

Strengthening the Discipline Integration and Professional Development of Calligraphy Teachers

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ABSTRACT

This study explored the professional development issues, challenges, and opportunities faced by calligraphy teachers in the context of disciplinary integration. Descriptive survey was used in the study to explore the professional development of Calligraphy teachers' discipline integration. Through questionnaire surveys and comprehensive analysis, it was found that calligraphy teachers generally believe that subject integration has a positive effect on improving teaching effectiveness and promoting comprehensive development of students. However, in actual teaching, they face the challenge of increased workload and difficulty in integration brought about by literacy in interdisciplinary teaching. In response to these challenges, calligraphy teachers have expressed an urgent need for professional development, especially in organizing classroom teaching and creating various book styles. This study suggests that schools should develop specific training and support plans to meet the professional development needs of calligraphy teachers; and apply the research results to educational practice, providing theoretical support and practical guidance for the innovation and development of calligraphy education.

Key words: Calligraphy Teacher, Discipline Integration, Professional Development, Calligraphy Education, Calligraphy Literacy

INTRODUCTION

The professional development of teachers is the core element to improve the quality of calligraphy education. Xu (2023) pointed out that teachers need to master interdisciplinary teaching skills and advanced educational concepts to adapt to the needs of modern education. With the advent of the digital age, the social and cultural forms have changed significantly. As an independent art discipline, calligraphy education has gradually moved towards professional development (Xiao, 2024). The professional development of teachers should be regarded as a continuous process, not limited to training at the beginning of their careers, but throughout their careers (Xu et al., 2024).

Most places in China do not have relevant regulations and requirements such as primary and secondary school calligraphy teacher qualification certification and professional title evaluation. To improve the education and teaching skills of primary and secondary school calligraphy teachers, it is necessary to treat calligraphy as an independent discipline. It starts with teacher allocation, qualification requirements, and professional title evaluation, and strives to promote core literacy education in the field of education. It is important to conform to the development of the times and social progress, especially in the education and teaching research of primary and secondary schools. Core literacy education needs to

be understood holistically, with the literacy of educators – teachers – as one of the priorities (Song, 2020). Based on the integration of disciplines, the professional development prospects of calligraphy teachers in primary and secondary schools are very broad.

The study aims to present the professional development of primary and secondary school calligraphy teachers in the integration of disciplines. The output of the study will derive a path suitable for the professional development of calligraphy teachers, and new forms and methods of discipline integration in calligraphy education and teaching. More specifically, the objectives of the current study are:

1. To explore the current situation of discipline integration in teaching Calligraphy,
2. To identify the problems in the professional development of Calligraphy teachers with discipline integration, and
3. To determine the proposed professional development for Calligraphy teachers in the integration of disciplines.

LITERATURE REVIEW

According to the development environment for calligraphy teachers, calligraphy teachers resolve their identity crisis by joining the school aesthetic education professional community. Calligraphy teachers can explore more opportunities for

school aesthetic education with art and music teachers based on raising their professional standing and enhancing calligraphy education. Calligraphy teachers can deeply explore and highlight the value of aesthetic education in inheriting culture and cultivating the mind. Aesthetic education and traditional cultural education in schools can develop together with the support of calligraphy instruction (Yue & Du, 2022).

In teaching, teachers not only are guides, practitioners, and participants in the cultivation of students' core literacy, but also must possess corresponding core literacy to meet the goal of cultivating students' core literacy (Yang, 2020). In the era of knowledge explosion and cultural diversity, young calligraphy teachers not only need a deep reserve of professional knowledge, but also need to constantly absorb the latest research results of related disciplines to lay a solid knowledge foundation for the discipline. In order to make the integration of knowledge more targeted, teachers should adhere to practicality and moderation in the design of pre-class tests, give priority to reading materials, deeply explore the content of textbooks, and combine local educational resources and narrative teaching methods (Zhang, 2022). The lack of curriculum standards, core literacy, evaluation systems, and professional standards for calligraphy teachers is the primary cause of the current development bottleneck for the discipline (Zhao, 2021).

As an educational and teaching concept that has been widely supported and practiced in recent years, interdisciplinary integration requires teachers of various disciplines to continuously improve their professional skills and comprehensive literacy and actively adapt to the development requirements of interdisciplinary integration. Its essence is to guide students to comprehensively apply knowledge from various disciplines to understand, analyze and solve practical problems, establish an interdisciplinary knowledge system, cultivate interdisciplinary thinking and problem-solving capabilities, thereby improving comprehensive quality and developing core literacy (Wei, 2021). Cao (2022) subdivided interdisciplinary integration into various forms such as integration within disciplines, integration between disciplines, and integration of multidisciplinary content into one discipline for interdisciplinary perspective.

In the context of interdisciplinary integration, calligraphy teachers must establish a lifelong learning consciousness, continuously improve their learning and research abilities, face learning and work with problem awareness and critical thinking, and improve their comprehensive quality and humanistic literacy (Wang, 2020). The exploration of calligraphy teachers' teaching and professional development is conducive to promoting the inheritance and development of calligraphy (He, 2020). Teacher development should have an overall literacy structure, ability, leadership and epistemological model (Zou & Wei, 2020).

