



MUSIC EDUCATION BASED ON GENERATIVE ARTIFICIAL INTELLIGENCE

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Abstract. This thesis provides a scientific and pedagogical analysis of innovative methods for organizing music education based on generative artificial intelligence technologies. The aim of the study is to identify effective ways of using artificial intelligence tools capable of generating text, musical notation, audio, visual, and multimedia content in music education, as well as to develop methodological recommendations for their integration into the educational process.

Keywords: generative artificial intelligence, music education, innovative method, digital pedagogy, professional competence, musical creativity, individualized learning, digital content, musical composition, reflective assessment.

Today, the rapid development of digital technologies necessitates the improvement of the content, forms, and methods of teaching at all levels of the education system. In particular, the integration of artificial intelligence technologies into the educational process creates new opportunities for expanding students' learning opportunities, developing individualized learning trajectories, automating pedagogical processes, and supporting creative activities. From this perspective, generative artificial intelligence technologies are emerging not merely as digital tools for providing ready-made information, but also as innovative pedagogical resources capable of generating new content, ideas, audio materials, musical notation, images, and multimedia resources.

Music education differs from other academic disciplines due to its creative, practical, and emotional characteristics. In this educational process, alongside acquiring theoretical knowledge, it is particularly important to develop skills such as musical perception, sense of rhythm, music notation literacy, performance, composition, and creative thinking. In addition to traditional teaching tools, the use of generative artificial intelligence can create favorable conditions for organizing the educational process in a more interactive, individualized, and creative manner.

The integration of generative artificial intelligence tools into education has accelerated the processes of developing lesson plans, individualized assignments,



visual materials, and assessment tools. Ethan Mollick and Lilach Mollick are among the researchers who have systematically investigated the potential of generative artificial intelligence in the educational process [2, p. 12].

W. Holmes, M. Bialik, and C. Fadel have studied the transformative potential of artificial intelligence in education and argued that AI tools can transform teachers' activities related to lesson planning, adaptation of educational materials, and organization of individualized learning [2, pp. 55–56].

Mike Sharples has investigated the future of artificial intelligence and education and emphasized that the role of teachers is changing in the context of generative AI. According to his perspective, AI tools should serve not simply to provide ready-made knowledge, but primarily to develop students' creative and critical thinking [3, p. 99].

The main contradiction in music education is manifested in the fact that, despite the broad didactic potential of generative artificial intelligence, the pedagogical objectives, methodological stages, assessment criteria, and ethical boundaries of its use have not yet been sufficiently clarified. A music teacher should not regard AI-generated products as ready-made knowledge; rather, they should critically evaluate their musical quality, stylistic characteristics, cultural relevance, and pedagogical value.

The purpose of the study is to identify innovative methods for organizing music education through the use of generative artificial intelligence tools and to develop methodological recommendations for their implementation in the educational process.

To achieve this purpose, the following objectives were defined:

- to identify the didactic potential of generative artificial intelligence in music education;
- to systematize innovative teaching methods;
- to develop a mechanism of interaction among teachers, students, and artificial intelligence;
- to substantiate the pedagogical, ethical, and legal limitations of using artificial intelligence.

The study employed methods including analysis of scientific literature related to generative artificial intelligence, music pedagogy, and digital education; comparison of various pedagogical approaches; modeling of educational activities; pedagogical



observation; and qualitative assessment of expected learning outcomes.

The methodological framework of the study was based on competency-based, activity-based, learner-centered, creative, and digital-pedagogical approaches. The competency-based approach aims to develop students' ability to apply knowledge in practical situations, while the activity-based approach focuses on the process of creating musical products. The learner-centered approach takes into account individual abilities and educational needs. The creative approach involves generating musical ideas, developing them, and proposing original solutions. The digital-pedagogical approach requires the integration of technology with the objectives, content, and assessment criteria of the lesson.

An empirical study examining the impact of ChatGPT-4 on music education found that students who used artificial intelligence demonstrated higher levels of musical knowledge acquisition compared with students in a traditionally taught group. However, such findings cannot automatically be generalized to all educational contexts; pedagogical effectiveness depends on task design, teacher guidance, and students' purposeful use of technology.

