Theoretical and methodological aspects of the use of digital educational technologies in the process of musical-instrumental training of applicants for the higher education of the future

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Abstract: Educational transformations caused by the global pandemic COVID-19 have actualized the use of digital technologies, in particular, in higher music education. The main purpose of the article is to analyze the theoretical and methodological digital educational technologies use aspects in the process of music-instrumental training of applicants for the higher music education of the future. General scientific methods (analysis, synthesis, deduction, and induction) and specifically scientific methods (prediction and concretization) were used in the research. The results reflect the importance of acquiring the necessary competencies in digital teaching methods work. The need for digital competence, communication skills, creativity, cybersecurity, and programming has been justified. The potential of digital technologies in higher music education was also analyzed. Namely, it is proved that the use of digital programs in music and instrumental training of students will expand the audience and lead to the possible collective writing of melodies and entire compositions in the future. To conclude, it is noted that the advantages of using digital technology in music and instrumental training are interactivity, integrality, didactic potential, comfortable learning environment, and creativity. At the same time, a broader study will require methods of teaching in higher music education of the future.

Keywords: higher music education, digital technologies, competencies, transformation, perspectives.

Introduction

Modern transformations of educational processes have accelerated greatly due to the impact of the COVID-19 pandemic. Quarantine restrictions actualized the use of distance learning forms, which before 2019 were perceived among teachers and students as an auxiliary way to master and consolidate knowledge, intended primarily for non-formal education. At the same time, the appeal to new forms and methods of teaching has demonstrated the effectiveness of distance learning, which has been achieved primarily through the active use of digital technology. In general, the penetration of digitalization into modern information society deserves further reflection given the causes, consequences, and prospects of this process. At the same time, digitalization has also subjected every single field of social activity, including the music and instrumental training of higher education applicants (Camlin & Lisboa, 2021). Consequently, many contemporary scholars recognize the importance of digital change in the training of future professionals (Anggraini & Handayani, 2022). At the same time, Daubney & Fautley (2020), in analyzing the major transformations of music education in the Covid-19 pandemic era, noted the importance of using distance digital technologies. Park (2021), while assessing the advantages and disadvantages of online education, still believes that the digitalization of education is inevitable and requires careful consideration. Wan (2022) highlighted the importance of digital technology in music education. At the same time, Kachur et al. (2021) described the features of the formation of digital art space in the context of the professional formation of future music teachers. Cayari (2017) explored the possibilities of YouTube in the professional education system of music professionals. Pećanac et al. (2016) described key aspects of the use of digital media in higher music education. On the other hand, Tytova & Mereniuk (2022) investigated the importance of digital literacy in the system of becoming the future. In spite of this, the question of the precise acquisition of digital competencies necessary for successful music and instrumental education remains understudied. This issue is also quite relevant because it allows us to determine how specific areas of

pedagogy and higher education have adapted to the current conditions in which the use of digital teaching methods achieves the highest effectiveness.

Research Problem

Important vectors for further research are digital innovations in the scientific sphere and the latest technologies, methodological foundations for use in the field of university education. Given the changes in the basic techniques and trends in the educational process, there is a need for further updates of empirical indicators and theoretical insights into the course of this process. For this reason, further involvement of optimal practices in the sphere of higher music-instrumental education will require long-term study and additional updating, taking into account the establishment of prospects for further work.

Research Focus

The article analyzes the problems of improving the theoretical and methodological foundations of higher music education institutions. especially noted the importance of the competent use of modern digital technologies and teaching methods in a rather specific industry. Particular attention is also paid to the prospects of further use of digitalization in higher music education, considered certain hypothetical problems that may arise in the introduction of technological innovations and software in the educational process, the use of best practices of other countries. Addressing these issues will potentially improve the ways of teaching, improve opportunities for further implementation of the most effective innovations in the educational process.

Research Aim and Research Questions

The main purpose of the article is to analyze the theoretical and methodological aspects of the use of digital educational technologies in the process of music-instrumental training of applicants for the higher music education of the future. When analyzing this broad problematic, attention was also drawn to several important problems associated with acquiring the necessary competencies during music-instrumental training, the peculiarities of the use of digital technologies. The received results will allow to improve the organization of the educational process, to harmonize them with modern requirements of preparation of highly skilled experts.

