically significant at the 95% confidence level.

Discriminant validity was also assessed using the Fornell-Larcker criterion and the Heterotrait-Monotrait ratio (HTMT). The results indicated that, for each construct, the square root of AVE was greater than its correlations with other constructs (AVE > MSV), and the HTMT values for all construct pairs were below 0.9. These findings confirm the model's discriminant validity.

Finally, R^2 values for the endogenous constructs in the model were all in the moderate to desirable range (above 0.3), indicating good explanatory power of the constructs within the model. Additionally, positive Q^2 values were reported, suggesting strong predictive relevance of the measurement model.

Overall, all statistical indicators demonstrated that the proposed conceptual model possessed satisfactory reliability, convergent and discriminant validity, and overall goodness of fit. Thus, the model can be regarded as a valid framework for developing art education in Iraqi secondary schools.

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Figure 1

Model with Standardized Coefficient Estimates

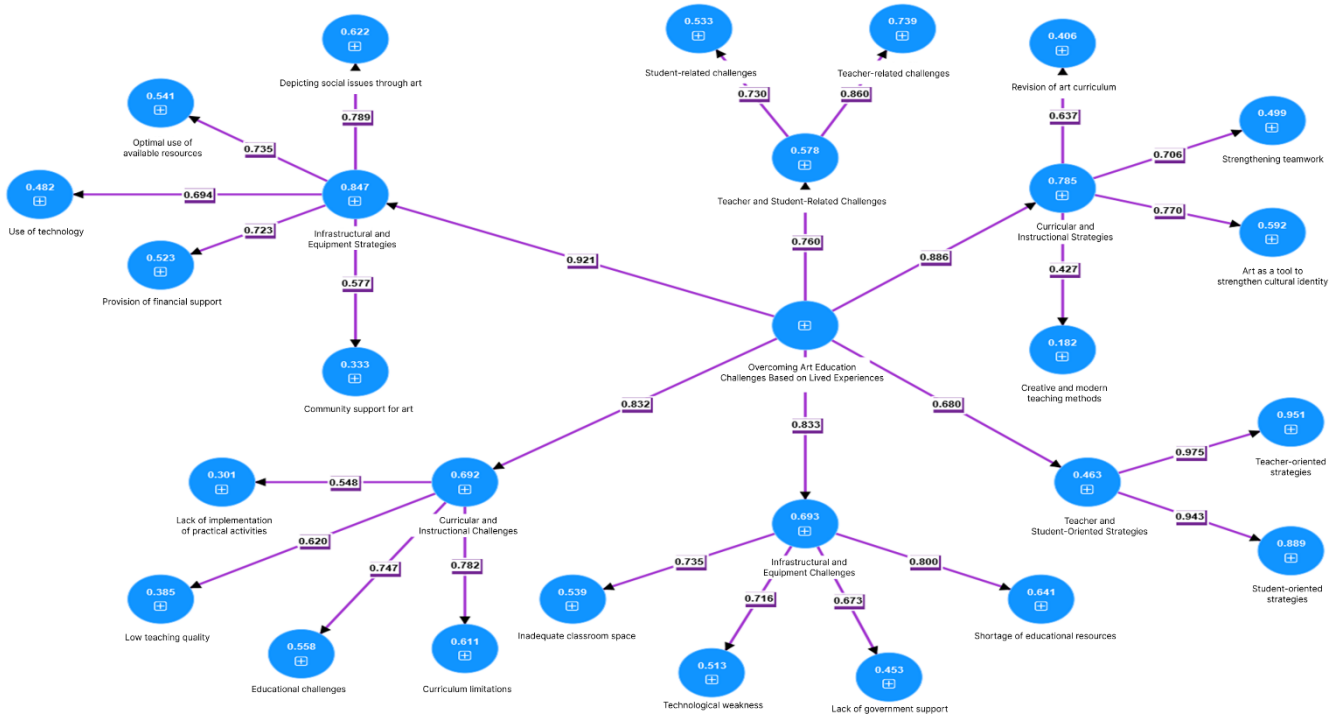
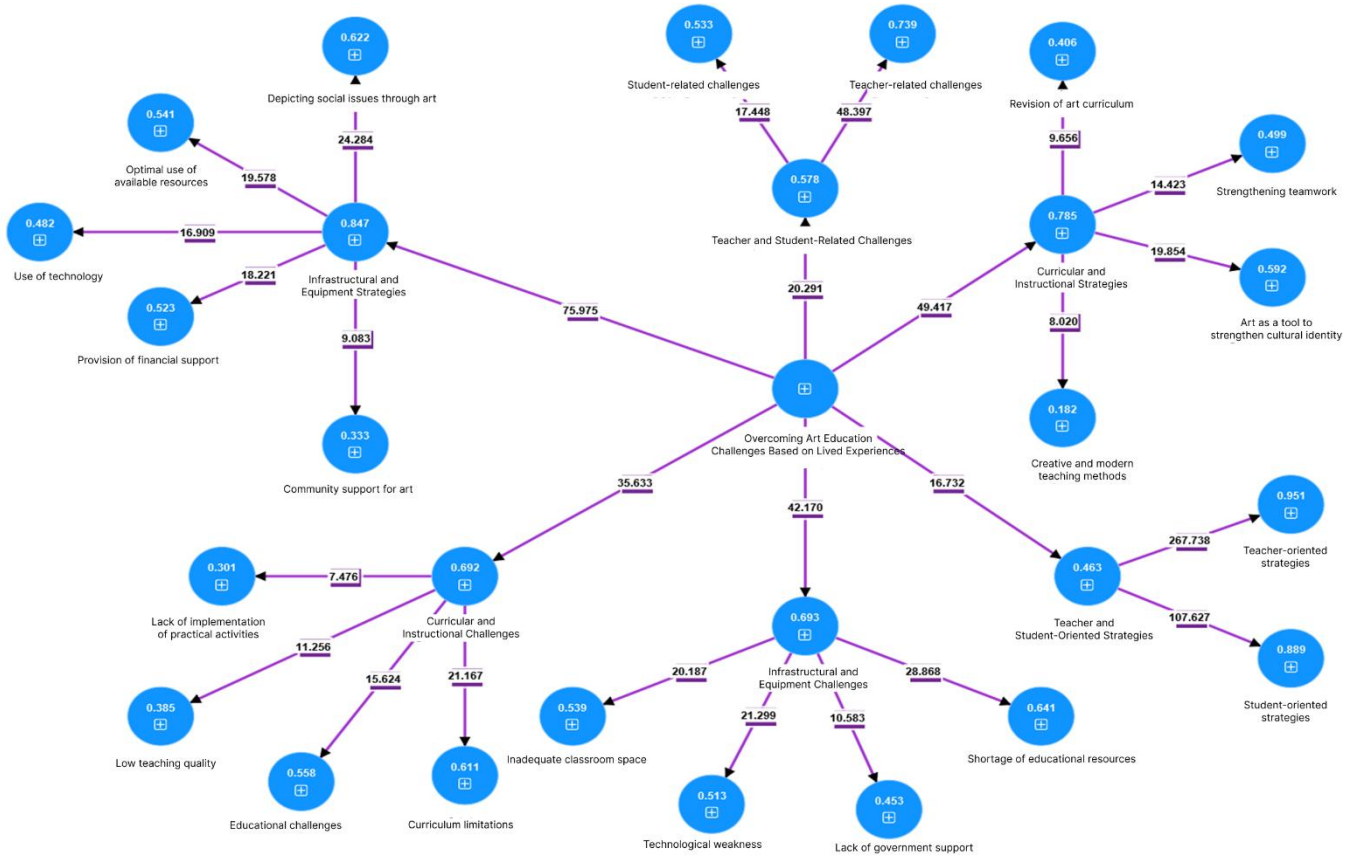