Theoretical Framework

The professional development of calligraphy teachers has its own rules. In improving the teaching ability of subject integration, it is necessary to combine the theory of teacher

professional development, the theory of teachers' career stages, and the theoretical basis of subject integration to conduct multi-dimensional research.

The teacher professional development theory is a system that guides the work and development of teachers. It involves all aspects of teachers' professional development and is committed to helping teachers improve their ability to develop their profession. It is mainly divided into three parts: first, the knowledge base theory, which means that teachers should master subject professional knowledge and education, psychology, and other related disciplines to prepare for better implementation of teaching services. Second, the theory of teaching ability development means that teachers should master scientific teaching methods and flexibly apply them in combination with reality to improve students' learning effects. Third, the theory of teacher growth and development means that teachers should continue to cultivate themselves, constantly improve and perfect their teaching practices, and better improve their professional level. All three are important components of teacher professional development theory. The theory of knowledge foundation is based on subject knowledge. The theory of teaching ability development is the use of scientific teaching methods to improve the learning effect of students. The theory of teacher growth and development is improving and perfecting their teaching practice to improve their professional level. The career stage theory is divided into eight stages (Fessler & Christensen, 2005):

The first stage is the pre-employment preparation stage. It refers to the retraining from the beginning of training at a normal college or university to the beginning of the new position, which is the reserve stage of the teacher's role.

The second stage is the onboarding phase. It refers to the first few years of a teacher's first teacher, and the new teacher strives to seek the buy-in of students, colleagues, and school and education administrators and can deal with day-to-day problems to a satisfactory degree.

The third stage is the formation of capability stage. At this stage, active participation in training programs and exchange meetings, and active acceptance of new educational concepts, is the stage of professional development.

The fourth stage is the stage of enthusiasm and growth. At this stage, teachers continue to pursue greater professional development and constantly seek progress.

The fifth stage is the stage of career frustration. At this stage, teachers' professional satisfaction begins to decline and frustration and burnout are experienced. Most of this stage occurs in the middle of a career.

The sixth stage is the stabilization and cessation phase. At this stage, teachers have lost the requirements for progress, are confined to their duties, are only satisfied with completing tasks, and lack the requirements of initiative and high quality.

The seventh stage is the stage of professional discouragement. At this stage, teachers savor the feeling of impending departure with a variety of feelings.

The eighth stage is the end of the career. It is the period after a teacher leaves his or her job, including both the

departure of retired teachers and the forced or voluntary suspension of work for various reasons.

Huberman's (1989) career process for teachers is summarized into 5 periods, with clear periods:

1. The employment period, which is the first to three years of employment, is the "survival and discovery period".
2. The stabilization period is the fourth to six years after work.
3. The period of experimentation and disambiguation is from the seventh to twenty-five years after work.
4. A period of calm and conservatism lasts from the twenty-sixth to the thirty-third years of teaching.
5. After the thirty-fourth year of teaching work, the career of teachers has entered a stage of gradual ending.

To accomplish breakthroughs that are challenging to achieve in the development of a single discipline, multiple disciplines are seeking common ground (pursuing common development goals) based on their differences. In the academic field, the significance of multidisciplinary integration comes from the internal needs of discipline development and the external pressure of disciplines seeking breakthroughs. Interdisciplinary integration aims to break down barriers between disciplines and incorporate knowledge and elements that participate in and intervene in different disciplines. This deep integration is a recombination of multi-subject content, using the knowledge of different disciplines to carry out teaching, cultivating students' interdisciplinary literacy, and integrating two or more disciplines to carry out learning activities, to emphasize interdisciplinary skills and concepts and help students learn and understand subject knowledge.

METHOD

Research Design

The study adopted descriptive-survey design in exploring the professional development of Calligraphy teachers' discipline integration. The survey focused on the current situation of Calligraphy teachers to their professional development from the perspective of subject integration.

Sample and Sampling Procedures

The respondents were identified based on the dimensions and aspects of Calligraphy, and different stages of professional development. Calligraphy teachers at primary and secondary schools in Haidian District, Beijing were the respondents of the study.

The study used total sampling of the 137 Calligraphy teachers' in Haidian District, Beijing; with discipline integration participants of the study.

Instrument

Data from the respondents was collected using a researcher-made questionnaire. Specifically, the questionnaire includes (a) The understanding and implementation of subject integration by calligraphy teachers; (b) The professional development goals of calligraphy teachers; (c) the

Professional development path for calligraphy teachers; (d) The implementation of calligraphy teaching objectives in the integration of disciplines; (e) The problems encountered by calligraphy teachers in subject integration teaching and corresponding countermeasures and suggestions; And (f) the corresponding professional development abilities of calligraphy teachers. Tool validation of the questionnaire was done at the University of Baguio ethics committee. The reliability of the questionnaire yielded 0.96 Cronbach alpha indicating very high reliability.

Weighted mean and standard deviation were used in the study to determine the current situation of Calligraphy with discipline integration and problems on the professional development of Calligraphy teachers with discipline integration. The statistical range of the weighted mean and interpretation is shown in Table 1.

