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Seeking the Metaverse in Music Education

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Abstract

The metaverse, which exploded into the public consciousness in 2021, has been hotly debated since its appearance. With definitions still being contested, the various discussions have instead tended to center on its future impact. Building on its unique capacity to unite imagination and vision, and with the support of artificial intelligence, blockchain, 5G, virtual reality and other technologies, the integration of the metaverse and education is an area that has the potential to transform the way we view the world.

Concerns over the quality of education and diversified development have led to the gradual recognition that music learning occupies an indispensable position in the process of personal growth. How to enable music education to keep pace with the times has therefore become an urgent issue, the hope being that the unique opportunities for immersion, interactivity, and diversity offered by the metaverse may serve to stimulate the future development of music education.

In the metaverse of music education, learners' access to rich virtual experiences, diverse knowledge resources, decentralized knowledge creation and sharing, and powerful digital productivity can all serve to widen the limited boundaries of the real world. At the same time, generation of the metaverse can also help reconfigure knowledge construction, learning scenarios, and the environmental identity of music education teaching. Through theoretical and applied research, music education can, and should be, rethought and reimaged.

Key words

music education, metaverse, educational model

Introduction

In the fifteenth century, European explorers embarked on voyages, accumulating wealth and increasing national power in the course of their explorations. Nineteenth century Western European countries harnessed the value of mechanized production through a series of inventions, in the process bringing about an industrial revolution and becoming world capitalist powers. China at this time was still a feudal “face to the field, back to the sky” society “living at the mercy of nature”, a situation that can, in part, be attributed to different perceptions of the unknown, change, and technology. In the present era of globalization, where everything is connected and interconnected, science and technology have become the leaders in every modern society’s economic growth. Within this context of modern information technology, represented by the rise of, and reliance upon, computers, the waves of the technological revolution have significantly changed the ways music is created and the environments in which it is heard. The demand for music culture has become more individualized and differentiated, and music education has inevitably shifted in response to this influence. As the “metaverse” continues to integrate various cutting-edge technologies, its immersion, interactivity, and openness will undoubtedly bring to music education unprecedented new experiences, in the process opening up a “new era” for future generations.

The familiar past and an unfamiliar present

The Spring Festival is a traditional event and an essential symbol of Chinese culture. Likewise, the annual “Spring Festival Gala” on New Year’s Eve is considered essential TV viewing. As part of the 2022 CCTV Spring Festival Gala, virtual / augmented reality technology, holographic scanning technology, 8K naked eye 3D presentation technology, AI multi-modal motion capture technology, and other “Black Technologies” were combined with colorful performances. Together, these not only provided the audience with an unprecedented audiovisual feast, but also created a continuous and enthusiastic discussion on domestic and international social media platforms. Whether it is facial recognition, mobile payment, or driverless cars, scenes that once existed only in science fiction movies are gradually becoming a part of people’s everyday lives. We live in an era characterized by human-centeredness and individualism, in which knowledge, technology, and invention are gradually becoming the primary forces driving social development. Furthermore, education and the environment are interdependent. In discussing the relationship between the individual and the teaching environment, Zhong Qiquan cites R. H. Moos, an American professor of psychiatry and behavioral sciences, who argues that “Individual behavior is not an inherent characteristic of the respective person. In other words, it is not determined by personality and attitude, but is strongly influenced by the results of the environment.” (Zhong, 2021). In the ever-changing information age, the question of how both education generally and traditional

teaching methods specifically have to change to keep pace with the times has become an urgent problem.

Technology is the engine of all things, and education is a powerful means of driving this engine. In 1350, Laurentius de Voltolina painted a picture depicting a crowded classroom at the University of Bologna. Ironically, despite being created more than six hundred years ago, there is much in the painting that would not look out of place in today's classrooms (see Figure 1).



Figure 1 *There are no essential differences between the delivery of music education as it occurs in today's classroom (right) and the organization of teaching more than six hundred years ago (left)*

What is no longer comparable is today's view of education, especially in terms of how it can and should prepare young talent for future development within the context of the kinds of

technological, economic and cultural developments that are part and parcel of our everyday existence. With its emphasis on quality education and diversified development, music plays an indispensable role in personal development. Sukhomlinsky, a Soviet educational theorist, once said, “Music occupies an important place in the means of influencing the minds of young people, it is a powerful source of thought. Without music education, there can be no intellectual development that meets the requirements.” With the introduction of a Western music-centered curriculum and the establishment of modern new schools, school music education in China has entered a new era, complete with teaching models that aim to provide more students with the opportunity to study the subject. However, where “unified” music classes are typically the norm, the teacher is often the “leader,” and the students the “passive performers” who, under their tutors’ guidance, listen to and appreciate selected musical works in order to obtain the necessary aesthetic experiences. In this kind of “processing production” teaching system, students’ autonomy and their ability to define the meaning and purpose of learning music are often neglected.

