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Transforming music pedagogy: integrating digital production tools into modern education

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Abstract

The use of digital software and technology has had a significant effect on how the modern music industry functions and produces music. This paper will examine how streaming services, digital audio work stations, social platforms affect the way money is made in the music industry, how music is produced, and how artists interact with their audience. This study uses an empirical method based on the International Federation of Phonographic Industries' annual reports detailing the trends of world-wide recorded music and it's segments. It also utilizes other academic papers and industry reports, which provide a comprehensive look at the music industries transition into being a digitally driven industry. The study analyzes the potential of digital transformation of music education and proves that the introduction of innovative teaching tools and methods contributes to the expansion of the conceptual vision of educational functionality, increasing its transparency, efficiency and adaptability. The key capabilities of digital technologies to increase the involvement and motivation of students, their creative growth, as well as to create an inclusive and dynamic educational environment, and to create the preconditions for effective exchange of experience on a global

musical scale are considered. In general, this study has shown that digital platforms and software have been a major factor in the changes taking place in the music industry, leading to its transformation towards greater platform orientation and influence on new monetization models and new performance practices. It is proved that current trends in the development of digital education are aimed at personalizing learning, creativity and efficiency, which is achieved through the involvement of online collaboration, adaptive technologies, artificial intelligence and social networks. However, digitalization has created many challenges for all parties involved, including issues related to unequal distribution of income due to algorithms, dependence on these algorithms, and competition with artificial intelligence-generated content.

Keywords: musical art, music industry, online platform, interactive technologies, digitalisation, streaming, innovations in piano teaching, digital competencies of a musician-pedagogue.

Introduction

The traditional concept of music pedagogy demonstrates a desire to evolve, attracting innovative opportunities to improve the learning process. Experimental research demonstrates the unlimited potential of digital technologies for the development of students' musical competencies, creative progress, and the formation of creative thinking skills. Now, with an inexpensive laptop, internet connection and minimal technical skills, artists can create music in the comfort of their own home, make that music available for download/streaming from anywhere in the world via various online streaming services and reach millions of fans globally. Not only has this process of democratizing access to music production technology transformed how we produce our music, but it has also fundamentally altered the way in which we perform our music and ultimately the economics of creating art (Hesmondhalgh & Meier, 2018).

Digitalization offers fundamentally new teaching methods, including the use of online communication, multimedia, virtual reality, and interactive applications, which makes the educational process more flexible, efficient, and creative. Interactive tools, such as virtual musical instruments, digital sheet music and scores, and targeted mobile applications, make it easier to master the basics of music theory, instrument playing, vocal skills, and ear training. The rapid development of software and applications for music education raises the problem of adapting traditional pedagogical methods to new realities and the issue of qualification of the teaching staff of educational institutions. In addition, the perception of digital technologies in education by both future musicians and teaching staff is quite different, with students demonstrating greater openness to the use of innovations than professional musicians. The related issues of ethics, copyright, and academic integrity should be

noted separately. This raises the dilemma of the potential benefits and challenges of integrating digital technologies into music pedagogy.

Literature Review

The basis for the digital upgrade of modern music pedagogy is the overall digital transformation of the musical environment. The literature review on the digital transformation of music can be divided into three main blocks:

the impact of platforms on distribution and consumption;

the role of software tools in production;

the evolution of performance practice.

All blocks reflect the various forms of technological innovation affecting the economics, creativity and social processes of the music industry. This research is based on quantitative data, qualitative interview material, and theoretical models to show how digitalisation can be said to affect the relationship between music being accessible and fairly rewarded to its creator. The research into the influence of platforms upon the distribution and reception of music was primarily developed by Hesmondhalgh and Meier (2018). They explain how companies like Google, Apple and Spotify have replaced traditional record labels and transformed music into "attention commodity". In this respect they explain how the availability of music for consumers has been greatly enhanced through the advent of streaming.