RESULTS AND DISCUSSION

Current Situation of Discipline Integration in Teaching Calligraphy

The integration of calligraphy and disciplines in teaching combines calligraphy with knowledge from other disciplines. Teachers enhance students' understanding and cultivate interdisciplinary literacy. They actively utilize various resources and methods to meet the requirements of the new curriculum standards for teacher professional development. It is evident in Table 2 that the Calligraphy with discipline integration in teaching is exceptional with a mean of 3.72 ($SD=0.41$).

As shown in Table 2, discipline integration emphasizes a positive impact on student comprehension with a mean of 3.76 ($SD=0.43$). It is important to note that teachers recognize the importance of discipline integration for their professional development with a mean of 3.66 ($SD=0.53$). Teachers believe that discipline integration in Calligraphy teaching can improve students' understanding. Discipline integration can help students connect knowledge from different fields and deepen their understanding of course content. The professional development of teachers is one of the key factors in improving the quality of education, and discipline integration is one of the important aspects of teacher professional development. Teachers need to constantly update their knowledge and skills to meet the requirements of subject integration and apply them to practical teaching. Teachers generally believe that subject integration plays an important role in calligraphy teaching, especially in improving students' understanding and cultivating interdisciplinary literacy.

Calligraphy teaching incorporates knowledge of disciplines such as literature, history, and art, deepens students' understanding and appreciation of calligraphy works through interdisciplinary learning, and promotes the improvement of thinking ability and comprehensive literacy (Sheng & Fu, 2023). Deep learning methods such as task-driven, contextualized, and value-guided have injected humanistic connotations into calligraphy classes, and are important attempts to cultivate students' core literacy and implement the fundamental task of "establishing morality and cultivating

Table 1. Statistical range and interpretation

Likert Scale	Statistical Range	Interpretation	Description
4	3.26 – 4.00	Exceptional discipline integration in Calligraphy/serious problem	Strongly agree
3	2.51 – 3.25	Good discipline integration in Calligraphy/moderate problem	Agree
2	1.76 – 2.50	Fair discipline integration in Calligraphy/minor problem	Disagree
1	1.00 – 1.75	Poor discipline integration in Calligraphy/not at all a problem	Strongly Disagree

Table 2. Discipline Integration in Teaching

Indicators	<i>M</i>	<i>SD</i>	Interpretation
1 I combine knowledge and content from various discipline when I teach Calligraphy.	3.73	0.46	Exceptional Discipline Integration
2 Discipline integration in Calligraphy teaching has enhanced students' comprehension.	3.76	0.43	Exceptional Discipline Integration
3 Discipline integration in teaching Calligraphy has cultivated interdisciplinary literacy.	3.75	0.43	Exceptional Discipline Integration
4 I utilize educational and teaching methods related to subject integration through various channels such as documents, books, and training.	3.69	0.48	Exceptional Discipline Integration
5 I recognize the requirements of discipline integration based on the new curriculum standards for the professional development of calligraphy teachers.	3.66	0.53	Exceptional Discipline Integration
Overall	3.72	0.41	Exceptional Discipline Integration

people". Teachers should not only pay attention to their own professional development and strengthen communication and cooperation with teachers of other disciplines, but also constantly update their knowledge and skills to better adapt to the requirements of interdisciplinary comprehensive teaching.

The extensive practice of subject integration in calligraphy teaching shows that this teaching method helps to achieve the transformation of subject knowledge, improve students' comprehensive analysis and problem-solving abilities, and promote their all-round development. Schools and relevant departments provide systematic training and resource support to help teachers promote interdisciplinary integration in teaching practice and continuously improve teaching effectiveness. Zhao (2024) pointed out that aesthetic education penetration is an important dimension of calligraphy teaching, which can not only enrich students' spiritual world and cultivate their aesthetic awareness, but also comprehensively improve students' aesthetic literacy through the process of discovering beauty, appreciating beauty, perceiving beauty, and creating beauty, laying a solid cultural and aesthetic foundation for their future development.

The exceptional implementation of discipline integration into Calligraphy teaching is reflected in Table 3 with a mean of 3.54 ($SD=0.48$).

According to Table 3, the implementation of interdisciplinary integration in calligraphy teaching is generally good, but there is still room for improvement. The study shows that in the process of adapting to interdisciplinary integrated teaching, teachers attach the highest importance to improving their own calligraphy skills and levels ($M=3.63$, $SD=0.50$), which shows that teachers generally believe that improving personal professional ability is a necessary condition for adapting to interdisciplinary integrated teaching.

At the same time, the effect of interdisciplinary integration in knowledge transformation, problem-solving ability and students' comprehensive literacy cultivation has also been highly recognized ($M=3.61$, $SD=0.52$), further confirming the positive impact of interdisciplinary integration on calligraphy teaching, especially in improving students' comprehensive literacy and problem-solving ability.

However, the data analysis also revealed the school's shortcomings in supporting teachers' professional development. The school's implementation efforts in organizing teachers' professional development training ($M=3.49$, $SD=0.60$) and providing teaching research and training support ($M=3.47$, $SD=0.58$) are relatively weak, indicating that these areas still need to be strengthened. Although the teachers' efforts to improve calligraphy skills ($M=3.60$, $SD=0.49$) are close to the overall rating ($M=3.54$, $SD=0.48$), indicating that the overall implementation is relatively balanced and the opinions of the respondents are consistent, there are still some differences in the teachers' views on specific support measures, as shown in indicator 3.