Figure 2

Model with Significance Level Estimates



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To evaluate the quality of the research instrument and the appropriateness of the outer model, reliability and convergent validity indicators were assessed. As shown in, the results of factor loadings, Cronbach's alpha, Composite Reliability (CR), Average Variance Extracted (AVE), and Rho_A fully satisfied the accepted thresholds. All items had factor loadings above 0.7, and their associated t-values were greater than 1.96, indicating statistical significance at the 95% confidence level.

From a reliability perspective, all latent variables had Cronbach's alpha values above 0.7 and Rho_A values greater than 0.7, indicating acceptable internal consistency of the measurement tool. Moreover, the Composite Reliability values for all constructs exceeded 0.7, confirming strong internal coherence. Regarding convergent validity, all constructs had AVE values exceeding the 0.5 threshold, demonstrating adequate shared variance between constructs and their indicators.

Additionally, the Variance Inflation Factor (VIF) for all indicators was below the critical value of 4, indicating no multicollinearity issues among the observed variables and no interference in the interpretation of relationships.

In sum, the findings show that the measurement model enjoys strong reliability and convergent validity, and the instrument used in the study effectively captured the intended theoretical constructs. These results provide the necessary foundation for proceeding to structural model analysis and assessing the overall model fit.

Table 3

Results of Factor Loadings and Collinearity Indices

Dimension	Component	Indicator	Factor Loading	t-value	Significance Level	VIF
Teacher and Student-Related Challenges	Teacher-related challenges	Lack of teacher support	0.901	26.947	0.001	2.58
		High teacher workload	0.729	30.553	0.001	1.38
		Lack of professional networks for teachers	0.867	29	0.001	2.26
		Shortage of specialized teachers	0.694	30.632	0.001	2.12
		Lack of professional development opportunities	0.630	27.816	0.001	1.77
	Student-related challenges	Student demotivation	0.866	24.053	0.001	2.58
		Student disinterest	0.904	25.447	0.001	2.16
		Student resistance to modern methods	0.747	30.105	0.001	2.4
		Students' negative attitude toward art	0.833	22.158	0.001	1.78
Curricular and Instructional Challenges	Lack of practical implementation	Lack of equipped workshops	0.842	21.211	0.001	2.89
		Project mismatch with student interests	0.761	25.763	0.001	2.21
		Limitations in project implementation	0.719	24.079	0.001	1.81
	Low teaching quality	Low quality of instruction	0.724	21.395	0.001	3.06
		Dry and uninspiring teaching	0.764	27.789	0.001	3.11
		Traditional approaches in art teaching	0.810	21.789	0.001	3.54
		Lack of modern teaching techniques	0.794	30.342	0.001	1.42
	Educational challenges	Lack of interdisciplinary (STEAM) education	0.637	25.158	0.001	1.23
		Absence of multicultural education	0.701	21.447	0.001	3.46
		Inflexibility in teaching methods	0.672	27.921	0.001	2.94
		Learning limited to artistic rules and techniques	0.638	26.763	0.001	1.99
	Curriculum limitations	Curriculum focused on memorization	0.666	22.132	0.001	2.07
		Outdated curriculum content	0.782	26.684	0.001	2.2
		Lack of creativity in curriculum	0.830	23.211	0.001	1.54
		Absence of coherent lesson planning	0.825	27.395	0.001	2.15

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		Curriculum not applicable to daily life	0.869	27.816	0.001	2.3
Infrastructural and Equipment Challenges	Art's status in culture	Lack of importance for art in education	0.663	29.579	0.001	3.48
		Low value of art in schools	0.861	27.132	0.001	1.74
		Lack of value placed on art	0.627	25.711	0.001	1.32
	Technological weaknesses	No use of innovation and modern techniques	0.672	28.737	0.001	2.69
		Lack of modern equipment	0.676	32.289	0.001	3.56
		Lack of modern art tools	0.674	27.842	0.001	1.9
	Inadequate classroom space	Small classroom size	0.806	26.974	0.001	2.82
		Inadequate lighting	0.743	26.395	0.001	3.56
		Lack of suitable space for project implementation	0.801	23.974	0.001	3.51
	Lack of government support	Lack of budget for art classes	0.649	32.447	0.001	3.21
		No financial support for teachers	0.732	28.263	0.001	1.67
	Shortage of educational resources	Lack of drawing tools	0.707	29.079	0.001	2.4
		Limited access to art materials	0.780	29.158	0.001	1.72
		Lack of specialized art books	0.860	24.5	0.001	1.21
Infrastructural and Equipment Solutions	Use of technology	Use of digital apps	0.846	30.368	0.001	1.63
		Use of smartphones and laptops	0.623	29.421	0.001	3.57
		Use of social media	0.753	27.579	0.001	2.15
		Augmented reality (AR) and virtual reality (VR)	0.839	21.316	0.001	2.83
	Optimal use of existing resources	Use of low-cost materials	0.890	24.158	0.001	2.47
		Use of recycled materials	0.750	30.368	0.001	3.18
		Use of accessible tools	0.701	29.789	0.001	1.54
	Financial support provision	Allocating more budget for art tools	0.846	26.447	0.001	1.26
		Increased government funding for art	0.860	32.474	0.001	3.11
		Funding through collaboration with local organizations	0.750	25.079	0.001	3.51
		Provision of educational resources and facilities	0.635	32.342	0.001	2.46
	Community support for art	Establishing an art community	0.706	32.237	0.001	3.5
		Creating a dynamic and diverse environment	0.733	24.395	0.001	2.29
		Establishing art centers and specialized workshops	0.781	28.842	0.001	1.37
		Strengthening art in educational policies	0.733	28.237	0.001	3.52
		Participation in competitions	0.786	21.632	0.001	1.67
		Exhibiting works in cultural fairs	0.674	30.316	0.001	3.65
	Art as a medium to address social issues	Depicting social problems through art	0.635	29.842	0.001	2.25
		Human rights and cultural differences	0.806	25.421	0.001	2.98
		Paintings with local cultural themes	0.910	27.316	0.001	3.33
		Environmental pollution expressed through art	0.844	29.447	0.001	2.92
		Art as a tool for psychological healing	0.868	24.263	0.001	2.67
	Optimal use of existing resources	Use of low-cost materials	0.858	23.921	0.001	1.29
		Use of recycled materials	0.693	26.605	0.001	3.25
		Use of accessible tools	0.817	32.947	0.001	3.08
Teacher and Student-Oriented Solutions	Student-oriented strategies	Alignment of teaching methods with student needs	0.894	32.368	0.001	2.16
		Attention to students' learning styles	0.765	29.132	0.001	3.25

