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Modern Pedagogical Technologies in the Professional Training of Specialists in Arts and Education

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Abstract

The current study sought to analyze the connection between innovative training strategies for prospective arts educators, their competencies, creativity, and learning efficiency. The main goal of the research is to identify connections between different digital technologies used in educator training and professional development programs, interactive learning strategies, and competencies necessary for an arts educator. The present research is based on the qualitative analysis of a body of 30 publicly available analytical and institutional documents published or updated between 2021 and 2026. Such documents include information on various aspects of higher education and include descriptions of degree programs, curricula and syllabi, learning strategies for digital education, research papers focused on quality assurance measures, and educational technology reviews. The findings suggest that among all technologies, digital learning system is the one most often mentioned and referred to in the analyzed documents – it is featured in 24 out of 30 papers. Next come project-based learning technology (23), tools and technologies of visualization and multimedia learning (21), digital portfolios (18), artificial intelligence-based tools (9), and virtual reality environments (7). As for competencies, the one that is discussed the most is digital-pedagogical competence (25), followed by creative-methodological (22), practice-oriented (20), reflective (17), communicative (16), and assessment-related (14) competencies. It is clear from the findings that the use of modern technologies in arts education programs at universities is still inconsistent – although digital infrastructure is commonly used and accepted, the use of project-based approach and artificial intelligence tools requires further research of pedagogical nature.

Keywords: innovations, innovative methods, learning, arts education, musical art, higher education students, professional training.

1. INTRODUCTION

The present paper relates to the challenge posed by the widening gap between the rapid pace of change in higher education and the requirements that are necessary for adequate arts and education training. Modern technologies, including digital platforms, online learning tools, artificial intelligence, and interactive technologies have seen widespread application within universities. However, the pedagogical values of these technologies proved to vary widely when implemented into an arts discipline. In fact, arts education requires various factors, besides mere access to information, including experiential education, emotional expression, creative interpretation, interaction between instructor and student, and reflective feedback. Thus, the key problem associated with the modern approach to pedagogical technologies is that these changes have a great influence on how future professionals in the arts and education field acquire creative and pedagogical competence. While they are innovations on a technical level throughout universities, it is yet unclear how these technologies contribute to providing students with such skills.

The current research is based on the premise that modern changes in the educational setting are related to innovative approaches to instruction in colleges and universities as part of a wider trend in the domain of higher education rather than being an isolated trend related to the use of technologies per se. Marshall et al. [1] argued that the adoption of new teaching strategies is likely to reshape the content and location of classes and the functions of the educator. Komljenovic et al. [2] built on this assumption by noting that technology-enabled college courses provide opportunities and dependency on the use of technology for teaching, as well as on the use of digital platforms for business operations. Such findings demonstrate that technology not only contributes to changing the way educational experience is delivered, but also reshaping the relationships between teachers and students.

It should be noted that the area of arts and education is the primary subject of concern in the broader discussion about modern trends in the realm of higher education. According to Chen and Gao [3], the main factor affecting the use of digital tools by instructors when delivering classes in the arts is the degree of comfort teachers feel about their digital skills. These findings suggest that technology in the classroom cannot be perceived merely as an innovation. In fact, modern digital tools will only be able to have any pedagogical value if they are adjusted to the experience of the instructor in terms of creativity, interpretation and practice-based pedagogy.

The unique nature of arts education is also reflected by Carvalho et al. [4]. The authors note that online learning in the arts poses challenges related to creativity, interaction, embodied practice, and constructive feedback. These results confirm the concerns voiced by Komljenovic et al. [2] regarding the risks involved when digitalising a discipline where learning relies on performance, creative expression, and interaction between instructors and students. Moreover, Valache et al. [5] confirm that a similar approach should be adopted when teaching music, thus implying that the revitalization of arts education should be supported by evidence-based approach.

While most existing research addresses the issue of relationships between the processes of digitalisation of higher education, digitalising the teaching of arts, digital literacy of teachers, and evidence-based teaching of music, there are still several important gaps in the body of research. In fact, much of the research in this area is limited to addressing each of these problems in isolation, as well as on a disciplinary level (i.e., how the discipline adapts to the changes induced by digitalisation). However, arts education is focused on the specific discipline (i.e., music, performing arts, or design). Therefore, it is impossible to obtain a complete picture of how modern pedagogical technologies affect the preparation of arts and education professionals. There is also a significant lack of focus on balancing between the development of digital innovations and preserving such aspects as embodied practice, artistic interpretation, feedback, and communication with human-centred components. In other words, although modern technological innovations have seen widespread applications in arts education, one key question remains open regarding whether these innovations can be successfully integrated pedagogically without changing the process of preparing arts and education professionals from technical and digital instruction delivery to TDID.