Disciplinary integration has achieved remarkable results in calligraphy teaching, but school support measures need to be strengthened. It is recommended that schools optimize the support mechanism, strengthen teacher training, enrich teaching and research resources, and improve supporting policies. At the same time, teachers should continue to improve their calligraphy skills and interdisciplinary teaching abilities to adapt to the needs of modern education and promote the overall improvement of the quality of calligraphy education. He (2020) proposed that the education department should organize more calligraphy teachers to participate in professional training, hold skill competitions, and provide a complete display platform and performance evaluation system. Gong (2021) further pointed out that precise top-level

Table 3. Implementation of discipline integration into calligraphy teaching

Indicators	<i>M</i>	<i>SD</i>	Interpretation
1 I strive to improve my calligraphy skills to adapt to interdisciplinary integration teaching.	3.60	0.49	Exceptional Discipline Integration
2 I strive to improve my calligraphy level to adapt to interdisciplinary integration teaching.	3.63	0.50	Exceptional Discipline Integration
3 My school improves the integration of Calligraphy Teachers' Subject Teaching Level with Emphasis on Organizing Professional Development Training for Teachers.	3.49	0.60	Exceptional Discipline Integration
4 My school provides teaching research for the integration and professional development of calligraphy teachers.	3.47	0.58	Exceptional Discipline Integration
5 My school provides training support for the integration and professional development of calligraphy teachers.	3.47	0.62	Exceptional Discipline Integration
6 Subject integration in Calligraphy teaching achieves the transformation of subject knowledge, strengthens problem-solving ability, and cultivates students' comprehensive literacy.	3.61	0.52	Exceptional Discipline Integration
Overall	3.54	0.48	Exceptional Discipline Integration

design is the guarantee of teacher training quality, platform building is the channel to improve professional level, and condensed culture is the ultimate destination of calligraphy art. Teachers should further enhance their awareness of the importance of interdisciplinary integration in calligraphy teaching, strengthen their personal calligraphy cultivation and teaching research, and better cultivate students' comprehensive qualities; for divergent opinions, they can communicate and discuss more to promote consensus and cooperation among teachers.

Professional development of interdisciplinary teachers is an interdisciplinary teaching method that aims to improve teaching effectiveness and students' comprehensive quality. Teachers can stimulate students' interest and enhance their sense of participation and achievement by skillfully demonstrating the copying and creation of different fonts. However, teachers need to have the corresponding professional ability and quality to effectively carry out interdisciplinary calligraphy teaching. This teaching method not only helps to improve students' comprehensive quality and subject literacy, but also provides a good practical path for interdisciplinary integration. Table 4 yielded an exceptional professional development in Calligraphy with discipline integration.

As shown in Table 4, the mean values of indicators 1 and 3 are both 3.55, with standard deviations of 0.62 and 0.57, respectively, indicating that teachers can skillfully demonstrate the copying of different fonts to students, effectively achieve the course objectives, and stimulate students' interest in learning. The mean value of indicator 4 is 3.60, with a standard deviation of 0.53, indicating that teachers can effectively stimulate students' interest. The mean values of indicators 5 and 6 are both 3.64, with standard deviations of 0.50 and 0.50, respectively, indicating that teachers can improve students' classroom participation and sense of achievement. The mean values of indicators 7 and 8 are both 3.57, with standard deviations of 0.62 and 0.55, respectively, indicating that teachers have relevant professional capabilities and quality requirements and can carry out interdisciplinary calligraphy teaching.

The highest mean value of 3.64 appears in the indicator "I improve students' sense of achievement". This shows that teachers generally believe that their teaching methods can effectively improve students' sense of achievement. A higher sense of achievement may be directly related to students' learning enthusiasm and participation, so this is a very positive finding. The lowest mean value of 3.39 appears in the indicator "I skillfully demonstrate the creation of various fonts to students". This may mean that teachers face some difficulties or challenges in this regard, and may need more training or resources to improve their skills.

Teachers generally believe that they focus on subject integration in calligraphy teaching, have corresponding professional capabilities and quality requirements, can skillfully demonstrate to students the copying and creation of different fonts, effectively achieve course objectives, and stimulate students' learning interest, participation and sense of achievement.

Calligraphy is the carrier of Chinese culture. The improvement of calligraphy teachers' teaching ability will help promote the development and inheritance of calligraphy culture (He, 2020). Teachers should continuously strengthen their professional capabilities and quality requirements, better achieve subject integration, improve teaching quality, and enhance students' learning outcomes. The exploration and professional development of calligraphy teachers in teaching are of great significance to promoting the inheritance and development of calligraphy art (He, 2020). In teaching, teachers should combine the subject characteristics of calligraphy courses, stimulate students' thinking activities and cultivate their thinking ability through effective development of questions, questions and answers, so as to improve the level of calligraphy learning. The application of teaching methods should be diversified, and teachers need to stick to the textbooks and design them reasonably according to the characteristics of students. The professional development ability of calligraphy teachers is one of the key factors in achieving high-quality subject integration. Through subject integration, teachers can broaden their teaching horizons, improve

their teaching level, promote their own professional growth, and provide students with a more comprehensive and in-depth calligraphy education. Schools should provide more training and support to promote the in-depth implementation of teacher professional development and subject integration.

