

RESEARCH ARTICLE

The art education curriculum and its relationship to the art performance of preservice teachers: Basis for an action plan

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ABSTRACT

This study adopts social support theory as its central framework to examine the associations between pre-service teachers' artistic performance and their adaptability to preschool education environments. A descriptive-correlational research design was employed. The sample consisted of 274 pre-service teachers enrolled in early childhood education programs at three universities in Qingdao, Shandong Province, China. Measurement instruments were developed using Taba's (1962) seven-dimensional curriculum evaluation model and Smith's (1993) four-dimensional artistic performance framework. Data were analyzed through Spearman rank correlation, one-way ANOVA, and independent samples t-tests. Results indicated that the overall quality of arts education curricula fell within the good-to-very-good range. Among curriculum dimensions, selection of learning experiences received the lowest mean score ($M = 2.78$), while evaluation received the highest ($M = 3.57$). Regarding artistic performance, use of cultural tools ($M = 3.00$) and autonomy development ($M = 3.28$) were comparatively weak. Neither age nor gender produced significant effects on curriculum evaluation ($p > 0.05$). With one exception, significant positive correlations were found between all curriculum evaluation dimensions and artistic performance dimensions. The strongest association emerged between content selection and social interaction ($p = 0.607$, $p < 0.001$). These findings are consistent with a positive associative pathway from curricular social support to artistic performance, with theoretical implications for environmental adaptability. Targeted recommendations for curriculum improvement and teacher preparation are proposed accordingly.

Keywords: social support; pre-service teachers; artistic performance; early childhood education; environmental adaptability; curriculum evaluation

1. Introduction

Early childhood education represents a critical developmental window for children's cognitive, emotional, and social growth, and these formative years substantially shape children's long-term developmental trajectories. Empirical literature consistently documents that arts education has received growing attention from researchers and policymakers during this period, reflecting sustained expansion in its recognized functions beyond skill training to encompass emotional cultivation, cultural identity formation, and creativity development. China has pursued sustained reform in school arts education, and these policy shifts reflect the formal integration of aesthetic education into national educational strategy.

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Huang et al. (2024) conducted a systematic review of literature on school arts education in China from 2001 to 2022. Their findings confirm that arts education contributes meaningfully to cognitive development, emotional expression, and social integration, and that its policy status and practical value have continued to rise alongside educational reform^[1]. Huang et al. (2025) further analyzed central education policy documents through critical discourse analysis and found that arts education has been assigned an increasingly explicit national mission that extends beyond aesthetic cultivation to serve broader objectives of improving national competency and building cultural soft power^[2].

This policy transformation signals a profound shift in how arts education is conceived within the Chinese educational system. For pre-service teachers responsible for delivering arts education, the demand for enhanced professional competence has become increasingly pressing. However, significant tensions persist at the implementation level. Li et al. (2023) reviewed the developmental trajectory of aesthetic education policy in China and identified that, despite a maturing policy framework, significant challenges remain, including outdated curriculum design, uneven teacher professional quality, and inadequate assessment systems. The gap between policy intent and classroom practice reflects structural barriers that have constrained the full realization of aesthetic education goals^[3]. Wang et al. (2025) examined long-term policy changes in Chinese aesthetic education through a sustainability lens and concluded that repeated policy revisions alone are insufficient to produce meaningful reform. Substantive improvement in curriculum implementation requires simultaneous growth in teacher professional capacity; without such growth, policy objectives yield limited translation into student outcomes^[4].

These converging empirical findings position pre-service teachers as primary agents through whom arts education policy reaches practice. Adaptability and artistic performance in real teaching contexts function as critical variables connecting policy objectives to educational outcomes, and these factors substantially shape what students ultimately experience. This relationship therefore warrants systematic empirical investigation.

Environmental adaptability in preschool education refers to teachers' capacity to adjust their professional behaviors, instructional strategies, and interpersonal responses in response to the demands of diverse and dynamic early childhood settings (Nawab et al., 2021). Pre-service teachers entering preschool environments encounter substantial contextual variability, including differences in children's developmental levels, institutional cultures, and available resources. Their capacity to adapt to these conditions is recognized as a key dimension of professional readiness (Hao, 2015). Within the framework of social support theory, environmental adaptability is understood not as a purely individual attribute but as a capacity that develops through access to informational, instrumental, emotional, and appraisal support embedded in curriculum design, peer networks, and institutional structures (Xu et al., 2024). The present study treats environmental adaptability as the theoretically grounded professional outcome toward which curricular social support and artistic performance contribute, while acknowledging that this construct is examined indirectly through the lens of curriculum evaluation and self-reported performance.

Ziqing and Ngamsutti (2024) analyzed the curriculum philosophy and objectives embedded in China's arts curriculum standards and found that current standards address three dimensions — aesthetic perception, artistic expression, and cultural understanding — reflecting a reform logic that shifts from skill-centered to competency-centered education^[5]. This transition demands more than solid subject knowledge from pre-service teachers; it requires the capacity to translate educational goals into responsive practice that addresses children's developmental characteristics. Xu et al. (2024) developed a comprehensive assessment and development framework for aesthetic education using PCA and CEM models and identified that existing assessment

dimensions remain incomplete, particularly regarding the mechanisms linking teacher performance to curriculum adaptability. This gap provides a direct academic rationale for the present study ^[6].

The present study targets pre-service teachers enrolled in early childhood education programs at three universities in Qingdao, Shandong Province, China. A descriptive-correlational design is adopted, integrating Taba's (1962) seven-dimensional curriculum evaluation model with Smith's (1993) four-dimensional artistic performance framework. The study systematically examines associations between arts Curriculum Design and four key dimensions of pre-service teacher development: social interaction, cultural tool use, knowledge internalization, and autonomy development^[7]. Drawing on social support theory, the study proposes a theoretically grounded associative pathway connecting curricular social support, artistic performance, and environmental adaptability, offering an explanatory framework for understanding professional adaptation among pre-service teachers.

The study provides empirical evidence to inform arts curriculum reform, pre-service teacher training programs, and the development of institutional support systems in early childhood education, thereby supporting more effective translation of national arts education policy into classroom practice.

2. Literature review

The developmental benefits of arts education for young children appear to be well documented across significant empirical studies, providing a critical theoretical foundation for the present investigation. Moreover, Huang et al. (2025) employed a mixed-methods approach to examine how integrated arts education may well suggest fostering creativity in Chinese children, where the significant empirical findings could indicate that integrated arts programs activate children's creative potential across cognitive, emotional, and social dimensions simultaneously. Thus, the results may suggest that the effectiveness of such programs depends on whether teachers can embed arts activities into children's everyday learning contexts ^[8]. However, Song (2022) studied innovative aesthetic learning and findings may show aesthetic education should not be reduced to skill transmission alone^[9]. Additionally, research may indicate its core purpose affects children's intrinsic perception and creative expression.

Given that the evidence supports these multidimensional outcomes, Fei (2023) approached the topic from a different angle, focusing on emotional safety, where the important empirical findings could plausibly demonstrate that aesthetic education significantly enhances young children's interpersonal contact capacity and sense of security. Furthermore, the significant results may suggest that this points to an emotional support function of arts education that extends beyond knowledge transfer. Therefore, evidence may indicate pre-service teachers need competence to build emotionally supportive environments^[10]. Nevertheless, findings may show these studies confirm arts education value for development. In light of the key results, whether that value is realized depends on teachers' professional quality and adaptive capacity.

Notwithstanding these important theoretical considerations, the evidence could reasonably indicate that this is precisely what motivates the present study's significant focus on pre-service teachers' artistic performance, where these critical empirical findings demonstrate that the multidimensional value may substantially influence outcomes in practice. However, sociocultural theory may suggest that the key findings provide a productive lens for understanding how pre-service teachers develop artistic performance. Thus, results may show this theoretical framework affects professional development outcomes. Therefore, evidence could indicate sociocultural perspectives support understanding of teacher capacity. Additionally, research may show these considerations prove relevant to the present investigation. Chen (2025) drew on Vygotsky's sociocultural theory to examine that ethnic cultural representations in the play of preschool

children in Taiwan may well suggest significant empirical patterns in how cultural cognition develops. Given that the evidence indicates children's cultural cognition and artistic expression are largely constructed through social interaction, the important findings could demonstrate that teachers and peers function as critical mediators. Moreover, teachers may suggest that their understanding of local cultural symbols directly shapes children's cultural learning experiences^[11]. Wang et al. (2024) conducted a multi-case study; results may show beliefs affect classroom practice. Furthermore, teachers with open educational beliefs could indicate learning spaces affect outcomes^[12]. Wang (2025), in a doctoral study exploring reflective practice groups among Chinese early childhood teachers, could plausibly demonstrate that teachers' reflective engagement in significant artistic activities such as singing and movement effectively promotes the important development of professional autonomy. In light of the key findings, the evidence may suggest that this autonomy does not develop in isolation, and the results could demonstrate that peer support and the relevant social resources embedded in organizational culture remain critical factors. However, autonomy may depend on peer support and organizational culture^[13]. Thus, findings may show social networks affect performance. Additionally, research could indicate curriculum design affects adaptability.

