

Research on the Current Application Status of Digital Music Instruction in Primary and Secondary Education

XIANG XIN^{1,2}

¹ School of Education, Joongbu University, Goyang, South Korea

² School of Education, Ganxi Vocational and Technical College, Xinyu, China

646465977@qq.com

Abstract. This study focuses on the current application status of digital music instruction in primary and secondary education. The research topic is grounded in the need for educational model innovation amidst the rapid advancement of technology. The research background highlights that digital teaching platforms have accelerated the integration of information technology into education, thereby enhancing learning efficiency. Through non-experimental empirical research employing descriptive statistical methods, a questionnaire survey was conducted among 126 music teachers from primary and secondary schools in City X. The findings reveal that while most teachers acknowledge the significance of digital resources in music instruction, there are limitations in their use of advanced functional software and tools. The study's conclusions emphasize that digital resources can broaden teaching experiences and stimulate students' creative thinking. It is crucial to strengthen teachers' digital literacy training to promote the in-depth development of music instruction practices in primary and secondary schools.

CCS Concepts: Computing methodologies → Human-centered computing → Interactive systems and tools → Educational technology

Keywords: *digital music instruction; primary and secondary education; current application status; teachers' digital literacy; instructional innovation*

1. Introduction

Since the 21st century, the rapid evolution of technology has significantly reshaped and broadened the pathways for knowledge acquisition and information interaction. There is an urgent need for the integration of digital technologies into work and learning models to adapt to the transformative times. The continuous advancement of internet technology has injected innovative vitality into the design and implementation of educational processes. The emergence of artificial intelligence, such as digital teaching platforms, has accelerated the deep penetration

of information technology resources within campus settings, and the efficacy of their applications has rapidly become evident. These applications not only streamline the process of knowledge acquisition but also enhance learning efficiency [1]. In educational practice, the utilization of digital resources has become an indispensable component, particularly in the realm of communication and collaboration. Various digital technology resources and devices should be integrated throughout the entire process of students' socialization, with continuous optimization and application to cultivate their dynamically evolving digital cultural literacy [2]. In the wave of digitalization, technology and digital resources provide robust support for the construction and practice of novel learning theories. Technological innovations in the classroom essentially represent an organic integration of pedagogical science and information technology tools. The application of modern educational technologies has fundamentally transformed students' roles in the educational process. Students have transitioned from passive recipients to active explorers, creative initiators, and practical operators, with their learning activities visualized and intelligently guided through digital resources. Technological empowerment not only facilitates interconnection, collaborative creation, and creative expression among students but also establishes a profound interactive relationship between music and learners. Based on empirical research data, this article focuses on the field of music education in primary and secondary schools, analyzing the application needs and usage frequency of digital resources and their derivatives. The core value of this study lies in obtaining the current status of technology application in elementary school music classrooms. The analysis results indicate that there is an urgent need for innovative breakthroughs in current teaching practices to stimulate the initiative of all participants. Such improvements will directly enhance students' mastery of subject knowledge and skill acquisition efficiency, while promoting the comprehensive development of individual musical literacy and facilitating the simultaneous enhancement of digital capabilities among both teachers and students.

2. Methodology

The process of teaching practice needs to closely align with the dynamics of technological development and continuously reflect the changes of the times. The active application of digital educational technologies across various disciplines has become an inevitable trend [3]. To optimize the entire teaching process, numerous innovative strategies have been implemented, among which the integrated utilization of digital resources is particularly crucial. In this context, the educational system cannot afford to ignore the transformations brought about by

technological innovations. The strategic planning document titled "Opinions on Accelerating the Digitalization of Education" issued by the Ministry of Education and eight other departments in 2025 [4] has laid a solid foundation for the implementation of innovative measures in teaching practice. It not only provides strong support and practical guidance for teachers but also clarifies the digital competencies that teachers should possess, highlighting the importance of meeting students' individualized learning needs through digital means.

