The Development of Training Curriculum for Enhancing the Digital Technology Ability of Digital Media Arts Teachers at Private Colleges in Guangdong Province, People' s Republic of China

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Abstract

The abilities of digital technology are very crucial for digital arts teachers. This research aimed: 1) to study the current states and needs on the digital technology ability of digital media arts teachers; 2) to develop the training curriculum; 3) to implement the training curriculum; and 4) to evaluate the training curriculum for enhancing the digital technology ability of digital media arts teachers at private colleges in Guangdong Province, People' s Republic of China. This study was divided into four phases: Phase 1: Studying the current states and needs of digital technology ability of digital media arts teachers. The samples were 38 teachers, 90 students and 90 alumni from three private colleges, selected by using the quota sampling technique. A questionnaire was designed to assess the digital technology ability of digital media arts teachers. The collected data were analyzed by using frequency, percentage, mean and standard deviation; Phase 2: Developing the training curriculum. The target group consisted of 9 stakeholders, including two directors, two deputy directors, two department heads, and three business owners. Content analysis technique was performed on the interview data; Phase 3: Implementing the training curriculum. The target group included 38 digital media arts teachers at private colleges in Guangdong Province, selected by volunteering basis. The instrument was the test used as pre- and post-tests. The collected data were analyzed by using mean, standard deviation and dependent samples t-test; Phase 4: Evaluating the training curriculum. The target groups were 38 digital media arts teachers and five experts. The research instruments were satisfaction questionnaire and questionnaire for evaluating the quality of the training curriculum. The data were analyzed by using mean and standard deviation. The findings could be summarized as follows:

1. The digital technology ability of digital media arts teachers included three dimensions: technological ability, pedagogical ability and content ability, which pedagogical ability and content ability were at a high level, while technological ability was at a moderate level.

2. The developed training curriculum included three modules: digital technology resources integration ability, digital technology proficiency ability, and digital media arts creation ability. Each module was trained for 2 days, totally 6 days for 45 hours. The developed curriculum comprised both theoretical learning and practical exercises.

3. The results of the training curriculum showed that the digital technology ability of digital media arts teachers was statistically significantly higher after the training of Module 1: Digital technology resources integration ability, Module 2: Digital technology proficiency

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ability and Module 3: Digital media arts creation ability at the level of .01, and the training curriculum was effective and feasible.

4. The digital media arts teachers in private colleges were satisfied towards the digital technology ability training curriculum at a high level. In addition, the experts rated the quality of the training curriculum in overall was at a high level. When considering each quality component, it was found that the highest mean score was the quality of feasibility, followed by accuracy, utility, propriety, and comprehensiveness, respectively.

The findings are as the guidelines in improving the digital technology ability of digital arts teachers, providing effective pathways for digital technology skill enhancement, encouraging innovation and development in digital media arts education.

Keywords: Digital technology ability; Curriculum development; Digital media arts teachers; Private colleges

Introduction

Since the 20th century, some universities in People's Republic of China have begun to offer disciplines related to digital media arts, such as digital media design, digital animation, and related fields. The establishment of these disciplines marks the beginning of digital media arts research in People's Republic of China. With the rapid development of China's economy and the acceleration of modernization, the education sector has also experienced rapid growth. Within these disciplines, the application of digital media technology in education has increased significantly and has become an important avenue for promoting educational innovation. Additionally, China's educational reform is progressing steadily, exploring and experimenting with new educational methods and teaching approaches, among which the application of digital media technology is a key component. Ministry of Education of the People's Republic of China (2002) proposed several opinions to strengthen the construction and development of the field of digital media arts, aiming to advance the reform of undergraduate education and teaching in higher education institutions. This includes the digital literacy training of higher education teachers and encouraging them to engage in teaching and research in digital education. The "National Medium and Long-Term Outline for Educational Reform and Development (2010-2020)" (Ministry of Education of the People's Republic of China, 2010) emphasized the needs to strengthen the construction of the higher education teaching workforce and to improve teachers' teaching capabilities and research levels. The Development Plan for Educational Informatization during the "13th Five-Year Plan" in Guangdong Province (Guangdong Provincial Department of Education, 2017) proposed enhancing informatization in higher education, promoting educational reform, and digital teaching to provide better technical support and services for education and teaching. The Chinese government strongly promotes the capacity building of higher education teachers and the development of digital education.

