

Research on the Application of AI Technology in Music Composition Teaching

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DOI: 10.32629/jher.v5i6.3396

Abstract: With the rapid development of artificial intelligence technology, AI applications in education have become increasingly widespread, bringing new opportunities and challenges to music composition teaching. Based on constructivist learning theory, this study deeply explores the application value and implementation paths of AI technology in music composition teaching. Through analyzing the functional positioning of AI technology in music composition teaching, the dual role of artificial intelligence as an auxiliary tool and teaching interaction facilitator is elaborated. The research finds that AI technology can effectively support the construction of personalized music composition learning models and promote the optimization and upgrade of teaching evaluation systems. On this basis, optimization strategies for improving teacher professional literacy and integrating teaching resources are proposed, providing theoretical reference for promoting the deep integration of AI technology and music composition teaching. The study shows that the introduction of AI technology can not only enhance students' music composition ability and learning interest but also promote the overall improvement of teaching quality, which has important significance for advancing the modernization of music education.

Keywords: artificial intelligence; music composition; teaching application; teaching optimization; teacher development

1. Research background and core concepts

1.1 Research Background and Significance

The rapid development of artificial intelligence technology is profoundly changing teaching models and learning methods in education. In the field of music education, the introduction of AI technology has injected new vitality into traditional music composition teaching, showing broad application prospects[1]. In the context of the digital age, students' demands for music composition learning are increasingly diverse, and traditional teaching methods struggle to meet personalized learning needs. AI technology, with its characteristics of intelligence, personalization, and interactivity, can provide strong technical support and innovative momentum for music composition teaching. In the education informatization policy documents issued by the Ministry of Education, it is clearly stated that the deep integration of artificial intelligence technology and subject teaching should be promoted, fully leveraging the important role of information technology in promoting educational equity and improving education quality. Against this background, in-depth exploration of AI technology applications in music composition teaching has important theoretical value and practical significance.

From a theoretical perspective, the integration of AI technology and music composition teaching provides new research perspectives and ideas for educational theory research[2]. By exploring music composition teaching models supported by AI technology, the existing music education theoretical system can be enriched and developed, providing theoretical guidance for the information transformation of music education. From a practical perspective, the application of AI technology can break through the time and space limitations and resource bottlenecks in traditional music composition teaching, providing students with richer and more personalized learning experiences. With AI technology, teachers can better conduct instructional design, implement teaching processes, and perform teaching evaluations, improving teaching effectiveness and quality. From a development perspective, studying the application of AI technology in music composition teaching has important strategic significance for promoting the modernization of music education and cultivating innovative music talents.

1.2 Definition of Core Concepts

Before conducting research on the application of AI technology in music composition teaching, it is necessary to clearly define relevant core concepts. Artificial Intelligence (AI) refers to technology that simulates, extends, and expands human intelligence through computer programs, including multiple branch fields such as machine learning, deep learning, and natural language processing[3]. AI technology applied in music composition teaching mainly includes intelligent composition systems, music analysis tools, and interactive learning platforms. Music composition teaching refers to the

process of cultivating students' music composition abilities through systematic teaching activities under teacher guidance, covering multiple aspects such as composition technique learning, creative practice, and work analysis.

Music composition teaching supported by AI technology refers to a new teaching model that integrates artificial intelligence technology as an important tool and means throughout the music composition teaching process[4]. This teaching model fully utilizes the intelligent features of AI technology, maintaining the teacher's leading role while providing personalized learning support and creative assistance for students. Through the application of AI technology, functions such as intelligent push of teaching resources, real-time monitoring of learning processes, and intelligent evaluation of creative outcomes can be achieved, thereby improving teaching effectiveness. Teaching application research refers to exploring the theoretical foundations, implementation paths, and optimization strategies for the deep integration of AI technology and music composition teaching with the goal of improving teaching quality, providing scientific basis and guidance for educational practice.

2. Theoretical Foundations of Music Composition Teaching Supported by AI Technology

2.1 AI-Assisted Music Composition from the Perspective of Constructivist Learning Theory

Constructivist learning theory emphasizes that learning is a process where learners acquire knowledge through meaning construction in specific contexts, with the help of others and necessary learning resources[5]. Integrating AI technology into music composition teaching can provide students with rich learning contexts and effective cognitive support. From a cognitive construction perspective, AI technology can provide adaptive learning content and creative materials based on students' cognitive characteristics and learning needs, helping them establish cognitive frameworks for music composition. Through intelligent recommendation systems, students can access diverse musical works and composition techniques, building deep understanding of music composition through comparative analysis and practical exploration.