With the accelerated advancement of technological innovations, education needs to keep pace with the times and continuously enhance digital competencies. Key competencies need to be redefined according to the 21st-century skills standards, and assessment tasks also need to adapt to the transformation of educational standards to align with the development needs of information and communication technologies (ICT). Many scholars point out that the active application of digital competencies in the educational field is often defined as educational technology [5][6]. From a narrow perspective, it is a process of systematically designing and applying technologies and processes aimed at improving teaching quality. The learning process that leverages ICT places particular emphasis on multimedia and interactivity, deeply integrating digital information with elements such as images, animations, and sounds to provide comprehensive information support. This not only contributes to the development of students' digital competencies but also cultivates their critical thinking, autonomous learning abilities, and knowledge application capabilities. In stark contrast to traditional teaching models, it requires comprehensive renovations in aspects such as goal setting, planning, teaching forms, motivation of learning, scoring mechanisms, and teacher role positioning.

In the current era, new knowledge is constantly emerging in various fields, necessitating continuous adjustments in the teaching process to adapt to the demands of the new digital age. The introduction of modern technologies has steered the teaching process towards digitization and multimedia. The utilization of digital technologies implies fully tapping into the potential of digital information to enhance students' digital literacy and provide robust support for achieving educational goals [7]. Through normalized application in the classroom, it can effectively compensate for the shortcomings of traditional classrooms [8].

In summary, the application of digital technology resources in daily teaching holds significant importance. With the aid of these resources, students can cultivate independent learning abilities from an early stage of education and achieve self-education. Beyond the technological application in the classroom, teachers also need to continuously enhance their own capabilities to fully prepare for multimedia teaching and ensure the efficiency of the learning process.

However, some teachers still tend to adopt traditional teaching methods and hold a conservative attitude towards new technologies [9]. As the planners, organizers, and implementers of the teaching process, teachers need to continuously monitor and assess students' progress, becoming active participants in teaching activities. They need to possess flexible adaptability and be willing to experiment with and apply new teaching methods to adapt to the trend of educational digitization.

3. Results

This study is non-experimental empirical research utilizing descriptive statistical analysis. The questionnaire employed is a Likert 5-point scale, encompassing variables such as gender, age, educational background, work experience, as well as music teachers' access to, attitudes towards, and practical experiences with digital resources in music courses. The research subjects consist of 126 primary and secondary school music teachers from X City. All participants were thoroughly informed about the research objectives, the anonymization and security measures for data handling, and their right to withdraw from the study at any time. After fully understanding and agreeing to the research information, the participants voluntarily completed the survey questionnaire. Table 1 presents the descriptive statistical analysis of the sample.

Table 1. Descriptive Statistics of the Sample (n=126)

Variable	Attribute	Frequency	Percentage (%)
Gender	Male	8	6.35
	Female	118	93.65
Educational Level	Junior College	11	8.73
	Bachelor's Degree	79	62.70
	Graduate Degree	36	28.57
	Less than 10 years	36	28.57
Teaching Experience	10-20 years	29	23.02
	20-30 years	33	26.19
	Over 30 years	28	22.22

During the second semester of the 2024-2025 academic year, there were 8 male teachers (6.35%) and 118 female teachers (93.65%). Among them, 11 teachers held a junior college degree (8.73%), 79 teachers held a bachelor's degree (62.70%), and 36 teachers held a graduate degree (28.57%). In terms of teaching experience, 36 teachers had less than 10 years of experience (28.57%), 29 teachers had 10 to 20 years of experience (23.02%), 33 teachers had 20 to 30 years of experience (26.19%), and 28 teachers had over 30 years of experience (22.22%). The survey also found that 76 respondents (60.32%) taught multiple grade levels simultaneously,

while 18 respondents (14.29%) taught only one grade level. In terms of data analysis, the availability of digital devices in classrooms was first examined. As shown in Table 2, respondents were required to confirm which digital devices they could use in their music courses. Table 3 presents the frequency of respondents' use of these digital devices.