Table 5 shows that the professional development ability of teachers in discipline integration is exceptional with a mean of 3.54 ($SD=0.11$).

As shown in Table 5, indicators 1 and 3, the average values at 3.62 and 3.42 respectively, with standard deviations of 0.50 and 0.68, respectively. This indicates that teachers believe that subject integration has a positive impact on the professional development of calligraphy teachers. At the same time, there are certain doubts about their calligraphy skills, especially in meeting the requirements of interdisciplinary integration teaching. The average value of indicator 2 is 3.58, with a standard deviation of 0.52. This indicates that teachers believe that professional development is beneficial for subject integration teaching. The average value of indicator 3 is 3.44, with a standard deviation of 0.55. This indicates that the school has provided relevant support and resources for teachers. The average value of indicator 5 is 3.66, with a standard deviation of 0.48. This indicates that teachers have a strong willingness and enthusiasm to

improve their professional development level and promote interdisciplinary integration through training, research, and practical activities.

The highest data is 3.66, which appears in indicator 5. The lowest data is 3.42, which appears in indicator 3. It can be seen that there are certain differences in the attitudes of teachers towards calligraphy skills and interdisciplinary integration. The highest data indicates that teachers have a strong willingness and enthusiasm to improve their calligraphy skills and promote interdisciplinary integration in professional development. The lowest data suggests that teachers may feel that their abilities in certain calligraphy skills are not sufficient to meet the teaching requirements of interdisciplinary integration.

Teachers believe that subject integration can promote the professional development of calligraphy teachers, and professional development is also conducive to subject integration teaching. They realize that their calligraphy skills may be insufficient, but they are willing to improve through training, research, and practical activities. The school also provides relevant support and resources.

In the context of disciplinary integration, Calligraphy teachers should establish a lifelong learning awareness, continuously develop learning and research abilities, face

Table 4. Discipline integration in professional development

Indicators	<i>M</i>	<i>SD</i>	Interpretation
1 I proficiently demonstrate copying of various fonts to students.	3.55	0.62	Exceptional Discipline Integration
2 I proficiently demonstrate the creation of various fonts to students.	3.39	0.74	Exceptional Discipline Integration
3 I effectively achieve the course objectives to stimulate student's interest in the classroom.	3.55	0.57	Exceptional Discipline Integration
4 I effectively stimulate student's interest in the classroom	3.60	0.53	Exceptional Discipline Integration
5 I improve the students' participation in the classroom	3.64	0.50	Exceptional Discipline Integration
6 I improve the students' sense of achievement	3.64	0.50	Exceptional Discipline Integration
7 I have the relevant professional abilities to conduct Calligraphy teaching with interdisciplinary integration.	3.57	0.62	Exceptional Discipline Integration
8 I have the relevant quality requirements for Calligraphy teaching with interdisciplinary integration.	3.57	0.55	Exceptional Discipline Integration
Overall	3.56	0.49	Exceptional Discipline Integration

Table 5. Professional development ability of calligraphy teachers

Indicators	<i>M</i>	<i>SD</i>	Interpretation
1 Discipline integration can promote the professional development of calligraphy teachers.	3.62	0.50	Exceptional Discipline Integration
2 The professional development of calligraphy teachers is conducive to subject-integration teaching.	3.58	0.52	Exceptional Discipline Integration
3 My ability to copy and create seal script, official script, regular script, cursive script, and running script can meet the teaching requirements of interdisciplinary integration.	3.42	0.68	Exceptional Discipline Integration
4 My school provides teaching research and training support for the integration and professional development of calligraphy teachers' disciplines.	3.44	0.55	Exceptional Discipline Integration
5 I am willing to participate in further strengthening the training, research, and practical activities of calligraphy, promoting the professional development of interdisciplinary integration.	3.66	0.48	Exceptional Discipline Integration
Overall	3.54	0.11	Exceptional Discipline Integration

learning and work with a problem awareness and critical thinking spirit. Teachers should improve learning and research abilities, and enhance comprehensive humanistic professional cultivation (Wang, 2020). The development path of calligraphy teachers in copying and creating should be linked to teaching practice. First, start with regular script, and after mastering it to a certain extent, moderately expand to learning calligraphy styles such as seal script, clerical script, line, and grass.; (Wang, 2020) The exploration of teaching and professional development by calligraphy teachers can help promote the development and inheritance of calligraphy (He, 2020). The professional development of calligraphy teachers in primary and secondary schools should highlight the principles of humanism and comprehensiveness, adhere to multiple paths of common development, and comprehensively enhance the professional competence of teachers. It should be based on the copying and creation of classic inscriptions. With classroom teaching as the main battlefield, professional theory and comprehensive cultural cultivation as the support, personality cultivation and cultural responsibility as the soul, and strong learning and research abilities as the guarantee and driving force (Wang, 2020).