However, they also point out that this increase in access has led to a significant reduction in artist earnings through lower royalty payments and greater corporate control of the music industry. As they say, "Digital economy strengthens capitalist systems in which value is placed upon algorithms rather than cultural value." These findings were echoed by Wlomert & Papies (2016) who used the example of Spotify entering Germany to illustrate how the advantages of digital formats are becoming increasingly prevalent over their physical counterparts. The authors found that as well as replacing traditional sales methods, streaming services are changing the way musicians can earn money from their music. Streaming services create additional earning potential for artists through subscription-based services and advertising. But this does not mean that all independent artists will benefit equally.

Early works were followed up by newer works that reflect a longer-term platform development. Dolata (2020) is found in the study "Digital Transformation of the Music Industry. Second Decade: From Download to Streaming." This work provides an in-depth history of streaming, particularly in regards to how services like Spotify, Apple Music, and Tencent Music changed the entire value chain from creation to consumption. According to Dolata, these platforms don't simply provide music; they create the preferences for consumers with personalized music recommendations leading to the "platformization" of the whole industry.

In their work titled "Platformization of the Music Business Ecosystem in the Netherlands," Geurts and Cepa (2023) expand upon this concept of "platformization". They show how established traditional labels are being surpassed by new digital players who are providing all aspects of the music experience including distribution, promotion, and even creation. Finally, Barata and Coelho (2021) analyze factors associated with the adoption of streaming services and identify habit, hedonic motivation, and perceived value of the premium model as primary motivators for transitioning from illegal (pirated) to legal music consumption. Walsh (2024), takes a more social science approach by documenting how streaming transforms personal music listening into a socially networked activity in which music becomes a part of users' daily identity.

To describe the impact of digitalization on music production and the performing arts as described in academic research regarding software tools involved with the creation of music, democratization is emphasized. The democratization of music creation refers to the involvement of more people than before in creating music. Kjus (2026) discusses how Digital Audio Work Stations (DAW's) like Ableton Live and ProTools are evolving from being a tool for the musician to be a labor relation platform. It is shown in the article that besides making it easier to do technical tasks, DAW's are changing how musicians organize their work; they are enabling more musicians to produce music in the comfort of there own homes and through the use of cloud based applications, they are providing access to large communities of other musicians.

Reuter (2022) provides another perspective on how DAW's have changed the way that popular music is produced. He argues that due to the ability of DAW's to allow musicians to combine samples, synthesizers and live instruments together while producing music in real time, pop production has been dramatically changed. A study done by Chen and Wang (2024) places DAW's within the larger context of survival in the digital age. They argue that DAW's enable hybrid genre productions and inter disciplinary experimentation however they also create competition between solo artists who create using DAW's and traditional composers. Another important aspect of music production that Bell et al. (2026) highlight is the importance of YouTube as a educationally valuable resource for DAW users. This forms a new pedagogy of music production among young musicians.

The shift from traditional stage performances to hybrid digital performances is documented by academic studies related to the evolution of performance practice. An example provided by Parc and Kim (2020) about the Korean music industry demonstrates how digitalization has enabled the transformation of K-pop from physical album sales to global streaming and virtual concert performances. The authors argue that technology has had two major impacts on K-pop; it has increased the size of the audience and has changed the focus of management. Instead of managing albums, management now manages individual songs. Instead of focusing on audio, management focuses on video and synergistic networks. TikTok as a

platform for performance practice was analyzed in two separate studies. Skelton (2025) and Winkler et al. (2024) provide empirical evidence that directly relates to the virality of short videos posted to TikTok and its effects on streaming metrics and live performances. Users of TikTok are more likely to pay for premium subscriptions and attend live concerts but, because of the short format required for posting on TikTok, the length of songs and narratives may be altered.

There has been significant current study about the total transformation of the digital music business. There has also been a lot of focus on the role of independent artists with regard to how they make money from their work. As stated by the authors there are now many more software tools and streaming platforms, where the democratization of music creation/distribution has made it possible for hundreds/thousands of independent artists to produce/create and distribute content without the help/support of large record labels (Darvish & Bick, 2024; Chen & Wang, 2024). At the same time, the influence of artificial intelligence (AI) in music is expanding. This AI can be used to generate/compose musical works/arrangements, as well as generate/recommend musical playlists through recommendation algorithms. This is radically transforming the way in which artists are able to creatively develop their works, and also how artists will receive compensation for their works (Arenal et al., 2026).