Table 2. Availability of Digital Teaching Devices (n=126)

Description	Yes (%)	No (%)
Does the teaching classroom have unlimited internet access?	120 (95.24%)	6 (4.76%)
Can a computer/laptop be used in the teaching classroom?	123 (97.62%)	3 (2.38%)
Does the teaching classroom have an LCD TV?	99 (78.57%)	27 (21.43%)
Can a smart whiteboard be used in the teaching classroom?	31 (24.60%)	95 (75.40%)
Can a projector be used in the teaching classroom?	99 (78.57%)	27 (21.43%)

Table 3. Frequency of Using Digital Devices in Music Courses (n=126)

Device Name	1-Never	2-Rarely	3-Sometimes	4-Often	5-Always
Mobile Phone	29 (23.02%)	13 (10.32%)	63 (50.00%)	15 (11.90%)	6 (4.76%)
Computer	3 (2.38%)	5 (3.97%)	2 (1.59%)	26 (20.63%)	90 (71.43%)
Projector	28 (22.22%)	2 (1.59%)	5 (3.97%)	18 (14.29%)	73 (57.94%)
LCD TV	26 (20.63%)	3 (2.38%)	4 (3.17%)	12 (9.52%)	81 (64.29%)
Smart Whiteboard	97 (76.98%)	5 (3.97%)	5 (3.97%)	6 (4.76%)	13 (10.32%)

In music instruction, the majority of teachers have access to computers (123 teachers, 97.62%), LCD TVs (99 teachers, 78.57%), and projectors (99 teachers, 78.57%). Among them, 90 teachers (71.43%) utilize computers for teaching, 81 teachers (64.29%) use LCD TVs, and 73 teachers (57.94%) use projectors. Despite many teachers' disapproval of using mobile phones in class, it cannot be overlooked that 63 teachers (50.00%) occasionally use them as auxiliary teaching tools. The results indicate that most classrooms are equipped with unlimited internet access, and the working environment regarding device usage frequency is largely consistent, regardless of the school's location or educational level.

As can be seen from Table 4, primary and junior high school music teachers do not frequently use software/tools with advanced functions such as creating, recording, or editing audio in their courses. However, compared to direct music creation or editing, teachers show a slightly higher level of agreement with using digital tools for knowledge testing, introducing composers' works, and assisting in music score learning. In the option "I use digital tools (such as for creating,

recording, and editing audio) to complete the course," the proportion of teachers who selected "Somewhat Agree" or above is relatively low, indicating that most teachers do not often use these advanced functions. Nevertheless, in options like "I use digital tools for teaching" and "I have students use digital tools for preview," the proportion of teachers selecting "Somewhat Agree" or above is relatively higher. These results and conclusions may partly stem from the respondents' unfamiliarity with specific software or tools, suggesting that there exists a knowledge gap among teachers in identifying and utilizing digital devices and tools with the aforementioned functions.

Table 4. Digital Tools Used in Music Courses (n=126)

Digital devices help me conduct teaching activities more effectively in music courses.	1 (0.79)	1 (0.79)	4 (3.17)	17 (13.49)	103 (81.75)
I use digital tools (such as for creating, recording, and editing audio) to complete the course.	46 (36.51)	10 (7.94)	27 (21.43)	31 (24.60)	12 (7.94)
I use digital tools (like Make music or others) for teaching in the course.	44 (34.92)	19 (15.08)	26 (20.63)	27 (21.43)	10 (7.94)
I use digital tools (such as Rhythm Trainer or other apps) for post-class quizzes.	46 (36.51)	8 (6.35)	37 (29.37)	26 (20.63)	9 (7.14)
I use digital tools (such as the National Centre for the Performing Arts or others) for students' preview.	13 (10.32)	18 (14.29)	18 (14.29)	35 (27.78)	42 (33.33)
Description	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)

Note: 1 - Strongly Disagree; 2 - Somewhat Disagree; 3 - Disagree; 4 - Somewhat Agree; 5 - Strongly Agree

From the above research, it is evident that primary and junior high school music teachers believe that the use of digital technologies, software, and tools can facilitate a better understanding of the materials prescribed in music education curricula. Moreover, they hold a positive attitude towards the influence of software and digital tools in music education classroom activities. Despite the limitations teachers face in using software and tools with advanced functions, they still recognize the potential and value of digital tools in music education.