Research Methodology

General background

The methodological basis of this research are pedagogical methods of theoretical knowledge: specification, prediction, abstraction, etc. General scientific methods of use in the implementation of the main purpose of the study: analysis, synthesis.

Instrument and Procedures

With the help of content analysis, a review of literary sources was carried out, and little-studied problems were characterized. At the same time, based on the analysis, the main object of the study is divided into smaller topics: analysis of the necessary skills to work with digital environments, the possibility of using modern digital platforms, the prospects that digitalization reveals before higher medical education. Based on the synthesis defined subtopics are combined and defined their own judgments on the effectiveness of the use of digital technologies in the process of training specialists of music and instrumental areas. The work used the method of abstraction, based on which the transition from the analysis of general theoretical theses to the formation of specific hypotheses and conclusions was carried out. As a result of the use of the predictive method reflected the main prospects for the use of digital technology in higher music education.

The study took place in several stages, in particular on the first - the little-researched questions of the topic, characterized the relevance of the research, on the second - the characteristic of digital technologies in the system of training specialists musical-instrumental direction, highlighted the main

digital technologies that are used in higher music education, on the third stage - conclusions and identified prospects for further research.

Research Results

Digitalization of music and instrumental education of students: the competence aspect

The current development of the system of university training of future specialists of musical-instrumental art is characterized by fundamental transformations, the main content of which is the transformation of the attitude to the usual, traditional visions of the content, methods and forms of education of professional competence (Daubney & Fautley, 2020). Specialists note that specialized learning in its ideal form has the goal of creating a space for individualizing a creative educational trajectory that subtly combines classical methods of higher music education with modern pedagogical methods, personal achievement and self-development, and the integration of digital technologies into learning (Pećana Milenović, 2016). Such an ideal remains relevant, although it has experienced some correlating influences, including those related to the introduction of distance learning, which is based on independent work more than standard forms (Laufer et al., 2021). At the same time, the vector of education of professional musical competencies for applicants for higher education in the musical arts, which focuses on high ideals of understanding artistic canons and receiving artistic education in accordance with the organic use of synthesis of cultural and historical experiences with the innovative potential of modernity, including the appeal to information and communication technologies (Scripp & Gilbert, 2019), becomes adequate for modern conditions.

If we resort to comparisons and past times of pandemic and related global quarantine restrictions, the use of digital technologies in teaching music and instrumental arts in the university environment has several advantages: interactivity, integrality, psychological comfort, appeal to professional-pedagogical practices, the art of ergonomics, the economy of work organization, etc. (See Figure 1).

Figure 1.

The main advantages of using digital technology in the teaching of music and instrumental art
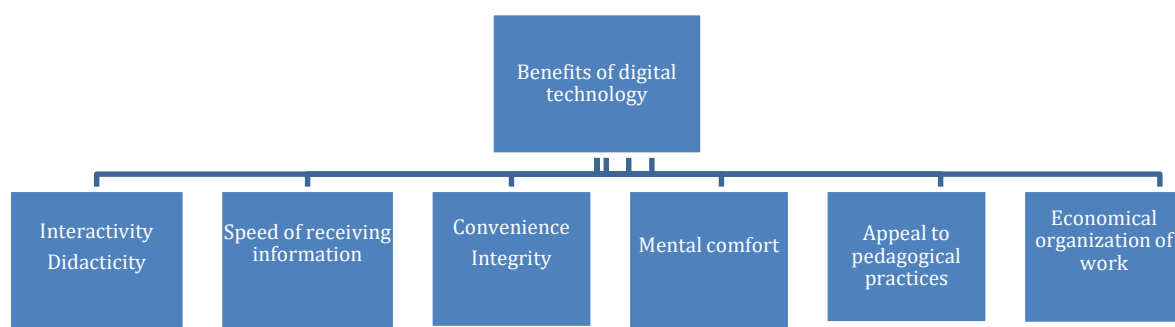
Source: authors' own development

The main elements of the digitalization of music education researchers call the emergence of high-quality online services for teaching music via the Internet. On the one hand, allow you to choose the right digital learning content to work online, but also integrate with modern university educational programs to train highly qualified specialists in instrumental performance. Learning services are based entirely on advanced information technology to address the shortcomings of modern music university education, emphasize the features of interactivity, support the operation of multisensory simulators and various instrumental computer stimulators. The creation and management of digital

resources for music education is the foundation of digital music education applied in higher education. The creation and overall standardization of digital music education resources that address the needs of higher education applicants, university and conservatory faculty, and potential stakeholders is essential to the management functions of digital music education tools.

