

Immersion and Interaction: Diversified Strategies for Empowering Primary School Music Teaching with AI

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Abstract: Leveraging technological advantages such as intelligent recognition, situational simulation, data analysis, and interactive generation, artificial intelligence (AI) breaks the limitations of time and space. It transforms abstract musical elements into visualized and tangible musical scenarios, making music teaching more interactive and music learning more immersive. By empowering primary school music teaching with AI, teachers promote the diversification of music teaching modes, which conforms to the trend of basic education reform and the music learning needs of primary school students. Against the background of the new era, this paper constructs a diversified teaching strategy of immersion + interaction, explores feasible paths for AI-enabled primary school music teaching, and puts forward problems existing in practical application and corresponding improvement countermeasures, aiming to provide references for the innovative development of primary school music teaching.

Keywords: Artificial intelligence; Primary school music; Immersion; Interaction; Teaching strategy

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1. Introduction

In the new era, artificial intelligence (AI) empowers primary school music teaching in multiple ways, injecting new vitality into traditional classrooms and redefining the content, forms and objectives of primary school music teaching. Relying on AI technology, teachers build diversified, immersive and highly interactive music teaching scenarios, which effectively solve the problems of monotonous teaching forms and low student participation in traditional music classrooms. It guides students to engage in music learning with multi-dimensional senses including audition, vision and kinesthesia. Compared with the traditional teaching mode, the diversified teaching mode of “immersion + interaction” is more in line with primary school students’ characteristics of being lively, active and curious, and is of great significance for enhancing their subjectivity in teaching.

2. Diversified strategies for AI empowering primary school music teaching

2.1. AI-enabled situational immersion: Allowing students to “step into” music itself

In traditional music teaching, situational creation mostly relies on teachers’ verbal description and multimedia courseware, resulting in relatively single musical scenarios and difficulty in enabling students to achieve in-depth immersion. AI effectively solves this problem in creating musical situations. With the functions of 3D modeling, virtual reality, and audio visualization, it realizes dynamic generation and multi-sensory linkage, breaks the limitations of traditional situational creation, and provides immersive scenarios more suitable for teaching content. It guides students to perceive music in depth, step by step, following the progressive path of song appreciation—esthetic appreciation—cultural understanding ^[1].

For example, when teaching the ballad *Herdsmen’s Ballad*, teachers can generate real grassland scenes via an AI virtual scene platform, matched with morin khuur background music to construct the artistic conception depicted in the tune. This allows students to be “immersed” in the vast grassland and experience the artistic beauty of the music in an immersive way. As students immerse themselves in the scene and gradually become familiar with the rhythm and emotion of the song, teachers guide them to hum softly, imagine grazing on the grassland, resonate emotionally with the song content, and deepen their perception of musical beauty.

Furthermore, teachers advance students’ learning to the cultural level, guiding them to perceive the melodious tunes of Mongolian music and the inclusive and bold spiritual connotation of grassland culture. Teachers extend students’ music learning from simple music appreciation and singing to cultural understanding, enabling students to truly walk into the connotation of music. This helps improve students’ cultural literacy, deepen their understanding of musical works, and enrich the emotional expression of their performances ^[2].

2.2. AI-enabled interactive training: Achieving effective improvement for every student

At the primary school stage, students vary greatly in their music foundation. The traditional “one-size-fits-all” teaching mode hardly meets the needs of students at different levels, leading to unsatisfactory teaching effects ^[3,4]. To better match the music teaching mode with students’ personalized learning needs, teachers can utilize AI’s intelligent recognition and data analysis functions to carry out personalized interactive training and targeted guidance, so as to effectively improve the musical literacy of every student. For instance, integrating singing teaching with AI can construct a personalized and intelligent interactive training mode.

First, during students’ singing practice, AI music teaching software automatically collects and analyzes singing data to identify problems in intonation, rhythm, and breath control. Problems are presented visually through intonation curves, rhythm deviation marks, and breath stability scores, allowing students to intuitively see their own deficiencies.