The research objective is to assess the use of digital pedagogical technologies to ensure arts and education professionals receive relevant practical and humanistic skills that will make them good instructors and successful artists within their domains. In particular, this research aims to examine the extent to which digital technologies can be efficiently combined with interactive teaching methods and empirically supported pedagogy in training future arts instructors to enhance their potential in arts education as a discipline.

To achieve the set objectives, the research aims to accomplish the following tasks: explain the role played by modern technologies in arts and education training, identify the key challenges and benefits that are involved in implementing digital and interactive technologies in creative spheres; analyse the extent to which the use of technologies affects artistic production and communication with students; evaluate the extent to which modern pedagogical technologies are used as supplementary instruments for developing arts educators as opposed to replacement tools.

2. LITERATURE REVIEW

According to the recent literature, modern pedagogical technologies in connection with the issue of arts training and education should take the primary place in the learning process of the artistic learners, in teaching by teachers, creative interactions between them, and developing professionalism. Nevertheless, the interest in the role of modern pedagogical technologies does not preclude fragmentation of the scientific literature. There are many authors who address artificial intelligence exclusively, others – only digital platforms, or virtual reality. For these reasons, there arises a need to systematize all possible directions and bring them into a unified context for the preparation of arts educators.

Many research studies are dedicated to the question of the influence of artificial intelligence on creative activities. In the working paper written by Alsuwaida and Alsamiri [6], it is stated that within the context of an advertising art class, AI serves as a means that helps in idea generation, visual experimentation, and conducting innovative classroom activities. Importantly, this article introduces an extended definition of artificial intelligence as not only a technical but a pedagogical resource that assists in creative processes. Nevertheless, this article opens additional areas of research. It concerns questions like how AI will impact on the professional qualities of future educators (e.g., pedagogical judgement, ethical responsibility, and capacity to assist the learning process of students creatively). On this note, Hui [7] continues with his analysis of interactive learning based on AI and collaborative platforms for digital arts and art making. Main advantage of such techniques lies in the collaborative and cooperative aspect. However, there is also a risk associated with it. With growing popularity of digital platforms in arts, it becomes increasingly difficult to distinguish what is done individually by the artist and what is created together with digital technologies.

Another aspect of the influence of AI on creativity is psychological. Hwang and Wu [8] explored the effects of generative artificial intelligence on the creative cognition of design students through such factors as self-efficacy and anxiety. This study is important as it proves that not only the availability of instruments is the key to influencing creativity, but also the state of emotions and students' self-perception of their abilities. Medel-Vera et al. [9] examined a similar issue, namely the use of generative artificial intelligence in the sphere of architecture. It is claimed that through exploration, visualization, and alternative solutions, students may find themselves an opportunity to create. Just like Hwang and Wu [8] mentioned before, it is crucial to consider the problem that generative tools are not necessarily helpful in learning. If reflection, critique, and well-established criteria of assessment are ignored, it reduces the visibility of students' creative contribution to learning.

The literature also explores the issue of using digital tools for art and design education. In this regard, it is important to mention Mao and Ling [10]. In their study, they analyzed the influence of virtual reality on both art and design education. These researchers believe that VR has a number of advantages in the sphere of spatial modeling, immersive perception, and experiential learning; this aspect can be of great importance in the spheres of figural construction and understanding of form, space, proportion, and visual environment. However, the effectiveness of VR in pedagical aspect is highly dependent on its association with the goals of the activity rather than a purely aesthetic one. Moreover, Escala et al. [11] introduced a more general concept of using digital instruments for arts education by considering their potential to integrate arts into the education curriculum of elementary schools. It is found that digital technologies have a positive influence on interdisciplinary learning, creative expression, and innovative pedagogic practices. Despite the discrepancy in scope, it is possible to point out that this study gives important insights into the fact that it is necessary to consider not only technical but pedagogical perspectives in the development of arts technologies.

