# THE RELATIONSHIP BETWEEN DIGITAL LITERACY AND TEACHING EFFICACY AMONG ART TEACHERS IN X HIGH SCHOOL, JIANGSU PROVINCE, CHINA

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## Abstract

This study: 1) examined the levels of digital literacy and teaching efficacy among art teachers at X High School in Jiangsu Province, China, 2) tested differences across demographic and professional groups, and 3) investigated the association between the two constructs. A quantitative cross-sectional survey was conducted with 226 full-time art teachers selected through convenience sampling. Digital literacy was measured using 20 items across five dimensions, while teaching efficacy was assessed using 16 items covering four dimensions. Data were analyzed in IBM SPSS Statistics 26 using descriptive statistics, independent-samples t tests, one-way analysis of variance, and Pearson correlation analysis.

The findings: 1) the teachers reported a moderate level of digital literacy (M = 3.33, SD = 0.69) and a relatively high level of teaching efficacy (M = 3.52, SD = 0.67). Digital technology knowledge and skills was the strongest digital-literacy dimension, whereas digital application was the weakest. Classroom management received the highest teaching-efficacy rating, while teacher–student interaction in artistic practice received the lowest. 2) There are significant differences in both constructs were reported across gender, teaching experience, professional title, and art discipline. 3) Digital literacy was strongly and positively associated with teaching efficacy (r =.809,

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$p < .01$). These findings indicate that teachers' digital capabilities are closely related to their perceived effectiveness in art instruction. Professional development should therefore move beyond basic technical training and emphasize discipline-specific digital application, interactive artistic practice, and sustained pedagogical support.

**Keywords:** Digital literacy, teaching efficacy, art teachers, technology integration, high school, China

## Introduction

The digital transformation of education in contemporary schools requires teachers to select and evaluate digital resources, redesign instruction, protect privacy, and pursue technology-enabled professional learning. Accordingly, digital literacy is increasingly understood as an integrated combination of technical, pedagogical, ethical, and professional capabilities rather than a discrete set of information and communication technology skills (Falloon, 2020; Redecker, 2017). This broader understanding is reflected in China's national education-industry standard, which defines teachers' digital literacy through five dimensions: digital awareness, digital technology knowledge and skills, digital application, digital social responsibility, and professional development (Ministry of Education of the People's Republic of China [MOE], 2022).

These capabilities are particularly important in secondary-school art education. Digital tools can broaden access to visual resources, support multimedia creation and critique, and facilitate demonstrations and assessment. Yet art learning also relies on material engagement, visual interpretation, creative experimentation, and sustained dialogue. Research with K-12 art teachers indicates that technology has substantially changed resource access, presentation, and student media production, but teachers' preparation and the sophistication of classroom use remain uneven (Strycker, 2020). More recent evidence suggests that art teachers' digital literacy is associated with perceived usefulness and ease of use, which are related to ICT integration intention (Chen & Gao, 2025). Thus, access to digital tools alone does not

ensure effective art instruction; teachers must be able to align technology with subject-specific pedagogical purposes.

Teaching efficacy provides a relevant lens for examining this alignment. It refers to teachers' judgments of their capability to organize and perform the actions required to achieve desired instructional and student outcomes (Tschannen-Moran & Hoy, 2001). In art education, such efficacy is expressed through classroom management, clear presentation of concepts and artistic processes, flexible teaching strategies, and productive interaction during artistic practice. Prior studies have reported positive associations among teachers' digital competence, ICT-related self-efficacy, and technology use (Hatlevik, 2017; Instefjord & Munthe, 2017). Evidence from early-career teachers further shows that ICT literacy and general teacher efficacy are connected to technology-integration efficacy and subsequent instructional use (Paetsch et al., 2023). Collectively, these findings provide a theoretical basis for expecting digital literacy to be positively associated with teaching efficacy. However, most studies focus on general subject teachers, preservice teachers, or technology acceptance rather than the overall teaching efficacy of practicing secondary-school art teachers.

This gap is especially important in China, where national policy specifies a multidimensional framework for teacher digital literacy, but school- and discipline-specific evidence remains limited. Art teachers' competencies may vary with professional experience, title, gender, and discipline. Without contextual evidence, school leaders may design generic training that emphasizes tool operation while overlooking pedagogical application, ethical responsibility, or professional learning.

Therefore, this study investigates art teachers at X High School in Jiangsu Province, China. It examines their levels of digital literacy and teaching efficacy, tests differences across demographic and professional groups, and determines the association between the two constructs. Integrating China's five-dimensional standard with art-specific teaching-efficacy indicators provides context-sensitive, relevant empirical evidence for teacher development and school-level digital transformation in an underexamined secondary-school discipline.

## Literature Review and Hypotheses Development

This section establishes the conceptual foundations of teachers' digital literacy and teaching efficacy, reviews evidence relevant to secondary-school art education, and develops the study hypotheses. The review adopts Social Cognitive Theory as its principal explanatory lens, while the Technological Pedagogical Content Knowledge (TPACK) framework and the Technology Acceptance Model (TAM) clarify how digital capability is translated into subject-specific practice. Because the study uses a cross-sectional correlational design, the proposed relationships are expressed as differences or associations rather than causal effects.

### Theoretical Foundations

Social Cognitive Theory proposes that human functioning emerges through reciprocal interactions among personal factors, behavior, and the environment (Bandura, 1986). Within teaching, digital knowledge and beliefs constitute personal resources; technology-supported instructional practices represent behavior; and school infrastructure, leadership, professional learning, and collegial support form the environment. These elements may reinforce one another. For example, a teacher who successfully uses a digital resource can acquire a mastery experience, strengthen efficacy beliefs, and become more willing to attempt complex technology-supported instruction. Conversely, weak support or repeated implementation difficulties may reduce confidence even when basic technical knowledge is present. Bandura (1997) identified mastery experiences, vicarious experiences, verbal persuasion, and affective states as major sources of self-efficacy, making the theory particularly suitable for explaining variation in teachers' confidence across career stages and working conditions.

TPACK complements this perspective by emphasizing that effective technology integration depends on the interaction of technological, pedagogical, and content knowledge rather than on technical skill alone (Mishra & Koehler, 2006). This principle is critical in art education because technologies have different pedagogical affordances across visual art, music, dance, and other creative fields. Digital drawing, image editing, audio production, virtual performance, motion analysis, online critique, and portfolio platforms require distinct combinations of subject knowledge and

teaching strategy. The framework therefore explains why general digital capability may not transfer automatically into effective art teaching.

