

Music and Artificial Intelligence

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Abstract: *Many researches are investigating the use of artificial intelligence (AI) technologies as an auxiliary tool in education. However, it turns out that even among advanced students there is a gap between awareness of the possibilities of AI and their systematic application to solve academic problems.*

Our work tracks changes in students' opinions over the years. The authors of the article analyze how the massive online learning experience has changed students' willingness to participate in interactive formats, their expectations of the learning process, and their perception of methods such as problem-based learning. In their opinion, the pandemic experience had a dual impact. On the one hand, it has increased awareness of the value of flexible formats typical for active learning. On the other hand, new barriers have been identified, such as digital fatigue and the need for clearer structuring of interactive tasks in any environment. It is also noted that a high level of basic digital literacy directly affects students' motivation to learn and use AI technologies in music education and musical creative work

Keywords: *Artificial Intelligence (AI), Digital Musical Synthesizers, Music Computer Technologies (MCT), Musical Education, Musical Creative Work*

1. Introduction

As artificial intelligence (AI) develops, so does its potential. The scientific novelty of the article lies in the fact that for the first time empirical data were presented showing the attitude of students of musical and performing specialties to digital sets of instruments in the system of modern art education – for more information, see [15-20; 23]). The special role and possibilities of using music and computer technologies and AI to provide inclusive music education are also noted (this is considered by the example of the experience of using music and computer technologies in teaching students with profound visual impairments - see [4; 9; 14]).

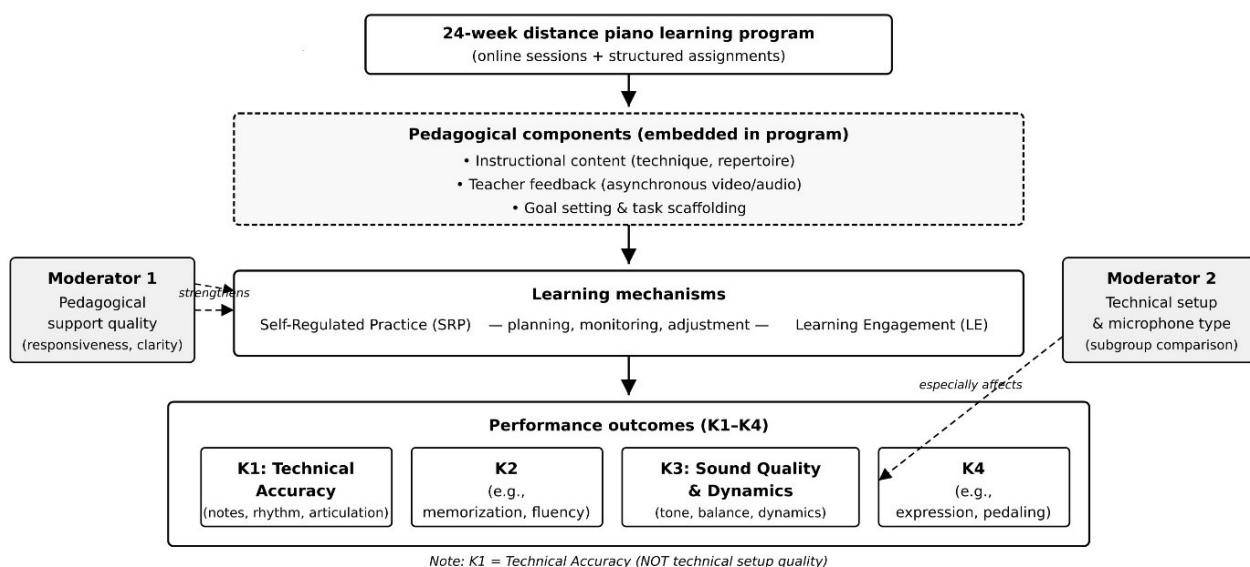
2. Music computer technologies and AI in Music Education

The contribution of our research to the development of the modern music education system is to rethink the possibilities of AI technologies for teaching musical disciplines that not only allow, but also require the direct participation of AI systems. The work demonstrates that success is determined not only by the availability of technology, but also by methodological adaptation, which develops students' independence, including self-diagnosis and critical analysis skills.

Based on empirical data, ready-made methodological recommendations on the technical organization of the lesson were developed (including the selection of equipment, the angle of video recording and videography, settings for specialized music and computer equipment and software [1-3; 5-8; 10-13; 21-23]), lowering the entry threshold for teachers. The pedagogical model for the formation of basic performing skills represents an

asynchronous format of interaction. The educational model created by us also describes specific formats of educational activities (online seminars with collective discussion, various formats of remote music playing in an ensemble, etc.) that can be integrated into the curricula of music universities around the world, especially in conditions of geographical remoteness of students (Figure 1. Conceptual framework of the educational model).

Figure 1 - Conceptual framework of the educational model



Solid arrows: direct effects. Dashed arrows: moderation (contextual conditions that strengthen/weaken relationships).
SRP = Self-Regulated Practice; LE = Learning Engagement. K1-K4 assessed at T1, T2, T3.

Therefore, this study makes a concrete contribution to the global discussion about the transformation of art education, taking into account the capabilities of modern AI systems, offering practical recommendations applicable to various musical and performing (instrumental) specialties, thereby helping to overcome geographical and infrastructural constraints in the training of musicians.

However, there are limitations related to the uniformity of the conditions of the pedagogical experiment, and existing external limitations related to the possibility of sampling. This circumstance does not allow us to automatically extrapolate the conclusions obtained in the described pedagogical conditions, for example, to the advanced level of training of students with special training in the use of AI and e-learning technologies in the modern music education system.

For example, the authors of the article *The Use of Multimedia and Music Computer Technologies to Improve the Performing Activities of Students of Musical and Musical Pedagogical Universities of the People's Republic of China* [24] Liu Ganfeng and Hou Wang attended advanced training courses under the program "Remote Technologies in Music Education" at the Research and Methods Laboratory Music Computer Technologies of the Herzen State Pedagogical University of Russia (St. Petersburg, Russia), which provided advanced training in this field and the ability to master remote control systems AI and music computer technologies at a professional level. The paper, prepared with the participation of Klara B. Davletova, a research teacher and teacher of electronic musical synthesizer, also notes the urgent need to use modern AI systems to create conditions for improving the effectiveness of the contemporary musical and educational process as a whole (for more details, see, for example, in the work [25]).

Attention should also be focused on assessing educational losses for different groups of students, ranked by age and level of practical skills

3. Conclusion

With the development of artificial intelligence (AI), its potential in creative fields is also growing, in particular in music and teaching various musical disciplines, including playing digital musical instruments. The

latest trend brought by AI to the music industry is composing music using machine learning algorithms. Despite the fact that "artificial" music is still far from the works of great classics, algorithms have already managed to achieve amazing results. Our presentation presents some of the currently existing methods of using artificial intelligence to compose music and various relevant projects, ranging from startups to products of technology giants. A special role in this process belonged and continues to belong to modern MCTs, of which digital musical synthesizers are an integral element

4. References

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