These studies demonstrate that this is a double-sided issue. On the positive side, technology has lowered the barriers to entry into the market and opened up global markets for independent artists. However, technology has created an additional barrier to entry into the market in terms of economic equality. Specifically, because so much royalty money is earned by just a few top artists, and since visibility through algorithmic recommendations is more important than artistic value (Kjus, 2026), Hesmondhalgh & Meier (2018);

Digital transformation has impacted both the industrial and artistic aspects of the music industry through how musicians perform their craft, how they teach, and how students learn. The research area includes:

the influence of digital technologies on both instrumental and vocal performance by using digital tools and platforms that enable artists to blend traditional techniques with newer ways of expressing themselves electronically, such as live-looping, AI assisted improvisation, etc.; and how innovation in piano education and voice pedagogy emerge from the use of DAWs, interactive applications and/or Virtual Instruments that provide opportunities for a more customized form of learning and enhance the digital literacy of a music educator/pedagogue (Parkita, 2021; Li, 2025; Mazlan et al., 2026; Wu, 2026). This will help ensure that a music educator can effectively integrate technology into their educational practices, analyze in real time student performance, adapt their teaching methodologies to meet an individual's needs. In general, the contemporary literature states a predominantly positive transformation: democratization of access, lowering of barriers for independent

artists, and the emergence of new forms of creativity. At the same time, almost all authors point to systemic problems, such as uneven distribution of income, dependence on algorithms, competition with AI content, and loss of control of creators over their own product (Dolata, 2020; Hesmondhalgh & Meier, 2018; Kjus, 2026).

The issue of integrating digital tools into the process of music education has been considered in a number of publications by contemporary researchers. In particular, Abuhassna et al. (2020), Saienko et al. (2022), Haleem et al. (2022) analyzed the general capabilities of innovative information and communication technologies tools within the current concept of education 4.0, which is based on the principles of adaptability, personalization, interaction, and extended learning. The researchers examined the possibilities of online educational platforms and artificial intelligence in the context of learning profiling and prediction, assessment, adaptability and personalization, as well as the creation of intelligent learning systems. The results of the research convince us of the need to integrate art education with other disciplines, which will expand the potential of learning and form a non-standard approach to mastering competencies.

Regional studies investigate different components of the development of the educational aspect of the digital розвитку music industry; however, no broad study exists which analyzes digital platforms, the use of software applications used for music production and performances, and changes in music production and performance practices through an examination of present empirical research. Additionally, regional studies have insufficiently analyzed how statistics can be visualized to discover key industry trends. Despite the fact that the scientific discourse in the field is becoming increasingly differentiated due to the rapid development of digital solutions in the field of music, most of the studies are rapidly losing relevance due to a narrow-profile approach to the study of the problem. The issues of comprehensive practical integration of digital technologies into the process of music education based on the principle of continuous improvement remain poorly understood, which requires an expanded scientific approach and actualization relevant to modern digitalization capabilities. Therefore, the purpose of this article is to outline major elements of the digital evolution of the music industry in the educational context by utilizing a combination of quantitative analytical methods along with graphic representations of data.

Methods and Materials

A variety of both qualitative and quantitative research was completed by means of a mixed-methods approach. The method enabled us to assess the influence on how we create music as well as how we present or "perform" music with respect to digital platforms and software tools. Thus, the main methodologies used in our study included a systematic literature review and secondary data analysis. These

methodologies enable us to assess current trends within the digital transformation of the music industry without having to collect and/or use first-hand experimental data.

Statistical official data, specifically the report published annually by the International Federation of the Phonographic Industry (IFPI, 2026) contained all necessary data regarding the global revenue generated from recorded music and the breakdown of those figures into its various sub-segments (streaming, physical media, digital downloads, performance rights, synchronization etc.) provided the empirical foundation for this study. In addition to the IFPI report, our research also incorporated industry reports related to social media's influence upon the music industry; in particular the TikTok Music Impact Report (2024), and analytical reports on the DAW and Home Studios Markets.

This is a selection criterion for the modelling based on the time-series data of selected key performance indicators of the music industry for the years 2010–25. It allows us to investigate structural transformation of the music industry from traditional media consumption forms to digital consumption forms in this period. This is an initial period of identification of the trend and development of predictive models reflecting long-term developments in the record market.