TAM further explains the movement from capability to use. Teachers are more likely to adopt technology when they perceive it as useful and manageable (Davis, 1989). Meta-analytic evidence confirms that perceived usefulness and related acceptance beliefs are associated with teachers' intentions and actual use of digital technology (Scherer et al., 2019). Digital literacy can reduce the effort required to select and operate tools, while pedagogical understanding helps teachers recognize their instructional value. Together, Social Cognitive Theory, TPACK, and TAM support a model in which digital literacy is situated, practice-oriented, and connected to teaching efficacy.

**Digital Literacy of Secondary-School Art Teachers**

Digital literacy has evolved from a narrow emphasis on operating devices toward a multidimensional professional competence. DigCompEdu defines educator digital competence across professional engagement, digital resources, teaching and learning, assessment, learner empowerment, and the facilitation of learners' digital competence (Redecker, 2017). Falloon (2020) similarly argues that teacher digital competence integrates technical proficiency with pedagogical, ethical, and professional judgment. Research reviews also show that digital competence is shaped by organizational infrastructure, strategic leadership, professional learning, and classroom practice, not solely by individual skill (Pettersson, 2018).

In China, the Ministry of Education's *Digital Literacy of Teachers* standard provides the most contextually appropriate structure for the present study. It identifies five dimensions: digital awareness, digital technology knowledge and skills, digital application, digital social responsibility, and professional development (Ministry of Education of the People's Republic of China [MOE], 2022). Digital awareness concerns teachers' recognition of the value of digital transformation and their willingness to engage with it. Digital technology knowledge and skills address the selection and operation of tools and resources. Digital application concerns the integration of technology into instructional design, implementation, assessment, and learner support. Digital social responsibility includes lawful, ethical, secure, and privacy-conscious

practice. Professional development refers to using digital environments for reflection, collaboration, research, and continuing learning.

For art teachers, these dimensions must be interpreted through disciplinary practice. Technology can expand access to cultural materials, provide multimodal demonstrations, support creative production and revision, and enable new forms of critique and assessment. However, empirical work shows that art teachers' technology use often remains concentrated on presentation, resource access, and personal productivity, with uneven preparation for more transformative classroom applications (Strycker, 2020). Örtegren (2012) likewise found that subject traditions and school-level conditions affected whether digital media were treated as central or peripheral to art learning. Recent evidence indicates that art teachers' digital literacy is associated with perceived usefulness and ease of use, which are related to their intention to integrate ICT (Chen & Gao, 2025). Digital literacy in this study is therefore treated as a combination of awareness, capability, application, responsibility, and continuing professional growth within art-specific teaching contexts.

**Teaching Efficacy in Art Education**

Teaching efficacy refers to teachers' judgments about their capability to organize and execute the actions required to produce desired instructional and learner outcomes. It is task- and context-sensitive rather than a fixed personality characteristic (Bandura, 1997). Tschannen-Moran and Hoy (2001) operationalized the construct through efficacy for instructional strategies, classroom management, and student engagement. Subsequent research has linked stronger teacher efficacy to higher-quality classroom processes, adaptive instructional behavior, student adjustment, professional commitment, and teacher well-being (Zee & Koomen, 2016).

Art teaching creates specific efficacy demands. Teachers must manage classrooms in which students use materials, equipment, digital devices, and collaborative spaces; present abstract concepts and creative processes clearly; adapt strategies to different levels of artistic development; and maintain constructive interaction during performance, production, interpretation, and critique. Accordingly, this study conceptualizes teaching efficacy through four dimensions: classroom management, clarity of teaching-material presentation, teaching strategies and creative

application, and teacher-student interaction in artistic practice. This specification preserves the established self-efficacy logic while adapting it to the practical and relational nature of secondary-school art education.

Teaching efficacy develops through experience but also remains sensitive to context. Novice teachers tend to rely more strongly on interpersonal support and available resources, whereas experienced teachers draw more heavily on accumulated mastery experiences (Tschannen-Moran & Hoy, 2007). Large-scale evidence further indicates that teacher characteristics, student groups, school context, and leadership account for meaningful differences in efficacy beliefs (Fackler & Malmberg, 2016). Teaching efficacy should therefore be examined in relation to both professional background and the digital conditions of contemporary teaching.

**Differences in Digital Literacy Across Teacher Groups**

Teachers do not enter digital transformation with identical experiences, opportunities, or confidence. Studies based on multidimensional digital-competence frameworks show that personal and contextual characteristics contribute to variation among in-service teachers (Lucas et al., 2021). Gender differences are not necessarily uniform across dimensions. Scherer and Siddiq (2015), for example, identified gender differences in basic and advanced computer self-efficacy but not in efficacy for instructional computer use. Such results suggest that group differences may appear in technical aspects while becoming smaller when technology is embedded in pedagogy. A non-directional hypothesis is consequently more defensible than assuming that either gender is consistently more digitally literate.

Teaching experience can also operate in competing ways. More experienced teachers possess deeper pedagogical and classroom knowledge, but younger or early-career teachers may have had greater exposure to recent digital tools during their formal preparation. Digital competence may therefore develop nonlinearly rather than increasing automatically with years of service. Professional title may create similar variation. Higher titles often reflect accumulated teaching expertise, formal evaluation, and access to leadership or professional-development opportunities; nevertheless, title does not guarantee familiarity with rapidly changing technologies. Differences may also arise across art disciplines because their dominant media, learning activities, and

assessment practices require different technological knowledge. TPACK predicts precisely this content-dependent variation (Mishra & Koehler, 2006), while art-education research demonstrates that disciplinary conceptions influence whether and how digital media are integrated (Örtegren, 2012; Strycker, 2020).

These arguments indicate that digital literacy should be compared across the four background variables without prespecifying which group must score highest. Therefore:

H1: Art teachers' digital literacy differs significantly across demographic and professional groups.

H1a: Digital literacy differs significantly by gender.

H1b: Digital literacy differs significantly by teaching experience.

H1c: Digital literacy differs significantly by professional title.

H1d: Digital literacy differs significantly by art discipline type.

**Differences in Teaching Efficacy Across Teacher Groups**

Teacher-efficacy research likewise supports the examination of group variation but does not justify simple universal rankings. Gender findings vary across efficacy domains and contexts. Klassen and Chiu (2010) found that gender, teaching level, workload stress, and classroom stress were associated differently with instructional, management, and engagement efficacy. This variability is especially relevant when efficacy is defined through several art-specific dimensions rather than a single total score.