Guangdong is a coastal province in Southern China and one of the country's largest economic provinces. In recent years, the education sector in Guangdong Province has developed rapidly, with private educational institutions also emerging swiftly and becoming an important part of Guangdong's education system. The development of private educational institutions has brought new vitality and opportunities for development to education in Guangdong Province. Ministry of Education of the People's Republic of China (2016a)

formulated a development plan for educational informatization, aimed at promoting the informatization of education in Guangdong Province and improving the quality and efficiency of educational management and teaching. The application of digital media technology in Guangdong Province spans various fields, including education, culture, and entertainment. Some universities in Guangdong Province have already started using digital media technology in their teaching and have begun integrating it into arts education within the province. "Interim Measures for the Administration of Quality and Teaching Reform Projects in Undergraduate Education in Higher Education Institutions" (Ministry of Education of the People's Republic of China, 2007) proposed advancing information technology education, training teachers for the digital age, and enhancing the application of information technology in undergraduate education to improve teaching quality and effectiveness. " Notice on Issuing the Implementation Plan for General High School Curriculum in Guangdong Province" (Guangdong Provincial Department of Education, 2020b: 1) aimed at training high school information technology teachers with educational knowledge, excellent teaching skills, advanced digital media technology, and innovative capabilities. "Key Points of Educational Network Security and Informatization Work in 2020" (Guangdong Provincial Department of Education, 2020a) proposed promoting the training and development of digital media technology teachers in Guangdong Province to improve the quality and impact of digital media technology education and teaching, and to promote the application of digital media technology in teaching, application, and development.

Although the Ministry of Education emphasizes the cultivation of teaching talent and the application of digital media technology in teaching, there are still some issues with the application of digital media technology in private undergraduate institutions in Guangdong Province. Private institutions in Guangdong Province refer to higher education institutions established and managed by enterprises, social organizations, individuals, and other non-governmental organizations. These private institutions face certain disparities in the allocation of educational resources and the improvement of teaching quality compared to public institutions run by the government. For instance, private institutions generally have weaker faculty and research capabilities, and their teaching facilities and hardware conditions are relatively poor. Additionally, the operating costs of private institutions are higher, resulting in relatively expensive tuition and miscellaneous fees. The overall strength and resources of private undergraduate institutions are relatively weak, and they lack funding and technical support, leading to limited application of digital media technology. Therefore, how to improve the quality of arts education in private institutions in Guangdong Province, enhance teachers' teaching skills, and increase the application of digital media technology that are important issues that need to be addressed.

Many researchers (e.g. Yu &Jiang, 2021; He, et. al., 2023) focusing on the arts department teachers at colleges and universities in China, have noted the importance of using digital media technology to assist teaching in actual classes. However, in Guangdong's private institutions, some teachers may have misunderstandings or lack of knowledge about the application of digital media technology, leading to low enthusiasm for its use. Additionally, some teachers in private institutions may lack training and guidance on the application of digital media technology and may not know how to use it for teaching and learning. Teachers need to have adequate technical and teaching skills to better apply digital media technology in arts education and improve students' learning outcomes.

To effectively manage digital media arts education, teachers must meet several conditions. According to the TPACK model, proposed by Mishra and Koehler in 2006, these conditions are categorized into three essential domains: technological knowledge, content knowledge, and pedagogical knowledge. Within the context of digital media arts education, educators are required to possess a comprehensive understanding of digital media technology, a deep knowledge of digital media arts content, and proficiency in pedagogical strategies. By synthesizing these domains, educators can design and implement effective digital media arts instruction. Employing the TPACK model as the theoretical framework, this study conducts a thorough analysis of the integration and application of technological, content, and pedagogical knowledge among teachers utilizing digital media technology. Ulger (2018) investigated the application of digital media technology in arts education. They explored the status and existing problems of digital media technology in arts education and proposed corresponding solutions. However, some studies have not deeply examined the influencing factors of digital media technology knowledge, content knowledge, and pedagogical knowledge on teachers, and they lack specific operational research methods and empirical data support. These shortcomings indicate that more in-depth and specific research is needed in this field to better understand the quality level of teacher education and the application of digital media technology in arts education.

Based on the background and significance of the research problems, this study adopts the TPACK model (Mishra & Koehler, 2006) to explore the current state and needs of digital technology ability among digital media arts teachers in private colleges in Guangdong Province, aiming to enhance their digital media technology ability. Additionally, the study aims to develop, implement, and evaluate a training curriculum to improve the digital technology ability of digital media arts teachers in private colleges in Guangdong Province, People's Republic of China.

Research Objectives

1. To study the current states and needs on the digital technology ability of digital media arts teachers at private colleges in Guangdong Province, People’s Republic of China.
2. To develop the training curriculum for enhancing the digital technology ability of digital media arts teachers at private colleges in Guangdong Province, People’s Republic of China.
3. To implement the training curriculum for enhancing the digital technology ability of digital media arts teachers at private colleges in Guangdong Province, People’s Republic of China.
4. To evaluate the training curriculum for enhancing the digital technology ability of digital media arts teachers at private colleges in Guangdong Province, People’s Republic of China.

