Digital Competence for Traditional Art Students in Higher Vocational Colleges: Expert Perspectives from Calligraphy and Painting Education in China

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DOI: https://doi.org/10.47772/IJRISS.2026.100600110

Received: 22 May 2025; Accepted: 27 May 2026; Published: 18 June 2026

ABSTRACT

The integration of digital competence into traditional arts education presents unique pedagogical challenges, particularly for higher vocational students specializing in Chinese calligraphy and painting. This study explores the dimensions of digital competence, self-efficacy, and critical thinking skills among traditional art students in Hebei Province, China. Through semi-structured interviews with 12 expert educators from four higher vocational colleges, the research identifies culturally specific digital competence dimensions (e.g., digital documentation of analog art, online portfolio curation, digital calligraphy tools, virtual exhibition participation, and ethical digital sharing). Findings reveal that self-efficacy serves as a critical filter affecting digital tool adoption, with domain-specific gaps between high social media efficacy and low technical efficacy. Critical thinking manifests distinctively as students navigate authenticity evaluation, tool critique, tradition-digital synthesis, and information source criticism. A conceptual framework summarizing the relationships among the three dimensions is presented based on expert findings. The study provides empirical support from non-Western vocational art education contexts, with implications for curriculum design that integrates traditional artistic heritage with digital literacy requirements.

Keywords: Digital competence, self-efficacy, critical thinking, vocational education, traditional Chinese art, calligraphy and painting, higher vocational colleges

INTRODUCTION

The rapid evolution of digital technology has significantly influenced learning systems across all educational sectors (Zakir et al., 2025). Society has experienced an essential technological revolution in recent decades, generating significant repercussions in the educational field, especially in higher education (Marrero-Sánchez & Vergara-Romero, 2023). University students are expected to have the appropriate digital competence to face the demands of the changing educational model and to meet the challenges of the future workforce (Zhao et al., 2021).

However, the integration of digital competence into arts education presents unique challenges. Traditional art forms such as Chinese calligraphy and painting, which are rooted in millennia of material practice involving brush, ink, and rice paper, pose distinctive pedagogical questions when encountering digital tools. Art education

is aimed not only at teaching specific crafts but also at forming a person's spiritual culture and gaining special emotional experience (Bolatova & Nasipov, 2023). Digitalization in teaching academic painting requires careful consideration of how digital and traditional forms can complement each other (Parkhomenko & Matusovsky, 2023).

In higher vocational colleges in Hebei Province, China, students of calligraphy and painting are expected to master both traditional techniques and emerging digital literacies. Yet little research has focused on how digital competence interacts with self-efficacy and critical thinking specifically for this student population. The present study addresses this gap by investigating expert perspectives on the dimensions of these three constructs within the context of traditional vocational art education.

This paper addresses the following research questions:

1. What dimensions of digital competence are relevant for traditional calligraphy and painting students in higher vocational colleges?
2. How do self-efficacy beliefs shape these students' engagement with digital tools?
3. In what ways does critical thinking manifest when traditional art students encounter digital technologies?

LITERATURE REVIEW

Digital competence in higher education

Digital competence implies the knowledge, abilities, skills, and attitudes necessary to access, analyze, evaluate, reflect critically, create, and communicate in four key areas: technological, informational, multimedia, and communicative (Marrero-Sánchez & Vergara-Romero, 2023). Existing frameworks such as DigComp 2.1 have been validated in non-Western higher education contexts. A pilot study validating the Digital Competence (Dig-Comp 2.1) Framework instrument within the context of a non-Western developing country found that the framework portrayed an excellent fit with pilot data, suggesting that the instrument's measures are appropriate and reliable for future investigations (Abubakari et al., 2023).

In the Chinese higher education context, research with 5,164 university students from all majors at Gansu Agricultural University revealed that students' perceptions of digital competencies in terms of information and data literacy, communication and collaboration, and safety were positive (Zhao et al., 2021). Significant differences in students' self-perceptions of digital competence were found related to gender, grade level, area of residence, and prior relevant training (Zhao et al., 2021).