E-ISSN: 3041-8828

		Enhancing student motivation through projects	0.760	32.868	0.001	3.14
		Project-based learning	0.747	30.579	0.001	2.16
		Organizing student exhibitions	0.804	25.526	0.001	2.35
		Managing life challenges through art education	0.854	30	0.001	2.79
	Teacher-oriented strategies	Professional development for teachers	0.899	29.079	0.001	2.07
		Creating teacher networks for experience-sharing	0.877	32.526	0.001	1.46
		Documenting successful teaching practices	0.862	28.184	0.001	2.41
		Organizing educational trips for teachers	0.836	24.974	0.001	1.22
		Collaborative teamwork among art teachers	0.847	27.868	0.001	3.06
		Forming expert groups and holding regular sessions	0.788	27.737	0.001	2.23
Curricular and Instructional Strategies	Art curriculum revision	Revision of art curricula	0.780	22.921	0.001	2.25
		Establishing monitoring and support systems	0.847	22.132	0.001	3.36
		Inclusion of art as a core school evaluation criterion	0.674	28	0.001	1.26
		Creating a supportive environment for idea expression	0.791	23.632	0.001	1.23
		Curriculum updating	0.766	31.211	0.001	2.56
		Integrating art with other subjects	0.805	29.974	0.001	1.61
		Support for cultural diversity	0.809	22.053	0.001	1.96
	Promoting teamwork	Collaborative teamwork among teachers	0.879	26.105	0.001	1.94
		Group discussions	0.759	22.5	0.001	3.44
		Interactive sessions	0.849	32.868	0.001	3.23
		Promoting collaborative creativity	0.896	21.737	0.001	3.32
		Participation in group projects	0.674	28.947	0.001	2.59
	Creative and modern teaching methods	Use of innovative art teaching methods	0.877	31.132	0.001	2.91
		Developing creativity and critical thinking	0.856	24.211	0.001	3.66
		Practical experiences in teaching	0.723	32.342	0.001	2.76
		Teaching beyond textbooks	0.659	23.947	0.001	1.55
		Modern methods in art education	0.633	21.263	0.001	3.02
	Art as a tool for strengthening cultural identity	Family or local storytelling	0.718	25.263	0.001	1.87
		A powerful tool for shaping future generations	0.680	23.632	0.001	3.34
		A medium for personal and social expression	0.830	23.868	0.001	3.02
		Introducing students to local culture and history	0.837	31.395	0.001	3.39
		Integrating art with local cultures	0.787	29.868	0.001	2.19
		Enhancing cultural belonging	0.740	32.395	0.001	2.05

Table 4

Results of Second- and Third-Order Factor Loadings

Dimension	Component	Factor Loading	t-value	Significance Level
Curricular and Instructional Strategies	Revision of art curriculum	0.637	9.656	0.001
	Strengthening teamwork	0.706	14.423	0.001
	Creative and modern teaching methods	0.427	8.020	0.001
	Art as a tool to strengthen cultural identity	0.770	19.854	0.001
Teacher and Student-Oriented Strategies	Student-oriented strategies	0.943	107.627	0.001

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	Teacher-oriented strategies	0.975	267.738	0.001
Infrastructural and Equipment Strategies	Use of technology	0.694	16.909	0.001
	Optimal use of available resources	0.735	19.578	0.001
	Provision of financial support	0.723	18.221	0.001
	Community support for art	0.577	9.083	0.001
	Depicting social issues through art	0.789	24.284	0.001
Teacher and Student-Related Challenges	Teacher-related challenges	0.860	48.397	0.001
	Student-related challenges	0.730	17.448	0.001
Curricular and Instructional Challenges	Lack of implementation of practical activities	0.548	7.476	0.001
	Curriculum limitations	0.782	21.167	0.001
	Low teaching quality	0.620	11.256	0.001
	Educational challenges	0.747	15.624	0.001
Infrastructural and Equipment Challenges	Technological weakness	0.716	21.299	0.001
	Inadequate classroom space	0.735	20.187	0.001
	Lack of government support	0.673	10.583	0.001
	Shortage of educational resources	0.800	28.868	0.001
Overcoming Art Education Challenges Based on Lived Experiences	Curricular and instructional strategies	0.886	49.417	0.001
	Teacher and student-oriented strategies	0.680	16.732	0.001
	Infrastructural and equipment strategies	0.921	75.975	0.001
	Teacher and student-related challenges	0.760	20.291	0.001
	Curricular and instructional challenges	0.832	35.633	0.001
	Infrastructural and equipment challenges	0.833	42.170	0.001

