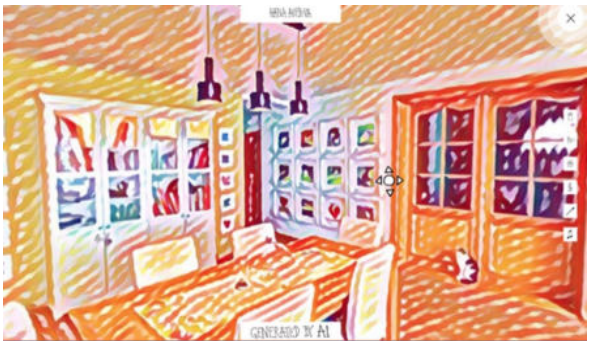
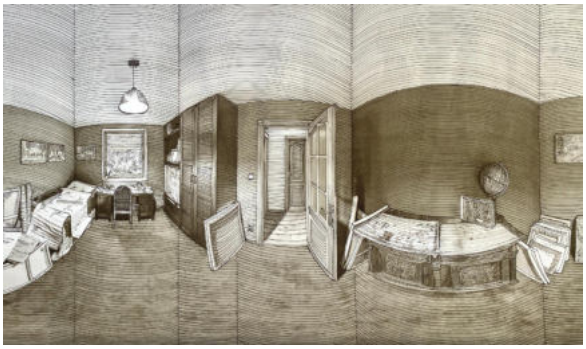
VIRTUAL REALITY IN ART: CREATING A VIRTUAL STUDIO AND IMAGE GALLERY

Ing. Hana Nováková

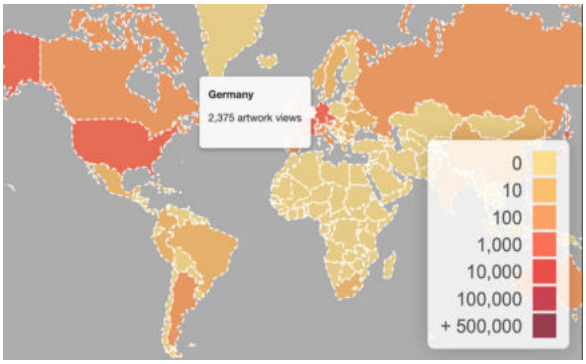












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"This work charts the efforts of a human painting outside the cultural metropolis to create her own 3D virtual studio using VR and AI in the age of covid lockdowns, trying everything that can and can't be done on a very limited budget before the massive advent of AI, and the value she brings to the world through her research, creativity and efforts."

ABSTRACT

This thesis aims to identify the potential and limitations of using Virtual Reality (VR) to create an experimental and accessible virtual studio, with a **focus on democratizing technological advances in the art environment**. Through detailed insight into the current state of VR and an understanding of its possibilities and limitations in the arts, we explore the design of an application that transforms the research findings into an authentic virtual studio and gallery. The application serves as an inspiration for artists outside of cultural centers, combining innovative elements and smart technologies. The theoretical part of the thesis offers a brief overview of VR worlds and key concepts. The practical part presents the results of primary research, **leading to the formulation of 12 principles for the creation of artistic VR**. The resulting app combines creative and user aspects with innovative elements such as interchangeable images at an angle, AI-generated and hand-painted 3D spaces and sound branding. The virtual space created is authentic, technological and affordable, serving as a flexible digital platform for experimentation, art and intelligent technology that can be flexibly modified and innovated. **Linking art, marketing communications and technology in the era of the Covid-19 pandemic, it is an inspiring resource for contemporary artists, charting a unprecedented period in history.**

