Intersection Points Between Contemporary Art and Design

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New tendencies in the design of cultural spaces have been used to visualize futuristic ideas in design through contemporary art. This research aims to identify the intersection points between contemporary art and design based on a survey of students and to carry out a SWOT analysis of the latest technology implementation process for the professional training of future specialists in the design and contemporary art to establish the benefits of using the latest technology. Results. We analyzed the elements of contemporary art and principles of art and design in modern art to identify points of intersection between contemporary art and design.

As a result of the study, it was found that the use of the latest technology benefits both students and teachers; contributes to the development of practical skills of future professionals in the field of contemporary art and design based on the use of the latest technology; development of the ability to use the latest technology in contemporary art and design; development of algorithmic style and culture of thinking of students.

Keywords: contemporary art, design, intersection points, education, cutting-edge technologies

INTRODUCTION

At the beginning of the XXI century, significant global changes were characterized by the intensive development of digital technologies, the revolution in the information space, and the acceleration of globalization and the digitalization of the economy. The transition to digitalization today is one of the key priorities in developing the world economy. Consequently, current information, digital technologies, and innovations have become important in the sphere of modern art and design.

The twenty-first century is the century of digitalization, and information technology is changing all industries, including contemporary art and design (Sîrghi, Sîrghi, 2020). Therefore, reforming science and fostering innovation are critical sources of sustainable economic growth and are directly related to introducing innovative and information technology in contemporary art and design (World Economic Forum, 2021).

In the last decade, digital technology has dramatically changed how we do business (Gray et al., 2013). Companies are transforming digitally not only to reimagine what their customers like (Filieri et al., 2018; Galati and Galati, 2019) but also to create operating models that can fully exploit new opportunities and thus differentiate themselves from their competitors (Berman, 2012). Nevertheless, topical innovation in contemporary art and design remains crucial for societal development, business growth, and supporting competitive advantage in markets (Franklin et al., 2013). Furthermore, the innovation process is still iterative, uncertain, interactive and dependent on direction, context, and multitasking (Hüsig and Kohn, 2009; Pinna et al., 2018). Thus, it remains relevant that a key theme in business is determining the right solutions to implement the innovation process, from the initial phase of ideas to market diffusion (Brem et al., 2016; Ganzaroli et al., 2016; Agostini et al., 2020).

As a global institution, higher education institutions must be mobile, flexible, and adaptable to any new opportunity and challenge since education in contemporary art and design is based on flexibility, know-how, openness, individual autonomy, and creativity. Therefore, there is a need for a training program to consider the world's developments and innovations to fit this system (Istanto, 2002).

This research aims to identify the intersection points between contemporary art and design based on a survey of students and to perform a SWOT analysis of the implementation of emerging technologies for the professional training of future professionals in the field of design and contemporary art to establish the benefits of the use of emerging technologies.

The research goals of the article are:
1. To analyze the key elements of contemporary art and principles of art and design in contemporary art.
2. To analyze the influence of contemporary art trends on the design process in design to determine their points of intersection.
3. To carry out a comparative characterization of educational programs in the disciplines of the study of emerging technologies in the training of future professionals in design and contemporary art.
4. To survey students and identify the intersection points between contemporary art and design.
5. To carry out a SWOT analysis of the technology's implementation process for the professional training of future specialists in the field of design and contemporary art.

LITERATURE REVIEW

Recent research shows that skills, knowledge, and creativity are equally crucial for professional designers (Guo, 2011) and credentialed designers (Zerillo, 2005). Therefore, appropriately designed curriculum, teaching, learning, and assessment strategies are critical to preparing students for professional practice (Guo, Jamie, 2015).

Design education is a multifaceted process that aims to provide, on the one hand, a deep knowledge of specialization and professional training and, on the other hand, a deep understanding of contemporary art as an object of the educational and cultural process (CEDEFOP, 2008). Design is a discipline of shaping

and performing a variety of design projects, so quality professional training plays an important role. Design in the educational sense becomes a structured basis for new forms of learning. In this context, the term "design" is defined as a process: an idea of something that does not yet exist, subsequently ordering all the elements necessary to translate that design solution into reality (Yamashita, 2012).