Notwithstanding the considerable variation across contexts, the significant empirical findings collectively could indicate that pre-service teachers' artistic performance develops within important social support networks rather than through the critical process of individual effort alone. Therefore, the key evidence may suggest that curriculum design, peer interaction, and organizational culture together constitute the relevant social support system shaping both performance and environmental adaptability. Moreover, research may indicate challenges affect teacher preparation. In light of findings, results could show difficulties affect early childhood programs^[14]. Nevertheless, Wu et al. (2024) may show structural problems affect practical teaching outcomes. Kotova (2025) analyzed that significant challenges in Chinese arts and education teacher training emerge from a comparative perspective, indicating that curriculum misalignment and inadequate pedagogical adaptation could substantially undermine pre-service teacher professional growth^[15]. Moreover, the significant empirical findings may suggest that digital transformation contexts demand that traditional arts pedagogy adapt more systematically to meet actual teaching requirements. Ashykhmina (2025) demonstrates that professional subjectivity among future music education master's students might indicate the limitations of classroom instruction alone^[16]. Thus, findings may show professional identity requires systematic training combined with reflective practice. However, evidence could indicate teacher development demands more than conventional methodological approaches provide. In light of the significant empirical evidence, Hao (2015) could plausibly demonstrate that the important developmental journey from novice to expert teacher reveals critical organizational factors, drawing on in-depth interviews with ten preschool teachers in Shanghai^[17]. Furthermore, the key findings may suggest that supportive organizational culture demonstrates that catalytic conditions substantially influence this important developmental process. Klmn et al. (2020) might indicate that departmental culture could affect teachers' pedagogical orientations^[18]. Therefore, results may show positive cultures promote professional innovation. Additionally, evidence could suggest organizational factors affect development trajectories significantly.

Given that the significant comparative evidence may well suggest that contemporary teacher professional development increasingly requires context-sensitivity, Nawab et al. (2021) could reasonably indicate that standardized training detached from specific teaching situations demonstrates that adaptive capacity remains critically underdeveloped^[19]. Moreover, the important theoretical findings might suggest that this key evidence supports that environmental adaptability within preschool education settings represents significant theoretical consideration. Nevertheless, results may show this view provides backing for the present study's attention. Thus, literature could indicate demographic variables affect pre-service

development conclusions. Furthermore, evidence may suggest consistent findings support existing theoretical frameworks. Pan and Songco (2023) could plausibly demonstrate that the significant collaborative culture-building evidence at a Chinese art college reveals that aesthetic education reform may substantially influence the important conditions supporting pre-service teacher professional development. In organizations with strong collaborative cultures, individual differences in gender and age may well suggest only limited effects on teachers' significant professional engagement, where the significant empirical evidence could indicate that organizational-level cultural support emerged as the more critical and decisive variable^[20]. Moreover, Rezaeian and Abdollahzadeh (2020), working in an Iranian EFL context, might indicate that the relationship between teacher efficacy and age, experience, and gender is complex, with the important findings suggesting that the effect of gender on self-efficacy was not significant at the level of teachers' self-assessment. Furthermore, the key evidence demonstrates that this effect appears more in external student evaluations^[21]. Thus, Pranoto et al. (2021) may show contributions of teacher experience and age to instructional performance affect outcomes. In light of these results, research could indicate predictive power of these variables is moderated by organizational support^[22]. Given that the significant empirical findings could plausibly demonstrate that students' perceptions of teacher professionalism are shaped by multiple important contextual factors, Pennington et al. (2020) similarly suggests that the relevant evidence demonstrates that age alone is not a determining variable^[23]. Additionally, the important results may suggest that demographic variables should not be treated as independent predictors, with the key evidence indicating that their effects need to be examined within specific social support contexts. However, studies may show demographic variables need examination within support contexts. Therefore, evidence could indicate this provides justification for positioning social support structures at the center of the present study's explanatory framework.

3. Methodology

3.1. Research design

This study adopts a descriptive-correlational design, employing quantitative methods as the primary analytical approach. The design enables objective description of variables in their natural state and systematic testing of the direction and strength of relationships between arts education Curriculum Design and pre-service teachers' artistic performance, thereby providing an empirical foundation for theorizing their associations with environmental adaptability within a social support framework.

The independent variable is arts education Curriculum Design, operationalized into seven dimensions based on Taba's (1962) curriculum model: diagnosis of needs, formulation of objectives, selection of content, organization of content, selection of learning experiences, organization of learning activities, and evaluation. The dependent variable is pre-service teachers' artistic performance, operationalized into four dimensions following Smith's (1993) framework: social interaction, use of cultural tools, knowledge internalization, and autonomy development. Age and gender served as demographic grouping variables for subgroup comparison analyses.

Spearman rank correlation was selected as the primary method for examining associations between curriculum evaluation and artistic performance dimensions because Likert-scale data collected in this study are ordinal in nature. Pearson correlation assumes interval-level data and bivariate normality; given that these assumptions could not be confirmed for the present dataset, the non-parametric Spearman coefficient was the methodologically appropriate choice. This decision follows established practice in educational research employing ordinal survey instruments (Em & Khampirat, 2025).

The following null hypotheses were formulated to guide inferential analysis:

H₀₁: There are no statistically significant differences in arts education curriculum evaluation scores across pre-service teachers grouped by age or gender ($p > 0.05$).

H₀₂: There are no statistically significant correlations between arts education curriculum evaluation dimensions and pre-service teachers' artistic performance dimensions ($p > 0.05$).

Data were collected using a structured questionnaire with a five-point Likert scale to ensure standardization and comparability across the study population ^[24]. The analytical plan incorporated descriptive statistics, one-way ANOVA, independent samples t-tests, and Spearman rank correlation, addressing three analytical layers: describing current variable levels, testing group differences, and examining correlational relationships.

3.2. Participants

The study population consisted of pre-service teachers enrolled in early childhood education programs at three universities in Qingdao, Shandong Province, China: University X, University Y, and University Z. These institutions differ in character and mission, providing institutional diversity within the sample. University X is a multidisciplinary institution spanning engineering, economics, management, arts, education, liberal arts, and medicine, situated in the West Coast New District. University Y is a privately funded comprehensive undergraduate institution in Shandong Province and serves as a pilot institution for the Ministry of Education's applied technology university strategy. University Z is a regular higher vocational institution approved by the Shandong Provincial Government, affiliated with the Shandong Provincial Department of Commerce, situated in central Qingdao, and recognized as one of the earliest institutions in Shandong to train professionals in international trade.

Inclusion criteria required participants to be between 22 and 24 years of age, enrolled in an early childhood education major, having completed relevant arts education coursework, and willing to participate voluntarily. The total student population across the three institutions was 950: 290 at University X, 350 at University Y, and 310 at University Z. Based on the sample size formula proposed by Fisher and Smith (2023), a final effective sample of 274 participants was determined. Stratified random sampling was employed, with institutional affiliation serving as the stratification criterion. Samples were drawn proportionally: 84 from University X, 101 from University Y, and 89 from University Z. This approach ensured balanced representation across institutions and reduced selection bias, as every eligible student maintained an equal probability of selection ^[25].

3.3. Research instruments

The primary data collection tool was a self-developed structured questionnaire. Both published and unpublished research contributed to the instrument's theoretical foundation, and the instrument was finalized through multiple rounds of review and revision under supervisor guidance. A five-point Likert scale format was used throughout to ensure standardized data collection.

Part Two of the questionnaire comprised an arts education curriculum evaluation scale grounded in Taba's (1962) curriculum model, covering seven dimensions: diagnosis of needs, formulation of objectives, selection of content, organization of content, selection of learning experiences, organization of learning activities, and evaluation. Each dimension contained five items, yielding 35 items in total. Scores ranged from 1 to 5, with the following interpretive intervals: 1.00–1.80 (strongly disagree), 1.81–2.60 (disagree), 2.61–3.40 (somewhat agree), 3.41–4.20 (agree), and 4.21–5.00 (strongly agree).

Part Three addressed pre-service teachers' artistic performance, based on Smith's (1993) framework and covering four dimensions: social interaction, use of cultural tools, knowledge internalization, and autonomy development. Each dimension contained five items, for a total of 20 items, applying the same 1–5 scoring range with interpretive labels of poor (1.00–1.80), fair (1.81–2.60), good (2.61–3.40), very good (3.41–4.20), and excellent (4.21–5.00) ^[26].