The issue of readiness of teachers is one of the most discussed aspects of teacher preparation according to the research literature. For instance, Tusiime et al. [12] discussed numerous challenges faced by educators in teaching art and design in a digital world. Among them, one can name insufficient digital infrastructure and competence of the educators, as well as the inability to adapt the traditional studio approach to the digital world. On this note, research conducted by Kachur et al. [13] can be useful. Besides describing the benefits brought by the digital environment in the education process of future music educators, this study emphasizes an important issue. The presence of modern technologies cannot guarantee higher quality of training; the key is whether students can successfully apply these technologies in order to communicate, interpret, develop their artistry, and analyze their own work.

The body of literature dedicated to music education also contains a lot of valuable information for the present discussion. In particular, a systematic review conducted by Concina [14] shows that music education is significantly affected by such factors as teacher professional knowledge, communication ability, adaptability, giving feedback, and being sensitive to learners' needs. This article is particularly useful in terms of its message that although technology can enhance relational learning, it cannot substitute it completely. The principles described by López-Íñiguez et al. [15] also provide a unique perspective in the sphere of music education. They emphasize that the student-centered way of teaching and learning helps students in reflecting upon and understanding their creative decisions and interpretations; thus, it opposes traditional music teaching that relies on technology.

In addition to the previously mentioned principles, there is a perspective associated with social orientation in music

education. Thus, Lorenzo de Reizabal [16] discusses the importance of music as a means of social mediation. In particular, this article introduces another layer to the discussion about individuals as musicians, namely the developmental aspect connected with the participation in arts activities, communicating with people, and social responsibility. Moreover, in his research work Savage [17] evaluates the music education policies and practices in England from 2010 to 2020. His findings are important since he states that music policies determine what kind of learning is valuable; hence, any new emerging pedagogical technologies will be applied within the scope of the policy framework. As a result, the implementation of innovative approaches in arts education is either supported or impeded.

Finally, there has been a lot of attention paid to embodied and norm-breaking pedagogical techniques. For instance, Sholl [18] associates art practice with embodied pedagogy and claims that art is learned when practiced, communicated with other people, and improved through improvising and creating. Such an attitude towards artistic learning is especially interesting in terms of overcoming the overestimated role of cognitive and technological aspects of arts education. An artist's professional development consists in the embodied experience, sensibility, improvisation, and being present. Ferm Almqvist and Hentschel [19] contributed to the discussion on norms and identity in music education by suggesting a review article. In their opinion, arts education should not only serve the purposes of creative expression but also challenge normative thinking and identity; therefore, when applied to digital pedagogies, these technologies open new learning possibilities for students.

Thus, it is possible to conclude that there is a variety of functions of modern pedagogical technologies within the context of arts education. They stimulate creativity, make immersive and digital learning environment accessible, foster creative collaboration, and contribute to student-centered pedagogies. Meanwhile, there are certain limitations in the studied literature. Artificial intelligence, Virtual Reality, and Digital Platforms are analyzed separately as a technical achievement. In consequence, no sufficient research has been done on how the combination of these technologies affects the professional development of arts educators. Although numerous papers examine the issue of learners' creativity or technological innovations, few of them discuss how technology-based innovations affect professional characteristics of future arts educators (pedagogical judgement, reflection, kind and ethical approach to students, embodiment of creative experience, and designing meaningful learning environments, etc.)

From a more holistic perspective on the examined studies, it becomes apparent that modern teaching technologies have several overlapping functions when used in arts education. Firstly, they enable creative experimentation, offer access to digital and immersive environments, support collaborative creation, and provide innovative opportunities for student-centered education. On the other hand, certain limitations are present in current literature on this topic. The analysis of Artificial Intelligence, Virtual Reality, and Digital Platforms is conducted separately as individual advancements in technology, thus providing an inadequate understanding of the cumulative effect of each approach on professional development of arts educators. In other words, while much attention has been paid to examining creativity and technological opportunities, very few attempts have been made to investigate the effect of modern technologies on the overall professional qualities of arts educators, which include pedagogical judgement, ethical/kind practices, embodying artistic experiences, creating meaningful educational environment, among others.