Edgar Dale, an American audiovisual educator, proposed a theory called the “Tower of Experience” whereby ten levels of abstraction, from direct, purposeful experience to verbal symbols, are employed. In the same way that words and language are related, the various notes and terms written on the music staff can be described as the symbolic expression of abstract music. Through the process of being musically educated, learners use their

understanding of the symbols to engage in a variety of performance-related activities in order to gain the appropriate levels of perception, understanding, and aesthetic experience. As a result, teachers spend a great deal of time teaching students the meaning and function of various types of musical notation, and students spend corresponding amounts practicing repeatedly in order to grasp the intrinsic connection between notation and artistic expression. This kind of teaching model not only makes the learning process unnecessarily long, but also indirectly increases the difficulty of learning music.

In addition, the teaching process can be seen as one in which the teacher “encodes” the content and the students “decode” the information by listening to it. According to the “funnel principle” in the information transmission process, whether the teacher can deliver the information correctly and effectively, whether the students can extract the information they need in the listening process, and whether they can understand and master the information in the decoding process, all have a corresponding impact on the effectiveness of teaching. There is a common misconception that the process of learning and teaching is a unified whole, and that as long as the teacher demonstrates accurately the students will be able to grasp the relevant knowledge entirely and efficiently. However, due to limited teaching time, teachers are frequently called upon to utilize a range of teaching tactics and procedures in order to guarantee that students correctly grasp the information, meaning that the music class can all too easily turn into a performance class for the teacher. As a result, the uniqueness of learners

is ignored, and music education increasingly resembles a “teaching product” that is “templated”, in much the same way that it was delivered in the fourteenth century. Indeed, as has been stated, “In the last 100 years, our listening style and environment have changed dramatically. But the current model of teaching still follows the methods and content of the old tradition, as if it were providing music learners oriented toward the new century with the skills needed by the masters of 18th century church music” (de Souza, 2020). Furthermore, the fact that, as a new generation of “digital natives”, the majority of students’ musical achievements occur outside of school, should not be overlooked. Thus, regardless of the enthusiasm of instructors for technology, new technologies of all types have become an integral component of the growth of music education among today’s youth.

Toward a “future paradigm” of music education

The rapid outbreak of COVID-19 in 2019 interrupted people’s everyday lives, turning each individual into “an island in the metropolis.” Individuals were forced to conduct many of their jobs and studies online, a situation that resulted not only in short-term changes, but stimulated a broader discussion about the nature of work and the different possibilities for the dissemination of information. In the field of music education, the majority of nations and regions chose online education to preserve the stability and continuation of education during the standstill induced by COVID-19. Nevertheless, although online education has become an essential part of teaching and learning, there is plenty of room for improvement. For example,

students' sense of participation is frequently weak due to the lack of interaction, websites can be monotonous and boring, delays caused by network communications reduce learning efficiency, and the lack of sufficient learning data records makes it difficult to analyze and evaluate the effects of learning. As soon as the concept of the "metaverse" appeared, it was like a tsunami wave, causing heated discussions across various platforms. With the support of emerging technologies, such as virtual reality, 5G, blockchain, the Internet of Things, artificial intelligence, and cloud computing, can the metaverse lead education into a new network era?

Futurist Luke Shabro defines the metaverse as "a fuzzy, digitally hybrid reality with irreplaceable and infinite projects and roles, a cyberspace free from traditional physical limitations and constraints." (Hua & Huang, 2021) The Metaverse Development Research Report 2020-2021, published by the New Media Research Center of Tsinghua University, defines it as "a new virtual-real Internet application and social form resulting from the integration of multiple new technologies, which closely integrates the virtual world with the real world in terms of economic system, social system, and identity system, and allows each user to make content production and world editing". (Tsinghua University, 2021, p. XXX). As recently as thirty years ago, the famous scholar Qian Xuesen had a vision of virtual reality and the metaverse, even giving it the poetic name, "The Spiritual Realm." Compared with online education, the unique interactive, immersive, and participatory qualities of the

metaverse have the potential to resolve the aforementioned defects of online education, while within the teaching context the metaverse can replicate the rich experiences between people and objects. With the assistance of 5G technology, the low-latency network environment satisfies learners' desire for quality immersion, enhanced engagement, and learning motivation in diverse learning scenarios, while with the help of Artificial Intelligence, 'Cloud' computing, and other technologies to plan knowledge content and utilize learning resources, learners can be helped to build three-dimensional knowledge systems. With the realization of more diverse, creative, and imaginative scenarios, the metaverse not only creates a "new world" where learners are free to play, but all the participants are contributors based on immersion, autonomy, and the co-creation of values. The metaverse's ideological core of "co-construction, co-creation, co-rule, and sharing" embodies the ecological, pluralistic, and decentralized concepts pursued by postmodernism.