In vocational education settings, teachers' digital competence is key to preparing students for the digital age, encompassing not only computer skills but also the creation of interactive learning, assessment, and collaboration (Diachuk, 2024). A study of vocational teachers found that 43.3% had a high level of digital competence, 50% had an average level, and 6.7% had a low level, with main problems including insufficient knowledge of specialized software, lack of systematic training and technical support, and low motivation due to workload and stress (Diachuk, 2024).

Digital Competence and Self-Efficacy

The relationship between digital literacy and self-efficacy has been empirically established. A study investigating the relationship between digital literacy and academic performance found that improving students' digital literacy skills can lead to thriving in academic pursuits (Zakir et al., 2025). The empirical findings demonstrated that an

increase in digital literacy improves digital competence, informal digital learning engagement, and digital self-efficacy (Zakir et al., 2025).

Digital literacy positively influences academic self-efficacy and negatively correlates with academic procrastination, with self-efficacy emerging as the most potent mediator among medical students (Yuan et al., 2024). Similarly, research grounded in Self-Determination Theory found that digital self-efficacy acts as a mediator between digital media engagement and motivation, underscoring the critical role of perceived competence in maintaining student motivation in technology-enhanced learning settings (Dong, 2025). Positive student attitudes and digital literacy significantly contribute to self-efficacy, which in turn positively affects online engagement dimensions including social, collaborative, cognitive, behavioral, and emotional engagement (Getenet et al., 2024).

Self-Efficacy in Arts and Vocational Education

In the context of visual arts education, research on pre-service primary teachers revealed a subtle yet statistically significant correlation between self-efficacy beliefs in visual arts instruction and attitudes toward the teaching profession (Erden Kocaarslan & Riedler Eryaman, 2024). An upward trend was observed in both self-efficacy beliefs in visual arts teaching and attitudes toward the teaching profession as academic grade level advanced (Erden Kocaarslan & Riedler Eryaman, 2024).

In vocational school settings, research investigating the association between learning skills and creative thinking found negative correlations between fluency and self-efficacy, while self-efficacy was positively correlated with reading accuracy (Magenes et al., 2022). Among Chinese high school students, self-efficacy is positively correlated with academic performance, with male students demonstrating a stronger sense of self-efficacy than females (Liu, Wu & Zhao, 2023).

Critical Thinking in Arts Education and the Digital Era

Art education has been suggested as a contributor to creative skill development and critical thinking skills (Basak & Yucel, 2024). However, research examining critical thinking dispositions of undergraduate art education and history students found that critical thinking skill levels were low in both cohorts, with no statistically significant difference according to study areas (Basak & Yucel, 2024). This suggests that critical thinking skills could be supported by designing curricula that encourage and develop critical thinking through specific educational strategies (Basak & Yucel, 2024).

Studio-based art practices such as drawing, painting, and sculpture can be used to foster critical thinking skills in young learners (Ankyiah & Bamfo, 2023). Open-ended art projects that promote student autonomy and require making decisions can boost skills like analysis, interpretation, evaluation, and creative problem solving (Ankyiah & Bamfo, 2023). When combined with self-reflection and group critique, studio art may enhance perspective taking, reasoning ability, and abstract thought in young learners (Ankyiah & Bamfo, 2023).

A quantitative study on arts education and cognitive development revealed significant associations between arts education and critical thinking skills, suggesting that active participation in arts-based activities fosters deeper analytical abilities among college students (Li & Qi, 2025). Engagement in arts activities promotes creative problem-solving skills, enhancing students' adaptability and innovation in academic pursuits (Li & Qi, 2025). In the digital era, the intersection of critical thinking and technology has become increasingly important (Moustaghfir & Brigui, 2024). Research examining the role of digital literacy and self-efficacy in enhancing students' critical thinking found that digital literacy has a positive and significant effect on students' critical thinking, self-efficacy has a positive and significant effect on students' critical thinking, and both together have a positive and significant effect (Leuwol et al., 2023).

