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THE EUROPEAN DIGITAL MUSIC ACADEMY

TEDMA

Needs and perspectives for the training of digital skills at universities in four European countries.

An ERASMUS+ funded project

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1. ANDintroduction to this TEDMA-Project

The world is becoming increasingly digitalized and, especially since the Covid-19 pandemic, all areas of our daily life have been affected. From jobs that are increasingly being replaced by remote work, to communication technologies that are shifting from face-to-face meetings to video conferencing, to entertainment programs - especially in the music industry - that are replacing live performances by creating digital livestream formats have developed.[1] These few examples show the disruptive changes that digitalization brings with it in both private and professional life.[2]

Apart from this digital transformation process, professional musicians have to deal with a wide range of skills, from technical instrumental skills to self-management, concert booking, branding and communication skills, knowledge of legal aspects such as copyright issues, networking skills and creative potential necessary for success in required by the modern music industry.[3]

Advancing digitalization is not only shaping everyday life today, but is also changing fundamental work structures and requirements in the music industry. This is where it sets **TEDMA-Project** whose aim is to promote the necessary digital and interdisciplinary skills for musicians and students in the live music sector. Through targeted collaboration between music universities and technical institutions in Germany, France, Denmark and the Netherlands, the project pursues a practical further development of teaching methods that help students to assert themselves in the digitalized music landscape and to meet the requirements of the modern music industry.

Project structure and goals

Four central goals were defined in the TEDMA project:

1. Surveying the status quo of digital skills at universities in the participating countries.
2. The development of an application-oriented methodology for digital skills that provides students with practical skills for the music sector.
3. Promoting an interdisciplinary approach that brings together different actors and disciplines of the music ecosystem.

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[1] Fischer, Benjamin: Concerts for the couch. In: Frankfurter Allgemeine Zeitung [online: https://www.faz.net/aktuell/wirtschaft/musiker-in-der-corona-kritik-die-professionalisierung-der-live-stream-konzerte-17049576.html (last access December 8, 2022)].
[2] Döhring, B. et al.: COVID-19 acceleration of digitalization. [online: https://link.springer.com/content/pdf/10.1007/s10368-021-00511-8.pdf?pdf=button, (last accessed December 8, 2022)].
[3] Schneiderwind, Peter and Tröndle, Martin: Self-management in the music business. 2014, p. 14-15.

4. The creation of sustainable impulses for university curricula in order to anchor digital skills in the long term and sustainably.

The project is divided into several phases, including in-depth secondary research to assess needs, the development of a practice-oriented methodology and the implementation of international multiplier events to disseminate the results and promote exchange. Through this structured approach, TEDMA creates significant European added value, which enables the partner institutions to successfully master the digital challenges of music education and create a sustainable basis for students.

The digitalization of the music sector, which brings new approaches to the practice, production, communication and performance of music, raises the question of the need for further development of higher music education curricula. Therefore, the European Digital Music Academy (TEDMA) was founded to address this much-needed process of innovation in the live music sector and music education. Experts from four music academies and three music industry companies from four different countries, Germany, the Netherlands, France and Denmark, came together to spend two years analyzing the current state of digital skills training at universities and developing a training methodology for these institutions to impart effectively teaching digital skills to music students. The participating partners were:

- New Music Impulse Foundation (Germany)
- TH Lübeck (Germany)
- SDMK South Danish Music Conservatory (Denmark)
- Hanzehogeschool Groningen (Netherlands)
- SPOT Groningen (Netherlands)
- IMFP (France)
- SYL production (France).

With these project partners from Germany, the Netherlands, Denmark and France, the following five needs are to be addressed:

1. The live music industry is facing a digital transformation and must deal with new target groups, rapidly evolving consumption habits and the demand for digital consumption and multi-sensory experiences. This requires new skills in the training of the live music sector's current and future professionals (i.e. students) so that they can create new performance formats that improve the relationship between audiences and artists and reach new audiences. This is an EU-wide challenge that requires cross-border cooperation.

2. Digital skills are not yet well integrated into university curricula: students wishing to work in the live music sector are not provided with the right digital learning content, practices, methods and tools to cope with the evolving nature of live music. music sector is facing.[4]

3. The same university curricula are not yet fully integrated into an interdisciplinary approach. At the same time, tomorrow's live music professionals will need to master various tools (for production, management and communication) to better adapt to the digital evolution of the industry and meet audience demands.[5]

4. Work-based learning is still not a common practice in colleges/universities, although this is beneficial for students who can gain a more hands-on experience and for live music professionals who can benefit from a new and fresh perspective on their practices through today's times . “Digital native” students.

5. The various national music university systems are currently not well connected, which hinders cross-border learning and the exchange of practices.