To understand design as a connection between art and innovation (Cox 2005), the recent introduction of design and designer thinking at all educational levels has been recognized as a method of facilitating professional performance and capacity to support the transition from a post-industrial economy to a new creative economy based on design knowledge (Design Commission, 2011).

Contemporary art means the present art that connects art and reality aesthetically as part of a cultural dialogue concerning several structures, such as cultural identity and community at large. When traditional art forms stopped worrying about the interests of designers, contemporary art explored the relationship between means and ends to reconnect art and "reality" in its aesthetic manner.

Contemporary art has many trends based on its application, character, purpose, and intended use. Since there are many trends, we have chosen the following seven points of intersection closely related to design and contemporary art, which will be reviewed and analyzed during the case study section (Bashirova et al., 2021).

1. The conceptual art trend (contemporary movements and styles, conceptual art, etc.). In this type of art, the concept or idea involved in the work takes precedence over traditional aesthetic, technical and material concerns. Consequently, the idea is the main issue in which art design will be based entirely on such a specific idea. In other words, conceptual art is a movement that puts ideas above the standard visual components of works. Conceptualism took many forms, such as performances, happenings, and ephemera, from the mid-1960s to the mid-1970s, when conceptual artists such as Jackson Pollock and Andy Warhol created artwork that ultimately created their artwork rejected standard art ideas.

2. The environmental art trend. Contemporary designers are exploring a new understanding of ecological art by combining environmental and cultural connotations and characteristics, more rational thinking, and evaluation to understand the reality of the urban environment. Integrated social and environmental approaches, developed as a moral, restorative stance, appeared in the 1990s. The trend is the mainstream of ecological design, which is to create a comfortable and pleasant ecological system to protect the integrity of urban culture, environmental art and ecological coordination, and integration of the spiritual content of history and urban culture.

3. The minimalist art trend (Stewart, 2018). Minimalism in visual art is commonly referred to as "minimal art," literary art, and ABC art, important for visual art and design. The term "minimalism" is also used to describe a trend in design and architecture where the subject matter is reduced to essential elements. This trend requires artists, designers, and architects to break things down into basic components, using simple forms to create harmonious work. This movement established itself in American visual art in the 1960s and early 1970s through several prominent artists such as Donald Judd, Agnes Martin, and Frank Stella.

4. The performance art trend (Appleton, 1996). Its origins can be traced back to the 1910s, and the modern movement occurred in the 1960s. It includes four essential elements: time, space, the performer's body, and the relationship between the performer and the audience. This trend is applied to the design of cultural space through the interaction of creating a positive connection between people's existence and the design itself. For the building and its interiors as a performance art concept, all interior decorations, windows, doors, fittings, and equipment interact with the beneficiary. Consequently, materials must be sturdy for cultural spaces to resist abuse, easy to clean, provide minimal maintenance, and fit the function.

5. The trend of technology. The twenty-first century is an era that brings technology and art together. Technology is defined as any application of science to emergent functions, resulting in different ways of creative interaction and collaboration.

6. The trend of installation art. Installation art emerged in the 1960s but became more prominent during the next decade. Installations are used in sites because they are designed for existing

only in the space for which they were created, appealing to the qualities evident in an immersive three-dimensional environment. It invariably applies to interior installed works, and exterior pieces are referred to as land art. Installation works have been created in exhibition spaces such as museums and galleries and public and private areas.

7. The trend of abstract art (Livneva, 2020). Abstraction emerged at the turn of the 20th century and focused on exploring color and form. It is a departure from reality that frees people's creative energy and gives them the freedom to explore their minds and emotions in ways that were not possible in traditional art styles. Abstraction is an expression that combines feelings and vibrations with the usual perception of realism. Unlike other trends, abstraction does not depict objects as they appear in real life. Before this style, artists focused on illustrating human civilization and the natural world. Abstract works experiment with the use of texture, tone, and light. Because of abstract works, artists express their feelings rather than specific objects or scenes.