Overall, while much work has been conducted in terms of applying different technologies to arts education, what seems to be lacking is a cohesive picture of how modern pedagogical technologies can be utilized effectively in educating arts professionals. While some previous work has discussed how different types of technologies such as AI-based creativity, digital art learning, VR, music teaching and learning, as well as student-centered and embodiment based instructional techniques can contribute to arts education, very few examples demonstrate how to build a balanced approach that takes into account the need to cultivate creativity, knowledge application, social interaction, as well as a humanistic approach to arts education.

3. MATERIALS AND METHODS

The present case is an illustration of documental qualitative analysis concerning the representation of contemporary pedagogical technologies as well as its correlation to the learning outcomes in relation to preparing future specialists in education and arts. Thus, the subject under investigation is concerned with the representation of various pedagogical technologies among which there are digital, interactive, student-centered, project-based, artificial intelligence-enabled, virtual and portfolio-based technologies in relation to the preparation of future specialists in arts in particular. Neither surveys, interviews, observations or intervention experiments were used. Instead, the study relied upon open sources of information (documents of an institution or analytical character) that described the presence of pedagogically-rich technologies in relation to educational programmes, curricula, syllabuses, quality assurance materials and methodological guidance.

Data collection was carried out within the timeframe between 2025 and 2026 using publicly available institutions and analytical sources; materials used were not confined to one educational system within the scope of the research. The empirical data aggregate used in this study comprises thirty documents that were dated from 2021 to 2026. As far as the

period from 2021 was chosen as a lower limit of the timeframe, it is due to the following reason; it is believed that the timeframe with the most pronounced influence upon the institutionalization of online learning, blended learning or digitally-enhanced learning post-COVID-19 should serve as a lower bound. The materials aggregate used in this study comprises eight programme descriptions in higher education, six curricula/syllabuses, five institutional digital learning strategies, four quality assurance documents, four documents related to the digitalization of higher education and three methodological documents in relation to online/blended/digitalized instruction. Moreover, only those documents describing institutionally-accepted description of pedagogically-rich arts education curricula/activities that can be proven through documents were included in the analysis.

The corpus has been generated through purposive nonrandom sampling. The documents selected as materials for this study come from official websites of higher education institutions, educational quality assurance agencies, international educational organizations, digital education observatories as well as open institutional repositories. The following inclusion criteria should be met in order to consider any document as material for this study; the document has to contain directly relevant information to arts education; should refer to at least one modern pedagogical technology; should have a complete version available in full-text form; should be dated to or updated in-between the years of 2021-2026; and should contain detailed information in regard to learning outcomes, methodologies, assessments and practical training. All the rest documents that do not fulfill any of the inclusion criteria will be excluded in case the following characteristics exist within those documents; general information on education without referring to arts education; mention of technological equipment without pedagogical use of it; purely promotional material with no references to curricula, methodologies, assessments or quality assurance; cannot be surely affiliated to the agency.

Analysis was done in four consecutive steps. First of all, the relevance of materials in relation to preparation of future arts educators was screened out. In the second step, the selected materials were entered into the coding matrix. Next, in the third step, coding of every document according to four categories was done. The latter include a category of a pedagogical technology, a professional competence that corresponds to the technology use, a type of students' activities and a type of assessment of that use. Finally, in the fourth step, the comparison across all the documents was done concerning the recurring themes and lack of representation of certain pedagogical technologies in the institutions.

Coding matrix and descriptive frequency calculation of technologies in different categories were carried out using Microsoft Excel 2021. The technologies used for this study were categorized into 6 categories: digital learning platforms, multimedia tools/visualization, artificial intelligence enabled, virtual reality/immersive environment, project-based technology and digital portfolio assessment. The competencies were coded as follows: creative-methodological, digital-pedagogical, communicative, reflective, practice-oriented and assessment-related. Inferential statistics cannot be applied to the results obtained from the study since this study was based on documentary sources. To test the intra-coder reliability, the same set of documents was coded and matched to technologies as well as learning goals and assessments.

4. RESULTS

The analysis shows that the pedagogical technologies currently implemented can be considered the part of the educational process and include such components as access to learning environments, creativity promotion, project-based learning, and reflective/ portfolio-based assessments of learners' growth and progress. According to the review of the 30 institutions' documents, there are three purposes for which the technology can be viewed. These purposes include organising access to learning environments, creativity and project-based learning promotion, and the reflective/ portfolio-based assessments of learners' growth and progress. The references to learning technologies using artificial intelligence and virtual or immersive environments were much less in frequency, but their analysis showed that the emerging requirements are related to the teachers' level of competence, curricula redesign to ensure better assessment of learners' progress, and educational application of technology.