Table 5

Convergent Validity of the Model

Latent Variable	Cronbach's Alpha (CA > 0.6)	Rho_A (ρA > 0.7)	Composite Reliability (CR > 0.7)	Average Variance Extracted (AVE > 0.5)
Lack of implementation of practical activities	0.854	0.858	0.911	0.774
Use of technology	0.883	0.885	0.945	0.895
Optimal use of available resources	0.893	0.894	0.934	0.824
Revision of art curriculum	0.914	0.915	0.936	0.744
Provision of financial support	0.817	0.820	0.916	0.845
Strengthening teamwork	0.926	0.929	0.944	0.770
Community support for art	0.922	0.927	0.941	0.763
Teacher-related challenges	0.929	0.929	0.946	0.779
Teacher-oriented strategies	0.902	0.902	0.938	0.836
Creative and modern teaching methods	0.910	0.918	0.933	0.735
Technological weakness	0.739	0.749	0.884	0.792
Inadequate classroom space	0.837	0.843	0.902	0.754
Lack of government support	0.909	0.910	0.932	0.733
Curriculum limitations	0.881	0.883	0.913	0.677
Depicting social issues through art	0.929	0.930	0.946	0.779
Art as a tool for strengthening cultural identity	0.915	0.915	0.936	0.746
Low teaching quality	0.908	0.911	0.935	0.784
Educational challenges	0.916	0.919	0.941	0.798
Shortage of educational resources	0.912	0.913	0.934	0.740
Student-related challenges	0.886	0.886	0.921	0.745
Student-oriented strategies	0.814	0.814	0.915	0.843
Teacher and student-oriented strategies	0.928	0.928	0.946	0.777
Infrastructural and equipment strategies	0.919	0.923	0.929	0.698
Curricular and instructional strategies	0.900	0.904	0.913	0.646
Teacher and student-related challenges	0.871	0.873	0.898	0.696
Curricular and instructional challenges	0.878	0.883	0.898	0.659
Infrastructural and equipment challenges	0.894	0.897	0.910	0.603
Overcoming art education challenges based on lived experiences	0.971	0.972	0.972	0.594

E-ISSN: 3041-8828

Following the conducted statistical analyses, the results of confirmatory factor analysis (CFA) are presented to validate the conceptual model of the study. The primary aim at this stage was to evaluate the adequacy of the measurement instrument in terms of reliability and construct validity, as well as to identify the extent to which components and indicators contributed to the explanation of the model's main dimensions.

First, the validation of the measurement model was performed based on three key criteria: reliability (using Cronbach's alpha and composite reliability), convergent validity (using the Average Variance Extracted, or AVE), and discriminant validity. All indicators had factor loadings greater than 0.7 and significant t-values (greater than 1.96), indicating statistically meaningful relationships between the items and their corresponding latent variables and confirming the adequacy of the measurement instrument in terms of indicator reliability. Furthermore, values for Cronbach's alpha, rho_A, and composite reliability (CR) for all latent variables exceeded the accepted threshold of 0.7, supporting internal consistency and strong construct reliability. All AVE values were also above 0.5, affirming satisfactory convergent validity of the model. Additionally, the VIF index for all indicators remained below the critical value of 4, confirming the absence of severe multicollinearity among variables.

In the next stage, to determine the relative importance and priority of indicators, components, and dimensions of the model, confirmatory factor analysis was conducted at the first-order, second-order, and third-order levels. At the level of indicators, the highest factor loadings were observed for "paintings with local cultural themes" (0.910) and "lack of support for teachers" (0.901), indicating their significant roles in explaining their respective constructs. At the component level, "alignment between teaching methods and student needs" (0.894) and "strengthening collective cooperation and creativity" (0.896) had the highest factor loadings.

At the level of main model dimensions, the results revealed that the dimension "infrastructural and equipment-based strategies" held the highest factor loading (0.921), making it the most influential dimension within the construct "overcoming art education challenges based on lived experiences." This was followed by "educational and planning strategies" with a factor loading of 0.886, "infrastructural and equipment-based challenges" (0.833), and "educational and planning challenges" (0.832). The dimensions related to "teacher and student challenges" (0.760) and "teacher and student-related strategies" (0.680) had the lowest factor loadings, although they were still statistically significant at a high level.