The space triangle consists of three components (culture, architecture, and design) that serve together in designing cultural space. Concerning space, the common elements of art are nine: line, shape, size, texture, color, tone, sound, light, and time. Such elements as line, shape, size, texture, color and light are much closer to the field of design, which should be considered during our study. The other three elements of art are not relevant to the design process, respectively (Hassanein, 2021).

The research analysis on this problem shows that many scholars have paid attention to the problem of studying the processes of technology application in the learning process, such as virtual reality (VR) (Pellas et al., 2020), augmented reality (AR), and mixed reality (MR) (MacCallum, 2021). In addition, researchers have focused on the challenges of learning design with VR (Desurvire, Kreminski, 2018) and interface development (Wetzstein, 2016). Using digital technologies, Design Minds recognizes that interdisciplinary learning helps to engage and empower future professionals to think, implement, and discover new design solutions (Duell et al., 2014; Alekseeva et al., 2017; Alekhanovich, Abdurakhimovna, 2020; Smith & Koppel, 2014).

As a result, the problems of contemporary art and design and the definition of their intersection points are insignificantly reflected in scientific publications through theoretical research and practical studies. However, the issue of analyzing the intersection points between contemporary art and design remains relevant and open for further investigation.

METHODS AND MATERIALS

The aim fulfillment of this study involves the use of research methods such as:
- systematization of the main features of the influence of modern art trends on the design process in design to determine the points of their intersection;
- systematic and logical analysis, the method of synthesis of information of the key elements of contemporary art and principles of art and design in contemporary art;
- synthesis of the latest scientific publications concerning the SWOT analysis of technology implementation process for the professional training of future specialists in the field of design and contemporary art.
- comparison method to distinguish the characteristics of educational programs in higher education institutions and the definition of disciplines for the study of technology in the training of specialists in the field of design and contemporary art.

Undergraduate students of higher education institutions were surveyed using descriptive statistics with data provided by MS Forms Pro to identify the intersection points between contemporary art and design in 2021. We conducted the survey to determine students' perceptions of the art and design interdependence. An online survey was conducted from October 10 to January 30, 2022, collecting information from 3,000 students. The participants answered questions about their learning experiences, motivation, expectations,

and overall enjoyment of their studies in contemporary art and design. Questions addressed in this survey included the following research questions:

1. What are students' perceptions of current trends in contemporary art and design?
2. Are contemporary art and design related?
3. What are the intersection points between contemporary art and design?

RESULTS

There are six basic elements to consider when looking at contemporary art: line, form, light, size, color value, and texture. These are all visual elements that you use when considering art as contemporary art. All modern art usually contains all or any of these visual elements. Some of these elements will be visible, and others will not, but you can generally find all or most of these visual elements in a certain way in contemporary art. You can think about these visual elements to better understand the artist's message as you view contemporary art. When you look at art, you have to look at art and design principles. The principles of art and design consist of how the artist uses elements in the composition of his artwork (see Table 1).