Digital Integration in Art Education

The reasonableness of including digital painting in art education systems has been increasingly recognized (Bolatova & Nasipov, 2023). Research at the Luhansk State Academy of Culture and Arts compared traditional and digital forms of painting, highlighting a combined method that contributes to improving the quality of education (Parkhomenko & Matusovsky, 2023). The foundation in the educational process and at all stages of learning remains academic painting, but the interrelation and complementarity between digital and traditional forms is evident (Parkhomenko & Matusovsky, 2023). However, barriers exist. In Malaysia, visual art education receives limited attention, with students reporting that lack of art materials and tools creates stress, and they perceive visual art education as difficult with lack of exposure (Othman et al., 2023). These challenges are relevant to understanding the vocational art education context in China as well.

Conceptual Framework and Research Gap

Despite the substantial body of research on digital competence, self-efficacy, and critical thinking individually, no study has integrated all three constructs within the context of traditional Chinese vocational art education. The present study addresses this gap by exploring expert perspectives on how these three dimensions manifest among calligraphy and painting students in higher vocational colleges in Hebei Province, China. **Figure 1** presents the conceptual framework of this study, illustrating the hypothesized relationships among digital competence, self-efficacy, and critical thinking within the traditional calligraphy and painting education context.

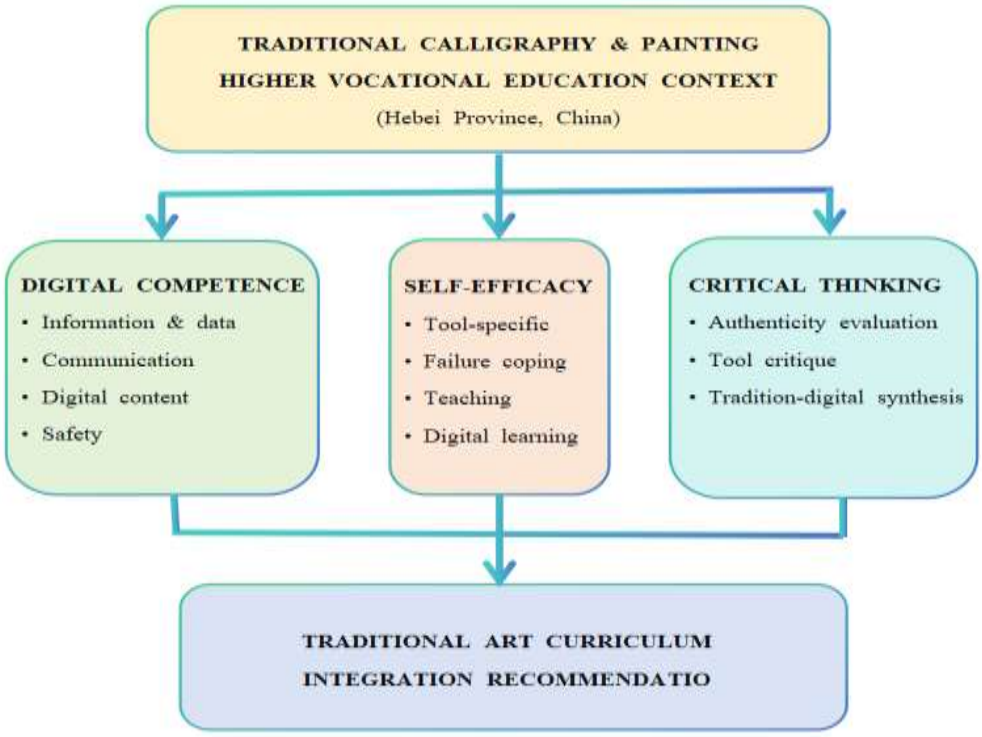

Figure 1. Conceptual Framework

RESEARCH METHODOLOGY

Research Design

This study employed a qualitative research design using semi-structured expert interviews. This approach was selected to capture in-depth perspectives from experienced educators who navigate the intersection of traditional

art pedagogy and digital competence requirements on a daily basis. A qualitative approach is particularly appropriate for exploratory research aiming to identify dimensions and themes that have not been previously documented in the specific context of traditional Chinese vocational art education.