Statistical evaluation was performed with use of IBM SPSS Statistics 27. Exponential Smoothing (Brown Model), and ARIMA (Autoregressive Integrated Moving Average) were used to develop time-series models allowing us to examine dynamic behavior of each segments of the market and perform short-term forecasting. Quality of developed models was evaluated by Coefficient of Determination (R2). R2 values range from 0.837 to 0.996. These are very good indications of goodness-of-fit and trustworthiness of the outcomes.

The research also utilized descriptive statistical methods, such as the determination of growth rates (YoY), Compound Annual Growth Rate (CAGR) and segmentation-based analysis of revenues. These allowed us to establish important trends within the music market, particularly that the dominant trend has been the increasing use of streaming; while there has been a continued but slower decline in the use of digital downloads, an overall shift in how people are accessing media (from physical to virtual).

Additionally, the literature review was compiled from published academic papers taken from Scopus, Web of Science, Google Scholar, and Research Gate databases, during the time frame 2016 through 2026. More than 40 academic articles were reviewed, approximately 25 of those were further examined using deeper theoretical frameworks to analyze. As such we have ensured the incorporation of both empirical data as well as contemporary theoretical frameworks regarding digitalization, the impact of platforms on industries and the transformation of the music industry. The criteria for assessing the quality of sources were the relevance and objectivity of the publication, completeness of coverage of the topic, and authority. The criteria for inclusion and exclusion of publications were spatial and temporal indicators and the

level of information reliability. Steps for removing duplicates: determining the criteria for uniqueness (study title, DOI, author), searching for duplicates and their subsequent removal. To reduce the internal bias in the publications used for this study, the strategy of open access and reuse of data was applied.

To achieve this goal, theoretical research methods were used. Analysis and synthesis were used to comprehensively study scientific approaches to the definitions, essence and functionality of digital education in the context of the music field. The method of induction allowed us to generalize the trends in the development of the phenomenon under study on specific facts, while deduction allowed us to verify them on specific examples. Abstraction was used to identify the most important aspects of the problem. Prediction allowed us to foresee potential trends in the development of cultural processes and the music education sphere in the context of digitalization.

Limitations of the study include the use of exclusively secondary data, which does not allow for the full consideration of the subjective experience of musicians and regional peculiarities of the industry development, particularly in Ukraine. In addition, the rapid evolution of digital technologies, including the development of artificial intelligence tools, may affect the relevance of the results in the short term.

Results and Discussion

Based on the report of the International Federation of the Phonographic Industry (2026), we will analyze the key indicators specified in the report. We will identify the main trends and try to predict the future values of the indicators in the short term. The research period will be 2010-2025. This is the period for which all the key research indicators demonstrating the global revenues of the recorded music industry (USD billion) are defined, namely:

physical media - sales of physical music formats (CDs, vinyl records, music videos) in the form of disks/records;

streaming - revenues from streaming music via services (Spotify, Apple Music, etc.);

downloads - digital downloads of tracks/albums (online music purchases);

Performance Rights - revenues from copyright and related rights for music performance (radio, TV, concerts, etc.);

synchronization - revenues from licensing music for use in films, advertising, games, etc.

Thus, the statistical analysis covers the period of 2010-2025 and includes five key sources of music industry revenue: physical media, streaming, digital downloads, performance rights, and synchronization.

The modeling will be conducted in the IBM SPSS Statistics 27 statistical package. Table 1 shows the models that yielded the best quality indicators.

Table 1. Model Descriptions

			Model Type	R-squared
Model ID	Physical	Model_1	Brown	0.924
	Streaming	Model_2	Brown	0.996
	Downloads	Model_3	Brown	0.964
	Performance_Rights	Model_4	ARIMA(0,1,0)	0.912
	Synchronization	Model_5	ARIMA(0,1,0)	0.837

Source: calculated by the authors based on data from the International Federation of the Phonographic Industry (2026)

The models used (Brown and ARIMA) demonstrate a high level of explanatory power (R^2 ranging from 0.837 to 0.996), indicating the reliability of the forecasts and the stability of the trends.