TABLE 1
CONTEMPORARY ART VISUAL ELEMENTS AND ITS ART AND DESIGN PRINCIPLES

Visual elements of contemporary art	Principles of art and design in contemporary art
1. Line is an element of art formed by a point moving in space. A line can be two or three-dimensional, descriptive, implicit, or abstract.	1. Rhythm is a design principle indicating movement. An artwork is created with carefully placed elements to make an almost visual tempo, beat, or motion in the artwork.
2. Form is a three-dimensional element of art. The shape includes some height, width, and depth, such as a cube, pyramid, sphere, or cylinder. The form can be freeform.	2. Balance combines elements to create a sense of balance or even stability in a work of art. The basic types of balance are symmetrical and asymmetrical.
3. Size is an element of art that is two-dimensional, flat, or limited by height and width.	3. Accent is known as a contrast. It is a way of combining elements to emphasize the difference between the elements.
4. Light (meaning) is the light or darkness of colors. White is the lightest value, and black is the darkest. There are different color values between each.	4. Variety is a design principle that deals with variety or contrast areas. For example, an artist can use diversity by using different shapes, sizes, or colors in a piece of art.
5. Texture is how things look and feel when touched. Does it look rough, smooth, or sharp?	5. Harmony is the combination of similar elements in a work of art to show or emphasize their similarities. It can be achieved through repetition or subtle, gradual changes.
6. Color - an art color consists of three primary color properties: hue, value, and intensity. For each of these: 6.1. Hue is the name of colors such as red, pink, and pink indigo. 6.2. Color value is a light or dark hue. The meaning of the color will change when you add other colors like black and white.	6. Proportion is the relationship in design between certain elements to each other or the whole.
	7. Gradation is about gradual changes in elements in a design. Examples are large shapes gradually changing into smaller shapes or shades of color gradually changing from dark to light.
	8. Motion is used in artwork to create the look and feel of a particular action. Motion helps orient the audience to the painting.

Source: Compiled by the authors based on official data of Hummel (2022).

The influence of contemporary art trends on the designing process is measured in Table 2 to determine their intersection points. The contemporary art trends: conceptual, ecological, technological, installation, and abstract trends interacted in the designing process. Thus, we concluded that only five of the seven trends were realized in design and engaged in achieving the primary goals as planned.

The five trends of modern art were fully applied and realized from the above table, which combined the trends of contemporary art and design and the materials used, providing the project's best realization based on functionality and flexibility.

Contemporary art is not only living art but also self-expression. As a necessary means of spreading the connotation of contemporary art, contemporary art education assumes the critical responsibility of applying aesthetics and enriching everyday life. Analyzed the process and potential of introducing the study of techniques for using contemporary art in the design process.

The analysis results of the available information on the official resources of educational institutions are reflected in Table 3.

The study results revealed that most educational programs do not include technology as a separate discipline but implement particular topics in professional disciplines or have different fields for students' choice. Among the disciplines and special modules for the study of technology in the studied universities, the most common are: VR/AR entry, multimedia programs, modeling, visualization, and virtual reality, and user experience with virtual, augmented, and mixed reality technologies (VR, AR, MR), multimedia, 3D modeling of objects and environments, digital art and technology, etc.

To determine the points of intersection between contemporary art and design in 2021, the students' majority of Australian National University, University of Georgia, Kyiv National University named after Taras Shevchenko, University of Economics and Law "CROC," Kyiv National University of Technology and Design, noted that:

- design and contemporary art are the keys to the realization of creativity and innovation in an exciting career in art and design (47.5%),
- design and contemporary art help to create technical and conceptual knowledge to develop creative work (44.4%),
- design and contemporary art become an integral component, an innovative style for the design of cultural space (6%),
- design and contemporary art are inextricably linked to complex aesthetic and emotional ways (2.1%) (see Figure 1).

TABLE 2
CONTEMPORARY ART TRENDS AND MATERIALS USED

Type of art trend	Conceptual art	Environmental art	Minimalism art	Performance art	Technology art	Installation art	Abstraction art
Design concept applied	Historical Culture in shape of modernism	Naturally, green materials, equipment are properly utilized	Minimalism in Visual Art	Interaction Human with the Art	Integrated Methods of Technology	Site-specific that they are design and exist in space	Artwork that reshapes the natural world
Achieved and implemented	Yes	Yes	–	–	Yes	Yes	Yes
Not applicable	–	–	N/A	N/A	–	–	–
Elements of interior design	Floors	Ceilings	Walls	Partitions	Furniture	Lighting	Colors
Application of materials used	HDF Wood–Timber Wood–Granite Titles–Ceramic	Glass reinforced Concrete–Stainless Steel–Double–glazed glass panels	Pre–Cast Concrete Walls–Gray Granite Panels	Wood timber panels–Stainless Steel	Wood–Metal–Stainless Steel	Daylight–Artificial Direct–Indirect–Fixed–Movable	Aromatic and Earth scheme colors of Metallic–Gray, Brown

Source: Compiled by the authors.