Research Methodology

The research employs a mixed method design aiming to study, analyze, develop, and evaluate the training curriculum for enhancing the digital technology ability of digital media arts teachers at private colleges in Guangdong Province, People's Republic of China. This research methodology is divided into four phases as follows:

Phase 1: Studying the current states and needs of digital technology ability of digital media arts teachers

The samples for this research were 38 teachers, 90 students, and 90 alumni from 3 private colleges. They were selected by using the quota sampling technique. The research instruments included: 1) the documentary analysis and a high-frequency word list, and 2) a set of questionnaires designed to gather information about the current situations of digital technology ability among digital media arts teachers at private colleges in Guangdong Province, People's Republic of China. The IOC values ranged from 0.80 to 1.00. The researcher sent the letter issued by the Graduate School asking for permission to collect the data. The researcher collected all data by himself. The questionnaire data were analyzed by using mean and standard deviation.

Phase 2: Developing the training curriculum for enhancing the digital technology ability of digital media arts teachers

The target group consisted of nine stakeholders involved in the academic operations of private colleges, divided into two groups: six policy-level practitioners (two directors, two deputy directors and two department heads) from small, medium, and large private colleges, and three operational-level practitioners (business owners with interns from the digital media arts department). The research instruments included 1) the documentary analysis, 2) the semi-structured interview guide, and 3) the outline of the training curriculum. The researcher collected the data from the 9 stakeholders through interviews. The interview data were analyzed by using content analysis technique.

Phase 3: Implementing the training curriculum for enhancing the digital technology ability of digital media arts teachers

The target group included 38 teachers from the Digital Media Arts Departments of private colleges in Guangdong Province, People's Republic of China. They were selected on a voluntary basis. The research instruments included 1) the training curriculum for enhancing the digital technology ability of digital media arts teachers, and 2) the test of the digital technology ability of digital media arts teachers, used as pre-test and post-test. The researcher collected data from pre-tests and post-tests before and after implementing a training curriculum for digital media arts teachers in Guangdong's private colleges. The test scores were analyzed to calculate the mean and standard deviation. Additionally, the mean scores before and after the training were compared using dependent samples t-test.

Phase 4: Evaluating the training curriculum for enhancing the digital technology ability of digital media arts teachers

The target group for the satisfaction evaluation of the training curriculum included 38 teachers from Digital Media Arts Departments of private colleges in Guangdong Province, People's Republic of China. They were selected on a voluntary basis and were the same group as used in Phase 3. The target group for validating the training curriculum consisted of five experts from the fields of education or digital media arts. The research instruments included 1) the satisfaction questionnaire towards the training curriculum for enhancing the digital technology ability of digital media arts teachers, and 2) the evaluation form assessing the

quality of the training curriculum for enhancing the digital technology ability of digital media arts teachers. The researcher collected data from the target group using both a satisfaction questionnaire towards the training curriculum and an evaluation form to assess the training curriculum. The satisfaction questionnaire data and the quality of the developed training curriculum were analyzed by using mean and standard deviation.

Theoretical Conceptual Framework of the Research

This study focuses on the development of training curriculum for enhancing the digital technology ability of digital media arts teachers at private colleges in Guangdong Province, People's Republic of China. In the research, the digital media arts teachers' ability is applied in the investigation and analysis method to study the present situation and existing problems of media arts teachers in private colleges, to improve the digital technology ability of media arts teachers, to design and develop the media arts teachers' digital technology ability training curriculum, and to evaluate the application effect of digital technology ability training curriculum. The research conceptual framework of this study is shown in Figure 1.