Table 2 presents the forecast values and confidence interval limits.

Table 2. Forecasted Revenue by Music Industry Segments (2026–2028)

Model		**2026**	**2027**	**2028**
Physical-Model_1	Forecast	5.58	5.87	6.16
	UCL	6.34	7.33	8.46
	LCL	4.83	4.41	3.87
Streaming-Model_2	Forecast	23.49	24.98	26.47
	UCL	24.58	27.24	30.14
	LCL	22.40	22.72	22.80
Downloads-Model_3	Forecast	0.78	0.76	0.75
	UCL	1.33	1.90	2.57

	LCL	0.23	-0.37	-1.08
Performance_Rights-Model_4	Forecast	3.01	3.11	3.22
	UCL	3.31	3.55	3.75
	LCL	2.70	2.68	2.69
Synchronisation-Model_5	Forecast	0.62	0.64	0.66
	UCL	0.74	0.81	0.87
	LCL	0.50	0.47	0.45

Source: calculated by the authors based on data from the International Federation of the Phonographic Industry (2026)

Note: UCL – Upper Confidence Limit; LCL – Lower Confidence Limit

Based on the modeling and forecasting results, we can identify key trends by segment.

Streaming will continue to be the most important growth driver. The data show, however, that streaming has by far the strongest growth rates and that it nearly perfectly fits our model ($R^2 = 0.996$). Accordingly, we expect a strong and continuous revenue development for this format. The expected total revenue for this segment is about $23.49 billion in 2026 and increases to around $26.47 billion in 2028. It can therefore be concluded that digital platforms (e.g., Spotify, Apple Music) are the primary infrastructure of the music industry today. These platforms affect both the way consumers consume their music (ownership vs. access) and how artists perform:

- the increasing importance of algorithms as promotional tools;
- the increasing number of artist-created "streaming friendly" songs;
- the adaptation of music production to shorter formats and rapid release cycles.

Physical Media - Stabilization. The physical market shows a very weak growth trend from $5.58 billion in 2026 to $6.16 billion in 2028.

Downloads is a structural abbreviation. The downloads segment shows a gradual downward trend (from $0.78 to $0.75 billion). At the same time, the confidence intervals (UCL and LCL) indicate high uncertainty and even possible negative values, which emphasizes the degradation of this channel as an economic model.

This is a direct consequence of the development of streaming platforms, which

- change the monetization model (from purchase to subscription);

- reduce the need to own digital content;
- form new consumption habits.

Performance rights - steady growth. Revenues from performance rights are gradually increasing (from $3.01 to $3.22 billion).

This reflects the expanding use of music in:

- digital media;
- radio and television;
- online platforms.

The growth of this segment indicates the increasing role of copyright in the digital environment, which is an important aspect of the functioning of modern platforms.

***Synchronization is the smallest but most stable segment*.** The synchronization segment has the lowest values, but shows steady growth (from $0.62 billion to $0.66 billion).

This is due to the expanding use of music in video content:

- video content (YouTube, TikTok);
- video games;
- advertising.

Digital formats have increased greatly the necessity for synchronizing music to digital forms, this has had an impact on integrating music within Multimedia Systems.

In terms of the overall direction of the world-wide music industry we see that there is a radical shift happening due to the introduction of digital technology. The first aspect to note is the high degree of digitization occurring across the entire music industry. As consumers move away from traditional methods of consuming music through physical media (i.e., CDs), and purchasing individual tracks for single use; they will continue to seek out and utilize digital music platforms based upon subscription models. This model is having an effect on the financial structure of the music industry, and is generating increasing amounts of money through users paying a fee to access content on a regular basis rather than buying individual music products. In addition to generating additional funds through subscription models, the emphasis placed upon developing digital services continues to grow in importance as a factor in defining the nature of the world-wide music market.

Beginning in 2019, it was reported that “platforming” was becoming more popular. Platforming relates to the process of having the key components of delivering music (making music accessible to listeners), marketing the music, and generating income through sales or other means for use with music being concentrated into few larger providers of on-demand streaming services. As companies such as Spotify and Apple Music continue to lead the way in terms of providing streaming access to consumers, a new paradigm has emerged. These services now represent the center point for both

music-related and financially related activities. The algorithm-driven processes play a significant role in these platforms. In addition to identifying which artists' music will be provided additional exposure and promotion; algorithms also identify how much revenue each artist can earn.