Teaching experience is theoretically important because mastery experiences are a central source of efficacy. Experienced teachers generally possess a larger repertoire of instructional responses, yet efficacy may not rise indefinitely. Klassen and Chiu (2010) reported nonlinear relationships in which efficacy increased from early to middle career and subsequently declined in some domains. Tschannen-Moran and Hoy (2007) also demonstrated that novice and experienced teachers rely on different sources when judging their capability. Professional title may distinguish teachers in recognized expertise, responsibilities, and access to institutional resources, while simultaneously exposing senior teachers to more complex duties. Art discipline type may produce further differences because managing a visual-art studio, directing an

ensemble, guiding dance practice, and teaching other art forms involve different instructional, organizational, and interactional demands.

Because the direction and magnitude of these differences are likely to depend on the efficacy dimension and local context, the following non-directional hypotheses are proposed:

H2: Art teachers' teaching efficacy differs significantly across demographic and professional groups.

H2a: Teaching efficacy differs significantly by gender.

H2b: Teaching efficacy differs significantly by teaching experience.

H2c: Teaching efficacy differs significantly by professional title.

H2d: Teaching efficacy differs significantly by art discipline type.

**Relationship Between Digital Literacy and Teaching Efficacy**

Digital literacy and teaching efficacy are conceptually distinct but theoretically connected. Digital literacy concerns what teachers understand, can perform, value, and regulate in digital environments; teaching efficacy concerns their confidence in accomplishing teaching tasks. Social Cognitive Theory suggests several mechanisms linking them. Digital knowledge and skills can reduce uncertainty when teachers plan technology-supported lessons. Effective digital application can create mastery experiences, while online professional communities can provide models, feedback, and verbal encouragement. Awareness of pedagogical value can strengthen motivation, and responsible digital practice can reduce concerns about privacy, copyright, and inappropriate technology use. These experiences can reinforce efficacy judgments related to classroom management, explanation, instructional adaptation, and interaction.

Empirical research supports these connections. Hatlevik (2017) found meaningful relationships among teachers' ICT self-efficacy, information-evaluation strategies, digital competence, and school ICT use. Instefjord and Munthe (2017) reported a positive association between teacher educators' self-reported efficacy and professional digital competence. Research with early-career teachers further showed that ICT literacy and general teacher efficacy were connected to technology-integration efficacy and subsequent instructional use (Paetsch et al., 2023). These findings do not

establish that digital literacy alone produces teaching efficacy, but they consistently indicate that digital capability and efficacy beliefs develop in related professional processes.

The relationship should be especially salient in art education. Digitally literate art teachers can select media that make artistic processes visible, provide multiple forms of representation, organize digital resources, support iterative creation, and sustain feedback beyond the physical classroom. Such capabilities may strengthen confidence in presenting complex material, differentiating instruction, managing technology-rich activities, and supporting teacher-student interaction. At the same time, TPACK cautions that technical activity without pedagogical and content alignment may add complexity rather than improve teaching (Mishra & Koehler, 2006). The expected association therefore concerns integrated digital literacy, not the frequency of tool use alone.

Although prior research has examined digital competence, technology acceptance, or technology-integration efficacy, relatively little evidence addresses the relationship between multidimensional digital literacy and overall teaching efficacy among practicing secondary-school art teachers in China. The present study addresses this gap using the five dimensions specified by the Chinese standard and art-contextualized dimensions of teaching efficacy. Because the design is correlational, the hypothesis is stated as an association:

**H3: Digital literacy is significantly and positively associated with teaching efficacy among art teachers at X High School in Jiangsu Province, China.**

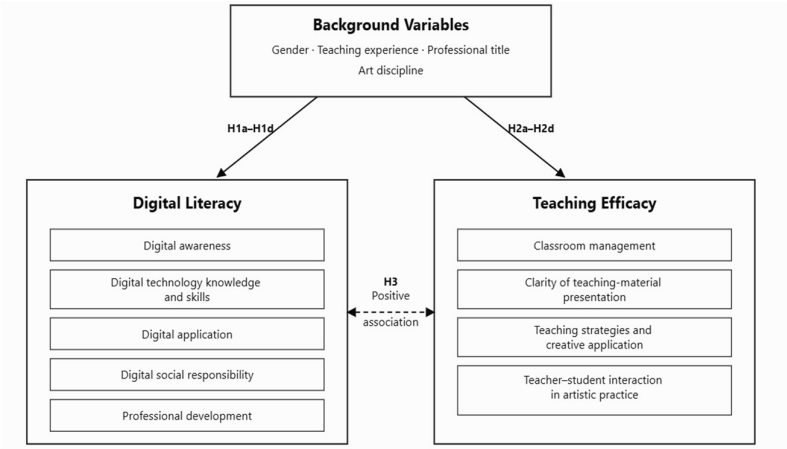



**Figure 1** Research Conceptual Framework

## Research Methodology

### Research Design

This study adopted a quantitative, cross-sectional survey design to examine digital literacy and teaching efficacy among art teachers at X High School in Jiangsu Province, China. A survey was appropriate because both constructs were operationalized as multidimensional, self-reported perceptions that could be compared across teacher groups and examined statistically within a defined population. The design was correlational rather than experimental: digital literacy and teaching efficacy were measured at one point in time, and no variable was manipulated. The findings therefore indicate group differences and associations but do not establish causal effects (Creswell & Creswell, 2018).

The quantitative design followed a hypothesis-testing sequence. First, descriptive statistics were used to establish the level and distribution of each construct. Second, group-comparison tests assessed whether digital literacy and teaching efficacy varied by gender, teaching experience, professional title, and art discipline. Third, Pearson's product–moment correlation tested whether teachers with higher digital literacy also tended to report stronger teaching efficacy. This sequence directly connected the research questions, measurement model, and statistical tests.

### Population and Sample

The target population comprised 294 full-time art teachers identified in the sampling frame for X High School. The frame included teachers in fine arts, music, dance, and other arts-related disciplines. Because access depended on teachers' availability and willingness to participate, convenience sampling was used. Although this nonprobability procedure limits statistical generalization beyond the study setting, it was feasible for reaching teachers who met the inclusion criteria: current full-time employment, responsibility for an arts subject, and voluntary completion of the questionnaire.

The final analytic sample consisted of 226 respondents, representing 76.9% of the accessible population. This sample exceeds the benchmark of 169 cases reported by Krejcie and Morgan (1970) for a population of approximately 300. It also provides adequate observations for the planned mean comparisons, correlational

analysis, and preliminary assessment of the measurement structure. Nevertheless, sample adequacy does not remove selection bias; conclusions should remain bounded to the institutional context and respondent profile.