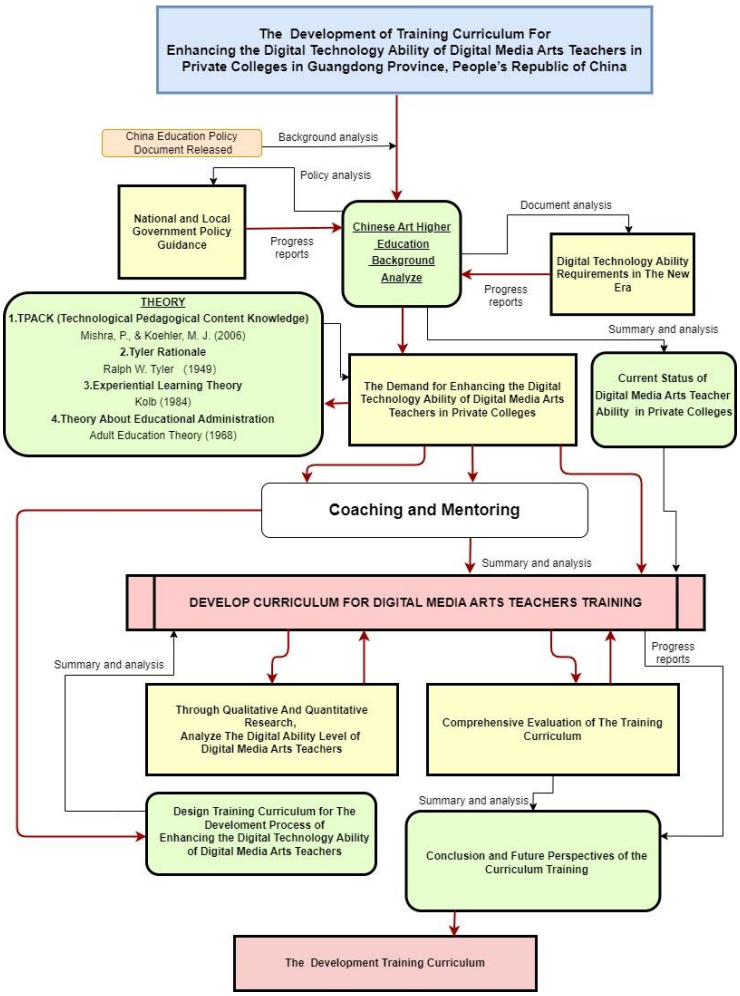


Figure 1 Research Conceptual Framework

Research Results

1. Studying the current states and needs of digital technology ability of digital media arts teachers

The result was found that the current status of digital technology ability levels of digital media arts teachers in private colleges in Guangdong Province, as rated by the samples are shown in Table 1

Table 1. Mean, Standard Deviation, Level, and Rank of Digital Technology Ability (n=218)

Digital Technology Ability Dimensions	$\bar{X}$	S.D.	Level	Rank
1. Technological Ability	3.48	1.27	Moderate	
1.1 Digital Technology Resources Integration Ability	3.36	1.27	Moderate	9
1.2 Digital Technology Proficiency Ability	3.38	1.30	Moderate	7
1.3 Digital Technology Troubleshooting Ability	3.69	1.19	High	1
2. Pedagogical Ability	3.67	1.15	High	
2.1 Digital Instructional Design Optimization Ability	3.68	1.18	High	2
2.2 Digital Teaching Management Ability	3.66	1.15	High	5
2.3 Digital Assessment Ability	3.68	1.13	High	2
3. Content Ability	3.55	1.24	High	
3.1 Digital Media Arts Concept Understanding Ability	3.67	1.21	High	4
3.2 Digital Media Arts Learning Ability	3.62	1.25	High	6
3.3 Digital Media Arts Creation Ability	3.38	1.25	Moderate	7
Total	**3.57**	**1.22**	**High**	

According to Table 1, the overall digital technology ability of digital media arts teachers at private colleges in Guangdong Province was at a high level ($\bar{X}$ = 3. 57, S.D. = 1.22). Notably, the teachers achieved high levels in two of the three core dimensions: "Pedagogical ability" and "Content ability", while "Technological ability" was at a moderate level. Within the "Technological ability" dimension, digital technology troubleshooting ability was at a high level, while digital technology resources integration ability and digital technology proficiency ability were at a moderate level. In the "Pedagogical ability" dimension, digital instructional design optimization ability, digital teaching management ability, and digital assessment ability were all at a high level. Within the "Content ability" dimension, digital media arts concept understanding ability and digital media arts learning ability were at a high level, while digital media arts creation ability was at a moderate level.

2. Developing the training curriculum for enhancing the digital technology ability of digital media arts teachers

Combined with the questionnaire and expert interview, based on the curriculum development objectives, the contents of the training curriculum for enhancing the digital technology ability of digital media arts teachers included three modules. The details of each module are as follows:

The first module " Digital technology resources integration ability" included understanding digital technology resources and digital resource integration strategies.

The second module "Digital technology proficiency ability" included 3D modeling & practice and game development & practice.

The third module "Digital media arts creation ability" included practical application of digital technology for digital arts teaching and innovative applications of digital technology in arts education focusing on AI.

Each module was trained for 2 days, totally 6 days for 45 hours. The developed curriculum comprised both theoretical learning and practical exercises.

3. Implementing the training curriculum for enhancing the digital technology ability of digital media arts teachers

To compare the digital technology ability level of the digital media arts teachers before and after the training, the researcher conducted pre-training and post-training level tests on the digital media arts teachers respectively. Test had a total score of 30 points. The test results are shown in Table 2.

