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A Case Study of China Music Teachers in the Use of Assistive Technology in Teaching

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ABSTRACT

In the context of the music education, many middle school music teachers are starting to use Tablets as teaching tools for teaching technology in music appreciation classes. Teachers understand that utilizing Tablets as ICT teaching tools can enhance student engagement and foster a greater interest in learning, When Tablets are distributed to students for use in teaching. However, some teachers are unable to effectively utilize teaching tools such as Tablets in music appreciation classes, thereby failing to achieve optimal teaching outcomes. The objective of this study is to interview teachers' attitudes, skills, and barriers when using Tablets in music appreciation teaching. This study was conducted in five middle schools located in KuanCheng District, Changchun City, Jilin Province, China. The sample consisted of five middle school music teachers, including two males and three females, who had varying years of teaching experience and expertise. The design of this study used qualitative approaches and interview methods to gather data. The result of the study was analysed in content analysis. This finding indicated a low level of attitude and skill towards the use of tablets as the teaching tool in music appreciation teaching, primarily due to a lack of skills, infrastructure, and resources associated with tablets.

1. Introduction

In the era of rapid technological advancements, the integration of technology in education has become increasingly significant, particularly for enhancing student engagement and learning outcomes [1-3]. Music education, as a vital component of comprehensive education, can also benefit from the incorporation of assistive technology, such as Tablets, in teaching practices [4,5]. Especially in music appreciation teaching, it is crucial to utilize teaching assistive technology, such as Tablets, in a rational and effective manner as teaching tools [6]. For instance, distributing Tablets to students and utilizing specific software as specialized teaching tools. Because the use of Tablets in music appreciation classes has been identified as a promising approach to foster students' interest, facilitate active learning, and cater to diverse learning needs [7,8].

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Recent decades have seen revolutionary changes in music education as a result of technological advancements and the growing variety of student populations [9,10]. Assistive technology in particular has shown great promise as a method to aid students and improve musical outcomes [11,12]. However, there may be cultural differences in the acceptance and use of assistive technology in music instruction [13,14]. Over the past few decades, music education in China has flourished, with a primary goal of expanding access to music education for all students [15]. However, the incorporation of AAC into China's music classrooms is still in its infancy. Technology in music classrooms, according to studies [10], may help students study at their own pace and encourage originality. However, thoughtful evaluation of pedagogical techniques and the requirements of varied learners is necessary for the successful incorporation of technology into music education [11,12]. In example, research shows that the use of assistive technology improves students' motivation and performance in music classes [16]. Music educators can take advantage of assistive technologies such as adaptable instruments, music notation software, and mobile applications to enhance their students' musical development [12].

Despite the perceived benefits, many middle school music teachers in China face significant challenges that impede the effective implementation of these tools in music appreciation classes, leading to suboptimal teaching outcomes [17].

One key issue is the lack of necessary skills and knowledge required for the successful integration of tablet technology into music appreciation teaching [18]. Many music teachers may be unfamiliar with the functionalities of Tablets, as well as the pedagogical strategies and digital resources that can be employed to optimize the use of these devices in the classroom, so that they cannot Good guide students to use the tablet well [7]. This may result in teachers' reluctance or inability to utilize Tablets effectively, thereby limiting their potential to enhance students' music learning experiences. Another significant barrier is the lack of adequate infrastructure and resources to support the widespread adoption of Tablets in music education [13]. Many schools may not have sufficient funding to provide Tablets for all students, leading to unequal access and disparities in learning opportunities [7]. Additionally, schools may lack the technical infrastructure and support required to maintain, troubleshoot, and update tablet devices, which can further exacerbate the challenges faced by music teachers [19]. Assistive technology in music education may have varying degrees of cultural acceptance and utilization [4]. Assistive technology in music education may be affected by cultural variables like values and attitudes [16]. In addition, studies on the implementation of assistive technology in Chinese music classrooms are scant.

This case study contributes to the understanding of the potential benefits and challenges of using assistive technology in music education in China. It provides valuable insights into the experiences and perspectives of music teachers and has implications for music educators, policymakers, and researchers interested in enhancing music education through the use of technology.

2. Objective

Therefore, this qualitative study aimed to examine the attitudes, skills, and barriers of music teachers to using Tablets as a teaching tool assistive technology in teaching music appreciation.