For content validity, two Chinese subject experts with backgrounds in early childhood and arts education, and one Philippine expert in cross-cultural research, independently reviewed the questionnaire. Each reviewer assessed the accuracy of item wording, the completeness of dimensional coverage, and the alignment between items and research objectives. Feedback informed revisions to ambiguous or logically unclear items, strengthening correspondence between questionnaire content and the theoretical framework.

For construct validity, a pilot test was conducted with five pre-service teachers from each of the three participating institutions, totaling 15 participants. Item-total correlations were calculated using Pearson *r*, and items failing to meet validity criteria were revised or removed, ensuring that retained items adequately represented their intended theoretical dimensions. The pilot sample and the main study sample were drawn from the same population but remained independent to prevent data contamination ^[27].

3.4. Validity and reliability

The validity and reliability testing procedure followed a systematic sequence. Content validity was established through independent expert review as described above. Construct validity was examined through pilot-based item-total correlation analysis.

For reliability, Cronbach's alpha was computed for the full instrument and for each subscale separately. The overall Cronbach's alpha coefficient was 0.765, meeting the conventionally accepted threshold of 0.70 for quantitative social science research. Subscale reliability coefficients are reported in **Table 1a**. These results confirm adequate internal consistency for each dimension and support the use of subscale scores in subsequent descriptive and inferential analyses. Sufficient measurement stability across all dimensions supports the analytical framework of the study ^[28].

It is acknowledged that a pilot test with 15 participants provides a preliminary rather than comprehensive basis for construct validity claims. Future research should employ confirmatory factor analysis with larger independent samples to provide stronger dimensional evidence for the instrument.

3.5. Data collection procedure

Data collection adhered to established ethical standards throughout the research process. A complete research protocol was submitted to the Institutional Ethics Review Committee (IERC) of Trinity University of Asia prior to data collection, and formal data collection commenced only after official approval was granted under reference number 2026-2nd-CASE-Jiang-v2. Written permission was subsequently secured from University X, University Y, and University Z. Each request detailed the research objectives, data usage, and participant rights protection measures. Formal data collection began only after written institutional consent was obtained from all three universities.

WeChat served as the primary communication channel for contacting potential participants. Research objectives were explained to all parties, and participants were informed that participation was voluntary and that withdrawal was permitted at any time without consequence. Questionnaire links were distributed only after confirmed consent was established. The questionnaire was hosted on a secure online survey platform, and responses were automatically stored in an encrypted database in real time, eliminating risks of data loss or manual entry error. No hierarchical relationship existed between the researchers and participants; the

researchers maintained no supervisory, instructional, or evaluative role over any participant during the study period, and voluntary participation was further assured through anonymity and the absence of institutional incentives or penalties.

The questionnaire was fully anonymous, with no personally identifiable information collected, including names, contact details, or IP addresses. All signed consent documents were stored securely in a locked filing cabinet, and electronic data files were password protected. Data will be retained for a minimum of three years in compliance with institutional data protection requirements ^[29]. All collected data were organized, coded, and verified before being imported into statistical software.

3.6. Data analysis

Multiple statistical methods were applied in accordance with the nature and level of each research question. Descriptive statistics — including frequencies, percentages, and means — were used to characterize the demographic profile of participants and the score distributions across all scale dimensions, providing a complete picture of sample composition and variable levels.

To test H_{01} , one-way ANOVA was used to examine differences in curriculum evaluation scores across age groups (22, 23, and 24 years), and independent samples t-tests were used to examine gender differences. All subgroup analyses report test statistics (F or t), degrees of freedom, exact p-values, and effect sizes (η^2 or Cohen's d). The criterion for retaining the null hypothesis was $p > 0.05$ ^[30].

To test H_{02} , Spearman rank correlation (Spearman's ρ) was used to examine the direction and strength of associations between the seven curriculum evaluation dimensions and the four artistic performance dimensions, yielding a 7×4 matrix of 28 correlation coefficients. Given the large number of simultaneous correlation tests, Bonferroni correction was applied to control familywise error inflation, with the adjusted significance threshold set at $p < 0.002$ ($0.05 \div 28$). Results significant at $p < 0.05$ prior to correction are also reported for reference. The non-parametric Spearman coefficient was selected because the ordinal nature of Likert-scale data does not satisfy the interval-level and normality assumptions required for Pearson correlation. This approach is consistent with standard practice for ordinal survey data in educational research (Em & Khampirat, 2025).

The combined application of these methods addresses three analytical layers — describing current variable levels, testing group differences, and examining correlational relationships — forming a coherent analytical chain from descriptive observation to empirical examination of the proposed associative framework.

4. Results

4.1. Demographic profile of respondents

A total of 274 valid questionnaires were collected. The demographic characteristics of the sample are presented in **Table 1** and illustrated in **Figure 1**, providing foundational context for evaluating sample balance prior to inferential analysis. Regarding age distribution, 93 respondents were 22 years old, accounting for 33.9% of the total sample. An additional 79 respondents were 23 years old, representing 28.8% of the sample, and 102 respondents were 24 years old, constituting the largest group at 37.2%. The 23-year-old group had a slightly lower proportion than the other two groups, while the 24-year-old group was marginally the largest. Differences across the three age groups were modest, and no single age cohort dominated the sample composition. This balanced age structure reduces the potential for age-related bias to distort descriptive or inferential findings, as sampling equivalence across groups is a recognized condition for reducing systematic error in survey-based educational research (Boudreaux & Elby, 2020).

Regarding gender distribution, 153 respondents were female, accounting for 55.8% of the total sample, and 121 were male, accounting for 44.2%. Female participants outnumbered male participants by a modest margin. However, this difference was not large enough to constitute a meaningful imbalance that would threaten the representativeness or validity of subsequent statistical tests (Ashykhmina, 2025) [30]. The gender composition of the sample broadly reflects the demographic characteristics of early childhood education programs in China, where female enrollment typically predominates. No single demographic characteristic dominates the sample composition in a way that would undermine analytical validity. The frequency distributions across both age and gender dimensions confirm that the sample is sufficiently balanced to support the generalizability of both descriptive and inferential conclusions drawn in subsequent sections. This demographic foundation establishes confidence in the representativeness of the data for the target population of pre-service teachers enrolled in early childhood education programs at the three participating institutions.

Table 1. Demographic profile of respondents (N = 274).

Variable	Group	Frequency	Percentage (%)
Age	22 years old	93	33.9
	23 years old	79	28.8
	24 years old	102	37.2
	Total	274	100
Gender	Female	153	55.8
	Male	121	44.2
	Total	274	100

Note. Data were collected from pre-service teachers at three universities in Qingdao, Shandong Province, China (University X, University Y, and University Z).

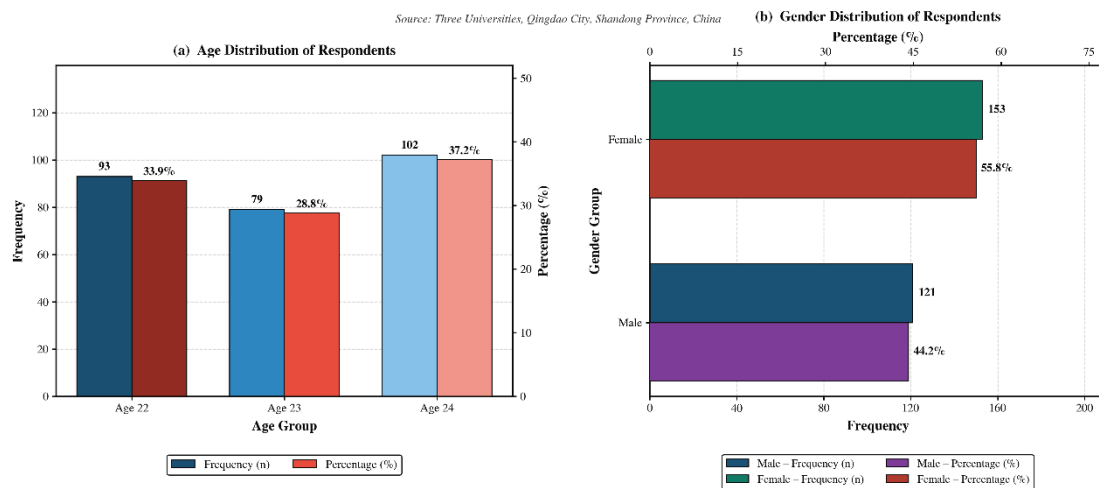


Figure 1. Demographic profile of pre-service teachers (N = 274).