Table 2. Comparison of the Difference between the Mean Scores before and after Training (n=38)

Tests	$\bar{X}$	S.D.	t	p-value
1. Pre-training test	18.21	5.11	11.241	0.000
2. Post Training Test	24.34	2.91		

** statistically significant difference at .01 level

According to Table 2, the mean score for the pre-training test is 18.21, and the mean score for the post training test is 24.34, and the difference between the mean scores before and after the training is statistically significant at the level of 0.01. That means the developed and designed training curriculum in this study has achieved the expected results.

4. Evaluating the training curriculum for enhancing the digital technology ability of digital media arts teachers

The researcher evaluated the satisfaction towards the training curriculum for enhancing the digital technology ability of digital media arts teachers at private colleges in Guangdong Province, People's Republic of China. The evaluation results are shown in Table 3.

Table 3 Evaluating the Satisfaction towards the Training Curriculum for Enhancing Digital Technology Ability of the Digital Media Arts Teachers (n = 38)

Evaluation Contents	$\bar{X}$	S.D.	Level	Rank
1. Curriculum Contents	4.46	0 .65	High	2
2. Trainers Performance	4.59	0.60	Highest	1
3. Training Methods and Effects	4.26	0 .76	High	3
Total	**4.44**	**0 .68**	**High**	

As can be seen from Table 3, the satisfaction of the digital media arts teachers towards the training curriculum for enhancing digital technology ability in overall was at a high level ($\bar{X}$ = 4.44, S.D. = 0.68). When considering each component, it was found that the highest mean score was Item 2: "Trainers Performance" ($\bar{X}$ = 4.59, S.D. = 0.60), followed by Item 1: "Curriculum Contents" ($\bar{X}$ = 4.46, S.D. = 0.65) while the lowest mean score was Item 3: "Training Methods and Effects" ($\bar{X}$ = 4.26, S.D. = 0.76). It is noteworthy that within "Trainers

Performance", teaching methods and curriculum interaction received the highest level. This highlights the trainers' effectiveness as key program strength. In "Curriculum Contents", the organization and arrangement scored highly, suggesting well-structured material that met participants' expectations.

In addition, the evaluation of curriculum quality includes five components, namely feasibility, propriety, accuracy, comprehensiveness and utility verified by five experts. The evaluation results are shown in Table 4.

Table 4. Experts' Evaluation of the Quality of the Training Curriculum

Evaluation Contents	$\bar{X}$	S.D.	Level	Rank
1. Feasibility	4.52	0.51	High	1
2. Propriety	4.40	0.56	High	4
3. Accuracy	4.50	0.51	High	2
4. Comprehensiveness	4.33	0.82	High	5
5. Utility	4.44	0.58	High	3
Total	**4.44**	**0.58**	**High**	

As shown in Table 4, the experts rated the quality of the training curriculum in overall was at a high level ($\bar{X} = 4.44$, S.D. $= 0.58$). When considering each quality component, it was found that the highest mean score was the quality of feasibility ($\bar{X} = 4.52$, S.D. = 0.51), followed by the quality of accuracy ($\bar{X} = 4.50$, S.D. = 0.51), the quality of utility ($\bar{X} = 4.44$, S.D. = 0.58), the quality of propriety ($\bar{X} = 4.40$, S.D. = 0.56), and the quality of comprehensiveness ($\bar{X} = 4.33$, S.D. = 0.82), respectively.

In summary, the experts gave high evaluation on each aspect of the quality results of the training curriculum. The training curriculum has relatively high application value and is worth promoting. To some extent, it can provide reference for the training of digital media arts teachers in private colleges, People's Republic of China.

Discussion

1. The Current States and Needs on the Digital Technology Ability of Digital Media Arts Teachers

The findings on the digital technology ability of digital media arts teachers at private colleges in Guangdong Province showed that while the overall level is generally high, there is a notable disparity among different ability dimensions. Among them, within the "Technological ability" dimension, Digital technology troubleshooting ability was at a high level, while Digital technology resources integration ability and Digital technology proficiency ability were at a moderate level. In the "Pedagogical ability" dimension, Digital instructional design optimization ability, Digital teaching management ability, and Digital assessment ability were all at a high level. Within the "Content ability" dimension, Digital media arts concept understanding ability and Digital media arts learning ability were at a high level, while Digital media arts creation ability was at a moderate level. These results suggest that while digital media arts teachers have a solid foundation in theoretical aspects and certain practical applications, there are gaps in Digital technology resources integration, Digital technology proficiency, and Digital media arts creation ability. This imbalance highlights areas for targeted enhancement in teacher training curriculum. To address these gaps, the training curriculum

should focus on strengthening these specific abilities. The findings offer valuable insights for curriculum designers to develop and refine training curriculum aimed at enhancing the digital technology abilities of digital media arts teachers at private colleges in Guangdong Province, People's Republic of China.