TABLE 3
**COMPARATIVE CHARACTERISTICS OF EDUCATIONAL PROGRAMS FOR THE TECHNOLOGY DISCIPLINES' STUDY**

Higher education institution	Curriculum topic	Technologies		
		VR	AR	MR
Mississippi State University	Virtual Reality Design	as a separate topic of the discipline is indicated	as a separate discipline (Optional) is indicated	-
University of Florida	Augmented and Virtual Reality	as a separate discipline (Core modules) is indicated	as a separate topic of the discipline is indicated	
Cornell University	Virtual Reality and Augmented Reality Studies	as a separate discipline (Core modules) is indicated	as a separate discipline (Optional) is indicated	
Australian National University	Immersive media - virtual reality	as a separate discipline (Core modules) is indicated		
Harvard University	Multimedia technology with a specialization in VR/AR	as a separate discipline (Core modules) is indicated		
University of Pennsylvania	Graphic design, industrial design	as a separate discipline (Core modules) is indicated		
University of Georgia	Digital Media Technology	as a separate topic of the discipline is indicated	-	
Michigan State University	Multimedia Design	as a separate topic of the discipline is indicated	-	
Iowa State University	UX/UI design and development	as a separate topic of the discipline is indicated	-	
Temple University	Graphic Design	as a separate topic of the discipline is indicated	-	
University of Connecticut	Digital Media Development: 3D Environments	as a separate discipline (Core modules) is indicated	-	
Kyiv National University named after Taras Shevchenko	Computer Graphics and Virtual Reality	as a separate discipline (Core modules) is indicated	as a separate discipline (Optional) is indicated	as a separate topic of the discipline is indicated
HEI University of Economics and Law "CROC"	Design, Multimedia Design	as a separate discipline (Core modules) is indicated	as a separate topic of the discipline is indicated	-

Higher education institution	Curriculum topic	Technologies		
		VR	AR	MR
Kyiv National University of Technologies and Design	Computer design	as a separate discipline (Optional) is indicated	as a separate topic of the discipline is indicated	
Odesa State Agrarian University	Project graphics	as a separate discipline (Optional) is indicated	as a separate topic of the discipline is indicated	-

Source: Compiled by the authors based on official data of Chemerys et al., (2021).