Teachers should actively participate in the training, research, and practical activities provided by the school to improve their calligraphy skills and interdisciplinary integration abilities. Schools can further optimize support and resources to better promote the professional development of teachers and the in-depth implementation of subject integration. This not only enhances the calligraphy skills of teachers, but also further promotes the effectiveness of subject integration teaching.

The professional development path in disciplinary integration is an important way for teachers to improve their teaching abilities. By participating in teaching competitions, teachers can enhance their professional abilities in interdisciplinary teaching, thereby better integrating disciplines. At the same time, actively participating in calligraphy competitions and exhibitions is also an effective way to improve professional development level, which can help teachers continuously improve their calligraphy skills and artistic literacy.

Table 6 presents the path of professional development of teachers for discipline integration.

As can be gleaned in Table 6, the average value of indicator 1 is 3.45, with a standard deviation of 0.70. This indicates that teachers believe that participating in teaching competitions is an effective way to enhance their professional abilities in interdisciplinary teaching. The average values of indicators 2 and 3 are 3.46 and 3.39, respectively, with standard deviations of 0.63 and 0.71. This indicates that teachers believe that participating in calligraphy competitions and exhibitions is an effective way to improve their professional development level.

The mean values of indicators 4 and 5 are 3.55 and 3.57, respectively, with standard deviations of 0.61 and 0.59. This indicates that teachers believe that they need to further improve their professional abilities in replicating and creating multiple book styles. The average values of indicators 6 and

7 are 3.47 and 3.53, respectively, with standard deviations of 0.58 and 0.53. This indicates that teachers believe that they need to further strengthen their professional abilities in organizing and implementing classroom teaching.

According to the provided data, the highest data is 3.57, which appears in indicator 5. The lowest data is 3.39, which appears in indicator 3. It can be seen that teachers have the highest requirements for professional skills in the creation of various types of calligraphy, which may be because the creation of calligraphy requires higher professional skills and innovative thinking. The teachers participating in calligraphy exhibitions have the lowest level of professional development, which may be due to the fact that calligraphy exhibitions place more emphasis on personal skills and creativity. In other indicators, teachers place more emphasis on improving their professional abilities and optimizing teaching effectiveness.

Teachers believe that participating in teaching competitions, calligraphy competitions, and exhibitions is an important way to improve their professional abilities. At the same time, they also realize the need to further improve their professional abilities in copying and creating various book styles, organizing classroom teaching, and implementing classroom teaching. Zhao (2024) pointed out that “there is a close relationship between calligraphy copying and creation, and learning plays an important role in calligraphy creation. Through thematic creation, calligraphy teachers can improve their writing skills and master the style of inscriptions and calligraphy, thereby enhancing their professional abilities.” This view emphasizes the importance of calligraphy teachers’ practice in copying and creation to professional growth.

Wei (2021) emphasized that “the essence of interdisciplinary integration is to emphasize that students use knowledge from various disciplines to understand, analyze and solve practical problems, improve their comprehensive quality, and develop core abilities.” Interdisciplinary integration not only helps to improve teaching effects, but also helps students consolidate their basic skills, which is also of great significance to the professional development of calligraphy teachers. Calligraphy teachers can deeply explore and demonstrate the value of aesthetic education in cultural inheritance and self-cultivation through subject integration. With the support of calligraphy teaching, aesthetic education and traditional cultural education in schools can develop together (Yue & Du, 2022). Carrying out quality education is the core task of educational modernization, and teachers are the key to implementing quality education. Education departments should organize calligraphy teachers to participate in professional training, organize calligraphy teachers to participate in skill competitions, provide a complete display platform and performance appraisal promotion system, and encourage college calligraphy graduates to teach in primary and secondary schools and teach for life (He, 2020). The professional development of calligraphy teachers is not only the improvement of personal ability, but also an important guarantee for promoting the development of quality education.

Table 6. Path of professional development in discipline integration

Indicators		<i>M</i>	<i>SD</i>	Interpretation
1	I enhance my professional ability in interdisciplinary teaching by participating in teaching competitions.	3.45	0.70	Exceptional Discipline Integration
2	I actively participate in calligraphy competitions and exhibitions to improve my professional development level.	3.46	0.63	Exceptional Discipline Integration
3	I actively participate in calligraphy exhibitions to improve my professional development level.	3.39	0.71	Exceptional Discipline Integration
4	I need to further enhance my professional ability to copy multiple book styles.	3.55	0.61	Exceptional Discipline Integration
5	I need to further enhance my professional ability to create multiple book styles.	3.57	0.59	Exceptional Discipline Integration
6	I need to further strengthen my professional abilities in organizing classroom teaching.	3.47	0.58	Exceptional Discipline Integration
7	I need to further strengthen my professional abilities in implementing classroom teaching.	3.53	0.53	Exceptional Discipline Integration
Overall		3.49	0.50	Exceptional Discipline Integration

Teachers actively participate in teaching competitions, calligraphy competitions, and exhibitions, showcasing their personal skills and creative achievements, and communicating and sharing with other teachers to promote their professional development. Strengthen professional training and practice in copying and creating calligraphy styles, organizing classroom teaching, and other aspects. Further, explore methods and techniques for creating multiple book styles to enhance one's professional abilities. Schools can provide relevant training and support resources to help teachers improve their professional abilities.