Constructivist theory also emphasizes social interaction and collaborative construction in the learning process. As an intelligent teaching assistant, AI technology can break through the temporal and spatial limitations of traditional classrooms, providing more convenient platforms for teacher-student and student-student interactions. In AI-supported collaborative creation environments, students can discuss creative ideas with peers, share creative experiences, and form positive learning communities. Meanwhile, AI technology's real-time feedback function enables students to promptly understand their creative issues and make adjustments, promoting continuous improvement and reorganization of cognitive structures. This AI-assisted music composition model based on constructivist principles can effectively stimulate students' creative thinking and enhance music composition learning outcomes.

2.2 Theoretical Support for Educational Applications of Artificial Intelligence

The theoretical foundation for educational applications of artificial intelligence involves multiple fields including cognitive science, educational psychology, and learning science. From the perspective of cognitive load theory, AI technology can reduce students' cognitive load in music composition learning through intelligent processing. When handling technical work such as processing and arranging musical materials and harmonic arrangements, AI systems can provide intelligent assistance, allowing students to focus more attention on creative thinking and artistic expression. Cognitive science research shows that moderate cognitive load is conducive to deep processing and internalization of knowledge, and AI technology can help achieve this balance.

Educational artificial intelligence theory emphasizes the adaptive and personalized characteristics of AI technology in education. In music composition teaching, AI systems can build personalized learning models by analyzing students' learning behaviors and creative characteristics, providing the most suitable learning paths and creative suggestions for each student. This intelligent teaching support based on data analysis can meet different students' personalized learning needs, achieving teaching according to individual abilities. Meanwhile, AI technology can continuously optimize teaching strategies and resource delivery through deep learning algorithms, forming a dynamically adaptive intelligent teaching system. This theoretical support provides scientific basis for the application of AI technology in music composition teaching, indicating the direction and principles of technology application.

Based on learning science research findings, the application of AI technology in music composition teaching should follow learning patterns and cognitive development characteristics. By organically combining AI technology with educational teaching theories, more scientific and effective music composition teaching models can be constructed. In this process, it is necessary to fully consider students' cognitive characteristics, learning styles, and emotional needs, rationally design AI technology application strategies, and ensure that technology application can truly promote the achievement of teaching

objectives. This AI education application research based on multiple theoretical supports provides a solid theoretical foundation for the innovative development of music composition teaching.

3. Functional Positioning of AI Technology in Music Composition Teaching

3.1 AI Technology as an Auxiliary Tool for Music Composition

In the process of music composition teaching, AI technology plays an important instrumental role. As an intelligent creative assistance system, AI technology can provide students with diverse creative support. In melody composition, AI systems can generate melodic materials that conform to specific rules based on given musical styles and creative requirements, providing students with creative inspiration and reference. Through machine learning algorithms, AI systems can analyze the characteristics of numerous excellent musical works, extract their creative patterns and artistic features, helping students better understand and master composition techniques of different musical styles.

AI technology demonstrates significant advantages in harmony arrangement and orchestration. Traditional harmony arrangement processes often require extensive technical operations, which can easily distract students from focusing on musical expressiveness. AI systems can automatically generate harmonic progressions based on the main melody through intelligent algorithms and provide multiple orchestration options for students to choose and modify. This intelligent assistance not only improves creative efficiency but also allows students to focus more on musical emotional expression and pursuit of artistic effects. Additionally, AI technology can perform intelligent analysis of creative outcomes, pointing out potential technical issues and areas for improvement, helping students continuously refine their work quality.

3.2 AI Technology as a Means to Promote Teaching Interaction

Beyond its creative assistance functions, AI technology also plays an important role in promoting teaching interaction. Intelligent teaching platforms provide new channels and methods for teacher-student communication. Through AI-supported online teaching systems, teachers can monitor students' creative progress in real-time and promptly identify and resolve learning issues. AI systems can also automatically record and analyze students' creative processes, providing data support for teachers to understand students' learning characteristics and creative styles, facilitating more targeted teaching guidance.