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[4] Treß, Johannes: Acting self-determinedly and critically in a post-digital future? A critical review of digitalization in music education. In: cefjournal (2023), p. 67. [online: https://doi.org/10.5281/zenodo.8010504 (last accessed, March 28, 2024)].

[5] Tobias, Evans: Inter/Trans/Multi/Cross/New Media(ting): Navigating an emerging landscape of digital media for music education. In: Randles, Clint (Ed.): Music Education. Navigating the future. New York 2015, pp. 91-93.

Taking all of the above into account, this project aims to answer the following research questions:

1. *What is the current status of digital skills training at universities in Germany, the Netherlands, Denmark and France?*
2. *What digital skills do musicians need to acquire during their studies in order to cope with digital transformations?*
3. *How can these skills be integrated into the academic curriculum?*

The TEDMA project aimed to improve the digital skills and competencies of university students and live music professionals. It addressed the need for innovation and the challenges of digitalization in the live music sector, which were accelerated by the COVID-19 pandemic. Although some best practices already exist - both in higher education institutions and in live music organizations - TEDMA brought together students and professionals in the live music sector to specifically develop their digital skills and strengthen their adaptability to digital change. A key objective was to create sustainable value for a long-term career, supported by the development of a methodology that addresses these needs and enhances live music performances through an interdisciplinary approach that integrates actors from different disciplines of the music ecosystem (performers, sound - and lighting specialists, PR and marketing specialists).

The project was characterized by collaboration between music colleges and technical institutions that developed innovative teaching methods to promote both technological and artistic skills and strengthen European exchanges. This transnational collaboration made it possible to integrate European perspectives and best practices that go beyond the national framework and are tailored to the needs of the entire live music sector.

In the following chapter we will first categorize and summarize the existing literature and describe the methods and experiences of other universities that have already been used. The third chapter shares the experiences from our own studies during the TEDMA project and presents the students' learning and audience reactions when the training results were presented at four events in each partner country. Finally, there

will be a series of recommendations for institutions interested in incorporating digital skills training into their own curriculum.

2. Training digital skills: status quo at universities

The TEDMA project aims to promote digital skills in music education and establish sustainable teaching methods for students. In order to analyze the existing gaps and potential progress, a literature search was carried out that illuminates both the current training practice at universities and the approaches to promoting digital skills.
Before the findings from the TEDMA project research are presented, an overview of the already exciting literature and theories on digital skills transfer at universities should be given. The starting point of the TEDMA project was the theoretical examination of existing approaches to training digital skills, not only to inspire and bring in new perspectives, but also to acknowledge the hypotheses described in the introduction.

As Minors, Burnard, Wiffen, Shihabi, and van der Walt argue in their joint paper on trends and challenges in higher music education, the need to reconceptualize and further integrate technology into education is evident in today's digital and competitive environment Music industry.[6] The relevance of the TEDMA project also derives from this perspective - it provides insights into the current situation of many educational institutions, which will now be examined in detail.

2.1 Training digital skills and methodologies for the live music sector in higher education curricula

Learning music has constantly evolved over the years. In an increasingly digital world, apps, smartphones, hardware and software are becoming increasingly popular in dealing with musical art. As Gouzouasis and Bakan point out, the use of digital devices and software remains the foreseeable future in music education and is

[6] Minors, H. et all: Mapping trends and framing issues in higher music education: rethinking/changing practices. In: London Review of Education (2017), pp. 457-464 [online: https://doi.org/10.18546/LRE.15.3.09 (last accessed, March 31, 2024)].

patiently ushering in a musical revolution in music making and production.[7] Jonathan Savage agrees, explaining that new technologies offer opportunities to create, perform, learn and share high-quality music using modestly equipped personal computers.[8] For higher music education institutions, the aim must be to aim for their students to acquire professional, flexible, innovative and creative skills that enable a successful career in an ever-changing, competitive and digitalized music industry environment. [9]

To achieve this overall goal, institutions, teachers and methods must adapt. As Wan explains, the use of digital technologies contributes to the development of professional skills such as technical, creative, lateral thinking and communication skills. Therefore, teaching must also develop further and focus on a student- and practice-oriented approach.[10]

The only methodological approach related to learning digital skills described in the literature is described by Weijia Wan, lecturer at the School of Music, Soochow University in Suzhou, China. Wan suggests using the flipped classroom concept and emphasizes that the introduction of digital technologies also brings with it the introduction of modern teaching methods. The flipped classroom concept swaps the learning and practice locations and gives students the task of learning theory/music at home and then presenting/explaining/discussing content in class. Even though this concept requires an openness to new approaches, the study at the University of China showed higher competence and motivation among the participating students.[11]

Wan also conducted a survey among students to find out their skills before starting his own training experiment. Their quantitative research showed that 66% of all

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[7] Gouzouasis, P. and Bakan, D.: The future of music making and music education in a transformative digital world. In: UNESCO Observatory Refereed E-Journal, Multi-Disciplinary Research in the Arts [online: https://www.researchgate.net/publication/237067499_The_future_of_music_making_and_music_education_in_a_transformative_digital_world (last accessed, March 31, 2024)].