Overall, these findings indicate that the measurement model of the study is statistically validated, and the proposed dimensions, components, and indicators accurately represent the structural framework of the concept of art education in Iraqi secondary schools. The analysis suggests that policymakers in education should focus on improving infrastructure, developing updated curricula, and providing targeted operational support to effectively address the challenges in art education.

In this study, to examine the relationships among latent variables and confirm their conceptual distinctiveness, correlation testing and the Fornell and Larcker criterion were employed to assess discriminant validity. Correlation analysis, a common method for evaluating the relationship between variables, demonstrated that all correlation coefficients were statistically significant at the 95% confidence level, with p-values below 0.05. These results indicate that all investigated variables have statistically significant and generally positive relationships with each other. Most relationships were found to be direct and aligned in such a way that increases or decreases in one variable led to proportional changes in the related variable.

Subsequently, the Fornell and Larcker criterion was used to confirm the discriminant validity of the model's constructs. According to this criterion, the square root of the AVE for each latent variable should exceed the highest correlation it has with any other latent variable. The results shown in the corresponding table demonstrated that this condition was met for all constructs, and the square roots of the AVEs located on the diagonal of the correlation matrix were significantly greater than their correlations with other variables. This indicates that each construct is more strongly correlated with its own indicators than with other constructs, which provides solid evidence for the conceptual and structural distinctiveness of the model's variables.

For example, the construct "service, self-sacrifice, and altruism" had a square root of AVE equal to 0.985, clearly exceeding its correlations with other variables and thus confirming its strong discriminant validity. Altogether, these results not only confirm the logical coherence and alignment among the constructs, but also demonstrate that the conceptual model of the study possesses the theoretical coherence and empirical precision required to analyze and explain the studied phenomena. This level of reliability and validity allows the findings to be used as a scientific

E-ISSN: 3041-8828

foundation for recommending educational policies based on evidence.

Table 6

Fornell and Larcker Matrix

Var.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	0.88	0.275	0.299	0.318	0.295	0.326	0.232	0.241	0.284	0.305	0.258	0.336	0.305	0.320	0.350	0.432	0.252	0.190	0.214	0.253	0.344
2		0.946	0.867	0.305	0.302	0.373	0.222	0.414	0.387	0.359	0.323	0.302	0.357	0.306	0.393	0.431	0.211	0.355	0.272	0.323	0.346
3			0.908	0.293	0.377	0.391	0.267	0.410	0.374	0.399	0.356	0.366	0.355	0.316	0.385	0.462	0.232	0.353	0.295	0.368	0.420
4				0.862	0.415	0.206	0.372	0.323	0.356	0.361	0.322	0.364	0.276	0.300	0.359	0.261	0.350	0.399	0.393	0.486	0.273
5					0.919	0.353	0.261	0.377	0.425	0.459	0.403	0.416	0.430	0.373	0.477	0.387	0.309	0.389	0.336	0.400	0.452
6						0.878	0.313	0.303	0.322	0.198	0.238	0.297	0.241	0.246	0.516	0.402	0.359	0.286	0.299	0.402	0.333
7							0.873	0.448	0.406	0.299	0.400	0.386	0.358	0.322	0.324	0.363	0.348	0.260	0.373	0.373	0.417
8								0.918	0.845	0.343	0.265	0.311	0.259	0.307	0.425	0.349	0.443	0.428	0.356	0.405	0.395
9									0.914	0.326	0.255	0.309	0.247	0.311	0.473	0.377	0.410	0.416	0.399	0.400	0.385
10										0.857	0.302	0.292	0.236	0.379	0.407	0.274	0.396	0.335	0.406	0.394	0.345
11											0.89	0.785	0.237	0.277	0.416	0.273	0.316	0.328	0.326	0.343	0.392
12												0.868	0.243	0.287	0.482	0.301	0.315	0.332	0.327	0.392	0.383
13													0.856	0.304	0.463	0.373	0.324	0.339	0.259	0.339	0.360
14														0.823	0.448	0.353	0.227	0.446	0.257	0.437	0.239
15															0.883	0.460	0.258	0.376	0.348	0.386	0.413
16																0.863	0.429	0.426	0.374	0.356	0.365
17																	0.885	0.273	0.275	0.354	0.446
18																		0.893	0.262	0.299	0.349
19																			0.883	0.279	0.402
20																				0.863	0.452

1. Lack of Practical Activities; 2. Use of Technology; 3. Optimal Use of Resources; 4. Curriculum Revision; 5. Financial Support; 6. Teamwork Promotion; 7. Community Support; 8. Student-Oriented Strategies; 9. Teacher-Oriented Strategies; 10. Creative Teaching Methods; 11. Technological Weakness; 12. Inadequate Classrooms; 13. Lack of Government Support; 14. Curriculum Limitations; 15. Art for Social Critique; 16. Art for Cultural Identity; 17. Low Teaching Quality; 18. Educational Challenges; 19. Teacher Challenges; 20. Student Challenges; 21. Lack of Educational Resources

This table presents the Fornell–Larcker criterion to assess the discriminant validity of the latent variables. The values on the diagonal (bolded) represent the square root of the Average Variance Extracted (AVE) for each construct, which should be higher than its correlation with any other construct in the same row or column. The matrix confirms that all constructs meet the Fornell–Larcker criterion, supporting the model's discriminant validity.