In classroom teaching, AI technology can enhance teaching effectiveness through intelligent teaching resource delivery and interactive design. Intelligent teaching systems can recommend relevant musical works and teaching cases based on teaching content and student characteristics, enriching classroom teaching resources. Through AI-supported interactive exercises and instant feedback, students can better participate in teaching activities, forming positive learning experiences. AI technology can also support collaborative creation among students, promoting communication and cooperation in the creative process through intelligent grouping and task allocation.

As a means to promote teaching interaction, AI technology not only changes traditional teaching methods but also creates new learning experiences. In AI-supported teaching environments, students can receive more creative guidance and feedback, while teachers can better control teaching pace and effectiveness. Through the application of AI technology, music composition teaching demonstrates more open and interactive characteristics, effectively promoting positive interaction between teaching and learning. This AI-based teaching interaction model provides new possibilities for innovative development in music composition teaching and opens new pathways for improving teaching quality.

4. Analysis of AI Technology-Supported Paths in Music Composition Teaching

4.1 Construction of AI-Based Personalized Music Composition Learning Models

Personalized learning is a crucial path for AI technology supporting music composition teaching. Through building intelligent learning platforms, precise analysis and personalized guidance of students' creative learning processes can be achieved. Intelligent learning systems can automatically generate personalized learning plans based on students' knowledge foundation, learning styles, and creative characteristics. In the specific implementation process, the system collects learning data and establishes personal learning profiles through real-time monitoring of students' creative behaviors, providing a basis for developing personalized learning strategies.

AI-based personalized learning models include multi-level support. In terms of learning content, the system recommends suitable composition technique tutorials and exemplary works based on students' cognitive levels and interests. For students with weaker foundations, the system provides more basic knowledge and skill training content; for higher-level students, it recommends more challenging creative tasks and advanced techniques. Regarding learning pace, AI systems can dynamically adjust the difficulty and rhythm of learning content based on students' mastery levels, ensuring students learn

within the optimal cognitive load range. Through this intelligent learning support, students' creative learning effectiveness can be significantly enhanced.

4.2 Design of AI-Driven Music Composition Teaching Evaluation System

A scientific teaching evaluation system is crucial for ensuring teaching quality. AI technology provides new implementation methods and technical support for music composition teaching evaluation. Through establishing AI-based intelligent evaluation systems, comprehensive assessment of students' creative processes and work quality can be achieved. The evaluation system uses machine learning algorithms to conduct multi-dimensional analysis of students' creative works, including technical indicators such as melodic structure, harmonic arrangement, and musical form, as well as aesthetic aspects like musical expressiveness and artistic innovation.

AI-driven teaching evaluation systems feature real-time and developmental characteristics. The system can provide immediate feedback on each creative attempt, helping students promptly identify and improve issues. Through recording and analyzing students' creative journeys, the system can generate personal learning development reports, showing students' progress at different stages and existing problems. This data-based scientific evaluation method can objectively reflect students' learning outcomes while providing references for teachers to adjust teaching strategies. Meanwhile, AI evaluation systems can establish scientific evaluation standards by analyzing characteristics of numerous excellent works, improving evaluation accuracy and fairness.

In the implementation of teaching evaluation, AI systems focus not only on final creative outcomes but also value the assessment of the creative process. Through tracking analysis of students' creative behaviors, the system can evaluate the development of students' creative thinking, problem-solving abilities, and cultivation of innovative consciousness. This process-based evaluation helps comprehensively understand students' learning conditions, providing a basis for teaching according to individual abilities. Additionally, AI evaluation systems can automatically generate personalized improvement suggestions and learning guidance plans based on evaluation results, forming positive interaction between evaluation and teaching. This intelligent teaching evaluation system provides strong support for improving the quality of music composition teaching.

5. Optimization Strategies for Integrating AI Technology into Music Composition Teaching

5.1 Teacher Professional Development Strategies

As the leaders of AI-supported music composition teaching, teachers' professional development directly affects teaching outcomes. Regarding technical application capabilities, teachers need to master the basic operations and application methods of AI technology in music composition teaching. Through professional training and practical research, they should enhance their proficiency in using intelligent teaching platforms and creative assistance tools. Teachers also need to possess instructional design abilities to rationally plan AI technology implementation and design effective teaching activities based on educational objectives and student characteristics.