2.1 Research Questions

- i. How far do music teachers hold positive attitudes towards the use of Tablets as an assistive technology tool in teaching music appreciation?

- ii. How far do music teachers demonstrate proficiency in using Tablets as an assistive technology tool in teaching music appreciation?
- iii. How far do music teachers encounter barriers when using Tablets as an assistive technology tool in teaching music appreciation?

3. Literature Review

The Ministry of Education of the People's Republic of China places significant importance on the integration of science and technology in education and has implemented the "Education Modernization 2035" policy to emphasize the acceleration of educational reform in the information age [20,21]. As per the "Compulsory Education Art Curriculum Standards (2022 Edition)" issued by the Ministry of Education of the People's Republic of China, teachers are required to guide students in the classroom to utilize various teaching tools for the purpose of appreciating and interpreting art [6,22,23]. Furthermore, it emphasizes the need for art education to keep abreast with contemporary advancements, wherein teachers should guide students to acquire skills in employing virtual instruments, virtual reality, augmented reality, and other technologies within the context of music appreciation teaching [23,24].

3.1 Assistive Technology in Education

In the context of education, assistive technology can be utilized to enhance teaching and learning experiences, particularly for students with diverse learning needs [25,26]. Examples of assistive technology include screen readers, speech-to-text software, and adapted keyboards. Tablets, in particular, have emerged as a popular form of assistive technology due to their portability, versatility, and user-friendly interface [27]. The use of assistive technology in education, particularly in the form of Tablets, has gained considerable attention in recent years. Research has shown that integrating Tablets into the classroom can enhance student engagement, promote active learning, and support collaborative learning experiences [14,28]. In the context of music education, the advantages of using Tablets include the ability to access a wide range of musical resources, such as recordings, scores, and interactive software applications, as well as the capacity to facilitate creative music-making through composition and improvisation [4].

3.2 The Challenges of Implementing Tablets in Music Appreciation Classes

Despite the potential benefits of using Tablets in music appreciation classes, there are various challenges and barriers that teachers may encounter when implementing this technology. One significant issue is the lack of necessary skills and knowledge required for the successful integration of tablet technology into music appreciation teaching [29]. Many music teachers may be unfamiliar with the functionalities of Tablets, as well as the pedagogical strategies and digital resources that can be employed to optimize the use of these devices in the classroom [30]. This may result in teachers' reluctance or inability to utilize Tablets effectively, thereby limiting their potential to enhance students' music learning experiences.

Another significant barrier is the lack of adequate infrastructure and resources to support the widespread adoption of Tablets in music education [13]. Many schools may not have sufficient funding to provide Tablets for all students, leading to unequal access and disparities in learning opportunities [7]. Additionally, schools may lack the technical infrastructure and support required to

maintain, troubleshoot, and update tablet devices, which can further exacerbate the challenges faced by music teachers [19].

3.3 Technology Acceptance Model

Technology Acceptance Model (TAM) is a prominent theoretical framework in the field of educational technology that seeks to explain the factors influencing users' acceptance and adoption of new technology [31]. TAM posits that perceived usefulness and perceived ease of use are the primary determinants of an individual's intention to use a technology, which, in turn, influences actual usage [32]. The TAM framework is particularly relevant to this study as it can help to shed light on the attitudes, skills, and barriers that influence music teachers' adoption of Tablets as assistive technology in music appreciation teaching [33]. By examining these factors through the lens of TAM, researchers can better understand the challenges faced by teachers and develop targeted interventions to promote the effective integration of Tablets in music education [24,33]. Teachers' attitudes towards the use of Tablets in music appreciation classes can also influence the successful implementation of this technology. The Previous studies have identified a range of factors that may impact teachers' attitudes, including their beliefs about the effectiveness of Tablets for music education, their perceived self-efficacy in using Tablets, and their openness to change and innovation [2,13]. Research has suggested that positive attitudes towards the use of Tablets can contribute to more effective implementation and better learning outcomes for students [3].

