

# A Study on the Application of AI-Driven Personalized Music Learning in Cultivating Musical Creativity in Higher Education

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**Abstract:** With the rapid development of artificial intelligence, AI-driven personalized learning has begun to reshape the teaching and learning methods of music courses in higher education. This study explores the role of artificial intelligence in promoting the development of college students' musical creativity through a combination of theoretical analysis, classroom observation, and teaching practice. Research findings show that in the early stage of work creation, AI can provide music materials with distinct styles and multiple generated versions, helping students break through creative bottlenecks and stimulate divergent thinking. During the process of secondary creation, the initial materials provided by AI will make students pay more attention to whether the structure is clear, whether the musical phrases are coherent, and whether the musical development is reasonable, and make their structural awareness stronger. In addition, AI can provide results quickly and switch to multiple styles, which enables students to be exposed to more types of music, making them less nervous when creating and more willing to get involved. Based on the above findings, this study proposes relevant teaching strategies: constructing an AI-assisted exploratory learning cycle, strengthening secondary creation tasks, establishing a process-oriented assessment mechanism, and enhancing teachers' AI literacy. Research shows that AI can help students enter the creative state more quickly, understand the structure of music, and expose them to more diverse styles. However, whether these effects can truly take effect still depends on how teachers guide and whether the course design is reasonable. This study also provides valuable references for universities on how to apply AI in music teaching centered on creativity.

**Keywords:** Artificial intelligence; Personalized learning; Musical creativity; Generative AI; Higher education

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## 1. Introduction

The deep integration of artificial intelligence and education has become a key research direction in recent times. In the field of music education, the application of artificial intelligence has evolved from an early auxiliary tool to an intelligent system with the ability to create music, changing students' learning methods. With the rise of generative technology, artificial intelligence is gradually transforming from a simple "teaching aid" to a key force in reshaping classroom structure and learning models, making art education more student-centered and interactive,

and capable of flexibly adjusting according to the dynamic progress of learners<sup>[1]</sup>. In the context of higher music education in China, musical creativity has always been regarded as a core ability. It not only reflects students' musical expression level, but is also one of the essential qualities emphasized in the current talent cultivation framework<sup>[2]</sup>. However, traditional classrooms often use the same textbook, follow the same pace of teaching, and assign the same tasks, making it difficult to take into account the differences among various students. In teaching, there is often an excessive reliance on the teacher's demonstration, resulting in a very limited variety of musical materials that students can access. Due to the lack of sufficient interaction and individual guidance, students often do not have the opportunity to revise their work in a timely manner. Students with a weaker foundation are especially prone to anxiety and do not know how to continue creating. The development of creativity is influenced by individual factors as well as closely related to the learning environment. The cognitive style, motivation level, and availability of supportive resources and collaborative atmosphere in the learning context of learners all have significant impacts on their creative performance<sup>[3]</sup>. Against this backdrop, AI-driven personalized music learning has opened up a new path. Artificial intelligence can automatically adjust the learning content based on students' abilities and interests, and achieve differentiated progress support through graded difficulty and personalized matching<sup>[4]</sup>. Generation tools like AIVA and Suno can quickly create some melody or style examples, providing students with a reference direction, helping them clarify their structural thinking, and making it easier for them to enter the creative process. Although these tools seem very useful, it is still unclear exactly how AI affects musical creativity. Based on existing research, this paper explores how AI-driven personalized music learning can support students' musical creativity in higher education and analyzes the potential mechanisms that may occur in such support, aiming to promote innovation in music education.

## **2. Theoretical foundations of AI-driven personalized music learning**

### **2.1. Educational foundations of personalized learning and generative AI**

AI-supported personalized learning emphasizes adapting learning resources and instructional approaches according to learner differences, making the learning process more flexible and better aligned with individual needs<sup>[5]</sup>. In the context of music learning, traditional forms of personalization have largely relied on data analytics to estimate learner proficiency and adjust task difficulty. With the emergence of generative AI, learning systems can now provide richer content support, including melody generation, harmonic completion, structural extension, and multi-version musical outputs, thereby greatly expanding the diversity of materials available to learners<sup>[6]</sup>. Because generative AI can produce results within seconds, students gain access to near-immediate information about their creative attempts. Existing research shows that timely information of this kind can enhance learners' motivation and engagement, and encourage them to continue refining and improving their work<sup>[7]</sup>.