[8] Savage: J.: Reconstructing music education through ICT. In: Research in Education, 78(1) (2007), p. 65-77 [online: https://doi.org/10.7227/RIE.78.6 (last accessed, March 31, 2024)].

[9] Minors, H. et all: Mapping trends and framing issues in higher music education: rethinking/changing practices. In: London Review of Education (2017), p. 457 [online: https://doi.org/10.18546/LRE.15.3.09 (last accessed, March 31, 2024)].

[10] Wan, W.: Digital technologies in music education:
The case of Chinese students. In: Música Hodie (2022) [online: 10.5216/mh.v22.70752 (last accessed, March 31, 2024)].

[11] Ebd.

students already use digital technologies to some extent, meaning that a third of students do not use digital tools at all. Only 32% said they had high skills in digital technologies and 48% even said they had low skills.[12] The results reinforce the need to implement a training program to develop digital skills, indicating a lack of skill progression throughout the course of study.

A major problem found throughout the literature is the problem of creating an attitude towards an adapted learning methodology. Many teachers and students seem to be reluctant to new ideas and prefer to stick to traditional teaching methods. Ignorance of the necessary change in teaching prevents the development of learning based on digital technologies.[13] One reason for these problems could lie in teachers' relationship to digital technologies. Jonathan Savage explains the concept of "digital immigrants" - people who did not grow up with these tools - and "digital natives" who are used to these tools. Because many teachers can be classified as “digital immigrants,” the integration of digital technologies is often hindered.[14]

In general, digital technologies enable integration into several areas of music education. While there are already many applications for music practice, it is music production that has created many opportunities for artists to create music at low cost, for example through recording and mastering software. And music distribution could also be democratized, so that it would be very easy to release music on all kinds of streaming platforms these days. A broad field is also communication systems that enable artists to network worldwide, create, produce and perform music in a decentralized manner and to promote their music, particularly via social media and other channels. Finally, digital tools also enable a greater variety of stage designs for artistic expression on the performance side.[15]

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[12] Wan, W.: Digital technologies in music education:
The case of Chinese students. In: Música Hodie (2022) [online: 10.5216/mh.v22.70752 (last accessed, March 31, 2024)].

[13] Gouzouasis, P. and Bakan, D.: The future of music making and music education in a transformative digital world. In: UNESCO Observatory Refereed E-Journal, Multi-Disciplinary Research in the Arts [online:
https://www.researchgate.net/publication/237067499_The_future_of_music_making_and_music_education_in_a_transformative_digital_world (last accessed, March 31, 2024)].

[14] Savage: J.: Reconstructing music education through ICT. In: Research in Education, 78(1) (2007), p. 65-77 [online: https://doi.org/10.7227/RIE.78.6 (last accessed, March 31, 2024)].

[15] Minors, H. et all: Mapping trends and framing issues in higher music education: rethinking/changing practices. In: London Review of Education (2017), p. 457 [online: https://doi.org/10.18546/LRE.15.3.09 (last accessed, March 31, 2024)].

2.2 Existing training practices and materials for university teachers and students

Based on the general situation at music universities, this chapter explains in more detail concrete options for integrating music technology using concrete examples of apps, software and platforms. But the advantages and problems of using digital technologies and concrete practices are also explained.

A variety of use cases for digital technologies in music education are described throughout the literature. The research conducted mainly used different hardware and software to improve the practice and production of music.[16] However, other options are described and should be presented.

Music practice

Musical exercises serve to improve technical skills and understanding of music. Digital music technologies support this process by supporting practice with information, background noise or practice opportunities in different locations (e.g. on public transport). Examples of this are applications like *PocketGuitar, Chordplay, Ireal, Ocarina oder Groovemaker.*[17]

Music production

Music production software has led to the music industry's most groundbreaking changes in recent decades, perhaps along with the shift to distribution via streaming

[16] Savage: J.: Reconstructing music education through ICT. In: Research in Education, 78(1) (2007), p. 65-77 [online: https://doi.org/10.7227/RIE.78.6 (last accessed, March 31, 2024)].
[17] Gouzouasis, P. and Bakan, D.: The future of music making and music education in a transformative digital world. In: UNESCO Observatory Refereed E-Journal, Multidisciplinary Research in the Arts, pp. 3-9 [online: https://www.researchgate.net/publication/237067499_The_future_of_music_making_and_music_education_in_a_transformative_digital_world (last accessed, March 31, 2024)].