While all this was going on, there has been a huge transformation in how music is made. The majority of modern music today uses digital tools to create music – specifically Digital Audio Workstations (DAWs) which are the programs where you record your music; Sound Processing Software like plugins which add effects or modify your sounds; and tools using AI technology. These new technologies have opened up many more creative avenues than before – it also has sped up the process of making music – and improved the overall end result of music. However, while all these technological advancements were happening, the way we produce music today has become much more dependent upon the needs of the various online platforms. Artists/Producers now must consider what algorithms will do to help promote their products, thus creating a need for more frequent releases; shorter song formats; and the utilization of Data Analytics for both creative & business decision-making purposes.

The global revenue generated by the recorded music industry grew dramatically in 2025 according to the International Federation of the Phonographic Industry. In fact, the global revenue reached a record high of $31.7 billion in 2025; which represents an increase of over 20 percent. Compared to the previous year there was an increase of 6.4 percent, and this was the eleventh straight year of increasing global music sales (International Federation of the Phonographic Industry, 2026). Once again, streaming was the leading source of revenue. Specifically, the amount of money earned through streaming in 2025 totaled $22 billion and represented 69.6 percent of all recorded music revenue. Further, subscribers to pay service increased by 8.8 percent. Subscribers account for 52.4 percent of the total revenue and represent 837 million people who subscribe to music streams. This is up from approximately 850 million people just one year ago (International Federation of the Phonographic Industry, 2026)

Similar to consumers using music more than ever before, producers are creating music differently than they did previously. Software called digital audio work stations (DAWs) has changed the way professional quality music is created. DAWs include software like Ableton Live, Logic Pro, and FL Studio. These programs have become accessible to millions due to their affordability and ease of use. Therefore, the DAW market size is expected to be $3.49 billion in 2025. Based on historical data, it is predicted that the DAW market will experience compound annual growth rate (CAGR) of 8.2 percent until it reaches $7.16 billion by 2034 (Fortune Business Insights, 2026). Home recording studios are also experiencing explosive growth. The home recording studio market is expected to reach $3 billion by 2025 (Real Time Data Stats, 2025). As a result of affordable technology, independent artists can create new sounds using

samples, synthesizers, and effects. They do not need to spend large sums of money renting expensive studios to collaborate with other musicians either.

The influence of social media on how we perform music has also changed dramatically. Viral hits on TikTok have become the major drivers for making music go global; 84% of all songs which ended up on the Billboard Global 200 list in 2024 were there because of a moment of viral fame on TikTok (TikTok, 2025). The short, vertical video format does not just discover emerging talent, but shapes song structures, chorus lengths and emotional narratives. In addition to traditional live concerts, artists now engage with their fans through live streaming, virtual shows, and hybrid events which allow for interactivity and a sense of immediacy. Performance practices thus move from being an event-based experience to having a presence across multiple layers of digital space.The digital transition represents an important development from a humanistic viewpoint. While this has opened up opportunities for thousands of talented musicians — especially those in regions without access to adequate physical networks (such as the Global South and Ukraine) — there is a lot of concern about the distribution of wealth generated through digital platforms. The digital landscape is creating several issues for artists. For example, with over 100 million new tracks released every year, the amount of competition is saturating the market and making it difficult for artists to stand out. Artists may also be concerned about the ethics surrounding the potential of AI-generated music. Social media algorithms represent yet another type of gatekeeper. In addition, with the current model being so heavily dependent on metrics (e.g., number of "likes" per artist or number of streams), many artists are being evaluated by how well they perform based on these metrics instead of how good their artistic talent is.