In addition, according to the needs assessment results revealed that digital media arts teachers prioritize training in cutting- edge areas such as “ 3D modeling and game development”, reflecting the evolving landscape of digital media. Their preference for "online free curriculum" with a specific schedule of "two days per week for a total of 45 hours over 3 weeks" indicates a desire for flexible, accessible training options that can be balanced with existing work commitments. These preferences are in line with the findings of Gobin (2023) who highlighted the importance of online learning platforms and software tools in meeting teachers' needs for flexible learning methods and high-quality resources. Interestingly, there is a notable difference in expectations between current students and alumni. While students emphasize “professional knowledge”, “personalized guidance”, and proficiency in practical tools like “graphic design software”, alumni place greater importance on soft skills such as the ability to “inspire creativity”, demonstrate “multicultural awareness”, and exhibit “creative thinking skills”. This divergence highlights the need for a comprehensive approach to teacher training that balances technical proficiency with the development of broader, creativity-focused competencies. These findings can inform the design of more effective and relevant training curriculum that meet the immediate needs of them. These findings align with Tondeur, et al. (2023) who emphasized the importance of aligning teacher training curriculum with practical needs and technological advancements in education.

2. Developing the Training Curriculum for Enhancing the Digital Technology Ability of Digital Media Arts Teachers

The expert evaluation of the curriculum outlines for improving the digital technology ability of digital media arts teachers at private colleges in Guangdong Province, People's Republic of China showed that the overall mean score was at a high level. This shows that:

2. 1 The expert evaluation results of the training curriculum content outlines demonstrate a high degree of appropriateness in content design. The three core modules: “ Digital technology resource integration competence” , “ Digital technology proficiency competence”, and “Digital media arts creation competence”, all received high level scores, indicating that the curriculum outline generally meets the competence improvement needs of digital media arts teachers. The first module "Digital technology resources integration ability" included understanding digital technology resources and digital resource integration strategies. The second module "Digital technology proficiency ability" included 3D modeling & practice and game development and practice. The third module " Digital media arts creation ability" included practical application of digital technology for digital arts teaching and innovative applications of digital technology in arts education focusing on AI. Ranking the six lessons based on their evaluation scores from highest to lowest: 3D modeling and practice and innovative applications of digital technology in arts education: Focusing on AI tied for first place, followed by understanding digital technology resources in third place, then game development and practice in fourth place, and finally digital resource integration strategies and practical application of digital technology for digital arts teaching tied for the last place. Notably, “3D modeling and practice” and “Innovative applications of digital technology in arts education: Focusing on AI”, received the highest scores. This result highlights the curriculum

strengths in cutting-edge technology areas, reflecting experts' belief that these contents are crucial for enhancing teachers' digital technology competence. This aligns with Hutson and Cotroneo (2023) who emphasized on the needs for new media arts education to keep pace with technological developments. The high evaluation of these advanced technologies reflects the curriculum's alignment with current industry trends and emphasizes the importance of hands-on experience in digital media arts education. Furthermore, this focus on emerging technologies underscores the importance of continuous learning and adaptive expertise for digital media arts teachers.

2.2 The evaluation results of the training curriculum components further validate the comprehensiveness and effectiveness of the curriculum design. The clarity of curriculum objectives received the highest score, indicating accurate positioning and clear goals, aligning with Somfongo (2022) who indicated that the concept of constructive alignment in curriculum design. Teaching methods scored the highest in both diversity and innovation, reflecting that the curriculum design fully considers the special needs of digital media arts education and adopts diversified and innovative teaching strategies, corresponding with Mishra and Koehler's (2006) TPACK framework emphasizing the integration of technology knowledge, pedagogy knowledge, and content knowledge. The sufficiency and accessibility of learning resources received high ratings, crucial for supporting teachers' continuous learning and development, as emphasized by Njui (2018) in their principles for effective professional development. The diversity and effectiveness of assessment methods scored highly, suggesting a comprehensive approach that ensures training effectiveness and provides meaningful feedback, in line with Guskey's (2024) model for evaluating professional development. The reasonableness of time arrangement also received a high score, showing consideration for in-service teachers balancing work and learning, which aligns with Kurutaş' (2020) core features of effective professional development, including sufficient duration and coherence with teachers' work schedules.

To further validate the curriculum's feasibility and effectiveness, five digital media arts teachers were invited to participate in a pilot training. The pilot training received high overall ratings, with a mean score of 4.24, indicating strong approval from the participants. This positive outcome not only corroborates the expert evaluations but also suggests that the curriculum is well-suited to meet the practical needs of digital media arts teachers in real educational settings.