Participant Selection

A purposive sample of 12 experts was recruited from four higher vocational colleges in Hebei Province specializing in calligraphy and painting education. Inclusion criteria were: (a) minimum 5 years of teaching experience in calligraphy or painting education, (b) involvement in curriculum design or digital integration initiatives, and (c) recognized expertise in traditional Chinese art pedagogy. **Table 1** provides demographic information and digital integration roles of the 12 expert participants included in this study.

Table 1. Expert Participant Demographics

Code	Role	Years of Experience	Digital Integration Role
E01	Calligraphy Professor	18	Led online gallery project
E02	Painting Instructor	12	Digital portfolio supervisor
E03	Curriculum Coordinator	9	Designed blended learning modules
E04	Vocational Training Head	15	Industry-digital liaison
E05	Digital Art Specialist	7	Introduced tablet painting tools
E06	Traditional Ink Painting Expert	22	Resisted then adopted digitization
E07	Educational Technologist	8	Trained faculty on digital tools
E08	Art History Lecturer	11	Uses digital archives for teaching
E09	Studio Practice Supervisor	14	Integrates social media for student shows
E10	Assessment Designer	10	Developed digital rubrics
E11	Calligraphy Artist-Educator	20	Digital calligraphy documentation
E12	Vocational Education Researcher	16	Published on art-digital integration

Interview Protocol

Semi-structured interviews lasting 45 to 60 minutes covered three domains corresponding to the research questions:

- **Digital competence**: Digital tools used by students and teachers, frequency of use, perceived necessity for traditional art careers, barriers to adoption.
- **Self-efficacy**: Confidence in learning new digital tools, confidence in teaching digital skills to art students, ability to overcome technical failures.
- **Critical thinking**: Students' ability to evaluate digital resources, capacity to adapt traditional techniques to digital media, and reflection on authenticity issues

Data Analysis

Interviews were audio-recorded, transcribed verbatim, and analyzed using thematic analysis. Coding followed a systematic process: open coding to identify initial themes, axial coding to organize themes into categories, and selective coding to integrate categories into core dimensions. Two independent coders analyzed the data, with inter-coder reliability calculated at $\kappa = 0.84$. The thematic analysis followed a systematic three-stage process, as illustrated in **Figure 2**, moving from raw interview transcripts to three core dimensions through open, axial, and selective coding.

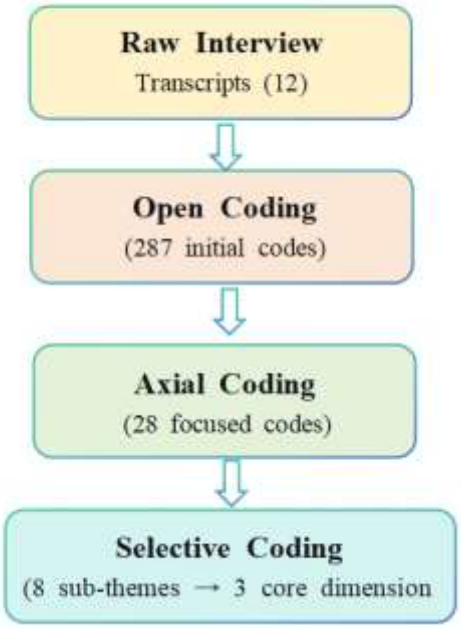

Figure 2. Thematic Analysis Process

FINDINGS

Dimension 1: digital competence for traditional art students

Experts identified five sub-dimensions of digital competence that are uniquely relevant to calligraphy and painting students in higher vocational colleges. These extend beyond generic digital competence frameworks to address the specific needs of traditional art education. To organize the digital competence dimensions identified by experts, **Table 2** presents five sub-dimensions with representative quotes and supporting literature.