### **2.2. Experiential and exploratory foundations of music learning**

Music learning and creation require repeated cycles of experience and practice. According to experiential learning theory, learning develops through a continuous loop of concrete experience, reflection, conceptualization, and re-experience<sup>[8]</sup>. AI-generated musical content allows students to engage in similar cycles—"generate, revise, compare, and regenerate"—providing repeated opportunities for practical engagement that align with experiential models of creative development. In music creation, exploration is a key driving force for creativity. Exploratory learning can activate learners' intrinsic motivation and stimulate creative thinking<sup>[9]</sup>. Building on this perspective, the diverse musical materials provided by generative AI make it easier for students to enter a state of exploration and experimentation during the creative process.

### **2.3. Aesthetic stimulation and cognitive scaffolding as environmental-psychological foundations**

The development of musical creativity is closely tied to the richness of musical experiences and the quality of the learning environment. According to the systems model of creativity, the musical resources and cultural context to which individuals are exposed directly influence their creative output <sup>[10]</sup>. AI can generate musical materials in a wide range of styles, allowing students to encounter more varied musical language and broaden their creative perspectives. Additionally, AI can function as cognitive scaffolding by offering prompts, examples, and structured forms of guidance that help learners progress through open-ended tasks <sup>[11]</sup>. Through this mechanism of cognitive support, AI can assist students in avoiding stagnation during music creation. Furthermore, AI-driven learning environments have been shown to enhance creativity, promote self-reflection, and reduce performance-related anxiety among learners <sup>[12]</sup>.

### **3. Analysis of the current situation and problems in cultivating musical creativity in higher education**

To gain a deeper understanding of the real situation of the development of musical creativity among college students, a one-month classroom observation was conducted, with a focus on recording students' behaviors, emotional responses, and learning difficulties in real learning situations. The observation results reveal several structural problems in the cultivation of music creativity in colleges and universities. Students' aesthetic vision is generally rather narrow, which obviously restricts their creative expression. Many students rely on teachers' demonstrations or examples from textbooks in the early stage of writing, often imitating to write and lacking initiative. This reflects that students have a relatively weak musical foundation and limited external stimulation, which in turn affects the originality of their works. The traditional unified teaching mode is difficult to meet the differences in students' abilities. In the classroom, it is common to see a significant divergence in creative progress: some students can quickly complete the basic writing, while others are unable to finish the first section for a long time. Although teachers have attempted individual guidance, they are constrained by the class size and find it difficult to provide sufficient personalized support, which leaves students with weaker foundations at a loss when it comes to creative tasks. The excessive time spent waiting for the teacher to point out problems during the creative process also affects the learning outcome. After students finish their work, they often do not know which parts need to be revised until the next class. By the time they actually hear the suggestions, many students' attention to their work and their motivation to revise them have already declined. Because it is difficult for students to promptly understand their own shortcomings, they also find it hard to constantly adjust and gradually refine the structure of their works during the writing process. Open-ended creative tasks generally trigger students' creative anxiety. Many students show unease when faced with the task of "starting from scratch" and do not know where to begin. Such emotions not only reduce writing efficiency but also weaken students' willingness to try new methods, thereby further restricting the development of creativity <sup>[13]</sup>.

### **4. The mechanisms through which AI-driven personalized music learning enhances musical creativity**

#### **4.1. The role of AI in the initial stage of composition and divergent thinking**

To understand the specific role of AI in cultivating musical creativity, this study guided students to directly use generative AI in creative tasks in the classroom and recorded their interaction process, modification

trajectory, and changes in works. By comparing the creative behaviors before and after the intervention of AI, its promoting mechanism can be systematically summarized. AI provides necessary support for the initial stage of creation. Before the intervention, some students remained at the stage of motivation for a long time. After using AI, students can obtain initial materials through professional prompt words such as speed, mode, and instrumentation. This not only alleviates initial anxiety but also prompts students to deepen their understanding of style elements when constructing prompt words. Although the generated content still needs to be processed, it can provide a clear direction for writing and form a process where external stimuli stimulate internal imagination. Multi-version generation effectively enhances students' divergent thinking. Different versions of music clips make students aware of the various ways materials are organized, and they absorb their advantages through comparison, going through the cycle of "selection–evaluation–modification," thereby demonstrating higher thinking flexibility and expression openness.