3. Implementing the Developed Training Curriculum for Enhancing the Digital Technology Ability of Digital Media Arts Teachers

The pre-tests and post-tests on theoretical and practical knowledge related to the training curriculum were conducted for 38 digital media arts teachers, and the results showed the significant overall performance increase of 33.66% indicating the curriculum's strong efficacy in enhancing teachers' abilities. Notably, the difference between the mean scores before and after the training showed statistically significant difference at the level of 0.01. That means the developed and designed training curriculum achieved the expected results, aligning with its intended objectives by Patel et al. (2018). These outcomes suggest that the training curriculum is not only theoretically sound but also practically effective in improving teachers' ability in various aspects of digital media arts education. However, long-term follow-up studies may be beneficial to assess the sustainability of these improvements and their translation into classroom practices and outcomes. Overall, this study provides a valuable reference for teacher

training in the field of digital media arts education, potentially informing similar training curriculums in other regions or disciplines.

4. Evaluating the Developed Training Curriculum for Enhancing the Digital Technology Ability of Digital Media Arts Teachers

The results of both the teachers' satisfaction survey and experts' evaluation of the developed training curriculum quality are very good overall. In the teachers' satisfaction survey, the mean scores from high to low were "Trainers' performance", followed by "Curriculum content", and "Training methods and effects", with an overall satisfaction at a high level. The teachers rated every aspect of the curriculum highly, particularly the organization and arrangement of the curriculum contents and the trainers' performance. This indicates that the curriculum content closely aligns with the teachers' expectations and can be effectively applied to their digital media arts teaching practice. The high satisfaction with trainers' performance suggests that the instruction was clear, interactive, and effective in conveying the curriculum contents. Similarly, in the experts' evaluation, the mean scores from high to low are utility, followed by accuracy, feasibility, propriety, and comprehensiveness. This aligns with findings from Lin (2024) who emphasized the importance of well-structured contents and effective instruction in digital competence training for higher education teachers.

The experts also rated every aspect of the curriculum highly, further confirming its strong overall quality. Notably, the high utility score aligns with the teachers' perception of practical applicability, suggesting that the curriculum is highly applicable to training digital media arts teachers at private colleges and can effectively improve their digital technology ability. Moreover, the high accuracy score from experts complements the teachers' satisfaction with contents, indicating that the curriculum contents are not only precise but also aligns well with practical application requirements, thus reinforcing its effectiveness in meeting the needs of digital media arts teachers. For instance, Tondeur et al. (2023) emphasized the importance of aligning teacher training curricula with practical needs and technological advancements in education. Additionally, Ma et al. (2024) highlighted the significance of comprehensive and accurately designed training programs in enhancing teachers' digital competencies, particularly in specialized fields like digital media arts.

In future curriculum design, these advantages should be maintained, while further improving the comprehensiveness and diversity of content. The high evaluation by both teachers and experts not only reflects the high quality of the curriculum but also provides valuable insights for curriculum improvement. Regularly collecting feedback from trained teachers and inviting expert evaluations will help to continuously optimize curriculum content and teaching methods, ensuring that the training curriculum can always maintain a high level of effectiveness in enhancing the digital technology ability of digital media arts teachers at private colleges.

Suggestions for Future Studies

1. Future research should aim to include a broader range of samples by incorporating more schools and regions. This will help to increase the generalizability and applicability of the research findings across different educational contexts and ensure that the conclusions drawn are representative of a wider population of digital media arts teachers.

2. It is recommended to conduct longitudinal follow-up studies to assess the long-term effects of the training program. Such studies can track changes over time, providing insights into how sustained and effective the improvements are in teachers' digital technology skills and teaching practices. This will help to identify areas for continuous improvement and adaptation of the training curriculum.

3. Future research should explore a variety of training methods to cater to the diverse needs of instructors. This includes investigating the effectiveness of online courses, blended learning approaches, and other innovative training formats. By offering multiple training modalities, it is possible to enhance accessibility and engagement, ensuring that all instructors can benefit from professional development opportunities tailored to their preferences and schedules.

References

Gobin, D. D. (2023). *Flexible Learning Space Choice Model (FLSCM) for Student Engagement and Satisfaction*. Doctoral Dissertation: Arizona State University, U.S.A.

Guangdong Provincial Department of Education. (2017). Development Plan for Educational Informatization during the "13th Five-Year Plan" in Guangdong Province. *Online*. Retrieved May 24, 2023. from: https://edu.gd.gov.cn/zwgknew/jyzcfg/dfjyzcfg/content/post_3379653.html.