4.2. Arts education curriculum evaluation results

Drawing on Taba's (1962) seven-dimensional curriculum model, this study assessed 274 pre-service teachers' perceptions of arts education Curriculum Design across seven structural dimensions. As shown in **Table 2** and **Figure 2**, the mean scores across the seven dimensions reveal a clear hierarchical pattern that reflects both the strengths and structural weaknesses of the current arts education curriculum as a social support system for pre-service teacher development. Three dimensions reached the "very good" level:

evaluation ($M = 3.57$), selection of content ($M = 3.56$), and formulation of objectives ($M = 3.41$). The remaining four dimensions — diagnosis of needs ($M = 3.34$), organization of content ($M = 3.31$), organization of learning activities ($M = 3.26$), and selection of learning experiences ($M = 2.78$) — fell within the "good" range. Selection of learning experiences received the lowest score by a considerable margin, standing clearly apart from the other six dimensions. This gap reflects a systematic deficiency in the curriculum's capacity to provide pre-service teachers with diverse learning opportunities. From the perspective of social support theory, this structural weakness directly constrains the instrumental support available to pre-service teachers, limiting the variety of experiential resources through which professional competence and environmental adaptability are developed [31].

The lowest-scoring dimension, selection of learning experiences ($M = 2.78$), is examined at the item level in **Table 3** and **Figure 3**. All five items within this dimension fell within the "somewhat agree" interval, indicating consistently limited perceived support across all facets of experiential learning design. The item with the relatively highest score within this dimension was "the curriculum aligns learning experiences with educational objectives and assessments" ($M = 2.96$), indicating that some degree of goal-oriented structural alignment is present within the curriculum. Nevertheless, this score still falls within the "somewhat agree" range, confirming that even the strongest item within this dimension reflects only partial fulfillment of its intended support function. The item "the curriculum incorporates a variety of collaborative and individual tasks" received the lowest score within this dimension ($M = 2.69$). This finding identifies a notable lack of peer collaborative learning support embedded in the current curriculum — a dimension closely tied to the instrumental support function emphasized in social support theory. When the curriculum fails to provide sufficient collaborative learning opportunities, the social learning resources available to pre-service teachers as they navigate real preschool teaching environments are significantly constrained. Pre-service teachers who lack access to structured collaborative learning experiences during their preparation are less equipped to draw on peer networks and social resources in professional practice. This constraint directly limits the development of the environmental adaptability that early childhood education settings demand (Omosebi, Ben & Andy, 2024; Yang, 2025).

The highest-scoring dimension, evaluation ($M = 3.57$), is presented in **Table 4** and **Figure 4**. All five items within this dimension reached the "agree" level, reflecting a relatively mature assessment support structure within the current curriculum. The item "the curriculum revises assessment methods based on student performance trends" received the highest score within this dimension ($M = 3.79$), indicating that a data-driven dynamic assessment adjustment mechanism has been established to a meaningful degree. This mechanism provides pre-service teachers with ongoing informational support and performance feedback, both of which are recognized as critical components of the appraisal support function in social support theory. Regular and responsive assessment revision enables pre-service teachers to develop more accurate self-evaluations of their professional progress, which in turn supports adaptive professional behavior in complex teaching environments. The lowest-scoring item within this dimension was "the curriculum includes peer assessment and self-assessment components" ($M = 3.49$). While this score still falls within the "agree" range, it identifies meaningful room for improvement in the curriculum's provision of interactive evaluative support — a finding that aligns with Ridge and Lavigne's (2020) argument that peer observation and feedback mechanisms are central to developing adaptive instructional practice.

Taken together, the findings across these seven dimensions indicate that the current arts education curriculum has established a relatively solid social support base in terms of assessment mechanisms and content construction, as evidenced by the strong performance of the evaluation and selection of content dimensions. However, the diversity of learning experiences and the availability of structured collaborative

support remain the core structural weaknesses that constrain the curriculum's function as a comprehensive social support system for pre-service teacher development. These structural imbalances have direct implications for the environmental adaptability of pre-service teachers entering preschool education settings, where diverse experiential preparation and collaborative professional skills are essential competencies ^[32].

Table 2. Summary of mean scores across seven curriculum dimensions (N = 274).

Dimension	Mean (M)	Interpretation
Diagnosis of Needs	3.34	Good
Formulation of Objectives	3.41	Very Good
Selection of Content	3.56	Very Good
Organization of Content	3.31	Good
Selection of Learning Experiences	2.78	Good
Organization of Learning Activities	3.26	Good
Evaluation	3.57	Very Good

Note. Scale intervals: 2.61–3.40 = somewhat agree (Good); 3.41–4.20 = agree (Very Good).

Table 3. Sub-item mean scores: Selection of learning experiences (Overall Mean = 2.78).

Item	Mean (M)	Interpretation
The curriculum incorporates active learning strategies (projects, debates, etc.)	2.79	Somewhat Agree
The curriculum provides differentiated experiences for diverse learning preferences	2.71	Somewhat Agree
The curriculum uses technology to enhance learning opportunities	2.77	Somewhat Agree
The curriculum incorporates a variety of collaborative and individual tasks	2.69	Somewhat Agree
The curriculum aligns learning experiences with objectives and assessments	2.96	Somewhat Agree

Table 4. Sub-item mean scores: Evaluation (Overall Mean = 3.57).

Item	Mean (M)	Interpretation
The curriculum employs multiple assessment formats (portfolios, presentations, etc.)	3.55	Agree
The curriculum ensures assessment criteria are transparent and shared with students	3.5	Agree
The curriculum uses assessment data to identify systemic learning gaps	3.53	Agree
The curriculum includes peer assessment and self-assessment components	3.49	Agree
The curriculum revises assessment methods based on student performance trends	3.79	Agree

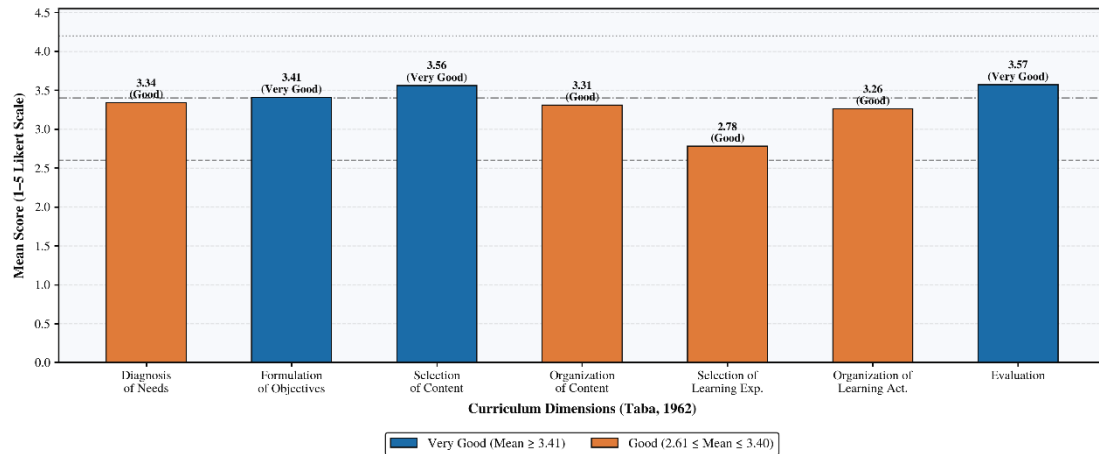


Figure 2. Mean scores of arts education curriculum dimensions (Pre-service Teachers, N = 274).

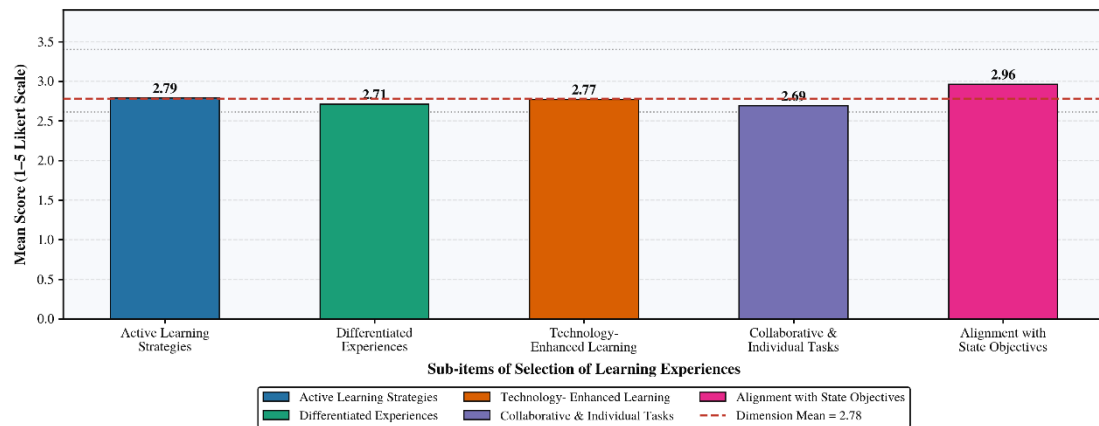


Figure 3. Sub-item mean scores: Selection of learning experiences (Lowest Scoring Dimension, Overall Mean = 2.78).