Teachers' professional development is reflected not only in technical application but, more importantly, in enhancing educational teaching abilities. Under AI technology support, the teacher's role has transformed, requiring greater attention to students' personalized needs and innovative capacity development. Teachers should deeply understand AI technology's characteristics and advantages, effectively utilizing technical means to stimulate students' creative potential. Additionally, teachers need to cultivate teaching research awareness, continuously summarizing AI technology application experiences and issues through action research and teaching reflection. In teaching practice, teachers must balance technology application appropriately, avoiding over-reliance on technology while neglecting the artistic essence of music composition.

5.2 Teaching Resource Integration and Optimization Strategies

The integration and optimization of teaching resources is a crucial strategy for enhancing AI technology application effectiveness. High-quality digital teaching resources are fundamental guarantees for implementing intelligent teaching. In resource construction, a comprehensive music composition teaching resource database needs to be established, including professional teaching videos, exemplary works, and creative materials. These resources should comply with teaching standards and student characteristics, facilitating intelligent processing and delivery by AI systems. Through resource classification, annotation, and quality assessment, the practicality and effectiveness of the resource database can be ensured.

The application of teaching resources must follow scientific integration principles. In resource selection, attention must be paid to the unity of adaptability and diversity, meeting learning needs of students at different levels while reflecting the

artistic characteristics of music composition. Through AI technology's intelligent management and delivery of teaching resources, precise and personalized resource application can be achieved. Regarding resource updates, a dynamic resource maintenance mechanism should be established to supplement and update teaching resources timely, maintaining resource timeliness and advancement. Meanwhile, attention should be paid to integrating quality teaching resources from both inside and outside the school, constructing an open and shared resource application system.

Resource integration optimization also requires attention to technical environment construction. Complete hardware facilities and network environments are important guarantees for implementing intelligent teaching. Teaching equipment configuration must meet basic AI technology application needs, ensuring smooth teaching activities. Through establishing cloud resource platforms, convenient storage and access of teaching resources can be achieved. Meanwhile, attention must be paid to teaching resource security management, establishing comprehensive data protection mechanisms to ensure resource use safety and standardization.

In the resource application process, attention should be paid to exercising teachers' leading role. Teachers should reasonably select and use teaching resources based on teaching objectives and student characteristics, avoiding blind pursuit of resource quantity while neglecting teaching effectiveness. Through teachers' professional guidance, students can effectively utilize AI-supported teaching resources to enhance learning outcomes. Meanwhile, teachers should be encouraged to participate in teaching resource development and improvement, forming a positive cycle of resource construction and application. This multi-level resource integration optimization strategy provides strong support for the deep application of AI technology in music composition teaching.

6. Conclusion

Through in-depth research on AI technology application in music composition teaching, the following conclusions are drawn: AI technology application has brought revolutionary changes and development opportunities to music composition teaching. From a theoretical foundation perspective, the organic combination of AI technology and constructivist learning theory provides scientific basis for constructing new music composition teaching models. The introduction of intelligent technology not only expands teaching means but, more importantly, deepens teaching concepts, promoting transformation of teaching methods. Regarding functional positioning, AI technology serves both as an effective creative assistance tool and an important means of promoting teaching interaction, reflecting the multi-dimensional value of technology application. Research shows that deep application of AI technology helps achieve personalization and intelligence in music composition teaching, holding important significance for improving teaching quality and cultivating innovative music talents.

Fund Projects

This paper is a phased result of the Jilin Higher Education Society Project (No.: JGJX24D0391).

References

- [1] Geng, M.P. (2024). Innovative Research on Artificial Intelligence in College Music Professional Teaching. *Anhui Science and Technology News*, 2024-09-13(013).
- [2] Bao, J. (2024). Research on the Application of Artificial Intelligence Music Software in Junior High School Music Teaching [Doctoral dissertation]. Nanjing Normal University.
- [3] Chen, S.Y., & Wang, J.X. (2024). Application and Prospects of Artificial Intelligence in Professional Music Teaching. *Voice of the Yellow River*, 2024(12), 125-129.
- [4] Zhang, S. (2024). Current Status and Optimization Strategies of Artificial Intelligence Application in Music Education. *Journal of Wuhu Institute of Technology*, 26(02), 80-82+88.
- [5] Tian, W.N. (2024). Thoughts on Music Education Reform Driven by Artificial Intelligence. *Craftsmanship*, 2024(05), 23-25.