Table 2. Digital Competence Sub-Dimensions with Expert Evidence

Sub-dimension	Description	Exemplar Quote	Supporting Literature
Digital Documentation of Analog Art	High-resolution capture, color calibration, archival storage of traditional artwork	"A student who cannot properly photograph their ink wash painting loses 70% of the gradation nuance." (E01)	Marrero-Sánchez & Vergara-Romero (2023); Zhao et al. (2021)
Online Portfolio Curation	Using platforms like ArtStation, Xiaohongshu, or custom websites for professional presentation	"Employers look at their social media portfolios before their physical ones." (E04)	Zakir et al. (2025)
Digital Calligraphy and Painting Tools	Tablets with pressure sensitivity, brush simulation software	"It's controversial, but some students start with Procreate before touching real brushes." (E05)	Parkhomenko & Matusovsky (2023); Bolatova & Nasipov (2023)
Virtual Exhibition	3D gallery software, online	"During COVID, they learned	Diachuk (2024)

Participation	viewing rooms, virtual art shows	to create virtual exhibitions. That skill remains valuable." (E09)	
Ethical Digital Sharing	Copyright awareness, watermarking, avoiding AI-generated plagiarism	"They need to know how to share without losing ownership of their artistic work." (E11)	Moustaghfir & Brigui (2024)

The findings indicate that digital competence for traditional art students is not merely about technical proficiency but encompasses a holistic set of skills that bridge traditional artistic practices with contemporary digital requirements. As noted by Marrero-Sánchez & Vergara-Romero (2023), digital competence includes attitudes necessary to access, analyze, evaluate, reflect critically, create, and communicate, all of which are relevant to these five sub-dimensions.

Dimension 2: Self-Efficacy

Self-efficacy emerged as a critical factor affecting whether students actually utilize available digital tools. Experts identified four key themes related to self-efficacy in the context of traditional art education. **Table 3** summarizes the four self-efficacy themes that emerged from the interviews, each illustrated with an exemplar quote from the experts.

Table 3. Self-Efficacy Themes with Expert Evidence

Theme	Description	Exemplar Quote	Supporting Literature
Tool-specific self-efficacy	Students confident in some digital tools but not others	"They can make a TikTok in 5 minutes but take 2 hours to match a scanned painting's true color." (E02)	Getenet et al. (2024); Yuan et al. (2024)
Failure coping efficacy	Tolerance for technical problems affects digital tool adoption	"If the tablet lags for 2 seconds, they say 'this doesn't work' and go back to paper." (E06)	Dong (2025)
Teaching self-efficacy (for future educators)	Students planning to become teachers doubt their ability to teach digital skills	"How can I teach digital competence when I barely learned it myself?" (E07, quoting a student)	Erden Kocaarslan & Riedler Eryaman (2024)
Digital learning self-efficacy	Confidence in learning new digital tools independently	"The students who believe they can figure out new software actually do. The ones who doubt themselves don't even try." (E03)	Zakir et al. (2025); Liu, Wu & Zhao (2023)

Consistent with Zakir et al. (2025), the findings suggest that possessing digital self-efficacy increases the likelihood of academic success and digital tool adoption. The domain-specific efficacy gap identified in this study, namely high social media efficacy but low technical (color/archival) efficacy, represents a novel finding specific to the traditional art education context.

As noted by Erden Kocaarslan & Riedler Eryaman (2024), self-efficacy beliefs in visual arts instruction are correlated with professional attitudes. Several experts (E01, E07, E10) emphasized that students with higher self-efficacy in digital tools were more likely to express interest in careers that integrate digital and traditional art forms.

Dimension 3: Critical Thinking

Experts noted that critical thinking manifests distinctively when traditional art students encounter digital technologies.

Unlike general critical thinking skills, the context of traditional Chinese calligraphy and painting introduces unique dimensions of critical evaluation. As shown in **Table 4**, four distinct critical thinking sub-themes were identified, reflecting how traditional art students navigate digital technologies in their learning process.