While reviewing the digital learning technologies within ID models, it was noticed that four different models were referred to in 30 sources reviewed (i.e., syllabi, academic papers, institutional documents, etc.). These digital learning technologies were mentioned in 24 out of 30 documents, which implies that these kinds of technologies play an important role in the processes of learning in educational institutions (e.g., by allowing the use of online and offline resources). The most common purposes served by digital learning technologies include organisation and facilitation of learners' access to resources, facilitation of blended learning, creation of communication channels, provision of feedback, and ensuring the continuity between online and face-to-face learning activities. Moreover, digital learning technologies are regarded as the institutional norm when it comes to the use of online learning tools within a curriculum as opposed to being applied in times of crisis. For instance, the example from University of the Arts London [20] proves the use of blended learning in order to foster the development of a systematic synchronous and asynchronous delivery model. Similarly, the example from the European Commission [21] shows how digital education could be applied within a policy framework meant for fostering digital capacity of European member states.

Twenty-one articles discussed audio and video visualisation tools being used in connection to various skills and

abilities. Visualisation tools in the context of arts and design programmes were used not only for communication but also for idea generation, implementation of experimental approaches, evaluation of the outcomes of the experiment, and decision making by the artist. Project development and experiments performed in the process allowed for exploring ways to improve professional design practices in the MA Design Products programme [22]. The same trend can be observed in the M.A. Information Experience Design programme: visualisation skills played a significant role in the development of new experience based on spatial, digital and experiential communication [23].

Artificial Intelligence (AI) -based technologies were mentioned in nine sources and were less popular than either digital or multimedia technologies; nevertheless, the institutional meanings were more complicated. AI technologies were able to not only introduce innovations but also enhance teachers' digital pedagogical competences, promote changes in curricula regarding the introduction of innovative assessments, ensure academic integrity, and encourage responsible use of educational technologies. UNESCO [24] addressed teachers' competences for AI as the set of professionally defined skills. Jisc [25] viewed AI in tertiary education as a factor influencing all aspects of the education process: how teachers teach, how students learn, how institutions regulate their functioning in terms of policies, and how they evaluate both students and teachers. TEQSA [26] considered the problem of how to redesign assessment in view of the impact of generative AI technologies: traditional assessment tasks will not provide enough information regarding the extent of student learning as there will be numerous possibilities for AI algorithms to generate and modify educational resources.

The second least common technology was the use of virtual or immersive environments which were mentioned in seven documents. As opposed to the use of digital platforms, the use of virtual or immersive technologies at the institutional level was much less due to the fact that there was more dependency on resources required for successful use of the technologies (e.g., facilities, experts, and programme-level justification) than when using digital platforms. It follows that although virtual or immersive technologies could be seen as advanced resources or even discipline-specific, they cannot be referred to as standard teaching-learning technologies.

Project-based technologies were discussed in 23 documents. This particular type of technologies was not linked to any specific tool and implied learning through practical outcomes, creativity and completion of projects or briefs through collaboration. The idea of using project-based learning was found within the programme specifications in the domains of art, design, and arts education. The MA Arts and Learning programme specification at the Goldsmiths, University of London [27] made sure that project-based learning occurs thanks to the combination of studio practice, theory, pedagogy, individual and group research, and artist/educator praxis. The same results were obtained within the programme specification for the PGCE Secondary programme, where professional preparation for teaching involves combining subject knowledge, educational practice and achieving competences in the subject area of creative arts and design [28]. Project-based pedagogy became a link between art-based products and preparation for educators' roles.

The notion of digital portfolios was mentioned as a part of learning technology in 18 documents reviewed. This category was very significant because technology was directly associated with assessment of learners' progress. As opposed to simply delivering learning process, digital portfolios were useful in showing how learners progressed: the process included showing multiple evidences of what students have achieved in terms of coursework (including artistic portfolio), written reflections of this work (reflections), documentation of completed project(s)/ work, lesson plans (i.e., plans for lesson delivery), as well as creativity that was present continuously due to its integration with other resources. Programme descriptions in the domain of arts followed a similar pattern: learners' assessments were connected to coursework, portfolios of evidence, practice-based assessments and reflective documentation. The BA (Hons) Fashion Design Technology: Menswear programme description at the University of the Arts London [29] demonstrates the same reasoning, as the institutionally-oriented fashion and design educational training includes studio practice, special skills, connections to industry, and development of the student's portfolio.