services. This is music production software such as: *MAGIX, Cubase* or *Ableton* – including DAW, MIDI or synthesizer modules, enabled the recording of far more advanced musical products.[18]

Communication channels

Smartphones, social media, video calling systems and much more have had a huge impact on our current communication, including when it comes to professional musicians, offering more opportunities to promote their music individually. But digital technologies have also opened up new possibilities beyond branding topics, including for the joint creation, joint practice and performance of music. Platforms like *Joy* or the *Online orchestra* as a digital music project can be related to this topic.[19]

Although other categories could also be mentioned (e.g. distribution), these are the most relevant when considering music education. Gouzouasis points out that most of these tools have so far been used outside the classroom, leaving learning, practice and teaching up to the students themselves. It is now the job of teachers to proactively bring these tools into classrooms to provide students with deeper and deeper sharing and learning.[20]

Savage not only recognizes benefits from the use of digital technologies, but also seeks to highlight the benefits and problems of practical application of digital technologies. In his detailed study he points out the following advantages and disadvantages:

Advantages:

1. Boys are more involved in music.

[18] Gouzouasis, P. and Bakan, D.: The future of music making and music education in a transformative digital world. In: UNESCO Observatory Refereed E-Journal, Multidisciplinary Research in the Arts, pp. 3.-7 [online: https://www.researchgate.net/publication/237067499_The_future_of_music_making_and_music_education_in_a_transformative_digital_world (last accessed, March 31, 2024)].

[19] Minors, H. et all: Mapping trends and framing issues in higher music education: rethinking/changing practices. In: London Review of Education (2017), p. 457 [online: https://doi.org/10.18546/LRE.15.3.09 (last accessed, March 31, 2024)].

[20] Gouzouasis, P. and Bakan, D.: The future of music making and music education in a transformative digital world. In: UNESCO Observatory Refereed E-Journal, Multidisciplinary Research in the Arts, pp. 3.-7 [online: https://www.researchgate.net/publication/237067499_The_future_of_music_making_and_music_education_in_a_transformative_digital_world (last accessed, March 31, 2024)].

2. Students show more pride, enthusiasm and motivation for their own work and take more responsibility for their own learning.
3. Changing the music curriculum to make it more stimulating and relevant.
4. The ease with which students approach technical pieces compared to learning traditional instruments.
5. New approaches to composition, with technology helping students who lack traditional instrumental skills.
6. A growing interest in GCSE music and other post-16 music technology options.
7. A general increase in level and improvement in skills of pupils across the Key Stage 3 curriculum.
8. An accurate representation of current topics and creative processes in the Music industry.

Use of digital technologies (In: Savage, J.: ICT, 2007)

Disadvantages:

1. Practical and technical difficulties in procurement, Implementing and maintaining music technology in a busy Classroom environment.
2. A noticeable loss of conventional musical ability in some cases.
3. Dwindling student confidence in music Performance.
4. Decreasing peer-to-peer relationships, interactions between students and group work with too much computer-based music work.
5. Difficulties in ensuring equal opportunities, especially in... limited resources
6. Different reactions of students to the use of ICT, in particular in students with traditional instrumental skills.
7. Students are unable to differentiate the quality of work from the quantity of it work, especially in composition tasks. It's easy, a lot to accomplish when there isn't much in it.

Use of digital technologies (In: Savage, J.: ICT, 2007)

While students were more motivated, engaged and creative and found new approaches to music, the conservative mindset and changing teaching and learning habits caused problems during the learning process. Even if the process of change towards digital technologies brings with it contradictions, the advantages outweigh the disadvantages.

There are several best practices from institutions integrating digital technologies into music education. Five examples will be presented here:

1. In Singapore, an experiment with video-based learning confirmed the development of cognitive abilities through the activation of all cognitive processes such as imagination, perception, thinking, reproduction, etc.[21]
2. At Aalborg University in Copenhagen, researchers proposed the use of virtual and augmented reality in music lessons to visualize content and a diverse and create a more interactive classroom environment.[22]
3. An integrative approach incorporating digital technologies has been implemented in England, following a similar approach to the flipped classroom concept. The students learned in instrumental groups and were able to develop communication and feedback skills through exchanges in class. The practice-oriented approach included digital technologies in self-study and increased creative, reflective, strategic and digital skills.[23]
4. In Spain, researchers found improved academic performance among students when they use modern technologies. Mobile applications and online learning

[21] Chua, S.; Tan, L.: Exploring online video-based professional development for music teachers. In: Music Education Research (5, 2021), pp. 580-593 [online: https://doi.org/10.1080/14613808.2021.1977786 (last accessed April 1, 2024)].