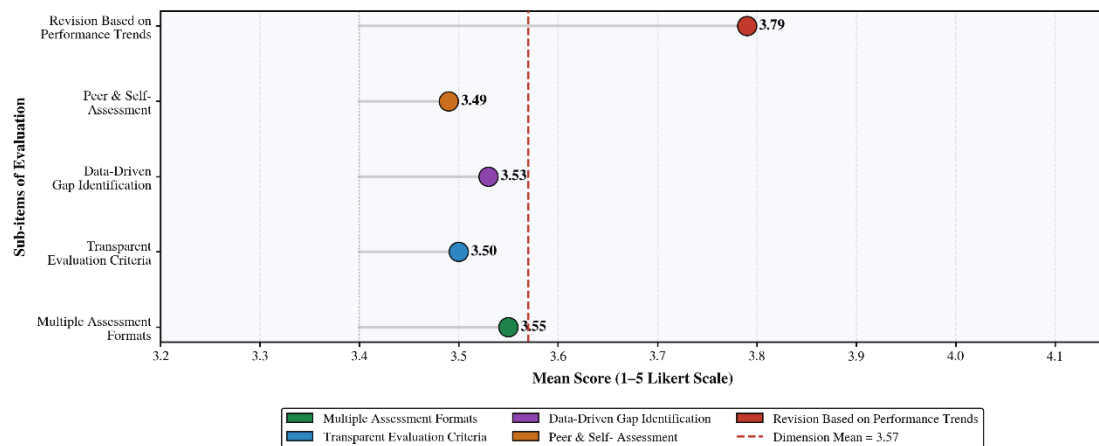


Figure 4. Sub-item mean scores: Evaluation (Highest Scoring Dimension, Overall Mean = 3.57).

4.3. Significant correlations between curriculum evaluation and artistic performance

Spearman rank correlation analysis was conducted to examine the direction and strength of associations between the seven curriculum evaluation dimensions and the four dimensions of pre-service teachers' artistic performance. The full correlation matrix is presented in **Table 5**, and key findings are further illustrated in

Figures 5, 6, and 7. The 7×4 matrix produced a total of 28 correlation coefficients. Of these 28 pairs, 27 reached statistical significance at $p < 0.05$. The sole non-significant result was the correlation between selection of learning experiences and social interaction ($\rho = 0.118$, $p = 0.052$), which fell just below the threshold for statistical significance. On the basis of these results, H_{02} is rejected: significant positive associations exist between arts education curriculum evaluation dimensions and pre-service teachers' artistic performance dimensions across nearly all variable pairs examined in this study.

The breadth and consistency of these significant associations confirm that arts education Curriculum Design is broadly and robustly correlated with pre-service teachers' artistic performance across all four dimensions. These findings provide strong empirical support for the theoretical proposition that curriculum structure constitutes a form of social support that is systematically associated with the development of pre-service teachers' artistic performance, and that such performance is in turn theoretically linked to their capacity for environmental adaptability in preschool education settings. Among all 28 pairs, the strongest correlation was found between selection of content and social interaction ($\rho = 0.607$, $p < 0.001$), representing a strong positive association. This finding indicates that the quality and relevance of curriculum content is most closely associated with pre-service teachers' interpersonal and collaborative behaviors in arts education contexts. Several additional pairs showed moderately strong associations: organization of content and knowledge internalization ($\rho = 0.564$, $p < 0.001$), diagnosis of needs and knowledge internalization ($\rho = 0.559$, $p < 0.001$), and selection of learning experiences and knowledge internalization ($\rho = 0.549$, $p < 0.001$).

These results establish that the structural support embedded in curriculum design is broadly associated with knowledge internalization across multiple curriculum dimensions, identifying this performance dimension as the one most consistently linked to Curriculum Design. The correlation between organization of learning activities and autonomy development was also notable ($\rho = 0.514$, $p < 0.001$), indicating that well-structured curriculum activities are associated with greater capacity for pre-service teachers' autonomous professional decision-making. This association aligns with the theoretical argument that organized learning activity design functions as a form of social support by creating structured opportunities for independent professional judgment to develop.

Table 5. Spearman correlation matrix: Curriculum dimensions $\times$ artistic performance dimensions ($N = 274$).

Curriculum Dimension	Social Interaction	Use of Cultural Tools	Knowledge Internalization	Autonomy Development
Diagnosis of Needs	0.298***	0.472***	0.559***	0.199***
Formulation of Objectives	0.411***	0.323***	0.357***	0.357***
Selection of Content	0.607*	0.228***	0.368***	0.234***
Organization of Content	0.269***	0.468***	0.564*	0.164**
Selection of Learning Experiences	0.118 ns	0.357***	0.549***	0.422***
Organization of Learning Activities	0.198***	0.411***	0.353***	0.514*
Evaluation	0.389***	0.286***	0.472***	0.298***

Note. *** $p < .001$; ** $p < .01$; ns $p > .05$. Bold values indicate the strongest correlation within each performance dimension.

As shown in **Table 6**, the ranked correlations between all seven curriculum dimensions and knowledge internalization range from $\rho = 0.353$ to $\rho = 0.564$. Three curriculum dimensions — organization of content ($\rho = 0.564$), diagnosis of needs ($\rho = 0.559$), and selection of learning experiences ($\rho = 0.549$) — all exceeded 0.54, indicating that knowledge internalization is the artistic performance dimension most broadly and consistently associated with Curriculum Design. This pattern reflects the central role of curriculum structure

in supporting the cognitive and professional internalization processes through which pre-service teachers translate arts education content into practical teaching competence. The consistency of these associations across multiple curriculum dimensions underscores that knowledge internalization is not narrowly determined by any single curriculum feature but is instead a broadly responsive outcome of overall Curriculum Design as a social support system ^[33].

Table 6. Ranked spearman correlations: curriculum dimensions → Knowledge internalization.

Rank	Curriculum Dimension	ρ	Significance
1	Organization of Content	0.564	$p < .001$
2	Diagnosis of Needs	0.559	$p < .001$
3	Selection of Learning Experiences	0.549	$p < .001$
4	Evaluation	0.472	$p < .001$
5	Formulation of Objectives	0.357	$p < .001$
6	Selection of Content	0.368	$p < .001$
7	Organization of Learning Activities	0.353	$p < .001$

Note. Knowledge internalization is the artistic performance dimension most broadly influenced by Curriculum Design.

Table 7 presents the ranked correlations between curriculum dimensions and autonomy development, with coefficients ranging from $\rho = 0.164$ to $\rho = 0.514$. Organization of learning activities demonstrated the strongest association with autonomy development ($\rho = 0.514$, $p < .001$), while organization of content showed the weakest association ($\rho = 0.164$, $p = .007$). This divergence in association strength indicates that autonomy development is more closely related to how curriculum activities are structured and sequenced than to how curriculum content is selected and organized. The finding is theoretically consistent with the argument in social support theory that structured activity design provides the relational and motivational scaffolding through which professional autonomy is gradually cultivated, whereas content organization alone does not sufficiently activate the self-directed learning behaviors associated with autonomous professional development.

Table 7. Ranked spearman correlations: Curriculum dimensions → Autonomy development.

Rank	Curriculum Dimension	ρ	Significance
1	Organization of Learning Activities	0.514	$p < .001$
2	Selection of Learning Experiences	0.422	$p < .001$
3	Formulation of Objectives	0.357	$p < .001$
4	Evaluation	0.298	$p < .001$
5	Diagnosis of Needs	0.199	$p < .001$
6	Selection of Content	0.234	$p < .001$
7	Organization of Content	0.164	$p < .01$

Note. Organization of learning activities is the strongest curriculum predictor of autonomy development; organization of content shows the weakest association.

Figure 7 presents a bubble chart displaying the self-assessed performance means and maximum curriculum correlation coefficients for each of the four artistic performance dimensions, allowing simultaneous comparison of performance level and strength of curricular association. Knowledge internalization ($M = 3.47$, max $\rho = 0.564$) and social interaction ($M = 3.46$, max $\rho = 0.607$) performed strongly on both indicators, reflecting both relatively high self-assessed performance and strong positive associations with Curriculum Design. By contrast, use of cultural tools ($M = 3.00$, max $\rho = 0.472$) and

autonomy development ($M = 3.28$, $\max \rho = 0.514$) were comparatively weaker on both self-assessed performance scores and the strength of their curricular associations. The dimensions on which pre-service teachers reported lower performance correspond precisely to those dimensions where the associations with Curriculum Design were more limited. This convergence across the two indicators is theoretically significant: it suggests that the dimensions of artistic performance that the current curriculum supports least adequately are also the dimensions in which pre-service teachers feel least confident, identifying the development of cultural tool use and professional autonomy as the most critical targets for curriculum reform and teacher preparation improvement.