Once appropriate digital resources are formed for online use, they must undergo certification of shared and common-use capabilities, remediation of deficiencies, and content editing. In fact, the use of digital technologies means that only standardized resources are needed to store, publish, import, share, and manage learning on digital platforms.

At the same time, the latest technological processes have significantly expanded the boundaries of the formation of professional competencies among applicants for higher music education, contributed to the diversity of arts and education pedagogical processes, significantly dynamized them (Park, 2021). So, the change of roles among the students at music universities and conservatories was ensured - they turned from the state of passive listeners into active participants of the educational process, who are ready for independent and competent performance of their duties and self-development. Overall, the current stage of higher music education has seen a gradual shift away from professional gnostic learning (which is based on pure knowledge with a minimum of practical experience in using it) (Ozoaghuta, 2019). Recent trends favor the implementation of a personal and activity-based approach related to the analysis of potential ways to harmonize the educational process through a balanced socio-personal orientation for students (Mas-Verdu et al., 2020). Due to this, modern methods of teaching operate with such notions as the fullness of reflection of the main values on which culture is based (such elements as science, art, religion, traditions of folk culture and pedagogy, etc. are spoken about), and also - productive and debugged cooperation of all participants of the educational process, the realization of the main functions of teaching (informational-cognitive, developing, social-transformation, culture-creative, search-and-transformation, etc.) (Mas-Verdu et al., 2020). In practice, this transition means that the main goal of the current higher music-instrumental education is the formation of applicants' sufficient knowledge and skills to establish an active professional activity, which will also become an engine for their own development and self-improvement in the future, that is, it is said to obtain the necessary level of professional competence.

The personality approach focuses on the formation of behavioral characteristics and the acquisition of competencies (Mas-Verdu et al., 2020). At the same time, the main problem that is solved during the training is the identification of personality traits in students, which can become a prerequisite for the further successful use of professional skills. For this reason, the acquired competencies become the main behavioral aspects and characteristics that can manifest in effective and successful actions according to the applied context of actions, organizational factors, axiological principles of the environment, as well as the applied parameters of professional activities (Kachur et al., 2021). For applicants in the instrumental-music profession, using the ideals of the functional approach, professional competence at the present stage can be considered the performance of their duties at a high professional level. This is due to higher education applicants obtaining a thorough knowledge of the music profession, successfully using it during practice (Franco & DeLuca, 2021). Therefore, professional competence for future instrumental-music performers in the conditions of digitalization should be considered as integrative qualities, which are distinctive features of the obtained knowledge on specialty, acquired skills and abilities, which are formed in accordance with the personal qualities of each applicant during the professional training in the framework of the art university. conservatory and further qualitative performance of their professional duties.