Problems in the Professional Development of Calligraphy Teachers with Discipline Integration

The moderate problem in the professional development of Calligraphy teachers with discipline can be gleaned in Table 7 with a mean of 3.36 ($SD=0.47$).

As shown in Table 7, in terms of the impact of disciplinary integration on teaching, indicators 1 and 2 indicate that calligraphy teachers generally believe that disciplinary integration has a positive influence on calligraphy teaching and their professional development. This integration not only helps improve teaching effectiveness but is also seen as a necessary means to strengthen teaching practice and construction. The average values for both indicators are relatively high (3.61 and 3.64, respectively), indicating that this is a widely recognized viewpoint among teachers.

In terms of the challenges of interdisciplinary teaching, indicators 3, 4, and 6 suggest that while disciplinary integration is generally well-regarded, interdisciplinary teaching also brings certain challenges. Teachers commonly believe that this teaching approach increases their workload and burden. Indicator 4 has the lowest average value (2.99), indicating that teachers strongly feel the burden imposed by interdisciplinary teaching.

In terms of the tendency of integrating arts and sciences, indicators 5 and 6 explore teachers' preferences for interdisciplinary teaching. The results show that teachers tend to

integrate humanities (such as Chinese, history, politics, art, etc.), which may be affected by the nature and cultural background of calligraphy teaching itself. However, the evaluation of integrating science is relatively low, which may reflect the difficulty and challenge of integrating scientific content in calligraphy teaching.

Overall, it is evident that calligraphy teachers have clear views and attitudes towards disciplinary integration teaching. Through the analysis of the average values and standard deviations of the six indicators, teachers perceive indicators 1, 2, and 5 as more prominent, while indicators 3, 4, and 6 as more moderate. Among them, indicators 2 and 5 have the highest average values, reaching 3.64, indicating that teachers have a strong awareness of the importance of disciplinary integration teaching and the inclination towards integrating humanities subjects. The average value of indicator 4 is the lowest, at 2.99, further supporting teachers' perception of increased burden from interdisciplinary teaching. Overall, teachers have a positive view of disciplinary integration teaching, but there is a need to strengthen construction and enrich practical experience in practice.

In summary, teachers generally believe that interdisciplinary integration has a positive impact on the professional development of calligraphy teachers, and emphasize the need to strengthen construction and enrich practical experience. However, interdisciplinary teaching also increases the workload and burden of teachers, which puts higher demands on teachers' professional ability.

Wang (2020) pointed out that the professional level of calligraphy teachers directly affects and even determines the quality of calligraphy education in primary and secondary schools and the development of discipline construction. Zhang (2021) further emphasized that interdisciplinary integration requires teachers to have multidisciplinary knowledge reserves and teaching design capabilities, but some teachers still have room for improvement in terms of depth of understanding and resource integration capabilities. Yan (2024) proposed that teachers should have the ability to discover and analyze problems, consult and review literature,

Table 7. Problems encountered by calligraphy teachers on professional development

Indicators		<i>M</i>	<i>SD</i>	Interpretation
1	Disciplinary integration in Calligraphy teaching is conducive to the professional development of calligraphy teachers.	3.61	0.53	Serious Problem
2	It is necessary to strengthen construction and enrich practice in disciplinary integration teaching.	3.64	0.48	Serious Problem
3	The integration of disciplines in teaching has increased the workload of calligraphy teachers.	3.24	0.73	Moderate Problem
4	The integration of disciplines in teaching has increased the burden of calligraphy teachers.	2.99	0.83	Moderate Problem
5	In interdisciplinary teaching, I tend to integrate subjects that lean towards humanities such as Chinese, history, politics, and art.	3.64	0.50	Moderate Problem
6	In interdisciplinary teaching, I tend to integrate disciplines that lean towards science, such as mathematics, science, geography, and information technology.	3.03	0.79	Moderate Problem
Overall		3.36	0.47	Moderate Problem

develop and implement programs, evaluate and reflect on effectiveness, and extract and share results. The improvement of these abilities will help teachers conduct research and reflection in teaching practice, thereby promoting professional growth. In addition, Wang (2020) research shows that the professional development path of calligraphy teachers in primary and secondary schools must be multi-channel and multi-dimensional, and continue to evolve with the progress of the times. Pan and Yang (2024) also pointed out that interdisciplinary integration breaks traditional boundaries and combines calligraphy with history, design, cognitive science and other disciplines, which helps to cultivate students' comprehensive literacy and creativity.

Schools and relevant departments should value teachers' feedback, take measures to alleviate their workload, and provide more support and resources to facilitate the effective implementation of disciplinary integration teaching. Teachers can further explore discipline integration methods suitable for their own specialties to improve teaching effectiveness and promote students' comprehensive development.

Proposed Professional Development for Calligraphy Teachers in the Integration of Disciplines

Addressing problems on discipline integration in calligraphy

The gap between teachers' understanding and practice of subject integration. Although teachers generally believe that subject integration is important in calligraphy teaching, in specific practice, the integration effect may be poor due to unfamiliarity with integration methods and strategies or lack of practical experience. Zhang et al. (2024) pointed out that primary and secondary school teachers often have difficulty choosing appropriate subject knowledge integration models in practice, resulting in unsatisfactory integration effects. Interdisciplinary curriculum integration needs to be guided by core competencies and deeply analyzed through specific practical cases. Teachers may find it difficult to effectively integrate theory with practice due to a lack of systematic integration strategies and experience (Yang, 2024).