**Measures**

Data were collected through a structured questionnaire with three sections. The first recorded four background variables: gender, teaching experience (0–4 years, 5–14 years, and 15 years or more), professional title (none, primary, intermediate, and senior), and art discipline (fine arts, music, dance, and other arts disciplines).

The second section measured digital literacy with 20 items, four for each of five dimensions: digital awareness, digital technology knowledge and skills, digital application, digital social responsibility, and professional development. The dimensional structure was aligned with China's *Digital Literacy of Teachers* standard (JY/T 0646–2022), which treats teachers' digital competence as a combination of informed awareness, technical capacity, pedagogical application, responsible conduct, and continuing professional learning (Ministry of Education of the People's Republic of China, 2022). Items were contextualized for arts education. They addressed, for example, the use of digital drawing or editing tools, the creation and retrieval of digital resources, technology-supported artistic participation, privacy and responsible online behavior, and the use of digital feedback for professional improvement.

The third section measured teaching efficacy with 16 items across four dimensions: classroom management, clarity of teaching-material presentation, teaching strategies and creative application, and teacher–student interaction in artistic practice. The construct was informed by the view of teacher efficacy as teachers' judgments of their capacity to organize and perform the actions required for successful teaching (Tschannen-Moran & Hoy, 2001). Items were adapted to features of arts instruction, including demonstrations of creative processes, management of practice-based activities, differentiated support, student expression, and discussion of artworks.

All substantive items used a five-point Likert-type response format ranging from 1 (*very inconsistent*) to 5 (*very consistent*). Item scores were averaged within each dimension, and overall scores were calculated by averaging all items belonging to the relevant construct. Averaging retained the original response metric and allowed direct

comparison across dimensions containing equal numbers of items. Higher scores indicated greater digital literacy or stronger teaching efficacy. Before computing scale scores, item coding and response direction were checked; no reverse-scored items were included.

**Data Collection and Research Ethics**

The questionnaire was administered online during [insert data-collection period]. A web link and QR code were distributed through the teachers' work communication group after the purpose of the study and completion instructions had been provided. Online administration offered a consistent question order and reduced manual data-entry error, although it may also have favored teachers who were more comfortable using digital platforms (Dillman et al., 2014).

Ethical approval was obtained from [insert committee and approval number, or state the applicable institutional exemption] before recruitment. The introductory statement informed respondents that the survey was conducted for academic research and that their answers would be treated confidentially. Names and other direct personal identifiers were not requested. Data were downloaded after the survey closed, screened, and transferred to Microsoft Excel and IBM SPSS Statistics 26 for coding and analysis. The final dataset contained 226 usable questionnaires. Results were reported in aggregate so that individual teachers could not be identified.

**Reliability and Construct Validity**

Measurement quality was assessed before testing the substantive hypotheses. Internal consistency was evaluated using Cronbach's alpha for each dimension and for both overall scales. Values of .70 or higher were treated as acceptable for research use, while coefficients above .80 indicated strong consistency (Nunnally & Bernstein, 1994). In the final sample, alpha was .902 for the 20-item digital-literacy scale and ranged from .866 to .936 across its five dimensions. For the 16-item teaching-efficacy scale, alpha was .935 overall and ranged from .818 to .889 across the four dimensions. These coefficients supported the use of composite scores, while recognizing that a high alpha does not, by itself, demonstrate unidimensionality or construct validity.

Construct validity was examined through exploratory factor analysis. Sampling adequacy was evaluated using the Kaiser–Meyer–Olkin statistic and Bartlett's test of

sphericity. Factor retention was judged from eigenvalues, the scree plot, explained variance, item loadings, cross-loadings, and conceptual interpretability rather than from a single numerical rule (Hair et al., 2019). The empirical solution was then compared with the proposed five-factor digital-literacy structure and four-factor teaching-efficacy structure.

Because both constructs were self-reported through the same questionnaire, common-method bias was considered when interpreting their relationship. Anonymity, neutral instructions, and separate questionnaire sections for the two constructs were used as procedural safeguards. Nevertheless, same-source measurement remains a limitation that should be considered when evaluating the observed correlation (Podsakoff et al., 2003).

**Quantitative Data Analysis and Hypothesis Testing**

Analysis was conducted using IBM SPSS Statistics 26. Before hypothesis testing, the dataset was inspected for missing values, impossible codes, duplicate submissions, univariate outliers, and response patterns suggesting inattentive completion. Means, standard deviations, frequencies, percentages, and score ranges were calculated to describe the respondents and main variables. Histograms, Q–Q plots, skewness and kurtosis, and standardized residuals were examined to assess distributional assumptions. Linearity and influential bivariate outliers were checked before correlation analysis, while homogeneity of variance was assessed with Levene's test for group comparisons (Field, 2018).

The inferential analysis proceeded from group differences to the focal association between the constructs. H1 proposed that digital literacy would differ across demographic and professional groups. An independent-samples *t* test was used to test the gender difference (H1a), whereas one-way analysis of variance (ANOVA) was used for teaching experience (H1b), professional title (H1c), and art discipline (H1d).

H2 proposed corresponding group differences in teaching efficacy. Consequently, an independent-samples *t* test was applied to gender (H2a), and separate one-way ANOVAs were performed for teaching experience (H2b), professional title (H2c), and art discipline (H2d). When an omnibus ANOVA was statistically significant, post hoc comparisons were conducted to identify the groups responsible

for the difference. Tukey's procedure was applied when the homogeneity-of-variance assumption was tenable, whereas the Games–Howell procedure was used when that assumption was violated.

H3 proposed a positive association between digital literacy and teaching efficacy. Pearson's correlation coefficient was calculated for the two overall scale scores, with correlations between their respective dimensions examined as supplementary analyses. The test was two-tailed at an alpha level of .05 to maintain conservative statistical inference despite the theoretically positive direction of the hypothesis. If the assumptions for Pearson's correlation were materially violated, Spearman's rank correlation was used as a robustness check.

Statistical significance was interpreted together with effect size and uncertainty. Cohen's *d* was reported for two-group comparisons, eta squared or omega squared for ANOVA, and *r* with a 95% confidence interval for correlations (Cohen, 1988). Where several outcomes were tested within the same hypothesis family, Holm-adjusted *p* values were examined to limit inflation of the familywise error rate (Holm, 1979). This analytical strategy allowed H1 and H2 to identify meaningful group variation and H3 to assess the central relationship between digital literacy and teaching efficacy, while keeping the conclusions consistent with the study's cross-sectional, nonexperimental design.