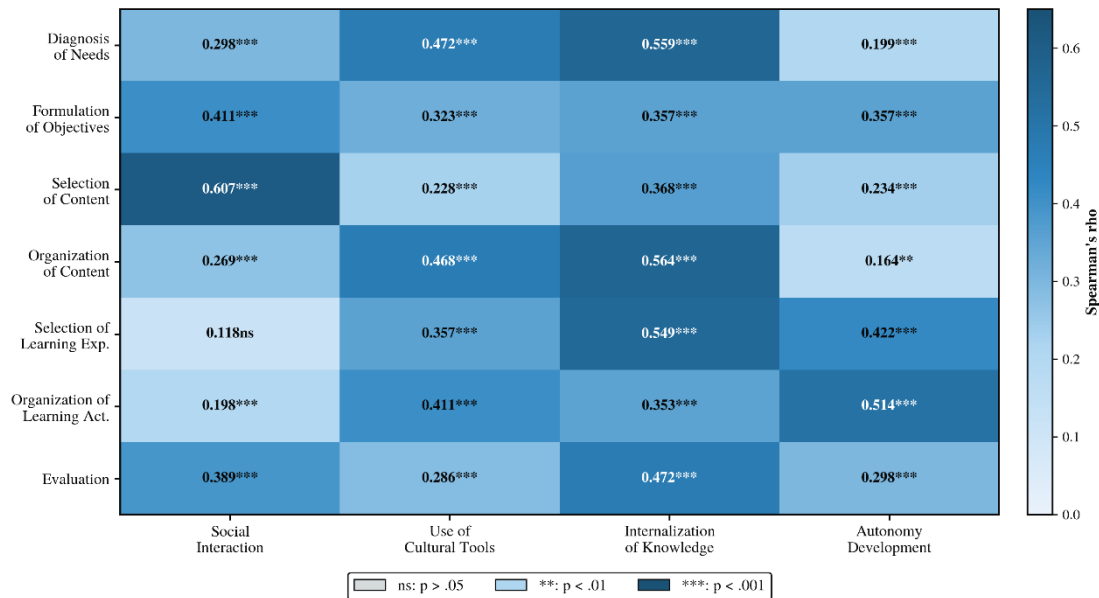


Figure 5. Spearman correlation heatmap: Curriculum dimensions vs. artistic performance dimensions ($N = 274$).

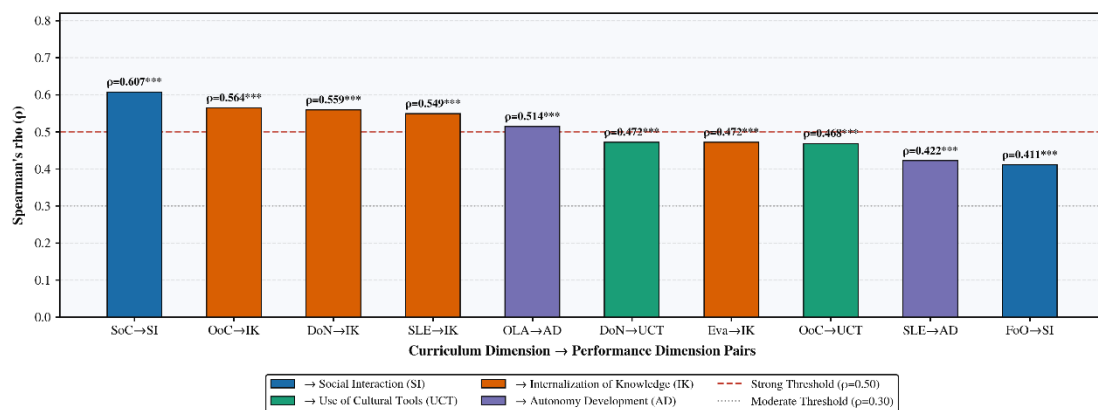


Figure 6. Top 10 strongest spearman correlations between curriculum dimensions and artistic performance dimensions.

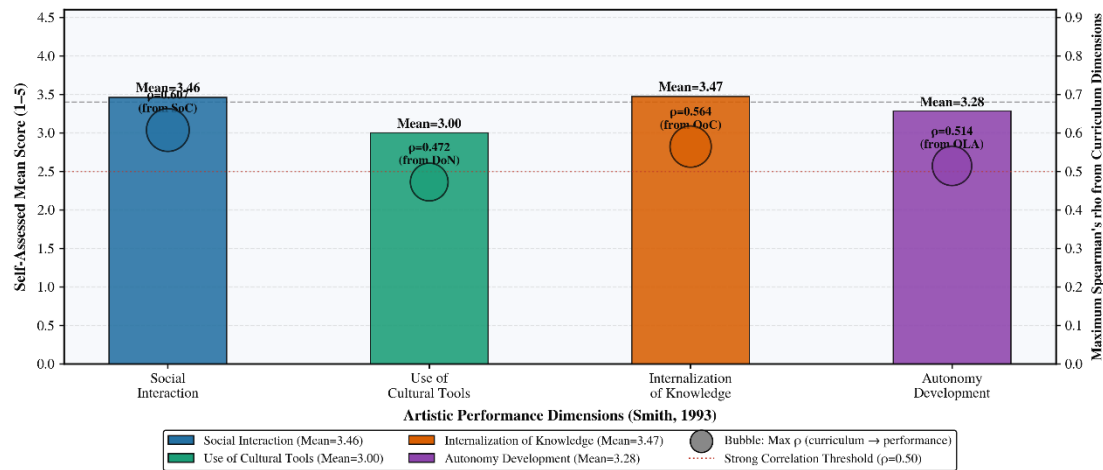


Figure 7. Self-assessed performance means and maximum curriculum correlations across four artistic performance dimensions (N = 274).

5. Discussion and conclusions

5.1. Discussion

The results of this study reveal broad and meaningful positive associations between the seven curriculum evaluation dimensions and the four dimensions of pre-service teachers' artistic performance, providing empirical support for the explanatory power of social support theory in the context of pre-service teacher professional development. These findings are interpreted below in relation to the study's theoretical framework and the existing literature, with attention to their implications for understanding environmental adaptability in preschool education settings.

The strongest association in the correlation matrix was found between selection of content and social interaction ($\rho = 0.607$, $p < .001$). This finding indicates that the quality and pedagogical relevance of curriculum content are closely associated with pre-service teachers' capacity for interpersonal engagement in arts education settings. This result aligns with Karsli and Karaman's (2024) argument that content-integrated social interaction serves as the core bond in teacher-student relationships within educational curricula. It also reflects Chen's (2025) Vygotskian proposition that teachers' deep engagement with curriculum content is a prerequisite for fulfilling a cultural mediation role in classroom interactions ^[34]. When curriculum content is rich, culturally relevant, and pedagogically purposeful, it activates social interaction behaviors by providing teachers with the conceptual and communicative resources necessary to engage meaningfully with children and colleagues. This association between content quality and social interaction has direct implications for environmental adaptability, as the capacity to engage in responsive interpersonal communication is a foundational competency for navigating the relational complexity of preschool education environments.

The significant positive association between organization of learning activities and autonomy development ($\rho = 0.514$, $p < .001$) further supports the theoretical argument that curriculum structure functions as a form of social support. This finding indicates that when course activity design provides adequate structured space for pre-service teachers to make independent professional decisions, their capacity for autonomous judgment is more fully developed. This result is consistent with Lennert da Silva and Mølstad's (2020) conclusion that teacher autonomy and the quality of learning activity organization share a mutually reinforcing relationship. From a social support perspective, well-organized learning activities provide the scaffolding through which pre-service teachers can safely exercise independent judgment, gradually building the self-regulatory competence that environmental adaptability requires. The structured

provision of autonomy-supporting experiences within the curriculum is therefore not a peripheral concern but a direct contributor to teachers' professional readiness for diverse and unpredictable preschool contexts.

The selection of learning experiences dimension received the lowest mean score across all seven curriculum dimensions ($M = 2.78$), and its correlation with social interaction did not reach statistical significance ($p = 0.118$, $p = 0.052$). This is the only non-significant association in the full 28-pair correlation matrix. This pattern indicates that when curriculum support for experiential diversity falls below a critical threshold, social interaction behaviors are not activated by the curricular environment. The breakdown of this association is theoretically important: it demonstrates that the relationship between Curriculum Design and artistic performance is not uniformly linear across all dimension combinations, and that certain forms of performance — particularly social interaction — depend on a minimum level of experiential curriculum provision before they can be cultivated. This finding is consistent with Wu et al.'s (2024) identification of systematic structural deficiencies in the practical teaching components of Chinese early childhood education programs and resonates with Kotova's (2025) analysis of the persistent misalignment between curriculum content design and the actual demands of real teaching contexts ^[35]. Together, these results indicate that the experiential gap in the current curriculum represents not merely a performance weakness but a structural barrier to the social support function that the curriculum is theoretically positioned to provide.