In the music teaching environment of the metaverse, the realistic and fully immersive nature of virtual reality not only has the power to "reconstruct" the real world, but also to build up creative teaching scenes according to the user's independent imagination. Just as the teaching environment is no longer homogeneous, online learning is no longer an imitation and transfer of offline learning but instead an environment completely different from the real world. In this new and distinctive reality, exploration of music knowledge is an "embodied engagement" based on full perceptual stimulation. In this kind of open teaching environment,

learners' perceptual experiences break through the boundaries of space and time, allowing the exercise of any form of creative and innovative thinking. Moreover, the use of multimodal learning resources blurs the boundaries between reality and the virtual world, so that the processes of creation and learning are simultaneously the processes of building and enrichment.

In addition to reshaping teaching scenarios and content, the teacher's identity as the dominant player will be reinterpreted. Firstly, each teacher in the virtual scenario will operate as an avatar, and "the avatar's characteristics will implicitly influence the user's cognition, attitude, and behavior", while the flexibility and freedom of virtual avatars to intermingle with various teaching scenarios will serve to better motivate learners. Secondly, virtual teachers shaped by intelligent technologies will also have a place in tutoring activities, significantly reducing the repetitive work of real teachers in terms of explaining knowledge, supervising the effects of learning, and processing learner learning data in real-time. The result of this "dual-teacher parallel" will be that the real teachers can focus more on content design, scene construction, emotional communication, and other curriculum materials. In addition, the inclusive and sharing nature of the metaverse creates value for the virtual world by allowing everyone to use their expertise and opening up an era of "teachers for all" in which everyone is given access to the learning resources they need. Learning from others in this way will have the effect of diluting teachers' absolute authority and building a

harmonious educational environment where teaching and learning co-exist.

This change in the role of the teacher will also bring about changes in the teaching and learning process. The pursuit of knowledge in an interactive teaching and learning environment becomes an “adventure”, an embodied experience that sees learners not as passive recipients, but as active constructors to understand and apply information directly. It is anticipated that exploratory, project-based, and game-based teaching models will become the main forms of learning; in this scenario, the focus of the music education metaverse will be on developing learners’ sensory stimulation, and helping them develop in a more holistic way. The teaching environment of the metaverse not only provides students with a convenient practice channel for solving real-world problems, but also brings about the subversion of inherent cognition through a process of continuous investigation.

Enjoying music learning in the metaverse

Avoiding the “impossible triangle” of quality, affordability, and efficiency that represents one of the main restrictions to the balanced distribution of education resources by changing the educational scene and the presentation of rich knowledge, the metaverse also allows for high-quality educational resources to be replicated, while simultaneously disseminating and complementing the interactivity and practicability previously lacking in online education. In the music metaverse, the boundaries of time and space are broken; global learning becomes

instantly attainable through the dramatic reduction of equipment costs and the continuous enrichment of resources, while with the efficient transmission of 5G technology, 4K HD presentation, and naked eye 3D technology, combined with various interactive means, learners are no longer spectators in front of the screen but personally and actively involved in various types of music learning and music performance activities. In this virtual world, access to any music content not only becomes easy, but high-quality, low-cost music resources provide more music-loving learners with opportunities to improve their abilities, in so doing promoting the equitable development of music education. In addition, the “sharing and building” environment provides a convenient and efficient platform for more capable and talented music creators and performers to display their talents. The idea of “letting the people with the ability to enhance others become the teacher”, advocated by Confucius thousands of years ago, will be reflected in the metaverse.

In November 2021, the famous Canadian singer Justin Bieber held his first metaverse concert on the virtual music platform ‘Wave’. Not only did it provide fans with a gorgeous view of the performance, but the virtual image was also particularly vivid (See Figure 2). The concert broke down many of the barriers between the singer and the audience by allowing the latter to move to different corners of the scene and change the viewing angle. Although there was not much interaction, the audience could use certain controls to customize their viewing experience, while the high speed and low latency network allowed the singer’s real body and

the virtual image to be synchronized in real-time, allowing the audience to see the performer's every move. This scene has since been widely used in music teaching, enabling learners to obtain implicit knowledge from multi-angle observation, build various scene environments independently, and learn more about the areas of continuous display, performance, and interaction.