FIGURE 1
ASSESSMENT OF THE INTERSECTION POINTS BETWEEN CONTEMPORARY ART AND DESIGN IN 2021
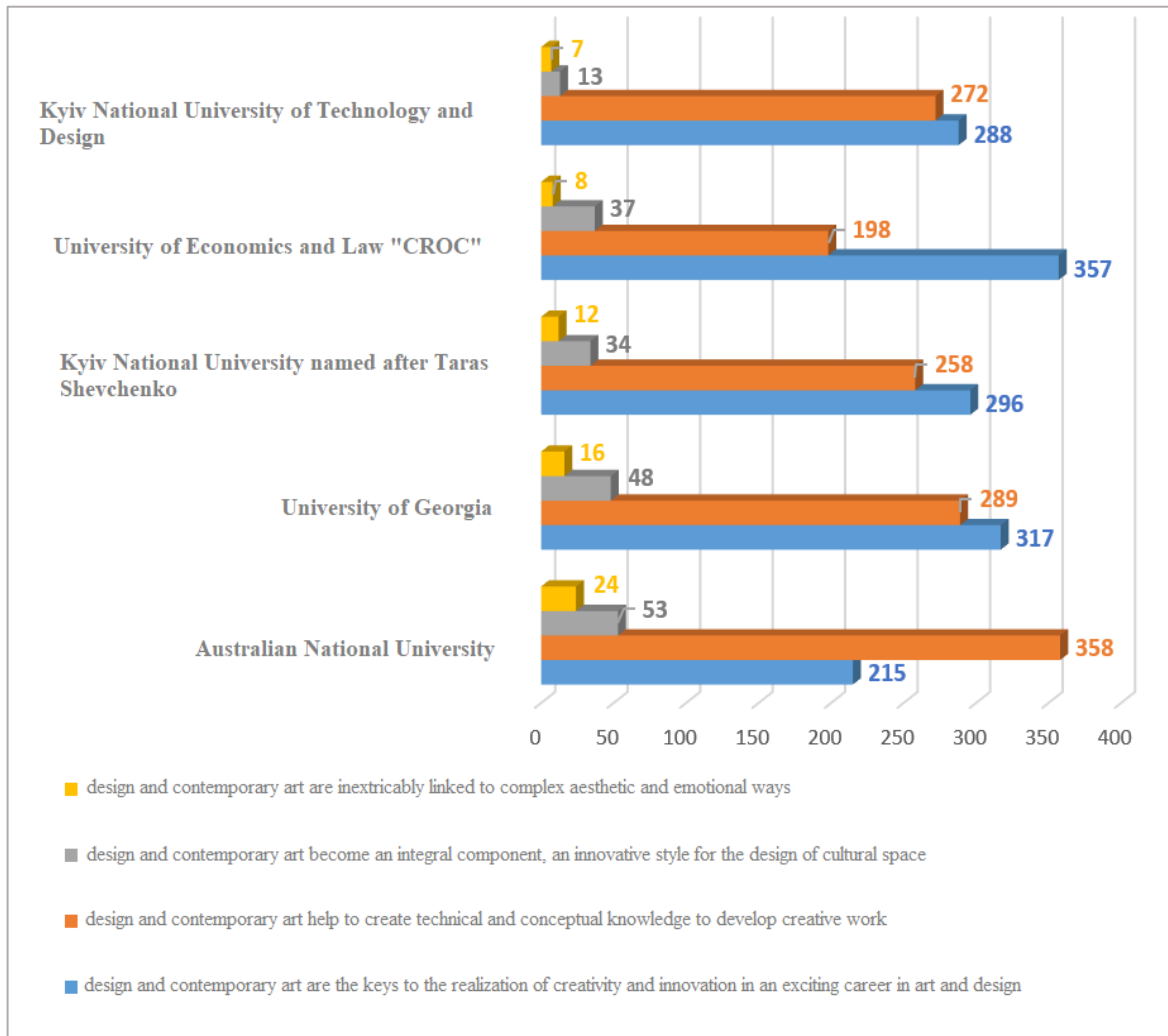
Source: Compiled by the authors.

The SWOT analysis was conducted to analyze the intersection points between contemporary art and design. The results allowed us to determine the hierarchy and positioning of opportunities and threats of introducing technology learning in the professional training of future professionals in design and art (see Table 4).

TABLE 4
SWOT ANALYSIS OF THE PROCESS OF IMPLEMENTATION IMMERSIVE AND INNOVATIVE TECHNOLOGIES FOR PROFESSIONAL TRAINING OF THE FUTURE SPECIALISTS IN THE FIELD OF DESIGN AND CONTEMPORARY ART

Strengths (S)	Weaknesses (W)
− high level of scientific and pedagogical staff involved in the teaching of contemporary art and design; − increasing the level of motivation and productivity of students' learning activities by focusing development on the attractiveness and image of contemporary art and design; − demand for contemporary art and design development skills; − strengthening the position of the future designer in the labor market, including the global one; − high reward price for the project, where modern technology has been applied.	− the high cost of educational institutions' equipment for the development and testing of technology development in contemporary art and design; − loss of motivation among students due to the complexity and a significant amount of time spent on the process of learning a software product based on the application of modern technology; − niche development of contemporary art and design contributes to the emergence of a small number of projects with high prices.
Threats (T)	**Opportunities (O)**
− low interest of teachers in mastering new technologies in contemporary art and design; − shifting attention from creative solutions to technical skills; − insufficient level of multimedia competence formation is necessary for the successful development of the future designer as a professional.	− opportunities for academic and professional mobility; − opportunities to adapt to the current changing realities of the design market; − advanced training, including in design development, thanks to technology in contemporary art and design.

Source: Compiled by the authors based on official data of Chemerys et al., (2021).