The absence of significant effects for age and gender on curriculum evaluation scores confirms that environmental adaptability is shaped primarily by curriculum structure and the social support systems embedded within it, rather than by individual demographic characteristics. Pre-service teachers across all three age groups and both gender categories evaluated Curriculum Design in broadly consistent ways, indicating that the structural properties of the curriculum — rather than who is experiencing it — are the dominant determinants of the social support it provides. This finding provides clear empirical support for directing professional development and reform interventions toward curriculum restructuring and institutional support enhancement rather than toward group-based differentiation strategies. It is also consistent with Pan and Songco's (2023) finding that organizational-level cultural support is a more decisive variable than individual demographic characteristics in shaping professional engagement and adaptability within educational institutions.

Taken together, these findings support the theoretical proposition that Curriculum Design, as a form of structured social support, is systematically associated with pre-service teachers' artistic performance across multiple dimensions, and that artistic performance is theoretically linked to the development of environmental adaptability in preschool education settings. The results do not establish causal directionality, as the descriptive-correlational design of this study permits only associational inferences. However, the breadth, consistency, and theoretical coherence of the observed associations provide a robust empirical foundation for the proposed theoretical framework and identify specific curriculum dimensions as priority targets for reform.

5.2. Conclusions

Four core conclusions can be drawn from this study. First, the overall quality of arts education curricula in early childhood teacher preparation falls within the good-to-very-good range, but considerable structural variation exists across dimensions. Selection of learning experiences ($M = 2.78$) is the weakest of the seven dimensions, while evaluation ($M = 3.57$) and selection of content ($M = 3.56$) perform relatively well. This structural imbalance directly constrains the overall effectiveness of the curriculum as a social support system for pre-service teacher development, as the experiential and collaborative dimensions of curriculum

provision — which are most directly tied to the instrumental support function — remain substantially underdeveloped relative to assessment and content dimensions.

Second, pre-service teachers' artistic performance is also broadly at the good-to-very-good level, but with notable variation across dimensions. Social interaction ($M = 3.46$) and knowledge internalization ($M = 3.47$) are comparatively stronger, while use of cultural tools ($M = 3.00$) and autonomy development ($M = 3.28$) are noticeably weaker. This pattern reflects systematic deficiencies in how the current curriculum supports cultural resource engagement and promotes autonomous professional development, and it identifies these two dimensions as priority areas for targeted intervention in pre-service teacher preparation.

Third, neither age nor gender produced significant effects on curriculum evaluation scores ($p > 0.05$), and H_{01} is retained. Curriculum Design perceptions are consistent across demographic groups, further confirming that curriculum structure — rather than individual attributes — is the key factor shaping the social support environment that pre-service teachers experience. This finding has clear practical implications: improving Curriculum Design will benefit all pre-service teachers regardless of demographic background, and reform efforts should be directed at structural curriculum features rather than tailored to demographic subgroups.

Fourth, significant positive associations were found between curriculum evaluation dimensions and artistic performance dimensions across 27 of the 28 variable pairs examined, and H_{02} is rejected. The three strongest associations — selection of content and social interaction ($p = 0.607$), organization of content and knowledge internalization ($p = 0.564$), and organization of learning activities and autonomy development ($p = 0.514$) — are consistent with the theoretical proposition that Curriculum Design as structured social support is positively associated with artistic performance, which is in turn theoretically linked to environmental adaptability in preschool education settings. These associations, examined through a social support lens, provide a coherent and empirically grounded framework for understanding the professional development of pre-service teachers in early childhood arts education contexts.

5.3. Limitations

Despite its systematic empirical contributions, this study has several limitations that should be considered when interpreting the findings. The sample of 274 pre-service teachers was drawn from three universities in Qingdao, Shandong Province, and participants were restricted to those aged 22 to 24. Qingdao is a comparatively well-resourced coastal city, and the institutional conditions at the three participating universities may not reflect those found in central or western regions of China, where resource availability, Curriculum Design, and institutional support structures differ substantially. Generalization of the present findings to pre-service teacher populations in other geographic or institutional contexts therefore requires caution, and cross-regional replication studies are needed to establish the external validity of the observed associations.

All participants were currently enrolled students with limited practical teaching experience. Their curriculum evaluations therefore reflect a learner's perspective rather than that of a practicing educator with direct experience of preschool classroom demands. This perspective has inherent limitations in capturing the full complexity of curriculum-practice relationships, and a gap likely exists between participants' self-reported perceptions of Curriculum Design and the actual conditions of professional adaptation in real teaching environments. Future research incorporating experienced in-service teachers or longitudinal tracking of pre-service teachers into their first years of practice would provide a more comprehensive account of how Curriculum Design shapes long-term environmental adaptability.

The cross-sectional survey design of this study permits only the examination of correlational relationships at a single point in time. Causal directionality and developmental trajectories cannot be determined from these data alone. The observed associations between curriculum evaluation dimensions and artistic performance dimensions are consistent with the theoretical framework proposed, but they do not constitute evidence of causal influence. Longitudinal research designs are needed to clarify the temporal sequencing of these relationships and to examine how Curriculum Design shapes the development of artistic performance and environmental adaptability over the course of pre-service teacher preparation and into professional practice.

At the conceptual level, the construct of environmental adaptability in preschool education was examined indirectly through curriculum evaluation and performance self-assessment scales rather than through a dedicated, independently validated instrument. The precise construct boundaries of environmental adaptability in this context, and the systematic psychometric validation of its measurement, remain areas requiring theoretical refinement and instrument development. The present study treats environmental adaptability as a theoretically grounded professional outcome toward which Curriculum Design and artistic performance contribute, but future research should prioritize the development of a standardized, purpose-built scale to enable direct and rigorous measurement of this construct. Additionally, the self-developed questionnaire used in this study relied on a pilot test of 15 participants for construct validity estimation, which provides a preliminary rather than comprehensive basis for dimensional validation. Future instrument development should incorporate exploratory and confirmatory factor analysis with larger independent samples to establish stronger psychometric foundations.

5.4. Recommendations

The findings of this study generate recommendations across four interconnected areas: curriculum design, teacher preparation, organizational support, and future research directions.

Regarding curriculum design, the selection of learning experiences dimension demonstrated the most pronounced structural weakness, with an overall mean score of $M = 2.78$ and a notably low score for the collaborative task item ($M = 2.69$). This pattern identifies the provision of diverse, collaborative, and experientially rich learning opportunities as the most urgent priority for curriculum reform. It is recommended that curriculum developers systematically integrate project-based learning, peer collaborative creation, and interdisciplinary arts practice into curriculum frameworks. These approaches directly address the instrumental support deficit identified in the current curriculum by providing pre-service teachers with structured social learning experiences that more closely approximate the collaborative and adaptive demands of real preschool environments. Embedding these experiential elements within the formal curriculum — rather than treating them as supplementary activities — is essential to closing the gap between curriculum design intent and environmental adaptability outcomes.

Regarding teacher preparation, use of cultural tools ($M = 3.00$) and autonomy development ($M = 3.28$) were identified as the two weakest artistic performance dimensions. Teacher education institutions should address these deficiencies by combining systematic instruction in traditional cultural and artistic techniques with targeted training in autonomous professional goal-setting and reflective self-regulation. It is recommended that at least two to three specialized workshops per academic year be dedicated to developing cultural competency and autonomy-oriented practice among pre-service teachers. These workshops should be embedded within the formal curriculum structure rather than offered as optional enrichment activities, ensuring that all pre-service teachers receive consistent and sustained exposure to cultural arts content and autonomous professional practice before completing their formal preparation. Workshops alone, however,

are insufficient without broader institutional commitment to creating a culture of reflective professional development that extends beyond individual sessions.

Regarding organizational support, the evaluation dimension ($M = 3.57$) demonstrated that a relatively mature feedback and assessment mechanism already exists within the current curriculum. School administrators and curriculum coordinators should build on this existing strength by expanding peer assessment and self-assessment components, which currently represent the lowest-scoring item within this otherwise strong dimension ($M = 3.49$). Establishing regular communities of teaching reflection and structured collaborative activity planning would extend the informational support function of the existing evaluation mechanism into the autonomy development and social interaction domains, where curriculum support is currently weaker. This approach leverages existing institutional strengths to address identified weaknesses, representing a cost-effective and structurally coherent pathway to systemic curriculum improvement.