[22] Baker, D. et al.: "Don't follow them, look at me!": Reflections on a haptic digital prototype as a bridge between conductor and visually impaired performer. In: Music Education Research (21, 2019), pp. 295-314 [online: https://doi.org/10.1080/14613808.2019.1605344 (last accessed, April 1, 2024)].

[23] Gibson, S.-J.: Transitioning from offline to online collaborative music-making, teaching and learning: Perceptions of ethnoartistic mentors. In: Music Education Research (23, 2021), pp. 151-166 [online: https://doi.org/10.1080/14613808.2021.1904865 (last accessed April 1, 2024)].

platforms were primarily used here, which resulted in 75% of students reaching a higher academic level.[24]

5. In Belgium the *Music painting machine* Software is designed to combine interactive visual technologies and audio software. It combines innovative and traditional methods and supports the teaching and learning of instrumental music.[25]

The literature suggests that integrating digital technology into higher music education brings a number of benefits and the acquisition of additional skills. There are already some best practices that demonstrate the improvements from implementing digital technologies. However, this change management process must be approached with an open mind and requires support from external or internal experts in order to successfully prepare teachers for this task.

3. **TEDMA project: Perspectives in four European countries**

The European Digital Music Academy provides a further contribution to the overall picture of the integration process of digital skills in higher music education. The project provided further insights into the value of incorporating digital technologies into music education, with a focus on developing digital skills and developing a practical, interdisciplinary methodology, and provided practical guidance for other institutions wishing to refine their curriculum.

The following chapters are intended to provide an overview of the initial status of the participating institutions and further education facilities in Germany, the Netherlands, France and Denmark, provide insights into the learning progress of the participating students and young professionals and the effects of the performances from the perspective of the audience.

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[24] Aróstegui, J.: Implications of neoliberalism and the knowledge economy for music education. In: Music education research (22.2020), pp. 42-53 [online: https://doi.org/10.1080/14613808.2019.1703923 (last accessed, April 1, 2024)].

[25] Wan, W.: Digital technologies in music education: The case of Chinese students. In: Música Hodie (2022) [online: 10.5216/mh.v22.70752 (last accessed, March 31, 2024)].

The methodology developed is not described in this document and is published in a separate document. However, both papers will be freely accessible online on all partners' websites and on the EPALE platform.

3.1. Current status of digital skills training in four countries

During the second transnational meeting of the TEDMA project, held at the Salon de Provence in the south of France, the results of the secondary research carried out were presented. The desk research was a questionnaire distributed by all partners in their own educational institution and among partner institutions at national level. The survey was conducted among 500 students from various institutions.

As a general overview, two of the four participating institutions have already partially integrated digital technologies into their curriculum. While the partner from Denmark, the Syddansk Music Conservatory Odense, was more of a competent partner as there were digital music programs initially. The Dutch partner Hanzehoogeschool Groningen partially used digital communication and practice tools without incorporating a general methodology and real strategy, while the partners in Germany and France did not previously use digital technology (Lübeck University of Music for Germany).

First, the distribution and target group of secondary research should be explained:

Syddansk Music Conservatory (SDMK): conducted the survey among freshmen of classical jazz, folk and electronic music.

Hanzehogeschool Groningen: In addition to our own music students, other institutions in the Netherlands also took part in the survey. The participants mainly came from the percussion and electronic design/interfaces departments.

TH Lübeck: did not conduct the survey at its own university because there are no music students represented there. Therefore, other music universities in Lübeck and Hanover also carried out the survey. The participants mainly came from singing, composition and conducting courses.

IMFP: conducted the survey among their own music students.

The results of the various survey questions are summarized and presented below:

1. Which digital skills in live performance will be important to you? Taught at university?

Some areas of the digital live performance are covered by the partner's educational institutions. However, this does not happen in a structured curriculum and it depends on the teacher whether digital technology is part of the lectures. The quality of this content – if it is conveyed – is also unclear. Depending on the institution, automatic lighting, sound design/sequencing, use of electronic devices, video and live streaming, electronic photography, logic visuals, sensory devices, use of visual images, immersive audio and DAW programs are offered.

2. Which digital skills in funding will be important to you? Taught at university?

The area of digital advertising is taught to some extent, but not to the extent required today. Here too, it depends on the teachers and their input.

3. Which digital skills are related to intellectual ones? Property rights are taught at your university?

Since the area of copyright is not taught at all, students do not know which (copyright) rights they own and how these are implemented, especially in new digital distribution systems.

4. What digital skills are needed in relation to entrepreneurship? taught at your university?

Entrepreneurship courses are largely covered through extracurricular courses. It is difficult to impart knowledge to students with additional courses. Some of them are overwhelmed and show little initiative, which is why the curriculum should specifically prepare them to strengthen their own learning.