Second, based on AI analysis results, teachers arrange step-by-step decomposed training content suitable for students’ foundational level, and guide them to conduct targeted corrective exercises on existing problems. This link combines the efforts of teachers and AI software: AI pushes targeted singing training resources according to analytical results, while teachers screen and guide students to selectively use these resources for special training ^[5].

Finally, teachers arrange complete track training timely according to students’ learning progress. Meanwhile, AI software synchronously analyzes and feeds back practice data to help students adjust their learning status at any time. Such personalized interactive training prevents underachievers from feeling

frustrated due to the inability to keep up and avoids top students from feeling bored with repetitive practice, maximizing learning gains for students at all levels.

2.3. AI-enabled interactive creation: Unleashing students' artistic creativity

Traditional primary school music teaching rarely incorporates music creation links, showing obvious deficiencies in cultivating students' innovative ability and artistic perception ^[6]. This is because music creation is relatively difficult; even if teachers set up such links, they are only accessible to a small number of outstanding students.

The combination of AI creation auxiliary tools and primary school music teaching enables every student to participate in music creation, realizing the goal of everyone being a creator. It effectively expands the coverage of music creation activities and makes up for the shortcomings of traditional teaching.

On the one hand, teachers guide students to create adapted works based on textbook tracks via the AI music creation platform. The platform provides diversified chord accompaniments and rhythm templates for students to adapt works to their life experiences. It also supports real-time recording of creative content and generates complete audio for playback. Students can analyze deficiencies in music appreciation knowledge and revise and optimize their works accordingly.

On the other hand, teachers guide students to try creating musical works of different styles with the help of the platform, helping them accurately grasp stylistic characteristics and improve creative ability. The platform collects musical works of pop, classical, folk, and other styles, and provides corresponding accompaniment templates and creative suggestions, assisting students in creation. In the process, students broaden their musical horizons and perceive the charm of diversified music styles ^[7,8].

2.4. AI-enabled diversified evaluation: Comprehensively and objectively assessing students' learning

Traditional primary school music evaluation mainly adopts written examinations and final singing assessments, focusing only on final learning outcomes. It features single evaluation dimensions and high dependence on teachers' subjective judgment, failing to truly reflect students' efforts and progress throughout the learning process.

The diversified evaluation mode formed by the integration of AI and primary school music teaching solves the above problems, realizing all-round and objective evaluation of students' music learning and providing an objective basis for teachers' teaching innovation. Teachers collect and analyze data throughout students' learning via AI to conduct process evaluation, fully understanding students' difficulties and progress in singing, instrumental performance, and music creation ^[9].

AI records students' performance in every teaching link, integrates scattered learning data into complete learning portfolios, and assists teachers in process evaluation. It breaks the limitation of traditional evaluation that only focuses on final results, enabling teachers to clearly grasp students' growth trajectory and allowing students to intuitively perceive their own progress. This not only helps teachers better grasp learning conditions, but also enhances students' sense of achievement.

In addition, teachers optimize students' self-evaluation and mutual evaluation with AI to deepen students' participation in teaching assessment. For example, students can upload their singing, performance, and creative works to the AI platform and conduct self-evaluation combined with AI analysis reports and learning objectives. After works are uploaded, classmates can also evaluate each other, pointing out

advantages and deficiencies in melody, rhythm, and lyrics, and sharing learning experiences ^[10].

3. Challenges and countermeasures of AI empowering primary school music teaching

3.1. Technical challenges and countermeasures

Challenges: In the practical promotion of AI music teaching in primary schools, many intelligent teaching platforms and music creation tools still have poor adaptability and cannot fully fit the actual teaching needs of primary education. For example, some AI teaching modules do not match primary school music textbooks and curriculum standards well, requiring teachers to redevelop teaching resources before application. Some AI music creation tools have complex operation procedures and are designed for older learners, exceeding primary school students' cognitive and operational levels. Forced application in class will increase learning difficulty, occupy a great deal of class time, disrupt teaching rhythm, reduce classroom efficiency, and affect overall teaching progress ^[11].