3.4 Strategies for Effective Integration of Tablets in Music Appreciation Education

In order to address the challenges and barriers associated with the use of Tablets in music appreciation classes, it is essential to provide adequate training and support for teachers. Research has emphasized the importance of professional development in equipping teachers with the necessary skills and knowledge to effectively utilize Tablets in their teaching practice [4,34]. Such training may include workshops, online courses, and collaborative learning opportunities, as well as the provision of relevant resources and support materials [35].

Moreover, understanding the role of cultural and contextual factors in shaping teachers' experiences with Tablets in music appreciation classes is also essential. The present study, focusing on middle school music teachers in KuanCheng District, Changchun City, Jilin Province, China, offers valuable insights into the unique challenges and opportunities associated with the use of Tablets in this specific context. For example, the implementation of Tablets in music education may be influenced by local educational policies, cultural norms, and practices, as well as teachers' specific teaching experiences and backgrounds [6,14,16]. By examining these factors in detail, the study contributes to a more nuanced understanding of how Tablets can be effectively utilized in music appreciation classes in China and provides important recommendations for policymakers, educators, and researchers.

Furthermore, the role of leadership and school administration in supporting the adoption of tablet technology in music appreciation classes cannot be overlooked. Studies have shown that school leaders can play a pivotal role in fostering a positive school culture that encourages the use of technology and provides ongoing support for teachers [20,36,37]. This includes establishing a clear vision for the integration of Tablets in music education, allocating resources for professional development, and providing technical support to address infrastructure and maintenance issues [6,23].

In summary, the use of Tablets as assistive technology in music appreciation classes offers numerous potential benefits for enhancing student engagement and learning outcomes. However, the successful implementation of this technology is contingent upon addressing the challenges and barriers faced by music teachers, including the need for appropriate skills, knowledge, infrastructure, and resources, as well as fostering positive attitudes towards the use of Tablets in music education. Providing comprehensive training and support for teachers can play a crucial role in overcoming these challenges and ensuring that the potential benefits of Tablets are fully realized in music appreciation classes.

4. Methodology

This study employed a qualitative research design with a partially structured approach to conduct interviews with music teachers. Purpose sampling was utilized to gather information for the study, resulting in the selection of five music teachers from five middle schools as respondents were two males and three females. The sample size was considered sufficient to obtain rich qualitative data. To ensure the confidentiality and protection of the respondents, their names were not disclosed, and they were referred to as Respondents A to E, in order to prevent any potential disturbances, threats, or misunderstandings.

The selected respondents all possessed a considerable number of years of experience in music education and were currently employed in middle schools located in Changchun, China, specifically in the KuanCheng District of Changchun City, Jilin Province. The research was conducted within this geographical context. The study results were analysed using a content analysis method, which involved dissecting and categorizing the research questions based on the findings. The process of compiling and reporting the written data was integral to this content analysis method. Throughout the research, a thematic analysis approach was employed to continuously refine each of the identified themes.

5. Results & Discussion

The study's findings were condensed into specific themes and codes, namely the attitude of music teachers towards the utilization of Tablets in teaching, the skills of music teachers in employing Tablets, and the barriers encountered by music teachers when incorporating Tablets in music teaching. The subsequent section presents a comprehensive overview of the study's findings pertaining to these identified themes.

5.1 Music Teacher's Attitude Toward the Use of Tablets in Music Appreciation Teaching in Middle School

The content of the interview analysis clearly expresses the attitude of music teachers towards the use of tablet computers in music appreciation teaching. The overall results of the interview analysis are shown in Table 1.

Table 1
Music Teacher's Attitude toward the Use of Tablets in Teaching

Respondents	Interview Summary
A	Willing to use, Tablets like a toy for students, when students are playing, teachers can take the opportunity to take a break
B	Rarely used due to the high cost of the equipment and concerns over potential damage caused by students.
C	Not knowing how to use tablets, finding the process of learning to use them too cumbersome, and consequently, preferring not to use them.
D	Both teachers and students are willing to use it, but some software contains advertisements that require additional expenses, which becomes a burden for both students and teachers. Moreover, the content of the advertisements may be inappropriate for student viewing.
E	Infrequently used, perceiving its teaching effectiveness to be inferior to traditional music appreciation teaching methods.