4. Discussion

After a thorough analysis of the diversity and usability of digital resources in the music teaching process of the respondents, it becomes apparent that there is an urgent need for more professional expertise and thorough preparation in introducing innovative teaching methods and content in music education. A statistically significant difference exists between projects

focusing on the use of specific software and tools for particular teaching activities and those centered on the application of digital devices in general teaching processes.

In practical teaching scenarios, teachers tend to favor the utilization and integration of various multimedia resources. While incorporating intermediary elements into music teaching has its merits, curriculum construction should not overly rely on these specific media. Currently, there is a notable lack of willingness among teachers to employ professional software and tools, which could otherwise make the teaching process more vivid, enhance the authenticity of musical experiences, and more effectively foster students' key abilities such as problem-solving, creativity, critical thinking, and digital literacy.

In related research fields, some scholars have focused on exploring the attitudes of teachers and music educators towards the possibility of applying digital resources in music classrooms[10]. Their findings indicate that introducing digital technologies and skillfully using music software to enrich and innovate singing (playing) practice can improve the efficiency and quality of primary school music classes. Regarding teachers' digital capabilities, consolidating their digital knowledge base, strengthening TPACK (Technological Pedagogical Content Knowledge) practical training to enhance their digital application skills, and fostering a sense of teacher community can amplify the collaborative effects of digitalization among teachers[11]. Teachers most commonly utilize computer networks and software for teaching, with popular programs including PowerPoint, Bilibili, music encyclopedias, various music teaching programs, some music creation and animated film creation programs, accompaniment and karaoke creation programs, sound editing and recording programs, etc., although the exact usage ratios remain unclear[12]. Some scholars have also suggested that in the era of artificial intelligence, music teaching should adhere to a teaching philosophy that balances humanities and data, position teachers for professional growth and autonomous capability development, and follow a development path guided by curriculum standard literacy evaluation[13].

A comprehensive comparison reveals that a majority of music teachers, accounting for 81.75%, frequently leverage the advantages of digitalization in music education and teaching activities. This result underscores the respondents' recognition of the importance, usability, and significance of digitalization in music education and teaching. However, only 7.14% of the respondents indicated full utilization of digital tools for post-class quizzes.

5. Conclusion

Although there have been some studies in China focusing on analyzing the mechanism of

digitalization in music education and teaching processes, as well as describing the application status of certain software solutions and digital tools in music academies, relevant research specifically targeting primary and secondary school music teachers remains relatively scarce. This study concentrates on the application attitudes and cognitive levels of primary and secondary school music teachers towards digital resources in education and teaching. Its exploratory findings hold significant importance for promoting the in-depth development of teaching practices in primary and secondary schools, as well as encouraging teachers and students to play a more active role in constructing learning processes and enhancing skill development.

In the music education curriculum system, the utilization of digital resources carries significant value. It not only broadens the dimensions of teaching experiences, stimulates students' creative thinking, and promotes personalized expression but also markedly enhances the level of innovation in the music learning process. The study emphasizes that these resources are particularly suitable for students with varying interests and ability levels. This is because the convenient access and flexible application of digital tools can assist students in achieving more significant learning outcomes within a relatively short period.