## Research Results

**1. To examine the levels of digital literacy and teaching efficacy among art teachers at X High School in Jiangsu Province, China**

**Participant Characteristics**

The final sample comprised 226 full-time art teachers from X High School in Jiangsu Province, China. As shown in Table 1, 131 respondents were men (57.9%) and 95 were women (42.1%). Most participants were experienced teachers: 132 respondents (58.4%) had taught for 15 years or longer, whereas 53 (23.5%) had 5–14 years of experience and 41 (18.1%) had no more than four years of experience. The distribution by professional title was 42 teachers without a title (18.6%), 47 with a primary title (20.8%), 50 with an intermediate title (22.1%), and 87 with a senior title

(38.5%). The four discipline groups were comparatively balanced. Fine arts teachers accounted for 22.1% of the sample, music teachers for 23.0%, dance teachers for 27.0%, and teachers from other arts disciplines for 27.9%.

Two features of the sample are relevant to the subsequent analyses. Teachers with at least 15 years of experience formed more than half of the sample, and senior-title teachers constituted the largest title group. The overall estimates therefore largely reflect a professionally experienced teaching workforce. By contrast, no single art discipline accounted for more than 30% of respondents. This relatively even disciplinary distribution permitted comparisons among fine arts, music, dance, and other arts disciplines without one category dominating the sample numerically.

**Table 1** Participant characteristics (*N* = 226)

| Characteristic | Category | *n* | Percentage (%) |
|---|---|---|---|
| Gender | Male | 131 | 57.9 |
| | Female | 95 | 42.1 |
| Teaching experience | 0–4 years | 41 | 18.1 |
| | 5–14 years | 53 | 23.5 |
| | 15 years or more | 132 | 58.4 |
| Professional title | None | 42 | 18.6 |
| | Primary | 47 | 20.8 |
| | Intermediate | 50 | 22.1 |
| | Senior | 87 | 38.5 |
| Art discipline | Fine arts | 50 | 22.1 |
| | Music | 52 | 23.0 |
| | Dance | 61 | 27.0 |
| | Other arts disciplines | 63 | 27.9 |
| **Total** | | **226** | **100.0** |

### Descriptive Results

Table 2 presents the descriptive statistics for digital literacy and teaching efficacy. The mean score for overall digital literacy was 3.33 (*SD* = 0.69), indicating a moderate level on the five-point response scale. Digital technology knowledge and

skills received the highest score (*M* = 3.51, *SD* = 0.80), followed by digital awareness (*M* = 3.48, *SD* = 0.59). The difference between these two leading dimensions was only 0.03 points, showing that awareness and technical competence were rated at broadly comparable levels.

The remaining dimensions were professional development (*M* = 3.22, *SD* = 0.76), digital social responsibility (*M* = 3.21, *SD* = 0.79), and digital application (*M* = 3.11, *SD* = 0.71). Digital application was 0.40 points lower than digital technology knowledge and skills. The respondents therefore rated their digital knowledge, technical skills, and awareness more highly than their classroom application of digital technology.

Overall teaching efficacy had a mean of 3.52 (*SD* = 0.67). Classroom management was the highest-rated dimension (*M* = 3.78, *SD* = 0.71). It was followed by teaching strategies and creative application (*M* = 3.41, *SD* = 0.85) and clarity of teaching-material presentation (*M* = 3.37, *SD* = 0.90), which differed by only 0.04 points. Teacher–student interaction in artistic practice had the lowest mean (*M* = 3.21, *SD* = 0.85), placing it 0.57 points below classroom management.

This pattern indicates that the participating teachers were most confident in establishing order and maintaining an effective classroom environment. Their confidence in facilitating dialogue, participation, and artistic decision-making during practice was comparatively lower. These comparisons describe the relative ordering of the dimensions; they do not represent statistical tests of differences between dimension means.

**Table 2** Descriptive statistics for the principal variables (*N* = 226)

| Construct and dimension | Number of items | *M* | *SD* | Interpretation |
|---|---|---|---|---|
| **Digital literacy** | **20** | **3.33** | **0.69** | **Moderate** |
| Digital awareness | 4 | 3.48 | 0.59 | Moderate |
| Digital technology knowledge and skills | 4 | 3.51 | 0.80 | High |
| Digital application | 4 | 3.11 | 0.71 | Moderate |
| Digital social responsibility | 4 | 3.21 | 0.79 | Moderate |
| Professional development | 4 | 3.22 | 0.76 | Moderate |
| **Teaching efficacy** | **16** | **3.52** | **0.67** | **High** |

| Construct and dimension | Number of items | *M* | *SD* | Interpretation |
|---|---|---|---|---|
| Classroom management | 4 | 3.78 | 0.71 | High |
| Clarity of teaching-material presentation | 4 | 3.37 | 0.90 | Moderate |
| Teaching strategies and creative application | 4 | 3.41 | 0.85 | Moderate |
| Teacher–student interaction in artistic practice | 4 | 3.21 | 0.85 | Moderate |

**2. To test the differences across demographic factors and professional groups**

**Differences in Digital Literacy**

H1 proposed that digital literacy would differ according to gender, teaching experience, professional title, and art discipline. Gender differences were examined using an independent-samples *t* test, while the remaining background variables were analyzed using one-way ANOVA. Table 3 summarizes the findings for the overall digital-literacy score. Male teachers reported a higher overall digital-literacy score ($M$ = 3.39, $SD$ = 0.64) than female teachers ($M$ = 3.24, $SD$ = 0.51). The reported test was statistically significant, $t$ = 0.3986, $p < .001$. The same descriptive direction appeared in four of the five dimensions. Male and female means were 3.58 and 3.35 for digital awareness, 3.58 and 3.42 for digital technology knowledge and skills, 3.16 and 3.05 for digital application, and 3.26 and 3.14 for digital social responsibility. Professional development showed nearly identical means for men ($M$ = 3.45) and women ($M$ = 3.44), although the reported test remained significant. Taken together, the inferential results indicated gender-related differences in the overall construct and all five dimensions. H1a was therefore supported.

Digital literacy also differed by teaching experience, $F$ = 8.955, $p < .001$. Overall scores rose from 3.10 among teachers with 0–4 years of experience to 3.16 among teachers with 5–14 years and 3.23 among those with at least 15 years of experience. A similar upward pattern was found for digital technology knowledge and skills ($M$ = 3.27, 3.30, and 3.39), digital application ($M$ = 2.87, 2.94, and 3.00), digital social responsibility ($M$ = 2.89, 3.09, and 3.12), and professional development ($M$ = 2.87, 2.94, and 3.00).