Table 4. Critical Thinking Sub-Themes with Expert Evidence

Sub-theme	Description	Exemplar Quote	Supporting Literature
Authenticity evaluation	Judging whether a digital reproduction distorts the original artwork	"An AI-upscaled calligraphy stroke often loses the 'rhythm of the brush.' Students must learn to see that." (E03)	Li & Qi (2025); Moustaghfir & Brigui (2024)
Tool critique	Critically evaluating digital tools rather than accepting them uncritically	"Just because Photoshop has a 'calligraphy brush' preset doesn't mean it's good for Chinese art." (E08)	Ankyiah & Bamfo (2023); Basak & Yucel (2024)
Tradition-digital synthesis	Integrating digital methods while preserving core traditional aesthetics	"The best students use tablets for composition studies, then execute with real ink. That's critical thinking in action." (E10)	Parkhomenko & Matusovsky (2023); Bolatova & Nasipov (2023)
Information source criticism	Evaluating online tutorials, reference images, and AI-generated content for authenticity	"They download any image from Baidu without asking: Is this authentic? Is this a forgery?" (E12)	Leuwol et al. (2023); Moustaghfir & Brigui (2024)

The findings align with Basak & Yucel (2024), who concluded that critical thinking skills could be supported by designing curricula that encourage and develop critical thinking through specific educational strategies. In the context of traditional art education, this means intentionally incorporating critical evaluation of digital tools and resources into studio practice.

As Ankyiah & Bamfo (2023) suggested, open-ended art projects that promote student autonomy and require making decisions can boost skills like analysis, interpretation, evaluation, and creative problem solving.

Experts in this study echoed this view, with several (E02, E06, E09) noting that students who engaged in digital documentation projects that required them to make decisions about color correction, cropping, and presentation demonstrated stronger critical thinking about authenticity.

Consistent with Leuwol et al. (2023), the findings confirm that digital literacy and self-efficacy together have a positive and significant effect on students' critical thinking in the digital era.

Summary of Thematic Findings

Table 5 provides a consolidated summary of the three core dimensions and their respective sub-themes, along with the key insight derived from each dimension.

Table 5. Summary of Core Dimensions and Sub-Themes

Core Dimension	Number of Sub-Themes	Key Insight
Digital Competence	5	Traditional art students require art-specific digital skills beyond generic frameworks
Self-Efficacy	4	Domain-specific efficacy gap exists (high social media vs. low technical efficacy)
Critical Thinking	4	Authenticity evaluation and tradition-digital synthesis are uniquely important

DISCUSSION

A culturally and artistically specific digital competence framework

The findings of this study extend existing digital competence research by identifying dimensions specific to traditional calligraphy and painting education in China. While frameworks such as DigComp 2.1 have been validated in non-Western higher education contexts (Abubakari et al., 2023), the present study suggests that generic frameworks may require adaptation for specialized artistic disciplines.

The five sub-dimensions identified (digital documentation, online portfolio curation, digital calligraphy tools, virtual exhibition participation, and ethical digital sharing) reflect the unique intersection of traditional artistic practice and contemporary digital requirements. This aligns with Marrero-Sánchez & Vergara-Romero (2023), who emphasized that digital competence encompasses technological, informational, multimedia, and communicative areas, all of which are relevant to art education. Furthermore, the findings support Parkhomenko & Matusovsky (2023), who argued that the foundation in the educational process remains academic painting, but the interrelation and complementarity between digital and traditional forms are essential for modern art education.

Consistent with Zhao et al. (2021), who found that Chinese university students' digital competence varies by gender, grade level, and residence, the present study suggests that similar demographic factors may influence digital competence among traditional art students, though this requires direct investigation with student samples. The study also aligns with Diachuk (2024), who identified insufficient training and low motivation as barriers to digital competence development among vocational teachers. Experts in the present study similarly noted that students lack systematic training in art-specific digital tools and that low self-efficacy reduces motivation to engage with digital technologies.