## **4.2. The impact of AI on students' understanding of musical structure**

One of the most notable changes in AI's participation in creation is the enhancement of structural awareness. Students usually take the generated fragments as processable materials and divide, replace, and reassemble them in the DAW. Compared with conceiving from scratch, this kind of secondary creation can better prompt them to pay attention to the logical relationships between materials, such as the connection of musical phrases, the density of textures, and the contrast of sections. Students usually can more quickly identify structural problems such as repetitive themes, insufficient paragraph development, or monotonous harmony patterns when dealing with AI-generated materials. AI output provides students with an "external perspective," enabling them to more clearly identify areas for improvement as music producers. The promoting effect of this type of material lies in its "complete yet unstructured" nature: it can serve as a reference and is also convenient for free modification, becoming a transitional material between the draft and the finished product, allowing students to devote more energy to structural refinement. In contrast, traditional classrooms find it difficult to provide such a large amount of processable practice materials in a short period of time. Therefore, AI has a unique advantage in cultivating structural awareness.

## **4.3. AI-enhanced stylistic exploration and emotional regulation**

The multi-style materials generated by AI bring students a broader musical experience. Under the same prompt words, there are often different or even cross-style combinations, such as the fusion of ethnic modes and electronic rhythms, etc. Although they may not be mature, they often inspire students' creativity and make them realize that styles can be extended and reorganized in more ways. In the process of comparing different versions, students will actively analyze style features such as melodic direction, rhythmic focus, and orchestration layers, and accordingly screen and modify them, thereby forming a clearer style understanding and being more willing to try new expressions in their creations. In addition, immediate generation also has a positive effect on emotional regulation. Students who were originally prone to being blocked at the beginning are more likely to get into the swing of things after seeing the reference version quickly provided by the AI. The process of constantly adjusting the prompt words also helps them find their direction.

# **5. Strategic recommendations for AI-enabled cultivation of musical creativity in higher education**

## **5.1. Constructing an AI-based exploratory learning framework**

The application of AI in music creativity teaching should adhere to the principle of "teacher guidance and



student orientation,” and requires overall planning in course design, classroom arrangement, and teacher capacity building. AI can provide students with materials and inspiration, but the final judgment, selection, and rewriting should still be completed by the students. In the classroom, AI-generated segments can be used as a reference that can be discussed and modified. Students can analyze their advantages and disadvantages and then rewrite based on this. In this way, AI can help students broaden their thinking, but it will not replace their creative subjectivity.

## **5.2. Strengthening requirements for secondary creation to avoid AI dependence**

Teaching guidelines should explicitly define “secondary creation” as a mandatory learning task. From the perspectives of educational ethics and arts pedagogy, AI-generated content cannot be directly regarded as students’ original work. Therefore, students should be required to submit materials such as records of their creative process, revision notes, and comparative analyses showing the differences between AI-generated outputs and final submissions. Encouraging students to critically process and creatively reconstruct AI-generated materials not only prevents overreliance on AI but also promotes the development of higher-level structural awareness.

## **5.3. Establishing a process-oriented evaluation system**

Assessment practices should shift from traditional outcome-oriented evaluation toward process-oriented evaluation. Since the key to cultivating musical creativity lies in the emergence and transformation of learning behaviors rather than the final artifact itself, instructors may adopt indicators such as the number of drafts, revision trajectories, the degree of effective use of AI feedback, and the clarity of structural organization. These criteria provide a more comprehensive representation of students’ learning depth and encourage the development of more flexible, adaptive modes of thinking.

## **5.4. Enhancing teachers’ AI literacy and professional judgment**

Teachers’ AI literacy is essential for the effective implementation of AI-enabled instruction. Instructors must not only understand the basic principles of AI music generation but also possess the ability to judge whether AI outputs are appropriate and pedagogically valuable, as well as identify potential stylistic inconsistencies or biases. In the teaching process, the instructor’s role resembles that of a curator or evaluator—filtering, interpreting, and safeguarding the use of AI-generated material. Teachers help students understand what content can be used, why it can be used, and its relevance to musical structure or stylistic development. Only under informed professional guidance can AI-generated content be transformed into meaningful learning resources.

## **6. Conclusion**

Based on theoretical analysis and classroom observation, this study explores the role of AI-driven personalized music learning in the cultivation of music creativity in colleges and universities. The results show that generative AI can provide an effective entry point in the early stage of creation and promote the openness of expression methods through multi-version output. Its editable material form also strengthens students’ structural awareness, making problem identification in secondary creation more intuitive. The rapid generation and no-evaluation attributes of AI stand out in alleviating creative anxiety and enhancing engagement. However, the effectiveness of AI depends on the guidance and evaluation mechanism of teachers; otherwise, it may lead to a tendency of dependence among students. Overall, AI has demonstrated significant advantages in creative entry,

structural understanding, style expansion, and emotion regulation, providing a new path for the cultivation of music creativity in colleges and universities. Future research can further focus on its applicability to different student groups and the expansion of more teaching scenarios.

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## Disclosure statement

The authors declare no conflict of interest.

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