1. "AI-Based Musical Composition" Method

The purpose of this method is to develop students' compositional thinking and musical creativity. Initially, the teacher determines the genre, meter, tempo, mood, and instrumentation. Using artificial intelligence, students generate several musical variations, compare them, and edit the most appropriate version. The final outcome should not be a reproduction of an AI-generated product but rather a composition reworked through the student's own creative and authorial decisions.

2. "Analyzing a Musical Work with Artificial Intelligence" Method

In this method, students first independently analyze the form, genre, rhythm, tonality, harmonic development, and expressive means of a musical work. They then compare their own analysis with the analysis generated by artificial intelligence. The teacher guides students in identifying contradictory, inaccurate, or questionable responses. As a result, students' critical thinking and musical analysis competencies are developed [4].

3. "Creating a Short Musical Composition Based on National Melodic Motifs"

At the motivational stage of the lesson, the teacher presents short examples of Uzbek traditional melodies and discusses their rhythmic, modal-tonal, and melodic



characteristics with students. As a problematic situation, an AI-generated musical example containing elements that are not characteristic of national music is presented.

At the task implementation stage, students develop prompts describing the rhythm, tempo, instrumentation, and melodic movement characteristic of traditional Uzbek music. Several musical variations are generated using artificial intelligence. Students analyze these variations according to the criteria of national musical traditions.

During the creative activity stage, students re-edit the generated material, remove inappropriate elements, and add their own melodic motifs. During the presentation stage, each group demonstrates its composition and distinguishes between the parts generated by artificial intelligence and those modified or created by humans.

The assessment process applies criteria such as musical content, conformity with the national musical style, originality, compositional integrity, purposeful use of technology, and the student's authorial contribution. During the reflection stage, students explain which AI-generated suggestions were useful and which were inappropriate, providing reasons for their judgments.

Based on the theoretical analysis, the methodologically justified use of generative artificial intelligence can expand students' interest in lessons, opportunities for musical experimentation, comparison of alternative versions, and completion of individualized assignments. Such activities require students not simply to accept AI-generated products, but to analyze, evaluate, edit, and creatively transform them.

The proposed methods are aimed at developing four interconnected competencies among prospective music teachers:

1. musical-creative competence;
2. methodological competence;
3. digital competence;
4. critical and ethical competence.

Pedagogical effectiveness should be assessed not merely by the amount of technology used, but by students' independent decision-making, the quality of their musical products, reflective abilities, and degree of authorial contribution.

Since no specialized experimental study was conducted within the framework of



this research, specific statistical indicators were not provided. In the future, the effectiveness of the proposed methods should be examined through experimental and control groups, diagnostic assignments, expert assessment, observation, and analysis of students' creative products.

The use of generative artificial intelligence technologies in music education is one of the promising directions for improving the modern educational process. The study identified the potential of generative artificial intelligence to support educational and creative activities in music education, individualize educational content, generate digital resources, and develop students' musical and creative competencies.

Generative artificial intelligence tools can be used to create textual, audio, musical notation, visual, and multimedia materials, develop musical ideas, generate preliminary versions of compositions, and adapt them to the pedagogical process. These opportunities create favorable pedagogical conditions for organizing music lessons in an interactive and creative manner, activating students' independent learning activities, and taking individual educational needs into account.

Generative artificial intelligence is also of significant importance as a tool supporting the professional activities of music teachers. Its use enables teachers to prepare educational materials more efficiently, individualize creative assignments, develop content appropriate for learners with different levels of proficiency, and expand opportunities for reflective assessment of educational outcomes.

At the same time, the effective integration of generative artificial intelligence into music education requires a balance between technological capabilities and pedagogical objectives. AI should function as a supporting and creative tool rather than replace the teacher's professional judgment or the student's independent creative activity. Therefore, future research should focus on developing evidence-based models for the pedagogically, ethically, and methodologically appropriate integration of generative AI into music education.

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