DISCUSSION

The study results of contemporary art and design intersection points led to the following conclusions. First, in today's world, the training of contemporary art and design professionals is changing towards a more holistic, harmonious individual who is fluent in logical and creative thinking (Alekseeva et al., 2017).

The correlation of modern art and design trends is a fundamental concept and approach to the cultural spaces' design that have grown at the beginning of this decade, and contemporary art is becoming recognized as an integral component, an innovative style for the cultural spaces' design. When combined, art and design are inextricably linked in complex aesthetic and emotional ways. Creativity in creating contemporary cultural spaces depends on two essential points: human culture, spatial identity, and the means of implementation that accompany approaches to modernism.

The tools of color and graphic design and their implementation, together with high-tech materials and a variety of modern art trends, the latest, innovative and futuristic, ideally help shape space and create

unique and expressive cultural objects. It is vital to use unique, modern approaches to nanomaterials, nanotechnology, high-tech materials, and related techniques that are strategically placed in the design, as well as all other elements of design with their direct intervention in contemporary art, will not only help to involve patrons in the mentioned cultural space and navigate it, but also serve to establish a tidal connection between them. The results of the study showed that the key trends that are often used in the design of cultural spaces: trends of conceptual, ecological, minimalist, and abstract art, which are closely related to technological trends. These trends are to obtain a distinctive identity in the cultural space design (Hassanein, 2021).

Therefore, improvements in information technology are focused on solving more intellectual, scientific problems (Smith & Koppel, 2014). Data visualization, image processing, and the creation of virtual environments allow the future specialist in contemporary art and design to achieve holistic and innovative approaches to solving complex problems. Today, the latest technologies are shaped as learning materials, which are small pieces of information presented in a particular logical sequence, contributing to the formation of students' intellectual, creative, and communicative skills. Let us note that the use of ICT is compatible with the help of other educational technologies, but they complement each other without denying it.

Organization of education in contemporary art and design, based on modern technologies in education, enhances students' creative thinking, independent decision-making, and teamwork skills by organizing practical and laboratory classes in particular subjects. The introduction of the latest technologies will be the basis for improving the effectiveness of education in training future specialists in contemporary art and design (Alekhanovich, Abdurakhimovna, 2020).

Consequently, the intersection points between contemporary art and design will modify following the changes in innovative and globalization requirements for the professional competencies of future specialists in contemporary art and design and in-depth research, which will lead to increased attention to improving knowledge on the application of the latest technologies in the specialists' professional training.

CONCLUSION

The analysis of the intersection points between contemporary art and design has established that using the latest technologies in education stimulates students' independent initiative in studying contemporary art and design and fosters thinking and aesthetic imagination. However, many problems require unique methodology and research methods. In this regard, it is helpful to use and integrate the experience of other educational institutions.

The ever-growing influence of technology has a destabilizing effect on traditional education models. As a result, it is becoming globally recognized that a shift toward a "new culture of learning" is necessary to function successfully within the paradigms of the twenty-first century. Design, the process of creatively and rationally exploring complex challenges, provides an ideal framework for facilitating this cultural shift.

As innovative means of communication, the general trend of the virtual and augmented reality market has led to a reorganization of the training content of future professionals in contemporary art and design as professionals with professional visualization skills. Furthermore, increased profits from using these technologies, attracting maximum attention, a novelty in use, prospects, and opportunities in the field of contemporary art and design - this is only a part of all the possible positive effects of using augmented and virtual reality in the professional sphere.

The practical significance of the conducted research is that specialists can use the conclusions and recommendations developed by the author and proposed in the article for selecting the tools of the newest technologies for providing education, which will allow the realization of quality professional training of specialists in the sphere of contemporary art and design.

Further research can be aimed at:

>   improving and developing methods for researching the intersection points between contemporary art and design to develop an appropriate program for introducing the study of the latest technologies in the professional training of future specialists in contemporary art and design;

research on the effectiveness of implementing this program, which will allow to identify and adjust essential and particular subject competencies for specific disciplines and correctly build.

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