5. What is the biggest hurdle, new technologies at your university to offer successfully?

An often-mentioned problem is the limited digital skills of many lecturers. The lack of willingness to adapt programs is also a problem. In addition, the lack of time, limited financial resources of universities and the specialization of students in certain areas of music represent hurdles.

6. What digital skills related to this Audience concert experience (live and online) at your university conveyed?

The area of audience interaction is rarely discussed, which is why artists sometimes only perform without establishing contact with the audience in order to play further performances.

7. Are there digital skills that are currently not available at your university? are taught and that you would like to include in your university's curriculum would record?

Less input could be gained from desk research on this question because the students themselves lack knowledge of the required skills. The main outcome of the discussion was therefore that institutions must encourage students to integrate digital learning into their self-study.

The results of the desk research clearly confirmed the assumptions that digital skills training is not yet an integral part of the curricula of higher music education institutions in three of the four participating countries. These are predominantly self-directed approaches by a few teachers, some of which also include digital technologies. Conducting the secondary research and the surveys based on it were a crucial step in identifying the fundamental needs in music education. This led to a practice-oriented teaching methodology that is based on the needs of the students and was implemented in the project partners' curricula as part of PR2

Based on the results of the secondary research, the project structure was adapted to address the identified gaps, in particular by adding practice-oriented modules. The survey highlighted the importance of digital skills in music studies and serves as a basis for future teaching methods and content.

The need for a methodical, strategic approach to incorporating digital skills training into higher music education can be confirmed by the project's research.

The project clearly shows that European exchange in this area was a central success factor. In particular, the collaboration with Hanzehogeschool Groningen, which already offers innovative teaching methods such as the smartphone orchestra, gave the project participants valuable insights and strengthened interdisciplinary exchange. This European added value made it possible to develop a unique methodological approach that goes beyond national educational structures.

In summary, the TEDMA project was able to identify important content that was missing from the curricula of the participating universities. This includes, among other things, practice-oriented digital skills in the areas of production skills, marketing and audience communication, which are essential for students' professional development. The modules developed in the project have already been successfully implemented at the participating institutions and offer students sustainable learning content that meets the digital and professional challenges in the music sector.

3.2. Development of students’ digital skills during the project phase

The second part of the research carried out by the European Digital Music Academy was to examine the progress of the participating students and provide some insights into the success of the methodology implemented. For this reason, three surveys - one before, between and after the TEDMA activities - were carried out to show the progress and development of the students during the project phase.

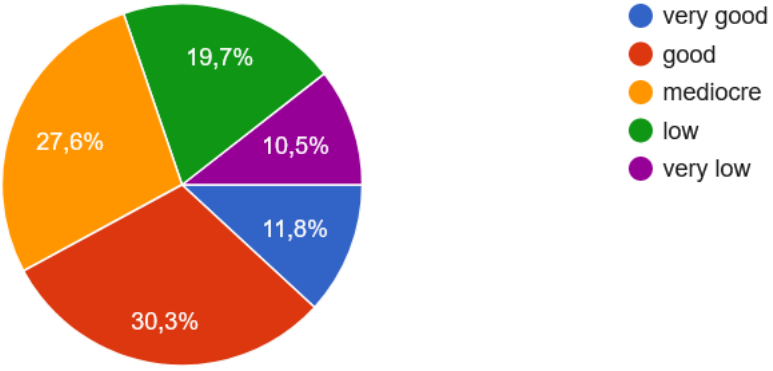
The participants in the survey were between 19 and 30 years old and were evenly distributed among all project partners, as each partner brought ten participants with them to the project. The courses were very diverse and ranged from classical

instrumental studies to sound engineering, digital music and sound art studies, combining a wide range of disciplines and knowledge.

Survey before activities

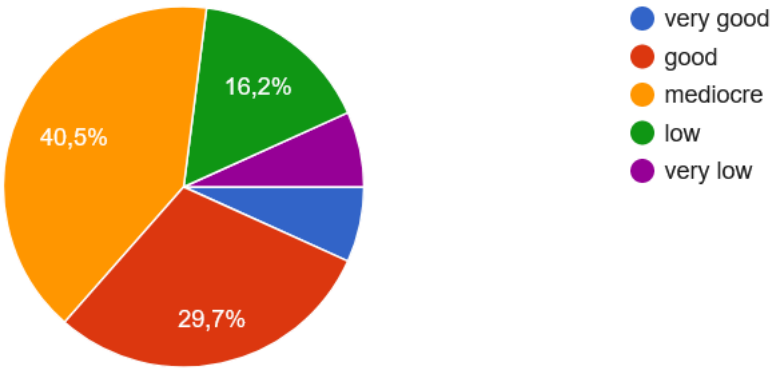
Before the TEDMA project began, all participants were asked questions about their digital skills. In the sample of students and young professionals, half of the students perceived their digital skills as “good”, while a third (33%) rated themselves as mediocre.