For the final assessment of the conceptual model's quality, model fit indices were analyzed to determine the degree to which the model structure aligns with the empirical data. Proper model fit is one of the most critical requirements in structural equation modeling (SEM), as it indicates the extent to which the hypothesized relationships between latent and observed variables are supported by actual data.

In this study, two well-known indices were used: SRMR (Standardized Root Mean Square Residual) and GOF (Goodness of Fit). The SRMR index measures the average discrepancy between the observed and predicted correlation matrices. The obtained SRMR value is 0.072, which is well below the critical threshold of 0.12. This indicates a good structural fit of the research model with the observed data and an acceptable level of approximation error.

Additionally, the GOF index was employed as a comprehensive indicator for assessing overall model fit. The GOF value for the final model was reported as 0.654, significantly higher than the acceptable minimum of 0.36. This suggests that the research model performs well both in terms of internal and external structure (i.e., in both the measurement and structural model components) and in explaining the observed data.

Collectively, these results indicate that the conceptual model extracted in this study aligns well with the empirical data and can be considered a valid and reliable model for explaining the challenges and strategies of art education in Iraqi high schools. In other words, the fit indices confirm that the relationships among the model's constructs are well-defined and that the research findings possess the necessary scientific and statistical credibility.

E-ISSN: 3041-8828

Table 7

Model Fit Indices

Model Fit Index	Symbol	Estimated Value	Acceptable Threshold
Standardized Root Mean Square Residual	SRMR	0.072	Less than 0.12
Goodness of Fit	GOF	0.654	Greater than 0.36

4. Discussion and Conclusion

The results of the current study, based on confirmatory factor analysis (CFA), provide strong empirical support for the proposed strategic model for art education in Iraqi secondary schools. The model includes six higher-order dimensions—teacher- and student-related challenges, curricular and instructional challenges, infrastructural and equipment challenges, and their corresponding solutions. Each of these dimensions was measured through multiple components and validated by 99 indicators. The model demonstrated excellent internal consistency, convergent and discriminant validity, and an acceptable fit based on indices such as SRMR and GOF. These findings suggest that the model has both theoretical coherence and practical applicability in the context of Iraq's secondary education system.

One of the most prominent findings was the significance of infrastructural and equipment-related challenges and solutions. The high factor loadings for components such as "technological weakness," "lack of government support," and "shortage of educational resources" indicate systemic deficiencies in the material and digital infrastructure necessary for effective art education. This confirms earlier observations by scholars who have emphasized the persistent underfunding and marginalization of art programs in Iraq (Abdolhosein, 2024; Al-Jazair, 2023). The importance of technological integration, especially the use of digital tools and platforms, aligns with international developments in art education. For example, studies by Zhang (Zhang & Li, 2023) and Xu (Xu & Ramli, 2024) have highlighted the transformative impact of digital environments and interdisciplinary models on expanding access, engagement, and creative learning. In Iraq, however, the limited availability of such technologies remains a key barrier.

The curricular and instructional challenges component also emerged as a critical dimension. Items such as "lack of practical art activities," "outdated curricula," and "low instructional quality" showed strong statistical significance and high factor loadings, indicating teacher and student dissatisfaction with the current curriculum. These findings are consistent with those of Dadashi et al. (Dadashi et al., 2022), who documented the misalignment between art curricula and pedagogical needs during the pandemic. Moreover, Zahiri et al. (Zahiri et al., 2022) found that secondary education programs in the region often lack aesthetic coherence, curricular flexibility, and creative scope. Similarly, Martins (Martins, 2024) argued that traditional curricula reproduce colonial hierarchies and stifle student agency. In this study, the strong statistical support for curriculum revision and the inclusion of creative, culturally responsive, and student-centered practices validates this growing demand for change.