The role of self-efficacy in digital tool adoption

The findings strongly suggest that self-efficacy plays a critical role in whether traditional art students adopt and persist with digital tools. Consistent with Zakir et al. (2025), who found that digital competence and digital self-efficacy serve as partial mediators between digital literacy and academic success, the present study indicates that self-efficacy similarly influences digital engagement outcomes for traditional art students.

The domain-specific efficacy gap identified in this study, namely high confidence in social media but low confidence in technical tasks such as color calibration and archival storage, represents a novel contribution. This gap may be particularly relevant to vocational art education, where students often have extensive experience with social media platforms for sharing artwork but limited formal training in professional digital documentation practices.

As Dong (2025) demonstrated, digital self-efficacy acts as a mediator between digital media engagement and motivation. The present study extends this finding to the context of traditional art education, suggesting that interventions targeting digital self-efficacy could enhance both motivation to use digital tools and engagement with digital resources. Additionally, the findings support Othman et al. (2023), who found that students perceive visual art education as difficult and lack exposure. Experts in this study similarly reported that traditional art students often lack exposure to professional digital documentation practices and need structured opportunities to develop these skills.

Critical Thinking in Traditional Art Education

The findings reveal that critical thinking in traditional art education manifests in ways that differ from general higher education contexts. While Basak & Yucel (2024) found low critical thinking levels among art education students generally, the present study identifies specific areas where critical thinking is both needed and can be developed: authenticity evaluation, tool critique, tradition-digital synthesis, and information source criticism.

Consistent with Leuwol et al. (2023), who found that digital literacy and self-efficacy have a positive and significant effect on students' critical thinking, the present study suggests that these relationships hold true specifically for traditional art students. The unique contribution of this study is the identification of *how* critical thinking manifests in this population, not just that it is low but in what specific areas intervention is needed.

The tradition-digital synthesis sub-theme is particularly noteworthy. As Li & Qi (2025) demonstrated, arts education in higher education is positively correlated with critical thinking skills. The present study suggests that for traditional Chinese art students, critical thinking involves not just analyzing digital resources but actively synthesizing traditional and digital approaches in their creative practice.

Conceptual Framework Derived from Expert Findings

Based on the findings from the 12 expert interviews, a conceptual framework was developed to summarize the relationships among the three core dimensions as identified by experts. The framework illustrates the following key insights: digital competence for traditional art students comprises five art-specific sub-dimensions that extend beyond generic digital literacy frameworks; self-efficacy manifests in four distinct themes, with a notable gap between social media confidence and technical proficiency; and critical thinking takes four forms that are uniquely shaped by the traditional calligraphy and painting context, particularly around authenticity and tradition-digital synthesis.

The framework suggests that digital competence and self-efficacy are closely related in the traditional art education context, and that both contribute to critical thinking capabilities.

However, as this study is exploratory in nature and based on expert perspectives rather than student-level quantitative data, these relationships are presented as thematic patterns requiring further empirical validation. Future research should test the proposed relationships using larger sample surveys and statistical methods such as structural equation modeling.

Implications For Vocational Art Curriculum

Curriculum Design Recommendations

Based on the findings, four curriculum interventions are recommended for higher vocational colleges offering calligraphy and painting programs. Based on the findings, **Table 6** proposes four curriculum recommendations aligned with each dimension, including example activities and supporting literature.