Keywords: art, gallery, studio, VR, AI, comparative research, innovation

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INTRODUCTION

Against the backdrop of the global historical event of the Covid-19 pandemic, which accelerated the digital revolution and forced small and large players in the art market to look for opportunities to present, sell and often create using digital tools, there was a need to understand these changes and, from the perspective of a creator living outside the metropolis without a large budget or technical background, to try to create an authentic and accessible 3D virtual studio inspired by the virtual reality (VR) projects of established institutions and smaller studios, thus contributing to the democratization of technological progress in the art environment. The focus of this dissertation and the primary research conducted is to explore and identify the potential of using selected technologies and narratives of virtual reality (VR) projects, with a focus on the presentation of works in the context of the art space, contemporary technologies and with an emphasis on accessibility. The exploration of the topic progresses from mapping the impact of the Covid-19 pandemic on the online art market, including interviewing creators themselves, to examining the challenges and opportunities for the creative industries in the field of XR technologies (augmented and virtual reality), to the implications for marketing ethics in the industry, and comparing a set of VR experiences. Based on these findings, 12 best practices for better VR are formulated. Further research in this area is essential to further develop and understand future technical possibilities and limitations, cross-industry overlaps and implications for creators, users and society. The application of the findings in the project section was awarded the prestigious Web Top 100 marketing award in 2021 in the Digital PR category and its current form can be found at www.ArtStudio.app.

1 CURRENT STATE OF THE PROBLEM

Virtual reality opens up new horizons for artists, allowing them to transcend traditional boundaries and offering viewers entirely new experiences. Art schools and institutions are using this technology to create virtual studios where students can experiment with spatial layout and design without constraints. VR also allows artists from around the world to share and collaborate on projects in real time, democratising art-making and breaking down geographical barriers. Declining costs and the increasing availability of VR devices allow independent artists and small communities to engage with virtual art and create their own virtual spaces. This trend encourages cultural diversity and innovation outside of traditional art institutions, leading to greater engagement and representation of different voices and perspectives in the art world. According to a study by Novakova et al. (2021), VR technologies seem to face challenges, including technical, financial and ethical ones, that may affect their mass adoption. However, technological advances play a key role in democratizing VR and increasing the attractiveness for investment and new content development. According to researchers (Cipresso, Giglioli, Alcañiz Raya, & Riva, 2018), we can expect a further boom in VR technologies, which could lead to mass adoption of these innovations and democratization of the field. Arguments for the importance of VR have shifted due to the covid pandemic due to changes in the way information, education and entertainment are consumed, which has led to individualization and the rise of streaming content. Technological advancements and the democratization of VR are bringing a new reality that may have a key impact on the future and creation of the metaverse. At the same time, there are still limitations such as financial constraints, technological limits and constraints on the part of users that may affect the mass adoption of VR and raise ethical issues related to the use of the technology. Although technological advances and the democratisation of VR are expected to reduce limitations and increase accessibility, there are still challenges related to content creation, data transmission and user experience that may hinder mass adoption. The ethical issues surrounding the use of VR, particularly in marketing and in combination with AI, require careful consideration due to the potential implications for future generations and interactions with artificial worlds. Discussion of the potential and risks of VR and AI is important for the future of technology and society as a whole. At the same time, new technologies are bringing new forms of artistic expression and communication to the art environment that were previously impossible to realize, and with technological advancements, they are being democratized. Of course, in addition to the

authentic solutions described in this thesis, there are now low-cost tools represented by gallery software programs that are changing the way art can be presented and viewed (Parsons, 2023). Parsons proposes that three-dimensional virtual galleries can be linked to the participatory action research methodology of photo-voice, which draws on Freire's seminal work to cultivate praxis, or the combination of reflection and action. An alternative option, without the required authenticity and embedding in the environment, icons, or custom design or development solutions, would be to use a template from one of the applications already existing in 2023 to create a virtual gallery, such as Artplacer.com, which can be used to place images in ready-made 2D templates and publish them on social media, to the more advanced Artsteps.com, which promises a VR experience. Platforms such as Kunstmatrix.com usually allow the creation of virtual galleries in a template, including the possibility of sharing, and usually have the option of viewing and purchasing artworks in a free trial or on a monthly fee basis for more advanced functionality or the publication of multiple exhibited works. Professional companies such as Ikonospace.com then offer the processing of more advanced museum projects and virtual displays of, for example, Egyptian statues or Pharaoh mummies. With Hubs.mozilla.com, a more advanced virtual 3D gallery can be designed, which is free to the creator for up to 20 visitors. Of course, classic online art galleries can also be used for 2D online presentation of artists' works. Some of the best known, according to Fine Art Summit's list, include Saatchi Art, with a global reach; Artmajeur, from Montpellier, France; Artfinder, which focuses on ethics and sustainability and provided data for the first of the research conducted; and Artful Home, which focuses more on objects such as sculpture and glass, UGallery , which represents about 500 artists mostly from the US, London-based IdeelArt, which focuses on abstraction, Pixels, which is particularly suitable for photographers, Zatista, which specialises in handmade 2D artworks, artFido, founded in 2012 by Australian Juan Garcia, and many others. In terms of scientific research on the psychology of online art gallery visits, we can recommend the open source tool The Open Gallery for Arts Research (OGAR), which allows researchers to describe in detail the behaviour of visitors in online art galleries (Rodriguez-Boerwinkle, Silvia, J., 2022). Unfortunately, this tool was not available to the creators at the time of the creation of ArtStudio and so was not used in the creation of ArtStudio. The curatorial perspective (Hashim Amir Nur Muhammad Amin, Hilal Mazlan, Aznan Bin Omar, 2022), on the other hand, according to the paper Virtual Art Gallery Tour: Understanding The Curatorial Approach, should take into account the three curatorial phases: mapping the actual gallery, constructing the virtual gallery and publishing the tour, which was fulfilled in this project.