Modern changes in educational paradigms have entailed the fact that the professional training of applicants for higher music education has become much more multidirectional than before. Specifically, we are talking about the emergence of updated functions that integrate the digital
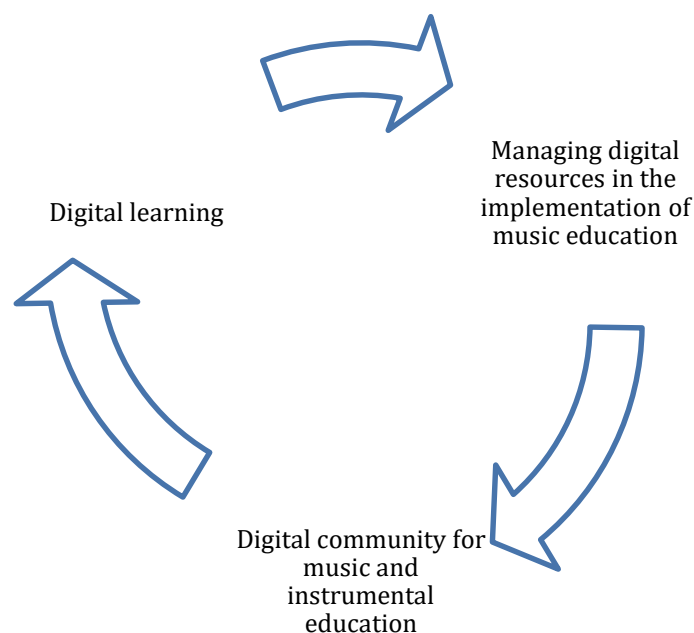
applications of modern technology in music-instrumental education under new circumstances (Daubney & Fautley, 2020). First of all, it is the software and methodological support (in different forms - media or tools of learning work), which has become the reason for more effective mastery of practical learning material by students in the classroom (Cayari, 2017). For this reason, art institutions of higher education and conservatories faced a new challenge - to find possible options for optimization in the ratio between professional and digital competencies for higher education applicants. this element is also noted in the Framework Programme of the European Union member states on the renewal of key competencies. The document, as interpreted by researchers, refers to the definition of digital competencies as confident, critical, responsible use and interaction with digital technologies during the learning process, professional employment (work) and in social and public life, personal self-development, etc. (Anggraini & Handayani, 2022). Digital competencies are characterized by the following parameters: digital and information literacy, acquired skills in communication and digital communication, collaboration and new content formation (including using programming elements), acquiring knowledge of cybersecurity basics, and the ability to solve digital problems at different stages of their occurrence.

Digital Learning Technologies in Instrumental and Musical Education

Digital learning was an important step in combining information technology with educational programs at universities. Its importance initially was to provide faculty and students with the ability to use computers for more immediate calculations, video broadcasting, animation formation, or other computer effects that would come in handy in solving pressing key and complex learning problems, to help bring abstract theories and principles to applicants for higher music education. Further, it became evident that the digital support platform for music education consists of several elements: digital education, digital management, and digital community (See Figure 2).

Figure 2.

Diagram of the digital support platform for instrumental-music education

Managing digital resources in the implementation of music education

Digital learning

Digital community for music and instrumental education

Source: authors' own development

Further developments in technology have demonstrated another promising direction for the use of information and digital technology in music education, aiming at a wider use of modern digital

technology and methods of using artificial intelligence for learning needs (Bank, 2020). It is about applying computer capabilities, demonstrating collaboration and competition in the learning process using computers, deepening autonomous and asynchronous learning capabilities, and determining the effectiveness of education on the use of computers in general (Camlin & Lisboa, 2021).

The next phase of digitalization of higher instrumental-music education came during the COVID-19 pandemic when an effective combination of theoretical developments and their practical use occurred. During the quarantine restrictions, digital technology became a major tool that helped students during their studies. Educational emphases gradually and definitively shifted from a partial recourse to digital technology as a definite learning aid to its full application as the main distance learning tool (Daubney & Fautley, 2020). At the same time, scholarly research into the processes of combining digital and traditional teaching methods has rapidly evolved - these trends have become extremely important to the discussion among many professionals in various research fields (including music professionals) (Laufer et al., 2021). In particular, the notion of "integration" has received coverage in several authoritative studies, with experts highlighting several aspects of the integration of information technology for use in the implementation of curricula (Kachur et al., 2021). First of all, it is about creating the necessary information environment for learning, transforming the existing traditional educational structures, and introducing updated teaching methods aimed at the wider use of digital technologies.