Regarding future research, this study identifies several priorities for advancing the theoretical and empirical foundations of this research domain. First, a standardized scale specifically designed to measure environmental adaptability in preschool education settings should be developed and validated. Such an instrument is essential for enabling direct empirical testing of the full associative pathway from Curriculum Design to artistic performance to environmental adaptability. Second, structural equation modeling should be employed to conduct path-level testing of the theoretical model proposed in this study, using a validated environmental adaptability measure as the outcome variable. This would provide a methodologically appropriate framework for examining the mediating role of artistic performance between Curriculum Design and environmental adaptability. Third, longitudinal research designs should be employed to track the development of artistic performance and environmental adaptability across the full arc of pre-service teacher preparation and into the early years of professional practice, enabling examination of the developmental trajectories and temporal dynamics that cross-sectional designs cannot capture. These methodological developments would collectively advance both the theoretical precision and the practical applicability of research on pre-service teacher professional development in early childhood arts education.

Conflict of interest

The author declares no conflict of interest.

References

1. Huang, R., Liu, S., & Rutten, K. (2024). Why does it matter? A literature review on the functions of school arts education in China 2001–2022. *Asia Pacific Education Review*, 1-14.
2. Huang, R., Liu, S., Valcke, M., Song, W., & Rutten, K. (2025). The functions of arts education portrayed in China's central Educational policy: a critical discourse analysis. *Asia Pacific Journal of Education*, 1-22.
3. Li, H., Pang, X., & Li, C. (2023). Review the development and evolution of aesthetic education in Chinese schools from a policy perspective. *Sustainability*, 15(6), 5275.
4. Wang, X., Chen, X., Qin, P., Lu, J., & Wang, H. (2025). Sustainable development of China's aesthetic teaching in long-term policy changes. *Plos one*, 20(10), e0334315.
5. Xu, X. H., Niu, Y. T., Li, Z. M., Xu, Y. Y., & Cao, K. W. (2024). Research on comprehensive evaluation & development of aesthetic education based on PCA and CEM model. *PloS one*, 19(8), e0308446.
6. Ziqing, W., & Ngamsutti, C. (2024). Curriculum philosophy and curriculum objectives of the art curriculum standards in China. *Journal of Roi Kaensarn Academi*, 9(10), 2184-2195.
7. Huang, L., Leung, S. K., Li, J. W., & Wu, Z. (2025). How does comprehensive art education facilitate children's creativity? A mixed-methods study in China. *Early Education and Development*, 36(2), 460-476.
8. Song, R. (2022). Research on Chinese children's innovative aesthetic learning. In 2022 5th International Conference on Humanities Education and Social Sciences (ICHESS 2022) (pp. 677-686). Atlantis Press.

9. Fei, W. H. (2023). Promoting preschoolers' contact ability and sense of security through aesthetic education. *International Journal of Advanced Culture Technology*, 11(1), 221-231.
10. Chen, B. C. (2025). Using Vygotsky's sociocultural theory to explore ethnic cultural representation in Taiwanese preschool children's play. *Frontiers in Education*, 10, 1569322.
11. Wang, X., Ye, P., & Qiao, T. (2024). Free play and pedagogical play: a multiple-case study of teachers' views of play in Chinese early learning centers. *Frontiers in Education*, 9, 1359867.
12. Wang, Q. (2025). Singing, moving, and learning: A reflective teacher study group for creative early childhood educators in China (Doctoral dissertation, Teachers College, Columbia University).
13. Wu, W., Adylbek kyzy, G., & Liu, C. H. (2024). The dilemma and breakthrough of practical teaching of preschool education major in Chinese colleges and universities. *International Journal of Chinese Education*, 13(2).
14. Kotova, A. (2025). Challenges of art and pedagogical education in China. *Educational Challenges*, 30(2).
15. Ashykhmina, N. V. (2025). Methods of forming the professional and subjective position of future masters of musical arts.
16. Kálmán, O., Tynjälä, P., & Skaniakos, T. (2020). Patterns of university teachers' approaches to teaching, professional development and perceived departmental cultures. *Teaching in Higher Education*, 25(5), 595-614.
17. Nawab, A., Bissaker, K., & Dattoo, A. K. (2021). Contemporary trends in professional development of teachers: importance of recognizing the context. *International Journal of Educational Management*, 35(6), 1176-1190.
18. Hao, H. (2015). The journey to expert: Teaching expertise acquisition of ten early childhood teachers in Shanghai (Doctoral dissertation).
19. Rezaeian, S., & Abdollahzadeh, E. (2020). Teacher efficacy and its correlates in the EFL context of Iran: The role of age, experience, and gender. *International Online Journal of Education and Teaching*, 7(4), 1533-1548.
20. Pranoto, Y. K., Utami, D. R., Latiana, L., & Ahmadi, F. (2021). Do teachers' experiences and ages contribute to their teaching performance. In *Proceedings of the 11th Annual International Conference on Industrial Engineering and Operations Management* (pp. 3515-3522).
21. Pennington, C. G., Curtner-Smith, M. D., & Wind, S. A. (2020). Influence of a physical education teacher's perceived age on high school pupils' perceptions of effectiveness and learning. *European Physical Education Review*, 26(1), 22-35.
22. Pan, L., & Songco, E. A. (2023). Building and leading a collaborative culture for teachers: A case study of a college of fine arts under aesthetic education reform in China. *IAHRW International Journal of Social Sciences Review*, 11(4), 492-500.
23. Kuntz, E. M., & Carter, E. W. (2021). Effects of a collaborative planning and consultation framework to increase participation of students with severe disabilities in general education classes. *Research and Practice for Persons with Severe Disabilities*, 46(1), 35-52.
24. Ridge, B. L., & Lavigne, A. L. (2020). Improving instructional practice through peer observation and feedback: A review of the literature. *Education Policy Analysis Archives*, 28, 61.
25. Blumberg, F. C., Flynn, R. M., Homer, B. D., Bailey, J. O., Eng, C. M., Green, C. S., Giannakos, M., Papadakis, S., & Gentile, D. A. (2024). Current state of play: Children's learning in the context of digital games. *Journal of Children and Media*, 18(2), 293-299. <https://doi.org/10.1080/17482798.2024.2335725>
26. Louka, K., & Papadakis, S. (2024). Enhancing computational thinking in early childhood education through ScratchJr integration. *Heliyon*, 10(10), Article e30482. <https://doi.org/10.1016/j.heliyon.2024.e30482>
27. Uğraş, H., Uğraş, M., Papadakis, S., & Kalogiannakis, M. (2024). Innovative early childhood STEM education with ChatGPT: Teacher perspectives. *Technology, Knowledge and Learning*. Advance online publication. <https://doi.org/10.1007/s10758-024-09804-8>
28. Rodríguez-Triana, M. J., Prieto, L. P., Ley, T., de Jong, T., & Gillet, D. (2020). Social practices in teacher knowledge creation and innovation adoption. *International Journal of Computer-Supported Collaborative Learning*, 15(4), 445-467.
29. Mai, T. M., Nguyen, L. T., Tran, T. L., & Le, T. V. (2020). EFL teachers' Facebook groups as online communities of practice. *Computer-Assisted Language Learning Electronic Journal*, 21(3), 140-158.
30. Grant, J. (2018). Principles of curriculum design. In *Understanding Medical Education: Evidence, Theory, and Practice* (pp. 71-88).
31. Zhu, G., Raman, P., Xing, W., & Slotta, J. (2021). Curriculum design for social, cognitive and emotional engagement in Knowledge Building. *International Journal of Educational Technology in Higher Education*, 18(1), 37.
32. Em, S., & Khampirat, B. (2025). Evolution of curriculum standards: A comprehensive review of historical development. *Journal of Education Innovation and Language Teaching (JEILT)*, 1(1), 25-43.
33. Luo, S. (2023). The current landscape and future direction of curriculum reform in China. *Future in Educational Research*, 1(1), 5-16.

34. Jayadi, K., Yatim, H., Sahnir, N., Djirong, A., & Abduh, A. (2024). The integration of local cultural arts in the context of teaching materials on the implementation of the Merdeka Belajar Curriculum. *Journal of Education Research and Evaluation*, 8(2), 404-413.
35. Liu, C., Asipova, N. A., Lu, B., & Wu, W. (2024). Culturally-informed strategies in art education: insights from China and Kyrgyzstan. *Journal of Institutional Research South East Asia*, 22(2).
36. Samuels, A. J. (2018). Exploring culturally responsive pedagogy: Teachers' perspectives on fostering equitable and inclusive classrooms. *Srate Journal*, 27(1), 22-30.
37. Link, B. (2022). Art integration in teacher education: Aesthetic tools to foster critical reflection. *Texas Education Review*, 10(2), 36-48.
38. Olalere, F. E. (2018). Integrating theory and practice: A critical pedagogy in art education. *The International Journal of Humanities Education*, 16(3), 1.