Table 6. Curriculum Recommendations by Dimension

Dimension	Recommendation	Example Activity	Supporting Literature
Digital Competence	Mandatory module on digital documentation (color management, archival formats, photography of artwork)	Students photograph same painting under 3 lighting conditions; class critiques accuracy of digital reproduction	Zhao et al. (2021); Diachuk (2024)
Self-Efficacy	Scaffolded digital tool introduction with "failure practice" sessions	Deliberately create common errors (tablet lag, file corruption, color mismatch); students troubleshoot in pairs	Dong (2025); Getenet et al. (2024)
Critical Thinking	Comparative analysis tasks: analog vs. digital versions of same artwork	Paint a bamboo branch traditionally; replicate with tablet; compare and defend which is "more authentic"	Ankyiah & Bamfo (2023); Basak & Yucel (2024); Li & Qi (2025)
Integrated Assessment	Portfolio requires both physical and digital components with reflective essay on tool choices	60% physical artwork, 30% digital documentation/presentation, 10% critical reflection on digital-traditional integration	Parkhomenko & Matusovsky (2023); Othman et al. (2023)

Institutional and Policy Recommendations

Beyond specific curriculum interventions, the study suggests broader institutional changes. Digital-art bridge courses co-taught by traditional artists and educational technologists could address the gap between traditional practice and digital requirements (Diachuk, 2024; Parkhomenko & Matusovsky, 2023). Low-stakes digital sandbox sessions where students can experiment with digital tools without fear of grading would be specifically designed to build failure-coping self-efficacy (Dong, 2025). Local digital archives of Hebei's calligraphy and painting heritage would give students authentic material for critical analysis and digital documentation practice (Zhao et al., 2021). Mentoring programs pairing digitally confident students with those who have lower digital self-efficacy could leverage peer learning to address the domain-specific efficacy gap (Erden Kocaarslan & Riedler Eryaman, 2024). Finally, faculty development programs are needed to enhance teachers' own digital competence, given that 43.3% of vocational teachers in one study had high digital competence but significant gaps remained in specialized software knowledge (Diachuk, 2024).

Addressing Barriers

Consistent with Othman et al. (2023), who found that students perceive visual art education as difficult and lack exposure, the present study suggests that similar barriers exist for digital integration in Chinese vocational art education. Recommendations to address these barriers include providing adequate digital tools and materials to reduce student stress, increasing exposure to professional digital art practices through industry partnerships, and developing teaching aids specifically designed for digital integration in traditional art education.

LIMITATIONS AND FUTURE RESEARCH

Limitations

This study has several limitations that should be acknowledged. First, the findings are based on expert

perspectives from only 12 educators across four higher vocational colleges in Hebei Province, which may limit the generalizability of the results to other regions or educational levels. Second, while expert interviews provide rich qualitative insights, the exploratory nature of this study means that the identified dimensions and themes require quantitative validation through larger-scale surveys with actual students. Third, the perspectives of experts, though valuable, may not fully capture the actual experiences and challenges faced by students themselves in developing digital competence and critical thinking skills.

Future Research Directions

Based on the findings and limitations, several directions for future research are proposed. Future studies should conduct quantitative surveys with larger samples of traditional art students to validate the dimensions identified in this study using confirmatory factor analysis. Comparative research between traditional art students and those in design or fine arts disciplines would help identify what is unique about digital competence in traditional contexts. Longitudinal studies are needed to test whether curriculum interventions actually improve digital competence, self-efficacy, and critical thinking over time. Additionally, the impact of generative AI tools on traditional art students' digital competence and authenticity judgments warrants investigation, as does the influence of demographic factors such as gender, grade level, and area of residence. Finally, intervention studies targeting the domain-specific efficacy gap identified in this study would have direct practical value for curriculum development

CONCLUSION

This study explored expert perspectives on digital competence, self-efficacy, and critical thinking among traditional calligraphy and painting students in higher vocational colleges in Hebei Province, China. Through semi-structured interviews with 12 expert educators, the research identified five art-specific dimensions of digital competence, four themes related to self-efficacy, and four distinctive manifestations of critical thinking. A conceptual framework summarizing the relationships among these three dimensions was developed based on the expert findings.

These findings have direct implications for vocational art curriculum design, including intentional integration of digital documentation training, scaffolded self-efficacy building activities, and comparative analysis tasks that bridge traditional and digital practice. The study contributes empirical evidence from a non-Western vocational art education context and provides a foundation for future quantitative research to validate the proposed relationships.

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