Countermeasures: Before deeply integrating AI into primary school music teaching, teachers shall make adequate preliminary preparations. Combined with disciplinary characteristics and classroom reality, teachers should investigate and trial relevant tools and platforms, compare functional differences through practical use, and give priority to intelligent software with simple operation, strong adaptability, and conformity to primary school students' cognitive rules. Selected tools should accurately match teaching objectives and fit diversified teaching links, such as classroom appreciation and creation. Meanwhile, teachers can cooperate with technical developers to carry out secondary development or customized settings of AI tools in accordance with primary school music curriculum requirements and students' characteristics, making AI tools more suitable for primary school students' cognitive level and operational ability ^[12].

3.2. Teacher-related challenges and countermeasures

Challenges: In the process of AI integrating into music education, there are prominent challenges in teachers' professional development. Influenced by long-term traditional teaching, some music teachers have solidified teaching thinking and fixed teaching modes with relatively conservative educational concepts. They show low acceptance of emerging AI technology and lack the willingness to actively explore intelligent teaching, making it difficult to break the limitations of traditional classrooms. In addition, some teachers lack systematic AI application training, have a superficial understanding, and are unskilled in the operations of various music intelligence tools. They only use basic simple functions, unable to skillfully apply AI to build teaching scenarios, enrich classroom interaction, and carry out diversified evaluation, resulting in failure to give full play to the teaching value of AI ^[13].

Countermeasures: Teachers should constantly update teaching concepts in the process of contacting, learning, and applying AI technology, deepen their understanding of the value of AI-enabled music teaching, break away from traditional thinking, and construct AI music teaching modes adapted to students' learning needs. Teachers should take the initiative to participate in AI technical training, learn basic AI knowledge, operation methods of AI music teaching software, data analysis, and application skills, so as to put the conception of intelligent music teaching into practical teaching.

3.3. Student-related challenges and countermeasures

Challenges: Under the background of in-depth AI-enabled music teaching, using intelligent tools to explore music knowledge and carry out creative practice can lower learning thresholds and enrich learning forms, but it also easily leads to students' over-reliance on AI. For example, when appreciating music with AI assistance, some students fully accept AI's analytical conclusions without carefully listening to melodies, perceiving rhythms, and understanding the connotation of lyrics, losing independent aesthetic experience. Long-term excessive dependence on AI will gradually weaken students' musical perception, artistic imagination, and independent critical thinking ability, solidify their thinking mode, and hinder the long-term development of personalized musical aesthetic literacy^[14,15].

Countermeasures: Teachers should rationally position AI, clearly recognize that relevant tools and platforms are only auxiliary learning tools rather than substitutes for students' independent thinking, and convey this concept to students to avoid excessive reliance. In AI-assisted teaching, teachers should intentionally set aside time for students to think and discuss. For example, when guiding students to create music with AI, teachers should encourage students to integrate personal, unique emotions into works, combined with their own life experiences.

4. Conclusion

To sum up, AI technology provides new possibilities for the innovative development of primary school music teaching centered on immersion and interaction. Relying on AI, teachers optimize situational construction, personalized interactive training, independent creation, and diversified evaluation, which conforms to the trend of teaching reform and students' learning needs. Teachers should take advantage of AI to solve problems in traditional teaching modes, enhance the fun, pertinence, and effectiveness of music teaching, and build a suitable learning environment for primary school students.

With the acceleration of educational digitalization, the integration of AI technology and primary school music teaching will become more extensive and in-depth. Teachers should actively embrace AI technology and innovate teaching modes in the following aspects:

- (1) Accurately grasp the integration entry point of music teaching and AI technology, optimize teaching design according to students' cognitive characteristics and learning needs, and gradually accumulate practical experience in AI-enabled music teaching;
- (2) Sort out various problems encountered in teaching practice, jointly explore solutions with technical developers and educational researchers, and continuously improve the practical path of AI empowering primary school music teaching;
- (3) Keep up with the development trend of educational digitalization, adjust AI-enabled music teaching strategies in a timely manner, give full play to the educational value of AI technology, and promote the high-quality development of primary school music teaching.

Disclosure statement

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