The results of the interviews allow for the conclusion to be drawn that the attitude of music teachers toward the utilization of tablets in the classroom setting for the instruction of music appreciation is unsatisfactory. This is primarily attributable to the resistance shown by both teachers and students to making use of the various assistive technologies that are currently available in the classroom. One of the people who was interviewed stated that they would be willing to use tablets in order to reduce the amount of physical strain they experience while attending classes. On the other hand, another person who was interviewed stated that they would not use tablets due to concerns regarding the consumption and advertising of software. Despite this, the remaining respondents did not make use of tablets for a variety of reasons, including the attitudes of teachers, a lack of adequate technological support, and fears associated with the introduction of novel technologies.

5.2 Music Teacher's Skill on the Use of Tablets in Music Appreciation Teaching in Middle School

The content of the interview analysis clearly expresses the skill of music teachers on the use of tablet computers in music appreciation teaching. The overall results of the interview analysis are shown in Table 2.

Table 2
Music Teacher's skill on the Use of Tablets in Teaching

Respondents	Interview Summary
A	Having a moderate level of proficiency in usage, it is often challenging to integrate it effectively into one's own teaching design. Relevant training opportunities are scarce both at the educational administration level and within schools.
B	Proficient in the use of tablets, yet during teaching, student discipline tends to become unruly.
C	Due to advanced age, lack of proficiency in utilizing new technologies arises, rendering direct piano playing and the convenience of course materials as preferable alternatives.
D	Proficient in usage, yet lacks a conducive software environment for facilitating music appreciation teaching.
E	Due to inadequate proficiency, a preference is given to traditional methods of music appreciation teaching.

According to the findings of the study, it is evident that at least half of the teachers are proficient in using tablets as assistive technology in teaching, while the other half of the teachers struggle with

proficiency due to their advanced age, their reluctance to embrace new technology, and their lack of familiarity with the usage of the technology. In addition, a number of educators are unable to use tablets because the software environment is not suitable for their use. There is another educator who has mentioned that they do not have sufficient access to relevant training. In general, the vast majority of educators are confronted with difficulties when attempting to successfully combine pedagogy and technology in their classroom practices.

5.3 Music Teacher's Barriers to the Use of Tablets in Music Appreciation Teaching in Middle School

The content of the interview analysis clearly expresses the skill of music teachers on the use of tablet computers in music appreciation teaching. The overall results of the interview analysis are shown in Table 3.

Table 3
Music Teacher's Barriers to the Use of Tablets in Teaching

Respondents	Interview Summary
A	The high cost of the equipment, there is concern over potential damage caused by either the teachers or the students.
B	The school lacks the provision of such equipment and does not permit students to bring their own tablets, primarily due to concerns about students engaging in non-educational activities, such as playing games, rather than focusing on learning.
C	Don't know how to use it, and worrying about using up new technology products. It's too expensive.
D	The software incurs charges, contains advertisements, and the content of these advertisements may be inappropriate for student viewing.
E	When students utilize this tablet as a teaching tool, it may lead to classroom discipline issues, and if the network is slow, it can further impede the progress of teaching.

As a result of this interview, the researchers were able to identify a variety of obstacles that music teachers encounter when attempting to utilize tablets in the classroom setting to teach music appreciation. According to the findings, the primary challenges consist of prohibitively high costs, a challenging software environment, and inadequate network infrastructure.

6. Conclusion

In this study focused on music teachers in Changchun, Jilin Province, China, it was observed that there exists a prevailing negative attitude towards the integration of tablets in music appreciation instruction. Challenges identified include the high costs, software environment concerns, and insufficient school teaching equipment. Younger teachers grapple with merging technology into their pedagogical techniques, while elder teachers, nearing retirement, exhibit resistance to technology-pedagogy fusion.

These findings underscore the urgent need for strategic interventions by the Chinese Ministry of Education and Ministry of Finance. Investments are required in infrastructure development, software improvement, and enhanced teacher training that aligns with national curriculum standards and the broader vision of the Modernization of Education 2035. This vision emphasizes holistic student development, talent cultivation, and the modernization of teaching methodologies and resources.

To realize this vision, proactive initiatives like specialized training in educational technology, official teaching software development, comprehensive resource repositories, and consistent professional development opportunities for music educators are crucial. Such efforts will be

instrumental in bridging the gap between micro-level teaching practices and macro-level educational reforms.

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