While 65% have used music production software, only 33% conclude that they have a good knowledge of using these software tools.



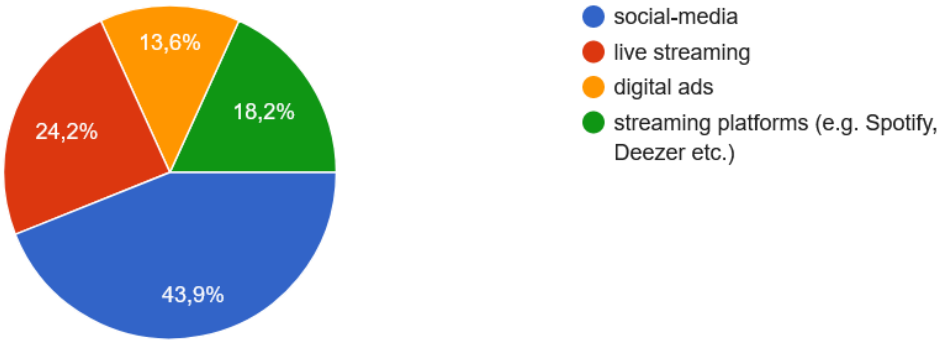
Ranking of skills in music production software usage (2022)

When it comes to digital skills for music creation, 40% rated themselves as average and 16% as low, highlighting the need to improve training in these areas.



Ranking of skills in music creation (2022)

In addition, the level of digital communication and distribution was rather low, as the following graphic shows:

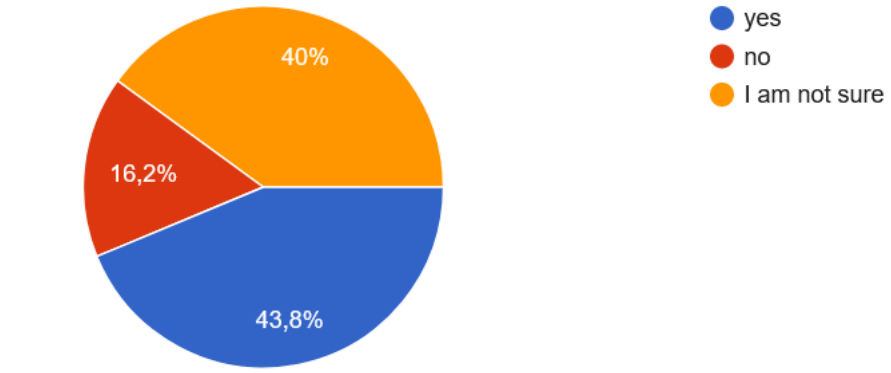


Ranking of skills in digital media usage (2022)

Interactivity survey

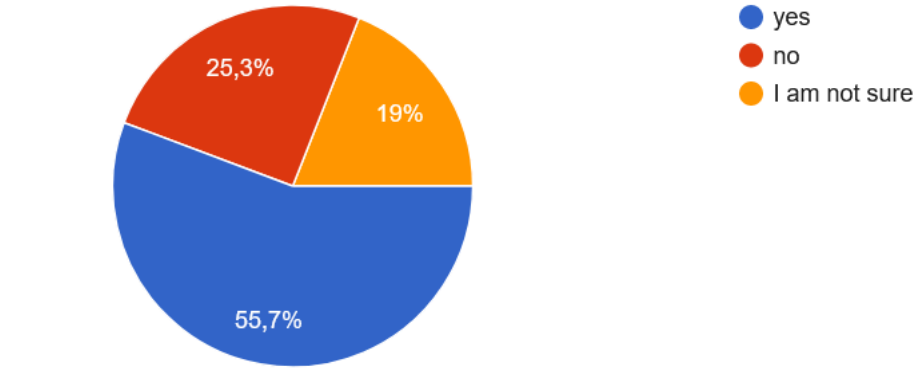
The interactivity survey was conducted after the method development test training. After participation, the impact and learning were focused on through this questionnaire.

Almost half of the participants agreed that they improved their digital skills by participating in the training activity. In the discussion with students, the 40% who were unsure mentioned either self-taught knowledge applied during training or a feeling of being overwhelmed that made it difficult to assess improvement immediately after training.