The intent behind this article is to provide an overall view of how both digital media platforms (such as Spotify, Apple Music, and TikTok) and software development programs (also known as Digital Audio Workstations or "DAW") have impacted both the way that people create music and perform it. Based on empirical research using current statistics, academic articles, and current reports from major organizations, this research provides an opportunity to graphically represent changes occurring in the area (i.e., revenue growth; streaming percentages; DAW market changes), and to show these same changes through graphical representations (tables; charts). This subject matter has relevance because it is changing at a rapid rate: by 2025-2026 AI technology will be generating tens of thousands of new songs each day, with much of that content being used as filler to produce millions of streams daily. As such, there are growing concerns regarding whether musicians/creators will continue to receive fair compensation for their work.

Equally important is the process of transforming performance practice, which is influenced by digital platforms and new models of music consumption. Performers are changing their approach to creating music content, focusing on the peculiarities of streaming services, where parameters such as track length, its ability to hold the listener's attention, and the potential for viral distribution are becoming important.

In addition, the role of social media as a tool for communicating with the audience, promoting one's own work, and building an artist's personal brand is growing significantly. Thus, performing arts activities are becoming integrated with digital ecosystems, which changes not only the way music is distributed, but also the very nature of artistic activity.

The medium term forecasts for this sector with the aid of statistical models suggest that the described tendencies will grow stronger. It is therefore predicted that streaming platforms will remain the largest single source of income for the industry and will grow steadily in order to confirm their dominant position in the modern music industry. On the other hand, it can be said that the physical media segment will continue to exist but mostly as a specialized or niche market with relatively weak dynamic development. It should also be noted that digital downloads (in contrast) are expected to experience a continued decrease because of the overwhelming dominance of streaming services as the primary method by which people consume music. Revenues generated from performance rights and synchronization are expected to rise over time due to increased utilization of music through various forms of digital media, advertisement and video/

These technological developments have a significant impact on social inclusion in music creation. They fundamentally democratize the production process and make it accessible to all people who were previously limited by physical, financial, or geographical barriers. The current study recognizes the importance of digital learning environments in the context of developing the competencies necessary for effective social progress towards a culture of communication, strengthening the philosophical concepts of cultural and ethical development for social progress.

The digital upgrade of music education involves the use of modern information and communication technologies for the formation and development of musical competence. The process involves the integration of online platforms, interactive and virtual tools for learning music theory, arrangement programs, master classes, mobile applications, and other learning tools. Digitalization makes the learning process more personalized and engaging, promotes adaptive learning, and the development of creativity, while the synergy of interactive approaches and social media allows for an active position in the global music community.

Regarding artificial intelligence in music education, it is advisable to highlight the key areas of promising use: personalized learning that takes into account the learning style, progress, and individual requests of the student; evaluation of exercises and performance techniques with instant feedback; development of musical skills through gamification, where AI regulates the complexity of tasks; engagement of virtual assistants to provide instructions, advice, and support; digital arrangement (Mandanici et al, 2023). Interactivity and an integrated approach to the use of AI will help expand the didactic possibilities of music education, increase the comfort of the learning environment, and stimulate the creative development of future musicians.

Immersive technologies, including virtual reality (VR), augmented reality (AR), and mixed reality (MR), help to optimize music education by creating a sense of interaction and real presence. In particular, VR allows for an immersive experience, creating an impression of a real concert hall or recording studio, equipment not available in real life, and visualizing complex musical concepts (e.g., sound waves) that are difficult to represent using traditional methods.Various programs are used to integrate VR into music education, including:

- TheWaveVR and MelodyVR - a platform for attending virtual concerts and interacting with the environment;
- SoundStage and VRChat - platforms for creating your own music studios, including equipment for recording and arranging, organizing music events;
- Virtuoso is a program for playing virtual instruments;
- MuseScore VR and the Fretello app for playing notes in a virtual space.

Modern music technologies, including digital sound stations such as Garage Band or Soundtrap, contain a wide range of sound and effect samples, musical instruments, and audio editing capabilities. GarageBand is equipped with functionality for mixing tracks and exporting finished works, while Soundtrap, thanks to its cloud-based technology and intuitive interface, offers real-time collaboration on music projects (Park, 2021).

When teaching instrumental music, it is advisable to use digital metronomes and tuners (TonalEnergy Tuner, Pro Metronome, etc.) that allow you to maintain the correct tempo and instrument tuning. Applications for music notation and composition (MuseScore, Sibelius, and Finale), instrument simulators, applications for ear training (Tenuto and EarMaster) and singing (Erol Singer's Studio or Vanido), and vocal analyzers (VocalPitchMonitor or Sing&See) have promising functionality.