Digital awareness did not increase linearly: its mean was 3.36 in the least-experienced group, 3.30 in the middle group, and 3.40 in the most-experienced group. Nevertheless, all five dimension-level tests were reported as significant at $p < .001$. The overall pattern supports H1b and indicates that teachers with longer careers generally reported higher digital literacy.

Professional title produced a significant difference in overall digital literacy, $F = 16.820$, $p < .001$. The mean increased progressively across the four groups: 3.03 for teachers without a professional title, 3.11 for those with a primary title, 3.23 for those with an intermediate title, and 3.32 for senior-title teachers. The same ordering was evident in digital awareness ($M = 3.42$, 3.52, 3.53, and 3.65) and digital technology knowledge and skills ($M = 3.69$, 3.72, 3.80, and 3.86). Larger increases appeared in digital application, digital social responsibility, and professional development, for which the reported means rose from 3.06 among teachers without a title to 3.93 among senior-title teachers. Digital awareness differed at $p = .010$, while the remaining dimensions differed at $p < .001$. These results support H1c and show that higher professional-title categories were accompanied by higher reported digital-literacy scores.

Significant differences were also observed across art disciplines, $F = 16.820$, $p < .001$. Fine arts teachers obtained the highest overall mean ($M = 3.93$), followed by music teachers ($M = 3.82$), dance teachers ($M = 3.78$), and teachers in other arts disciplines ($M = 3.64$). Fine arts teachers also recorded the highest means for digital awareness ($M = 3.51$), digital technology knowledge and skills ($M = 3.73$), digital application ($M = 3.93$), digital social responsibility ($M = 3.19$), and professional development ($M = 3.65$). Music teachers generally ranked second, while teachers in other arts disciplines recorded the lowest mean on each dimension. Digital awareness differed at $p = .010$, and all other dimensions differed at $p < .001$. H1d was therefore supported.

**Table 3** Reported group differences in overall digital literacy

| Background variable | Category | *M* | Test statistic | *p* | Hypothesis decision |
|---|---|---|---|---|---|
| Gender | Male | 3.39 | $t = 0.3986$ | < .001 | H1a supported |
| | Female | 3.24 | | | |
| Teaching experience | 0–4 years | 3.10 | $F = 8.955$ | < .001 | H1b supported |
| | 5–14 years | 3.16 | | | |
| | 15 years or more | 3.23 | | | |
| Professional title | None | 3.03 | $F = 16.820$ | < .001 | H1c supported |
| | Primary | 3.11 | | | |
| | Intermediate | 3.23 | | | |
| | Senior | 3.32 | | | |
| Art discipline | Fine arts | 3.93 | $F = 16.820$ | < .001 | H1d supported |
| | Music | 3.82 | | | |
| | Dance | 3.78 | | | |
| | Other arts disciplines | 3.64 | | | |

**Differences in Teaching Efficacy**

H2 proposed that teaching efficacy would differ across the same four background variables. Table 4 condenses the results for the overall teaching-efficacy score. Female teachers reported a higher mean teaching-efficacy score ($M = 3.74$, $SD = 0.93$) than male teachers ($M = 3.62$, $SD = 0.92$). The gender difference was reported as statistically significant, $t = 0.3896$, $p < .001$. Female teachers also reported higher means for classroom management ($M = 3.74$ versus 3.60), clarity of teaching-material presentation ($M = 3.83$ versus 3.69), teaching strategies and creative application ($M = 3.71$ versus 3.61), and teacher–student interaction in artistic practice ($M = 3.87$ versus 3.56). The largest descriptive gender gap occurred in teacher–student interaction, whereas the smallest appeared in teaching strategies and creative application. Significant differences were reported for the overall construct and all four dimensions. H2a was therefore supported.

Teaching efficacy differed significantly by teaching experience, $F = 8.995$, $p < .001$. Teachers with 15 years or more of experience reported the highest overall score ($M = 3.93$), followed by those with 5–14 years ($M = 3.67$) and those with 0–4 years ($M$

= 3.54). Classroom-management means rose from 3.40 to 3.56 and 3.78 across the three experience categories. Presentation clarity followed a similar pattern (*M* = 3.47, 3.61, and 3.85). Teaching strategies and creative application increased from 3.54 to 3.67 and 3.73, while teacher–student interaction followed the same sequence. All four dimension-level differences were reported as significant at $p < .001$. These findings support H2b and show a consistent positive pattern between teaching experience and perceived teaching efficacy.

A significant difference was also reported across professional titles, $F = 12.354$, $p < .001$. The mean teaching-efficacy score was 3.12 for teachers without a professional title, 3.27 for primary-title teachers, 3.29 for intermediate-title teachers, and 3.41 for senior-title teachers. Classroom management increased from 3.56 in the no-title group to 3.92 among senior-title teachers. Presentation clarity rose from 3.12 to 3.76, while teaching strategies and creative application increased from 3.32 to 3.71. Teacher–student interaction showed the same reported endpoints, rising from 3.32 to 3.71. Significant differences were reported for the overall construct and all four dimensions. H2c was therefore supported.

Teaching efficacy further differed by art discipline, $F = 12.354$, $p < .001$. Fine arts teachers recorded the highest overall mean (*M* = 3.93), followed by music teachers (*M* = 3.82), dance teachers (*M* = 3.78), and teachers from other arts disciplines (*M* = 3.64). Fine arts teachers had the highest reported means for classroom management (*M* = 3.51), presentation clarity (*M* = 3.73), teaching strategies and creative application (*M* = 3.93), and teacher–student interaction (*M* = 3.19). Across the four disciplines, the clearest separation occurred in teaching strategies and creative application: the fine arts mean was 3.93, compared with 3.02 for music and 3.01 for both dance and other arts disciplines. Significant discipline-based differences were reported for the overall construct and all four dimensions. These results support H2d.