Guangdong Provincial Department of Education. (2020a). Key Points of Educational Network Security and Informatization Work in 2020. *Online*. Retrieved May 25, 202. from: http://www.jiangmen.gov.cn/attachment/0/140/140542/2101005.pdf

Guangdong Provincial Department of Education. (2020b). Notice on Issuing the Implementation Plan for General High School Curriculum in Guangdong Province. *Online*. Retrieved August 28, 2023. from: https://edu.gd.gov.cn/zwgknew/gsgg/content/post_3429549.html

Guskey, T. R. (2024). Look Beyond the Satisfaction Survey: A Framework to Evaluate Results of Professional Learning. *The Learning Professional*, 45 (1), 28-33.

He, Y., He, H.Q., Zhang, G.M., & Li, Y.X. (2023). *Construction of a Collaborative Education Model between Universities and Enterprises for the Digital Media Art and Design Discipline in the Context of Digitalization*. UK: Francis Academic Press.

Hutson, J., & Cotroneo, P. (2023). "Generative AI Tools in Art Education: Exploring Prompt Engineering and Iterative Processes for Enhanced Creativity." *Metaverse,* 4 (1), 1-14.

Kurutaş, B. S. (2020). *Exploration of Effective Professional Development Characteristics from the Perspective of Integrated Teaching Project's Coordinator, Facilitator and Participants.* Master's Thesis: Boğaziçi University, Turkey.

Lin, X. Y. (2024). Professional Development and Teachers' Digital Art toward Enhanced Instructional Skills. *International Journal of Social Sciences and Public Administration,* 3 (2), 287-301.

Ma, N., Lee, S. S. J., Harrinni, M. N., Fu, J. Q., & Wang, Y. (2024). A Pre-service Art Teacher Digital Literacy Framework for Digital Literacy in Pre-service Art Teacher Education in China. *Asian Journal of University Education (AJUE),* 20 (2), 235-243.

Ministry of Education of the People's Republic of China. (2002). Notice on Issuing the National Plan for the Development of School Art Education (2001-2010). *Online*. Retrieved May 13, 2023. from: http://www.moe.gov.cn/srcsite/A17/moe_794/moe_795/200205/t20020513_80694.html

Ministry of Education of the People's Republic of China. (2007). Notice of the Ministry of Education and the Ministry of Finance on Issuing the "Interim Measures for the Administration of Quality and Teaching Reform Projects in Undergraduate Education in Higher Education Institutions". *Online*. Retrieved July 13, 2023. from: http://www.moe.gov.cn/s78/A08/gjs_left/s5664/moe_1623/201006/t20100601_88578.html

Ministry of Education of the People's Republic of China. (2010). National Medium and Long-Term Outline for Educational Reform and Development (2010-2020). *Online*. Retrieved 27 July 27, 2023. from: https://www.gov.cn/jrzg/2010-07/29/content_1667143.htm

Ministry of Education of the People's Republic of China. (2016). Notice of the General Office of the Ministry of Education on Issuing the "Key Points of Education Informatization Work in 2016". *Online*. Retrieved February 4, 2023. from: http://www.moe.gov.cn/srcsite/A16/s3342/201602/t20160219_229804.html

Mishra, P. & Koehler, M. J. (2006). Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge. *Teachers College Record*. 108(6), 1017–1054.

Njui, H. W. (2018). Professional Development: Promoting Quality Education in Learning Institutions in Kenya through Enhanced Teacher Capacity. *European Journal of Education Studies,* 4 (3), 1-20.

Patel, S. R., Margolies, P. J., Covell, N. H., Lipscomb, C., & Dixon, L. B. (2018). Using Instructional Design, Analyze, Design, Develop, Implement, and Evaluate, to Develop e-Learning Modules to Disseminate Supported Employment for Community Behavioral Health Treatment Programs in New York State. *Frontiers in Public Health,* 2018 (6), 1-9.

Somfongo, K. (2022). Constructive Alignment in the Learning and Teaching of Economics at a Comprehensive University. *The 7th Annual International Conference on Public Administration and Development Alternatives.* 12 June 2022. University of Venda, South Africa.

Tondeur, J., Howard, S., Van Zanten, M., Gorissen, P., Van der Neut, I., Uerz, D., & Kral, M. (2023). The HeDiCom Framework: Higher Education Teachers' Digital Competencies for the Future. *Education Tech Research Development,* 7 (1), 33-53.

Ulger, K. (2018). The Effect of Problem-based Learning on the Creative Thinking and Critical Thinking Disposition of Students in Visual Arts Education. *Interdisciplinary Journal of Problem-Based Learning,* 12 (1), 1-21.

Yu, W.H., & Jiang, T. (2021). Research on the Direction of Innovation and Entrepreneurship Education Reform within the Digital Media Art Design Major in the Digital Economy. *Frontiers in Psychology,* 21 (12), 1-1.