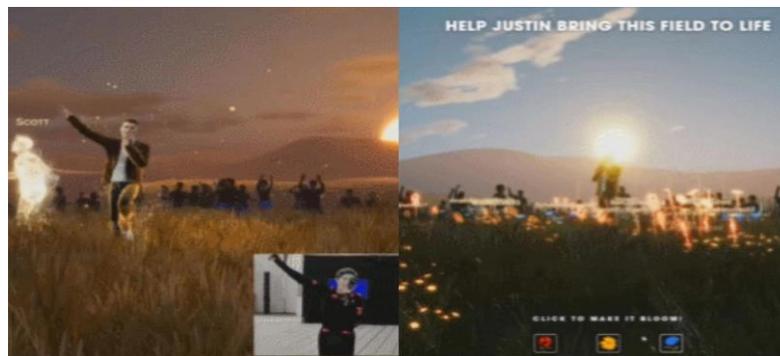


Figure 2 *The singer Justin Bieber performs via the virtual music platform, 'Wave'*

In the 2022 Jiangsu TV New Year's Eve concert, the appearance of the virtual persona Deng Lijun¹ generated lots of buzz (See Figure 3).

¹ Deng Lijun (1953-1995), one of the representative Chinese female singers in the 1970s and 1980s.



Figure 3 *Virtual persona Deng Lijun appearing on Jiangsu TV's New Year Concert²*

She can interact and talk as if she were a real person and sing the classic songs of the past exquisitely. The emergence of avatars in the metaverse not only replaces people as a means of completing the infrastructure, but also makes it possible to create a variety of them according to personal preferences. In the future metaverse of music education, avatars can serve as companions, learning assistants, and “human libraries”, with a solid knowledge base to solve all kinds of problems faced by learners at any given time, in the process freeing teachers from the repetitive and mechanical tasks of teaching activities and allowing them to shift their focus to better motivating learners and designing new, high-quality and compelling content.

In addition to changing the traditional music teaching model, information and images in the metaverse environment will be integrated more appropriately in order to meet the demands of different types of knowledge. Theoretical knowledge that previously required the

deliberate memorization of facts will be carried out in interactive scenarios through dialogue, interaction, and game activities, while the associated tacit knowledge can be experienced through task-based and breakthrough learning modes. Inner meanings and specific details of different types of knowledge and skills can be experienced through repeated challenges. Regarding practice and creative content, realistic scenarios can be projected into virtual environments, or new scenarios generated based on extensive data analysis to match students' learning preferences. For example, the 'Electronauts' music experience software developed by Survios, a game developer, can meet the various needs of creators through the real-time adjustment of parameters in order to obtain different auditory and visual effects. 'Foldit' is an experimental video game developed by the University of Washington. In 2011, 'Foldit' presented its users with a mission to find the protein structure needed to treat the AIDS virus, a problem that had plagued researchers for ten years; it was solved successfully within ten days by 60,000 players. In just the same way, future-oriented music teaching scenarios could well see participants from different backgrounds taking part in problem-solving processes together, and applying the results to the real world. Breaking down the boundaries and moving towards the integration of the virtual and the real in this way can result in a better and more just society for everyone.

Many of the existing rules will no longer apply in future music learning. Instead, new musical knowledge and experiences will be created through conversation, play, challenges,

and collaboration, and music learning will be more participatory, autonomous, and creative.

The diversity and inclusiveness of music education in the metaverse will also encourage participants to be more open to self-realization in different contexts.

Conclusions

The French literary scholar, Flaubert, once said, “The further we go, the more art becomes scientific, and at the same time, the more science becomes artistic, the more the two part from the foothills and reunite at the summit”. As the generation most deeply affected by technological changes, we should think about the future and face the current metaverse craze rationally and objectively. As music learners and teachers, we need to see it as an extension of the real world, not as a fantasy ‘utopia’ with technological support. Building the metaverse is a long-term commitment. Nevertheless, difficult as the journey may be, only sustained action can lead us to the destination. The future will undoubtedly usher in its own unique developments, enriching people’s music-learning lives in ways that are unimagined at present. The trumpet of the metaverse has been sounded. We stand on the threshold of a significant new era.

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