The research results indicate that primary and secondary school teachers have fully recognized the efficiency advantages of digital resources and the importance of their promotion and application in music education and teaching. Meanwhile, they also stress the necessity of organizing and launching courses and projects that encompass existing and new digital music tools, software, and online platforms. This initiative will help more primary school teachers transcend the current limitations dominated by personal enthusiasm and deeply recognize the urgency and necessity of enhancing the digital capabilities of primary and secondary school teachers. It will not only enrich teaching experiences, stimulate students' creative potential, and promote the realization of personalized expression but also inject more innovative elements into the music learning process.

Acknowledgements

This work was supported by the Related outcomes of the 2025 General Social Science Research Project of Xinyu City entitled "Research on the Current Application Status and Countermeasures of Digital Music Teaching in Primary and Secondary Education" (No: 25YGY376).

References

- [1] Qin, W., & Qin, M. J. "Transformation of talent cultivation models in basic disciplines in the era of artificial intelligence: causes, impacts, and paths." *Shandong Higher Education*, 2025(01): 29–36 + 90.
- [2] Zhang, M. J., & Li, T. Y. "Digital whole-process people's democracy: development motivations, connotation systems, and construction paths." *Social Science Research*, 2024(03): 1–10 + 210.
- [3] Li, B. Z. "Elements, potential risks, and practical strategies of the development strategy for digital transformation in universities." *Modern Education Management* [Online], pp. 1–13 [Accessed on June 20, 2025]. DOI: 10.16697/j.1674-5485.2025.07.010.
- [4] Ministry of Education, Cyberspace Administration of China, National Development and Reform Commission, et al. "Opinions of the Ministry of Education and nine other departments on accelerating the digitalization of education." [EB/OL]. (April 16, 2025) [Accessed on June 20, 2025]. http://www.moe.gov.cn/srcsite/A01/s7048/202504/t20250416_1187476.html
- [5] Wang, J., Zhou, Q., Zhang, Y. J., & Wang, C. "Application of educational digital humans: scenario analysis, risk examination, and coping strategies." *Journal of Guangxi Normal University (Philosophy and Social Sciences Edition)*, 2025, 61(03): 51–62. DOI: 10.16088/j.issn.1001-6597.2025.03.005.
- [6] Liang, L. M. "OECD's shaping of the digital education ecosystem: strategic framework and core issues." *E-Education Research* [Online], pp. 33–40 [Accessed on June 20, 2025]. DOI: 10.13811/j.cnki.eer.2025.05.005.
- [7] Liu, J., Qian, Y. C., Guo, G. Z., & Su, F. G. "Ten major trends in the digital and intelligent transformation of international education in 2024." *China Educational Informatization*, 2025, 31(03): 12–30.
- [8] Li, L. "Exploration of paths to enhance the attractiveness of ideological and political courses in higher vocational colleges from the perspective of digital empowerment." *Journal of Taiyuan Urban Vocational College*, 2025(03): 1–3. DOI: 10.16227/j.cnki.tycs.2025.0150.
- [9] Qin, W. A., Wang, M., & Fu, P. P. "Dilemmas and bridging paths in the cultivation of digital literacy among primary school mathematics teachers in China." *Education Reference*, 2024(12): 76–81.

- [10] Liu, L. L. "Exploration of integrating digital technology into primary school music classroom teaching." *Contemporary Music*, 2024(09): 50–52.
- [11] Xu, M. X., & Li, H. X. "Realistic dilemmas and implementation strategies for cultivating teachers' digital literacy under the TPACK framework." *Teaching and Management*, 2025(18): 53–57.
- [12] Hu, Y. "The 're-enlightenment' moment of knowledge production: the impact of artificial intelligence on the triadic structure of science." *Journal of Guangzhou University (Social Science Edition)*, 2024, 23(03): 5–14.
- [13] Liu, Y. L., & Liu, B. "Dilemmas and approaches in the form of music teaching in primary and secondary schools in the era of artificial intelligence." *Primary and Secondary School Textbooks and Teaching*, 2025(01): 10–15. DOI: 10.19878/j.cnki.zxxjcjx.2025.01.003.