2 DISSERTATION OBJECTIVES

Based on the research conducted, it can be concluded that the research gap of this dissertation addresses the limited understanding of the new possibilities and challenges of VR in the arts environment during the Covid-19 pandemic, with an emphasis on democratizing and reducing the costs of this technology and creating a proposal for an experimental and augmented space for virtual and interactive presentation of artworks using Artificial Intelligence (AI).

The main objective

The main objective of this dissertation is to identify the potential and limitations of using Virtual Reality (VR) to create an experimental and accessible virtual artist/artist studio using Artificial Intelligence (AI) and other technologies, with an emphasis on democratizing technological advancements in the art environment.

Sub-objectives

The sub-objectives of this thesis are (1) to provide a detailed and clear insight into the current state of VR, including technical and cultural background (2) to understand the potential and limitations of VR in art environments based on three self-published primary research studies and comparative research on 30 VR projects (3) to design an application that applies the research outputs to the creation of an authentic virtual studio and image gallery that can inspire artists with limited resources outside of large art centers.

3 THEORETICAL FRAMEWORK

Background of Art VR

The conceptual underpinnings of Art VR, are subjected to an exploration of the interaction between art and time and offer perspectives on how VR can influence our perception of movement and time. An interesting aspect is the analysis of the different ways in which film, reality and life can be presented through VR, suggesting a deep analysis of visual and narrative structures. The thesis also reflects on the physical aspects of virtual reality and its ability to simulate the real world, raising questions of veracity and accountability to the simulated reality. This part of the thesis is thus not only a survey of current trends in VR, but also a stimulating discussion of the ethical and philosophical dimensions of virtual art.

Terminological definitions and the nature of VR

The terminological definition and nature of virtual reality (VR) are crucial to understanding this innovative technological field. VR is defined as a simulated environment, which can be similar or completely different from the real world, and is created using computer-generated images and sounds. This technology allows users to interact with the virtual environment in real time. VR has a wide range of applications in various fields, from entertainment to education and training. In the context of art, VR opens up new possibilities for the creation and presentation of works, changing the traditional perception of artistic expression and experience. The terminology of VR includes concepts such as immersion, interactivity, metaverse, cyberspace, matrix, reference worlds, cybersickness, augmented and mixed reality, and a number of other narrative concepts such as ich-form, multi-plot, meta-suspense, post-human, and total artwork in VR, which are essential for understanding the subject matter or creating immersive and realistic virtual experiences.

Development trends

Trends in VR development include, but are not limited to, shrinking technologies and increasing variety, cloud computing, democratization of technologies, increasing frames per second, new devices for developers and users, evolution towards a screenless world, and cheapening of technologies. Along with the increasing ease of use of technology, technological advances are also making technology cheaper.

Technical basis

Within the technical base for creating virtual reality, various programs can be used to allow creators with different skill levels to create immersive virtual environments. Desktop tools include the Unity 3D and Unreal game engines, as well as tools such as Blender, 3D Studio Max and SketchUp. Web-based tools include Three.js and A-Frame. Then applications like JanusVR and JanusWeb, which bridge the gap between the virtual and real worlds, and Vizor.io or React VR. These programs, along with photo-tools, are key to the development of virtual reality as they allow creators to realize their visions.