**Table 4** Reported group differences in overall teaching efficacy

| Background variable | Category | *M* | Test statistic | *p* | Hypothesis decision |
|---|---|---|---|---|---|
| Gender | Male | 3.62 | $t = 0.3896$ | < .001 | H2a supported |
| | Female | 3.74 | | | |
| Teaching experience | 0–4 years | 3.54 | $F = 8.995$ | < .001 | H2b supported |
| | 5–14 years | 3.67 | | | |
| | 15 years or more | 3.93 | | | |
| Professional title | None | 3.12 | $F = 12.354$ | < .001 | H2c supported |
| | Primary | 3.27 | | | |
| | Intermediate | 3.29 | | | |
| | Senior | 3.41 | | | |
| Art discipline | Fine arts | 3.93 | $F = 12.354$ | < .001 | H2d supported |
| | Music | 3.82 | | | |
| | Dance | 3.78 | | | |
| | Other arts disciplines | 3.64 | | | |

**3. To investigate the association of digital literacy and teaching efficacy**

**Relationship Between Digital Literacy and Teaching Efficacy**

H3 predicted a positive relationship between digital literacy and teaching efficacy. Pearson correlation analysis showed that the two overall constructs were strongly and positively correlated, $r = .809$, $p < .01$. Thus, teachers reporting higher digital literacy also tended to report higher teaching efficacy. Because the research used a cross-sectional design, this coefficient represents an association rather than a causal effect. The dimension-level results were uniformly positive. Digital awareness correlated with overall teaching efficacy at $r = .461$. Its associations with the four teaching-efficacy dimensions ranged from $r = .318$ for teaching strategies and creative application to $r = .467$ for teacher–student interaction. Digital technology knowledge and skills ($r = .638$) and digital application ($r = .643$) had comparatively stronger relationships with overall teaching efficacy. Digital technology knowledge and skills correlated most strongly with teacher–student interaction ($r = .604$), while digital application was also most closely related to that dimension ($r = .575$). Digital social

responsibility correlated with overall teaching efficacy at $r$ = .349, while professional development correlated at $r$ = .496.

The overall digital-literacy score was positively associated with each dimension of teaching efficacy. Its relationship was strongest with teacher–student interaction in artistic practice ($r$ = .882), followed by clarity of teaching-material presentation ($r$ = .551), classroom management ($r$ = .504), and teaching strategies and creative application ($r$ = .469). This ordering shows that the overall relationship was most pronounced in the interactive and practice-oriented aspect of art teaching.

Several individual dimension pairs also produced strong coefficients. Digital social responsibility correlated with teacher–student interaction at $r$ = .925 and with teaching strategies and creative application at $r$ = .891. Professional development correlated with presentation clarity at $r$ = .891. By comparison, the smallest coefficient in the reported cross-construct matrix was the relationship between digital awareness and teaching strategies and creative application ($r$ = .318). Despite differences in magnitude, every coefficient was positive and was reported as statistically significant at $p < .01$. The findings therefore support H3 at both the overall-construct and dimension levels.

**Table 5** Correlations between digital literacy and teaching efficacy

| Digital-literacy variable | Classroom management | Presentation clarity | Teaching strategies | Teacher–student interaction | Overall teaching efficacy |
|---|---|---|---|---|---|
| Digital awareness | .349** | .466** | .318** | .467** | .461** |
| Digital technology knowledge and skills | .496** | .501** | .480** | .604** | .638** |
| Digital application | .481** | .510** | .411** | .575** | .643** |
| Digital social responsibility | .469** | .653** | .891** | .925** | .349** |
| Professional development | .641** | .891** | .496** | .501** | .496** |
| Overall digital literacy | .504** | .551** | .469** | .882** | .809** |

**Hypothesis-Testing Summary**

The results supported all three principal hypotheses and their respective subhypotheses. Digital literacy differed significantly according to gender, teaching experience, professional title, and art discipline, supporting H1a–H1d. The direction of the reported means showed higher digital literacy among male teachers, more experienced teachers, teachers holding higher professional titles, and fine arts teachers.

Teaching efficacy also differed significantly across the four background variables, supporting H2a–H2d. Female teachers reported higher teaching efficacy than male teachers, while the highest scores across the remaining comparisons were found among teachers with at least 15 years of experience, senior-title teachers, and fine arts teachers. Finally, the positive correlation between overall digital literacy and overall teaching efficacy supported H3.

**Table 6** Summary of hypothesis-testing results

| Hypothesis | Hypothesized difference or relationship | Result |
|---|---|---|
| H1a | Digital literacy differs significantly by gender | Supported |
| H1b | Digital literacy differs significantly by teaching experience | Supported |
| H1c | Digital literacy differs significantly by professional title | Supported |
| H1d | Digital literacy differs significantly by art discipline | Supported |
| H2a | Teaching efficacy differs significantly by gender | Supported |
| H2b | Teaching efficacy differs significantly by teaching experience | Supported |
| H2c | Teaching efficacy differs significantly by professional title | Supported |
| H2d | Teaching efficacy differs significantly by art discipline | Supported |
| H3 | Digital literacy is significantly and positively associated with teaching efficacy | Supported |

Overall, the participating teachers reported moderate digital literacy and relatively strong teaching efficacy. Digital technology knowledge and skills represented the strongest aspect of digital literacy, whereas digital application received the lowest score. Classroom management was the strongest dimension of teaching efficacy, while teacher–student interaction in artistic practice was the weakest. Significant differences were reported across all four background variables for both principal constructs. The group means further show that the direction of these differences was not identical for

digital literacy and teaching efficacy, particularly in the gender comparison: men reported higher digital literacy, whereas women reported higher teaching efficacy.

The strongest result was the positive relationship between the two overall constructs ($r$ = .809). Positive correlations were also reported across every pair of digital-literacy and teaching-efficacy dimensions included in the analysis. Accordingly, the results provide empirical support for H1, H2, and H3. These findings remain limited to statistical associations and group differences within the sampled setting; neither the cross-sectional survey nor the reported analyses establish a causal effect of digital literacy on teaching efficacy.

## Research Discussion

### Discussion of the Main Findings

This study examined digital literacy and teaching efficacy among 226 art teachers at X High School in Jiangsu Province. Three findings stand out. First, teachers reported moderate digital literacy and relatively high teaching efficacy. Second, both constructs differed across gender, teaching experience, professional title, and art discipline. Third, digital literacy was strongly and positively associated with teaching efficacy. Together, these findings suggest that digital competence is not separate from teachers' broader professional functioning; it is embedded in how teachers organize instruction, present artistic content, design learning activities, and interact with students. The overall digital-literacy mean was moderate ($M$ = 3.33). Digital technology knowledge and skills received the highest rating, whereas digital application was the lowest. This gap is important. It indicates that familiarity with devices, software, and digital resources does not automatically translate into confident pedagogical use. Falloon (2020) similarly argued that teacher digital competence extends beyond technical operation to include pedagogical judgment, ethical practice, and context-sensitive implementation. Studies of teacher education have also found that digital competence is often addressed unevenly, with greater attention given to tools than to their integration into subject teaching (Instefjord & Munthe, 2017; Pettersson, 2018). The present result extends this concern to art education, where digital tools need to

support demonstration, interpretation, creative production, critique, and collaborative practice rather than merely replace conventional presentation media.