It is necessary to connect the subject of research with key approaches of critical pedagogy. In particular, the theory of critical democracy and cultural policy (Henry Giroux) is of particular interest. This theory considers the educational sphere as a public environment where students learn to be active citizens by analyzing the influence of power, media, and culture. Positioning itself as a basis for sustainable development of education, the theory proposes transdisciplinarity, dialogic instead of monologic, social reconstruction, and learning through solving real social and personal problems.

In view of the above, it is advisable to formulate a strategy for the prospective digital upgrade of music education in the context of modern realities, which involves: integration of personalized curricula, adaptive exercises and testing based on the analysis of the progress and difficulties of each student; active involvement of the potential of immersive technologies to create an immersive virtual musical experience; use of gamification with an adaptive level of complexity; integration of software and applications for interactivity; in-depth analysis of the

Conclusions

The current research gives a broader insight to the changes occurring within the music industry's transformation process in relation to digital technologies and software tools. Through combining of the empirical data collected with the model used to determine the outcomes, it can be seen that during the last decade, there was a fundamental paradigmatic shift from a materialistic based musical market model toward a service platform-based musical market model. The result of this paradigmatic shift is that users no longer obtain possession of their music; they simply gain access to the content.

This means that there is a complete paradigmatic shift in how people consume music. As such, this paradigmatic shift will significantly affect the way consumers and content producers receive compensation (income) from consuming and producing music.

The evaluation of the times series data for the years 2010-2025, combined with subsequent forecasted estimates of future revenues clearly illustrate that many segments of the industry exhibit a structural asymmetry in terms of their rates of growth. Clearly the most dynamic and defining segment of the industry is streaming. Streaming functions as the core infrastructure component of today's music markets. It does not merely compensate for lost revenue due to declining traditional forms of revenue streams (i.e., downloads); it generates entirely new methodologies of distributing value through reliance upon algorithmically generated recommendations and consumer/user behavioral data. Consequently, music is becoming an increasing part of a digital service and less a single stand-alone product.

In contrast, the segment of the digital download market continues to lose its economic relevance, further evidenced by a movement away from models of one-time purchases toward models of continuous access. Although physical media exhibits some stability, physical media is ultimately becoming a niche format that fulfills a cultural/symbolic role as opposed to fulfilling an economically dominant role. Therefore, this demonstrates that there is now a differentiated music market where various formats exist simultaneously; however, each format carries differing levels of strategic importance.

In the field of music education, new opportunities are currently being actively developed to improve the effectiveness of the educational process through active interaction with a number of non-standard pedagogical methods and approaches based on interactive technologies. The article's unique contribution to the field's scientific discourse is seen in the combination of the study of the key concepts of digitalization of the music sphere with the possibility of using them in the educational environment of music teaching. Digital technologies make it possible to visualize abstract musical concepts such as rhythms, harmonies, and musical structures, which makes them easier to understand, and simulating performances and experimenting with different musical styles increases the involvement of students and promotes

their creative development. A variety of digital tools and resources, from online classes and gamification to virtual reality and music creation programs, allows us to rethink the pedagogical concept of teaching music, promotes individualization and inclusiveness of education, allows us to build sustainable musical competencies and motivates further learning.

While digitalization does create new opportunities it also creates many new problems. One example is the increasing dependency on platform algorithms. Algorithms create barriers to entry in terms of diversity of content while at the same time creating concentration of attention around a few successful artists. Another problem created by digitalization is a redistribution of revenue in the value chain where questions arise regarding fairness and levels of payment to authors and/or performers.

To summarize, it can be said that due to digital technologies the music industry today is undergoing a deep structural change. These processes encompass not only economic dimensions but also cultural, technological and social dimensions; ultimately leading to a new system of music production and consumption.

Limitations of the study include unclear boundaries of the topic, insufficient sources, risks of bias, and difficulty of experimental verification. Future research into the music industry should therefore look into how artificial intelligence, the algorithmic economy and future digital platforms affect the development of the music industry.

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