Table 1. *Distribution of educational technology categories.*

Category	N
Learning environments	10
Digital learning technologies	24
Multimedia tools	34
AI-based tools	9
Virtual/immersive environments	7
Project-based technologies	23

The second coding indicator refers to teachers' digital competences as it is demonstrated by an increased number of documents mentioning it (25 out of 30 documents). Thus, the documents indicate how teachers' digital competences will become professionally determined rather than treated as technical skills. Some examples of digital-pedagogical competences that have been mentioned in the reviewed documents include the ability to use learning platforms and digital tools for teaching. Additionally, it is necessary to ensure the possibility to conduct and manage online/blended

learning activities and foster learners' engagement in the learning process through participating actively in the online environment. Broad application of artificial intelligence (AI) support systems requires a holistic approach to digital education. For instance, OECD [30] presented a model framework for digital education including the digital education ecosystem involving infrastructure, governance, teachers' capacity, and pedagogical soundness. It follows that there is a clear institutional association between the teachers' readiness for professional teaching practice and their level of teaching-related digital competencies [31].

Table 2. *Institutional representation of modern pedagogical technologies in the analysed corpus*

Technology category	Number of documents where identified	Dominant institutional function	Main competence connection
Digital learning platforms	24	Organisation of blended and digitally mediated learning	Digital-pedagogical competence
Multimedia and visualisation tools	21	Support for creative presentation, modelling, and artistic communication	Creative-methodological competence
Artificial intelligence-supported tools	9	Support for responsible AI use, teaching redesign, and assessment awareness	Digital-pedagogical and assessment-related competence
Virtual or immersive environments	7	Simulation, spatial modelling, and experiential learning	Practice-oriented competence
Project-based technologies	23	Organisation of creative, collaborative, and practice-based learning	Creative-methodological and communicative competence
Digital portfolio assessment	18	Documentation of progress, reflection, and evidence of learning outcomes	Reflective and assessment-related competence

Note: The table presents descriptive frequencies from the coding matrix. One document could contain more than one technology category; therefore, the total number of mentions exceeds the number of analysed documents.
Source: Compiled by the author based on the documentary corpus analysed in Microsoft Excel 2021.

Creative-methodological competence is found in 22 documents; these documents predominantly concerned project-oriented learning, multimedia application, visualisation, collaboration and experiments. This competence could also be encountered in programme specifications, which defined students' creative output creation and presentation skills, i.e. designing, developing, implementing (connecting theory with practice) and presenting it (spatially, visually, performatively or materially). At Goldsmiths, University of London [27], this competence was expressed in the interconnection of contemporary art, education, critical reflection and practice, while at Sheffield Hallam University [32], teacher training in arts/design included knowledge of the subject matter and pedagogy of its professional implementation in secondary education.

20 documents included a focus on practice-oriented competencies, which showed close connection with curriculum documentation, programme specifications and methodological instructions. Technology in these documents had pedagogic significance if and only if it supported practical training and preparation, including preparation of lesson planning, studio work, school placements, creative projects and presentations, criticism and professional simulation. That means that they seldom stood apart as ends by themselves but rather contributed significantly to the process of practice-based training. For example, Goldsmiths' PGCE Secondary programme [28] connects professional development with preparation of teachers in secondary schools, while Royal College of Arts emphasises project work and design practices as ways of preparing professionals [22].

Reflective competence was addressed in 17 documents and correlated with digital portfolios, independent study, feedback and self-assessment. Reflection plays a bigger role in arts and education training because students are not merely required to create art but also to explain it, evaluate it critically and justify its pedagogical value. In the MA Arts and Learning programme specification, reflective competence was connected with artist educator praxis and interconnection between artistic practice, knowledge, politics and pedagogy [27]. It shows that reflective competence acts as a link between creation and pedagogy.