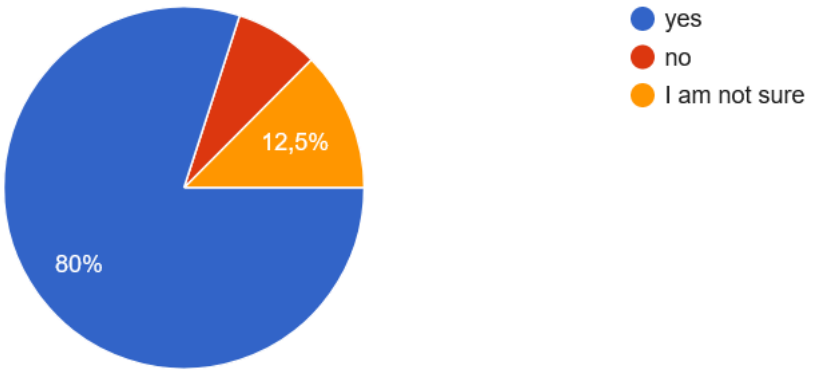
Skills enhancement after training activity (2023)

When comparing music creation skills using digital technology, 55% saw an improvement in their individual skills.



Skills enhancement music creation (2023)

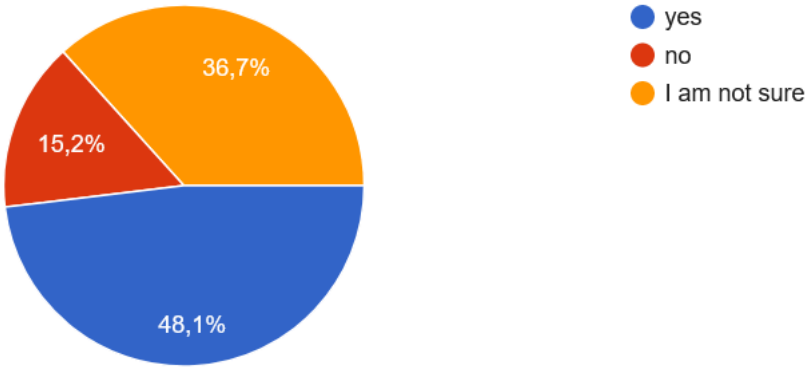
And above all, digital promotion skills could be increased through the methodology, as 80% of the participants stated.



Skills enhancement music creation (2023)

Post-activity survey

The final assessment of the participants' abilities took place after the presentation of the achievements developed in the test training. 49% of all participants improved their digital skills training, while a third (36%) were unable to improve it. This affects students with digital music programs and non-music students (other disciplines such as designers, engineers).



Post-activity digital skills enhancement (2023)

Most students also found the training helpful for their careers (76%) as it not only taught digital skills, but also created opportunities to network with other music

students and from other disciplines, providing opportunities for creative exploration and development of teamwork skills .

Even if not all participants were convinced of the program - another unrealistic goal - the majority of participants found the training positive.

3.3. Project presentation and analysis of audience reactions

The final activities of the TEDMA project included Multiplier events held in each partner country. These events had several purposes: they provided students with a platform to present their newly developed performances supported by digital technologies and to gain valuable experience in live performances. In addition, they served as an opportunity to disseminate the project results and analyze audience reactions to the innovative performances.

To analyze audience behavior and perceptions during the performances, a qualitative approach was adopted: a group of five researchers observed audience reactions and conducted informal interviews asking questions about perceptions, evaluations and criticisms of the performances. Spectators were also asked whether they would take part in such an event again.

Positive audience reactions demonstrated the general appreciation of the moderated performance, although some were challenging for parts of the audience due to the complex content. The use of digital technologies and the visual design of the performances received positive feedback overall.

The interviews confirmed this picture: many visitors even felt “very inspired” by the innovative use of digital tools and some students rated the use of digital technologies as a competitive advantage.

4. Conclusion and recommendations

The digital transformation of the music industry is having a significant impact on higher music education. New applications, hardware and software, platforms, and communication and sales tools offer artists expanded opportunities for expression and innovative ways to interact with their audiences (social media, livestream, podcasts), but require extensive knowledge to use these tools effectively.

However, currently only a few music education institutions are adequately integrating digital technologies into their curricula. There is often a lack of experience, knowledge and methodological approaches to effectively convey digital skills.

However, effective implementation requires new pedagogical and methodological concepts as well as training for teachers in both subject content and teaching design. Strategic moderation of this change management process at the institutional level is essential.

The TEDMA results confirm the necessary change in music education. By developing a test training and teaching methodology, the digital competence of the participants was strengthened and the acceptance of digital technologies in performance situations among the audience and students was increased.

In summary, the results of the TEDMA project show that the integration of digital skills and methodological approaches better prepares university graduates for the demands of the modern music industry. The practice-oriented modules implemented in the project, such as digital music production, self-marketing and music visualization, offer students the opportunity to apply these skills relevant to their career. The TEDMA partners recommend using the teaching methods and content developed as a basis for long-term curricular changes in music education.

It is proposed that higher education institutions integrate digital skills training, benefiting from the developed methodology.

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