Discussion

In particular, scholars have noted characteristic features of the importance of information technology for the contemporary training of instrumental music performers. For example, researchers rightly argue that the digital information environment blurs the boundaries between media, thus performing the personalization of musical performance (Wan, 2022). Thanks to modern technology and the Internet, the medium of learning and listening to music courses has become not just part of an elitist worldview, but accessible to a huge number of people-more student involvement mathematically increases the chances of acquiring and nurturing truly gifted instrumental performers (Park, 2021). The popularization of technological innovations and the digitalization of music have transformed the means by which people are introduced to music (Ozoaghuta, 2019). The process of instrumental performance and music writing is also no longer closed to the broader society because today, thanks to computer programs, many people can create their own tracks and compositions, which requires experience not only in the direct performance of compositions but also in arranging and digitally processing them.

 Evaluating music is the beginning of stimulating and writing new music. Thanks to digital technology, many will become later participants in the process of creating musical works using a variety of forms (e.g., melody writing, song lyrics, direct or indirect commentary, etc.). Therefore, in the future, during their studies at music universities, students will acquire the skills of teamwork and collective creation of new compositions using the composition of live performance and digital elements.

Also, a peculiarity of the new information and educational environment in higher music education institutions is that it does not oblige applicants for higher education to be "aesthetic" in the direct study of theory and practice. In traditional music education instruction, teachers typically focus on the appreciation and perception of instrumental and musical works, while disregarding the ability to create music independently (Park, 2021). At the same time, during instruction, students as creative people also want to demonstrate themselves and their own knowledge and skills through creativity rather than reproducing previously written works. New media environments allow students to choose their own ways to disseminate and share information to express their creative interests (Kachur et al.,

2021). Digital technologies also allow one to distribute their compositions using special applications so that potential audiences can view and evaluate them accordingly.

For example, a popular digital application today is Notion 6. The main purpose of this software is to generate melodies and sheet music. Users of Notion 6 note that it is easy to install, easy to use (subject to getting used to the interface), and the instrumental performance samples offered by the developers are among the best and most promising in the world. Overall, the potential of this digital application requires further disclosure, but from a professional point of view Notion 6 is capable of competing with the best and most expensive programs for creating your own musical content in any price range.

The program's interface allows you to view the time code of a song, adding the necessary markers for the potential location of future sound or other effects. The video window also has special transport buttons that allow you to work in a convenient format-no need to leave the video window to start or stop recording, etc. An additional advantage of this service is the original and very basic library of musical instrument samples, which is very important for music education. The developers of Notion 6 have installed individual samples from popular performers (musicians and entire orchestras) of today in the library. This includes Steinway piano playing samples, elements of performance by the London Symphony Orchestra at Abbey Road Studios, and selected samples of performance playing by prominent musicians (Wan, 2022). For this reason, applicants to higher music education have a unique opportunity to follow the performance of their score - it will sound as if it were performed by the leading performers of world music. The software allows you to not only listen to but also record your own track in several popular digital formats. Such a mode of operation is important for university projects or other independent activities. Obviously, the digital instrumental-music higher education of the future will integrate with such software solutions, which will seriously improve the performing skills of students, working through their results.

Conclusions and Implications

So, the modern digitalization of higher music education is a relevant process that has been influenced by the introduction of distance learning after the global pandemic of COVID-19. The appeal to digital resources has gone through several stages during its development, each of which has had its own effect on the teaching of instrumental and performing arts to students. In particular, current trends have shown the importance of moving away from previous paradigms of reproductive learning in favor of adopting a personalized approach that emphasizes the creative capabilities of higher education applicants. The advantages of using digital technologies during music and instrumental education in higher education institutions include the action of interactivity, integrality with modern technologies, didactic potential, comfortable conditions for learning and creative work, the economy in the use of resources, etc. At the same time, the use of digital technology has certain disadvantages. First of all, we are talking about the need for additional digital competencies in working with programs and the Internet environment, which should be paid special attention to (as well as certain programming skills required during the training).

Techniques for the use of digital programs in higher education music-instrumental training will evolve in the future toward a larger student audience and the possible collaborative writing of melodies and entire compositions. The use of digital technology is favorable to the development of public tastes and greater contact with potential consumers. The example of the Notion 6 program shows the possibilities of involving such technologies in the educational process. At the same time, teaching methodologies that would unlock the full potential of digital technologies in the music arts remain understudied. Usually, university teachers demonstrate conservatism in their work, which requires additional revision with sound scientific conclusions.

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