Communicative competence appeared in 16 documents. They were mainly concerned with collaboration on platforms, public presentation, evaluation by peers and group assignments, publicly communicating their creative project. Apart from verbal communication in arts education, there was also visual communication, collaborative interpretation, performance exchange, peer/teacher feedback and the ability to defend and present their creative ideas in front of different kinds of audiences. This applied equally well to all design and arts disciplines, because students would have to communicate in diverse ways as a result of collaborative, portfolio, presentation or other types of projects [22, 23].

Technology-enhanced learning was rarely mentioned in institutional assessment as it was included in 14 documents overall. However, that means that institutionally, the topic of technology-enhanced learning had limited coverage within the documents about competency development. While these documents contained references to blended learning, digital tools and creative tasks, few of them mentioned how technology was implemented in assessment procedures. The topics which got the most coverage regarding the technology-enhanced learning included policies and quality assurance; for instance, The Quality Assurance Agency [33] examined connections between HE studies, learning outcomes and expectations for

pedagogy and assessment, while the Quality Assurance Agency [34] indicated music as a subject area requiring specific methods of performance, creative and critical/reflective assessments. TEQSA [26] highlighted the importance of this topic by stating that due to the possible invalidity of standard assessments in determining individual student progress, changes would be necessary to respond to growing influence of artificial intelligence.

Finally, in order to analyse the ways of how students engage with technology and use digital tools actively, four types of student behaviour were distinguished. They include independent digital learning, collaborative creative production, practice project development and reflective documentation. The first type of behaviour was most frequently observed in relation to learning platforms, asynchronous learning materials and blended groups/sites. Secondly, collaborative creative production included collaborative projects, studio activities, collaborative peer reviews and collaboration on creative tasks. Practice-based project development was most frequently observed in design, fashion, arts and tutor training courses. Finally, reflective documentation mainly provided evidence of creating digital portfolios and documenting assessment techniques.

Fourthly, the analysis focused on assessment procedures for technology-related content. As the result, the most common procedures for technology-related content assessment included coursework, project work and presentation, portfolio creation, reflective writing and practice. In comparison to evidence and process-based assessment, examination-based assessments played smaller roles for arts and education training than for other types of education, which was not surprising given the specific requirements to such programmes. There were no specific procedures for using technology in the assessment process. Some of the programmes specified the final output (portfolio or project), but failed to describe what role technology played in producing them. It resulted in a significant disparity between learning activities and transparent assessment criteria.

Three central themes could be singled out from comparisons between programme specifications of arts and education training in different institutions. Firstly, technological developments in arts and education training were usually introduced in programme specifications as a part of the pedagogically relevant assessment and learning outcomes. Secondly, digitalisation had developed much better in learning organizations than in creative-pedagogical transformations: even though digital platforms were used frequently, there were few examples of implementation of tools for Artificial Intelligence and immersive environment. Finally, the most well-structured documents did not introduce technology as a replacement for arts and pedagogical practice, but rather integrated it with studio work, reflection, project development, collaboration, tutor training and professional development.

This evidence clearly shows that institutional representation of pedagogical technology in arts and education training is highly inconsistent and not random. Platforms and project-based technologies formed the most reliable basis for development, as they supported fundamental aspects of arts and education training. Multimedia technologies and digital portfolios represented a secondary level, which consisted of methods connecting artistic creation and presentation, collaboration, reflection and assessment. Finally, although less prevalent, artificial intelligence-assisted technologies and immersive environments posed the greatest challenge to institutions by raising important methodological questions: preservation of the creator's ownership, proper evaluation of students' contributions and proper training of future arts educators to use the new technologies. Overall, this shows that the main challenge that institutions face is not the availability of technology per se, but the degree to which technology integrates with pedagogy in order to promote creative methodology, digital pedagogy, reflective and communicative competences and assessment-related skills.

5. DISCUSSION

The results obtained during the analysis show that modern types of pedagogical technology applied in art education institutions can be described primarily in relation to their usage as tools for: (i) organization of learning; (ii) facilitation of developing creative projects; (iii) documentation; (iv) linking learning outcomes with evaluation practices. This confirms the assumption that technology was not regarded as an independent value in the field of education, but was valued only as a tool to help people become good professionals, motivate them to be interested in their education, and reflect on learning process in accordance with practical approaches.

According to Wang et al. [35], the usage of information technology can transform the process of art design education in three main aspects: visual modeling, availability of digital sources, and using innovative methods of creativity. In the course of reviewing the selected literature, multimedia and visualization software were noted almost in all documents discussed in this study concerning the topic of art design education. However, the results of the study showed that although technological transformation can happen in the process of evaluating students' work, receiving feedback and forming professional skills, this process may remain somehow limited.