The model also identified teacher and student-related challenges and strategies as a distinct and influential dimension. Teacher-specific issues such as "lack of professional development," "absence of professional networks," and "workload pressure" were among the most significant barriers reported. Student-related issues, including "low motivation" and "negative attitudes toward art," were also highly correlated with broader pedagogical challenges. These findings are supported by the works of Moushenah et al. (Moushenah et al., 2024) and Al-Khalfaji et al. (Al-Khalfaji et al., 2024), both of whom emphasized the interdependence between teacher preparation and student engagement. According to Hetland et al. (Hetland et al., 2013), cultivating "studio habits of mind" in art education requires reflective teaching practices, ongoing mentorship, and professional collaboration—all of which are currently underdeveloped in Iraq's educational system.

Among the proposed solutions, the model validated several strategic interventions. These include "use of low-cost and recycled materials," "integration of technology and digital art," "community support for the arts," and "project-based learning." These practices have been promoted globally to increase access and equity in art education (Bamford, 2006; Freedman, 2018). For instance, Garcia-Lazo (Garcia-Lazo, 2024) demonstrated that visual arts education could reinforce cultural identity and motivation among pre-service teachers, especially when connected to local contexts. Likewise, Eisner (Eisner, 2002) argued that the integration of expressive, experiential, and contextual

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learning strengthens student engagement and long-term cognitive development. The emphasis on "art as a tool for cultural identity" and "art for social commentary" in the validated model confirms that Iraqi educators recognize the transformative role of the arts beyond technical skill-building.

Another significant contribution of this model is its emphasis on teamwork, collaboration, and interdisciplinary instruction. Items related to "teacher teamwork," "group projects," and "cross-subject integration" loaded highly across multiple dimensions. These findings resonate with Gormley's (Gormley, 2025) conceptualization of creativity as a transferable competence across subjects, which can be facilitated through collaborative and interdisciplinary practices. Vygotsky's (Vygotsky, 1978) sociocultural theory also emphasizes the importance of social interaction in scaffolding learning, which further validates the inclusion of teamwork in the proposed strategic model.

The model's overall structure, supported by high R^2 and AVE values, offers strong predictive power. This is consistent with the literature that views arts education not only as a medium of aesthetic instruction but as a critical factor in developing psychological resilience, cognitive flexibility, and social intelligence (Bandura, 1986; Saif, 2024). It also confirms Schneider and Rohmann's (Schneider & Rohmann, 2021) meta-analysis, which highlighted the broad competencies cultivated through arts-based learning—including communication, empathy, problem-solving, and emotional regulation.

Finally, the model's empirical rigor contributes to a growing body of scholarship calling for context-specific and data-driven reforms in art education. While many previous studies relied on qualitative narratives or case studies, this research uses quantitative validation to support its theoretical framework and practical recommendations. It responds to the urgent need for culturally grounded, empirically validated models in Iraq and similar post-conflict societies where art education has been marginalized or politically co-opted (Al-Jassar, 2021; Ardipal, 2017).

Despite its strengths, the study has several limitations. First, the sample was limited to high school art teachers in Wasit Province, Iraq, which may not represent the full diversity of experiences across other regions. Cultural, administrative, and infrastructural differences in other provinces may influence the applicability of the model elsewhere. Second, while confirmatory factor analysis provides robust structural validation, the study did not include longitudinal data to assess the sustainability and long-term impact of the proposed strategies. Third, data collection relied solely on self-reported surveys, which may be subject to response bias. Observational or student performance data could provide more objective validation. Finally, the model did not directly engage with the perspectives of students, administrators, or curriculum designers, whose insights could further enrich the framework.

Future studies should expand the geographic and demographic scope of the research, including urban and rural areas across different provinces in Iraq. Comparative studies involving other countries in the region with similar educational and cultural contexts, such as Iran or Jordan, could provide cross-cultural validation. Longitudinal research is also necessary to examine how implementing this model affects student outcomes, teacher development, and school culture over time. Additionally, mixed-methods research incorporating interviews, classroom observations, and visual ethnography could offer deeper insight into how the model functions in real classrooms. Researchers may also explore the impact of specific interventions—such as integrating digital art platforms or establishing teacher networks—on improving learning outcomes and student engagement.

Educational policymakers should consider adopting this model as a framework for revising national art curricula, especially in terms of enhancing practical engagement, technological integration, and teacher development. Professional development programs tailored to the specific needs of art educators in Iraq should be prioritized, including training in modern pedagogy, digital literacy, and interdisciplinary teaching. Schools should be encouraged to foster collaboration through joint projects, exhibitions, and student-led initiatives that promote community involvement and cultural identity. Partnerships with local artists, cultural centers, and NGOs can provide additional resources and mentorship opportunities. Finally, allocating dedicated funding for art infrastructure and materials, even in low-resource settings, is essential for implementing meaningful, sustainable change.

Authors' Contributions

All authors significantly contributed to this study.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

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Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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The authors report no conflict of interest.

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