Teaching efficacy was comparatively high (*M* = 3.52). Classroom management was the strongest dimension, while teacher–student interaction in artistic practice was the weakest. Teacher efficacy is domain-specific: confidence in controlling classroom routines does not necessarily imply equal confidence in facilitating artistic dialogue or supporting open-ended creative decisions (Tschannen-Moran & Hoy, 2001). The lower interaction score is therefore plausible in art classrooms, where teachers must balance structure with autonomy and provide feedback without restricting students' individual expression. This finding is consistent with Zee and Koomen's (2016) conclusion that teacher self-efficacy varies across instructional tasks and is closely connected to classroom processes. It also suggests that professional development should pay more attention to critique, dialogue, collaborative creation, and technology-supported feedback rather than focusing only on classroom control.

The reported group differences offer a more differentiated picture. Male teachers scored higher in digital literacy, whereas female teachers reported higher teaching efficacy. The digital-literacy result is broadly consistent with research showing that gender differences in teachers' technology-related self-efficacy may appear in particular technical domains, although their magnitude and direction depend on how competence is defined and measured (Scherer & Siddiq, 2015). It should not be interpreted as evidence of an inherent gender advantage. Access to technology, prior experience, professional responsibilities, and opportunities to practise may offer more convincing explanations. The higher teaching-efficacy score among women differs from Klassen and Chiu's (2010) finding that female teachers in their sample reported lower classroom-management efficacy. This contrast indicates that gender patterns are context-dependent and should not be generalized across school systems, subjects, or efficacy dimensions.

Digital literacy and teaching efficacy also increased across teaching-experience and professional-title groups. This pattern accords with research showing that mastery experiences accumulated through classroom practice are central to the development of teacher efficacy (Bandura, 1997; Tschannen-Moran & Hoy, 2007). Experienced and

senior teachers may have had more opportunities to refine their instruction, participate in professional learning, solve classroom problems, and connect new technologies with established pedagogical routines. Nevertheless, experience alone should not be assumed to produce digital competence. Digital practices change quickly, and institutional support remains important. Cross-national evidence indicates that teacher efficacy is shaped not only by individual characteristics but also by school leadership, working conditions, and the composition of the teaching context (Fackler & Malmberg, 2016).

Fine arts teachers recorded the highest overall means for both digital literacy and teaching efficacy. One possible explanation is the close relationship between contemporary visual-art practice and digital image production, editing, presentation, and online exhibition. Örtegren (2012) showed that digital image media can reshape both the content and practice of art education, while Strycker (2020) found that art teachers' technology use is related to their preparation and professional opportunities. Even so, discipline differences should not be treated as fixed characteristics. Music, dance, and other arts subjects use different technologies and modes of performance, and a questionnaire emphasizing visual or screen-based applications may advantage fine arts teachers. Future instruments should therefore ensure equivalent disciplinary relevance.

The central finding was the strong correlation between digital literacy and teaching efficacy ($r$ = .809). This result is consistent with Hatlevik's (2017) evidence that teachers' digital competence, technology use, and self-efficacy are closely connected. From a social-cognitive perspective, teachers who can select and use digital tools successfully are more likely to develop mastery experiences, which reinforce confidence in their capacity to teach effectively (Bandura, 1997). The reverse pathway is also plausible: teachers with stronger efficacy beliefs may be more willing to experiment with unfamiliar technologies and persist when technical or pedagogical difficulties arise. The relationship is therefore likely reciprocal rather than one-directional.

The magnitude of the correlation nevertheless requires caution. Both variables were measured through the same self-report questionnaire at one point in

time, and several teaching-efficacy items explicitly referred to digital demonstrations, resources, or platforms. Shared measurement context and conceptual overlap may have inflated the association. Common-method variance is a recognized concern when predictor and outcome measures come from the same respondent and survey session (Podsakoff et al., 2003). Accordingly, the result supports an association but not the claim that improving digital literacy will necessarily cause an equivalent increase in teaching efficacy.

**Implications**

The findings point to a practical shift in teacher development. Training should move from generic software instruction toward subject-specific pedagogical design. For art teachers, useful activities include developing digital demonstrations of creative processes, designing online critique and portfolio tasks, adapting digital resources for different levels of artistic proficiency, and using technology to strengthen—not reduce—student agency. This approach is consistent with teacher-digital-competence frameworks that integrate technical, pedagogical, ethical, and professional dimensions (Falloon, 2020).

Support should also be differentiated. Less-experienced teachers and those without senior titles may benefit from mentoring, guided lesson design, and opportunities to observe effective digital art teaching. Music, dance, and other arts teachers require technologies and examples aligned with their own modes of performance and practice. Schools can support this work through discipline-based professional learning communities, peer observation, shared digital-resource development, and protected time for experimentation. Such arrangements may be more useful than one-off workshops because they connect professional learning with teachers' everyday classroom problems.

**Limitations and Future Research**

Several limitations qualify the findings. The sample came from one institutional setting and was selected through convenience sampling, which limits generalization to other schools and regions. The study relied entirely on teachers' self-reports; observed competence and classroom performance may differ from perceived competence. Its cross-sectional design also prevents conclusions about temporal order

or causality. In addition, the strong correlations between several dimensions raise questions about discriminant validity and item overlap.

Future studies should recruit teachers from multiple schools and provinces and use probability or stratified sampling where feasible. Digital literacy could be assessed through performance tasks, teaching artifacts, or classroom observations, while efficacy could be examined alongside student engagement and instructional-quality indicators. Confirmatory factor analysis with an independent sample would provide a stronger test of the proposed five- and four-factor structures. Longitudinal or intervention research could then determine whether changes in digital literacy precede changes in teaching efficacy and whether school support or professional learning mediates that relationship.

**Conclusion**

This study contributes evidence from a comparatively underexamined group: secondary-school art teachers working in a Chinese digital-education context. Participants reported moderate digital literacy and relatively strong teaching efficacy, but their confidence was uneven across dimensions. Technical knowledge and classroom management were relative strengths, whereas digital application and interaction in artistic practice were weaker. Reported differences across teacher groups suggest that digital and pedagogical confidence develop within particular professional and disciplinary contexts.

Most importantly, digital literacy and teaching efficacy were strongly related. This finding does not establish causation, but it shows that teachers' capacity to work meaningfully with digital technologies is closely connected to how capable they feel as art educators. Sustainable improvement will therefore require more than access to devices: it depends on pedagogically focused, discipline-sensitive, and continuing professional support.

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