The results of this study agree with the works by Yao and Li [36] on the question of whether students can study music with the help of technological innovations (such as online technology) without teachers. None of the documents reviewed mentioned the use of digital platforms as replacements for teachers, but they emphasized the role of such innovations in providing access to resources, communication, feedback, etc., and reflective documentation. Consequently, these findings

confirm that although technological transformations of arts education take place through the application of digital platforms, they still cannot serve as substitutes for teachers performing interpretive, correcting, and motivating functions.

Yusupova and Rakhmonova [37] share this view on implementing the technology into educational practices and emphasize the differences between project-based learning and digital portfolio as the basis of creative, reflective and evaluation practices. Consequently, the success of implementation of modern technological solutions depends not on the medium itself but on its instructional design.

Communication competence needs to be analyzed next. Based on the works by Zhang [38], communication competence is vital for future music educators, which is supported by the results of the current study. Communication occurs in many cases: through making presentations, criticism between peers, collaborating, providing feedback to others, and discussing one's creative decisions. Modern technology can promote communication processes only if it creates an appropriate atmosphere but not just provides the digital platform for discussion.

The findings in part coincide with the results of an earlier study conducted by Váradi et al. [39], which established that students' career decision making is affected by factors such as motivation and music education. In particular, the study revealed the need for institutions to establish connections between technology, professional identity and preparation in their documentation. It is also worth mentioning that according to Wang et al. [40], music education has an even broader impact on the emotional and personal growth of students. This finding that digitalization does not decrease but increases the human component of arts education is important.

It can be stated that this research project has shown that the problem under discussion consists not only in having access to Technology but in its implementation and utilization in educational activities according to the requirements of various competencies (creative-methodological, digital-pedagogical, communicative, reflective, practice-oriented, and assessment-related). Future research should examine how various types of technology are implemented into classrooms.

6. CONCLUSIONS

This paper has identified that the adoption of modern pedagogical technologies in arts and education would be institutionally included in training courses in order to organize the learning environment, promote creativity and project based learning, document students' learning experience and connect learning outcomes with assessment. Analysis of 30 documentary units (published and/or updated in 2021-2026) revealed that technology was not listed as an independent value of education and technology's significance depends on relations: relation to the professional competence, relation to the student activity, relation to reflection, relation to the practice-based training and finally to the assessment outcomes.

Descriptive coding of the collected documents demonstrated that educational software accounted for the most common type of technology as seen in the largest number of documents (24). Project-Based Learning Technologies (23), Multimedia and Visualization Technologies (21) as well as Digital Portfolio Assessment Technologies (18) were also well represented, but the least number of documents were related to the use of Artificial Intelligence (AI) Supported Technologies (9) and Virtual or Immersive Environments (7). These differences in technologies' usage reveal inconsistency of the application of modern technologies for education in arts as some of them (e.g. computer-based and projects based learning) are widely implemented and others (e.g. AI and immersive technologies) are still relatively underutilized.

According to the results obtained during data analysis, digital pedagogical competence proved to be the most apparent (detected in 25 documents out of 30 analysed) among other types of professional competencies. Creative-methodological competency came second (22), followed by practice-oriented (20), reflective (17), communicative (16) and lastly – assessment-related competencies (14). In other words, there is obviously a certain degree of emphasis on preparing professionals who are capable of teaching digitally and using creative methods, but not much attention was paid to development of aspects of their work related to assessment. One of the important practical implications drawn from this research is the necessity of greater coherence between technological means of learning and criteria of its assessment.

The study recommends implementing currently available technologies for arts teaching and education through the pedagogical perspective by integrating these technologies (digital platforms, portfolios and AI tools) with arts teaching process in order to provide opportunities for artistic practice, reflection, communication and professionalization to proceed under conditions of contemporary technological support without losing the human element of arts.

One of the main limitations of the research paper is connected with its dependency on open databases of educational institutions which provided an overview of representation, presence and roles of traditional technologies in education, yet did not provide evidence of how these technologies were really used. It could have been done through comparative analysis of documentary evidence combined with observations of teaching practices in the classrooms, teachers' individual interviews and students' portfolios in the studio or arts organization.

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