Virtual worlds

Virtual worlds, such as Second Life or There.com, offer users the possibility of interaction and economic transactions through avatars and virtual currency. Technologies such as VRML and later X3D have enabled the creation of rich and interactive 3D environments. Open-source platforms such as Solipsis and Open Cobalt have expanded the approach to creating and sharing virtual worlds, leading to greater variability and customization of virtual experiences.

VR personalities

Palmer Luckey, founder of Oculus VR, focused on reducing the discomfort of VR goggle users by aligning the visual experience with physical sensations. An important aspect of the development was the placement of pixels in the VR goggles to increase immersion and minimize negative reactions from users. Luckey believes that VR is not the solution to everything, but offers new possibilities for encounters and interactions in virtual worlds. Science fiction literature with VR themes often involves conflict, while Luckey and other industry experts are optimistic about the positive impact of VR. Creative classrooms play a key role in implementing innovation at different levels of society. John Carmack, co-founder of id Software, is another prominent figure in the VR community

The cultural underpinnings of VR: Literature and film

Virtual reality (VR) has its roots in cyberpunk and post-cyberpunk, which is important for a deeper understanding of VR design and aesthetics, ethical and philosophical issues, and social critique and reflection. Cyberpunk literature, such as the novels of William Gibson, Neal Stephenson and others, provide a rich source of inspiration for virtual environment design. This literature often describes futuristic, dystopian worlds with advanced technology that can be used to create VR visuals and atmospheres. This genre introduces questions about control, privacy, identity and artificial life. These questions are also relevant to VR, which

brings new possibilities and challenges in the field of human interaction with virtual environments and the relationship between technology and humans.

Through a brief summary of the basic issues or approaches depicted in cyberpunk films, this subchapter allows to understand and interpret the relationship between film, VR and society, including some fascinating concepts. Is life a simulated illusion? Can consciousness be preserved after life? What are the limits of machine and clone modifications of humans? Can the virtual world be a salvation in case of the destruction of the real world? Is a world without privacy the utopia of criminologists? Who is responsible if a human mind is embedded in a robot? How do we know truth from the illusion of truth? What ethical paradoxes does the world of artificial humans hold? What if the machine is more human than the human? Does a robot have a right to an identity? What about the traumas, defects and deviations of cyborgs? How to prevent the violation of the law of the uniqueness of each being? How to verify the reality of one's own world and oneself? Do we know the solution to the problem of morality and loss of control of artificial virtual intelligence?

4 CHOSEN METHODS AND PROCESSING

The dissertation relies on a number of secondary sources to address the issues under study, which have been used primarily to obtain a comprehensive view of the issue of VR usage, terminological definition of selected concepts, characterization of the current state of the field, as well as the technical or cultural background and a framework profile of key personalities in the field. In this part of the dissertation, traditional scientific methods such as analysis and synthesis have been used to contribute to an in-depth investigation and comprehensive understanding of the topic. The elaboration of the current state of the issue under study was the basis for conducting the primary research. A combination of different research methods was used in the conduct of the primary research. In the case of qualitative research, a combination of investigation through semi-structured interviews and observation was used. In the case of data collection, a survey through online questionnaires was used. In addition, analysis of secondary quantitative data was also conducted to contribute to a deeper understanding of the topic. The results of the primary research were analysed and comparisons and synthesis were also used in the process. Given the limitations imposed by the total number and structure of respondents, emphasis was placed on a descriptive approach. The results of the primary research, combined with the analytical and synthetic treatment of the researched issue, became the basis for the design of an experimental and extensible space for virtual and interactive presentation of artworks using artificial intelligence.

The methodology and methods of the work are carefully elaborated in the dissertation in subchapters: Methodology and methods of work of three published researches, methodology and methods of work of the fourth research, methodologies of comparative researches in the world and in our country, researchable criteria of the fourth research, final criteria with the justification of their choice, setting of objectivity of the chosen criteria, setting of the researched sample, data collection and diversity of sources, and formulation of the Art VR research set.

The list of sources used is divided into several sections for clarity (see List of References used), namely monographs, dictionaries, online sources, theses on related topics and conference proceedings. During the preparation of this thesis, the author used the services DeepL, Grammarly, CitationPro and GoatChat in some passages added in 2023 and 2024 and in dealing with foreign literature to improve the language level and clarity.