The challenge of calligraphy skills for teachers. Some teachers encounter difficulties in skillfully demonstrating

the creation of various fonts to students, which may limit their effective subject integration in teaching. As Zhou (2024) pointed out, the calligraphy literacy of primary and secondary school teachers is generally not high, and many calligraphy courses are taught by non-professional teachers, which has led to a decline in the quality of calligraphy courses. Wang (2022) also emphasized that calligraphy teachers not only need to have a solid foundation in calligraphy, but also need to master diverse teaching methods and techniques to stimulate students' interest in learning and improve teaching effectiveness.

The problem of increased workload, teachers believe that subject integration has increased their workload, which may have an impact on their acceptance and sustainability of this teaching method. Although subject integration contributes to teaching innovation, it also increases teachers' preparation and teaching pressure, which may reduce their acceptance of new teaching methods (Gao et al., 2024).

Insufficient support and resources for the professional development of calligraphy teachers. Although schools provide relevant support and resources for teachers, these may not be sufficient to meet all the needs of teachers in subject integration. Although the current allocation of calligraphy education resources has improved in the context of balanced development of compulsory education, it is still difficult to meet the actual teaching needs, especially in terms of the number and professional abilities of calligraphy teachers (Zhou, 2024).

Proposed professional development for discipline integration in calligraphy

The school organizes relevant training courses and seminars to help calligraphy teachers deepen their understanding of the theoretical foundation and practical skills of subject integration. To improve the calligraphy skills and artistic literacy of teachers, in addition to providing regular calligraphy skill training, calligraphy experts can also be invited to provide guidance or organize calligraphy workshops to enhance their actual professional abilities. He (2020) pointed out that calligraphy education is an important way to enhance teachers' artistic cultivation and professional abilities. Teachers can

better integrate calligraphy art into teaching practice through systematic training.

Schools can optimize teaching management processes, provide technical support, or develop corresponding incentive mechanisms to reduce the workload of teachers in subject integration and provide calligraphy teachers with more time for professional practice. Bao (2024) emphasized that schools should provide teachers with more independent time through improving management systems, optimizing task allocation, and other means to support their professional development.

By establishing a sound disciplinary integration mechanism and culture, schools can strengthen communication and cooperation between different disciplines. This policy emphasizes the importance of interdisciplinary teaching and provides teachers with more opportunities for practice and reflection, by strengthening the interconnection between disciplines, driving the comprehensive implementation of curriculum, and enhancing practical requirements (Chen, 2022). Schools should establish a sound disciplinary integration mechanism and culture, provide teachers with more interdisciplinary teaching opportunities and resources, promote teachers' practice and reflection in actual teaching, and promote the comprehensive development of students. Yang (2024) pointed out that subject integration not only enhances teachers' teaching abilities, but also significantly promotes students' comprehensive development. Li et al. (2024) emphasized that teachers' interdisciplinary teaching practices are influenced by interdisciplinary teaching knowledge and emotions, and these factors can be strengthened through a sound disciplinary integration mechanism.

CONCLUSION

The results of the study are summarized as follows: (1) exceptional discipline integration in calligraphy teaching and professional development of calligraphy teachers (2) moderate problem on the professional development with discipline integration; facing challenges in the calligraphy skills of teachers, increased workload, and insufficiency of resources.

From a teaching perspective, calligraphy teachers generally believe that subject integration has a positive impact on teaching, especially in improving teaching effectiveness and promoting comprehensive student development. However, interdisciplinary teaching also brings challenges, such as difficulty in integrating content and increased workload.

From the perspective of professional development, calligraphy teachers believe that subject integration is an effective way to enhance personal professional abilities, especially in participating in competitions and exhibitions. But they still have professional development needs in organizing classroom teaching, mastering various calligraphy styles, and creating calligraphy works.

From the perspective of disciplinary integration and professional development of calligraphy teachers, research has found that although calligraphy teachers recognize the importance of disciplinary integration, challenges are encountered including the complexity of interdisciplinary teaching,

increased workload, and the need for further improvement of personal professional abilities.

Based on the study results, it is necessary to conduct a thorough analysis of the specific problems and challenges that calligraphy teachers encounter in subject integration, such as increased workload and the need for skill enhancement. At the same time, maintain close communication with calligraphy teachers, understand their actual needs, and ensure targeted training and support are provided to them. And develop specific action plans, including providing continuous training, resource support, and professional guidance, to help calligraphy teachers better cope with the challenges of interdisciplinary teaching.

Applying the research results to educational practice, providing specific guidance and support for calligraphy teachers, and helping them implement subject integration more effectively. Regularly evaluate and adjust practical strategies to ensure that research results can be translated into practical teaching improvements and teacher professional growth. Share successful cases and practical experiences, inspire more teachers to participate in the integration of disciplines, and promote the innovation and development of calligraphy education.

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