Limitations

As the theoretical section shows, humanity is in a unique period where all factors from cultural, creative and technical to the ability to capture and transmit unprecedented volumes of data have come together, and so the current state of affairs corresponds to the beginnings of a completely new field, which is still facing many limitations that apply to the primary research carried out: From technical, to legislative, to difficulties in terms of availability of equipment and user knowledge or comfort, to the quality of data transmission, to challenges in terms of ethics or energy and financial requirements, and last but not least compatibility with other technologies such as In addition to this, there are also a number of other challenges. The limitations of the research are presented in detail in the dissertation in the relevant chapter and are divided into methodological (time, body of work and objectivity criteria) and implementation.

5 RESULTS

The first research, (Nováková, Kazík, Juříková, Štarchoň, 2020, pp. 5-6), which answers the first research question VO1, i.e. what was the impact of the Covid-19 pandemic on the online art market, showed that the unexpected Covid-19 pandemic caused complications for almost all participants in the art market, from supply, to transport problems, to the ban on art-inspired travel. Galleries and auction houses have closed, and the bricks-and-mortar art trade has in many cases shifted to the online market, which could eventually lead to the long-awaited digital revolution in the industry. As a contrast to this crisis of the suddenly fragile traditional art market, the online art community has become relatively resistant to the new challenges by sharing its experiences and warnings online, through its welcoming attitude, collaboration and generosity. This digitally enabled collaboration and communication between art market actors has translated into an increase in online sales in the six months under review . Thus, this first research showed that, unlike the global art market as a whole, which suffered from closed galleries, closed brick-and-mortar art shops, limited or delayed shipping services, and struggled with limited art tourism, the online art market remained relatively stable in structure and grew at an accelerated rate in new customers and sales. A striking feature of the climate of the online art market during the first six months of the pandemic was the unique combination of the fast-paced and precise digital world on the one hand, coupled with the human solidarity and generosity of artists and their customers on the other. However, a philosophical explanation of the online art market's recovery during the Covid-19 pandemic would probably be that the online art market survived so well mainly because it got the best of both worlds: the human and the digital. By replacing physical economic exchange with global supply and global demand, rapid digital transactions and the exchange of tastes, values and finances on the one hand merged with human access on the other, with customers showing generosity and solidarity with the problems of delays, transport and limited access to art tools. Of course, only time will tell if this is a long-term trend. Along with many in the online art market, the authors of the research agree that Covid-19 could powerfully accelerate the global art world's leap towards a long-awaited digital transformation. Perhaps the most important finding of this research is that the presence of actors in the global online art market provides relative protection against the difficulties caused by the pandemic. According to the research The role of technology in the art market in the Covid-19 period (Reshetnikova, Islacheva, Tapchieva, 2022), the market shifted online during the years of the Covid-19 pandemic due to external circumstances, as

businesses closed and events were cancelled, and retailers were forced to rethink their business models to adapt to the new economic reality, which for many meant deploying or significantly intensifying digital strategies to support sales and communication. "To better understand the impact of innovative technologies on the financial performance of Christie's, Sotheby's and Phillips auction houses, and based on econometric analysis, we can conclude that online auctions and, as a result, other technologies necessary to support their operations have increased in importance over the 2019-2021 period. This increase is driven by factors such as the forced move to an online format due to security measures and the fight against Covid-19, and increasing levels of trust from market participants," the research states. A report by Art Basel and UBS entitled Conversations: the impact of Covid-19 on the art market (McAndrew, 2023) found that, as in previous years, the most common channel for buying art in 2023 was through a gallery or dealer, with 86% of respondents buying either directly, online or through an art fair. Excluding art fairs, 79% of respondents purchased from a dealer or gallery. This proportion was relatively stable year-on-year for respondents in this survey, but down from 88% in 2022, when engagement across all channels was reported at a higher level. However, compared to the 2021 survey, it increased by 3% (76%). While the most common way for collectors to access dealer sales was to buy on their gallery premises, in 2021, gallery websites and online sales overtook face-to-face sales as more collectors became comfortable buying online." The following charts describe the sales structure over the period under review, detailed results can be found in the dissertation.

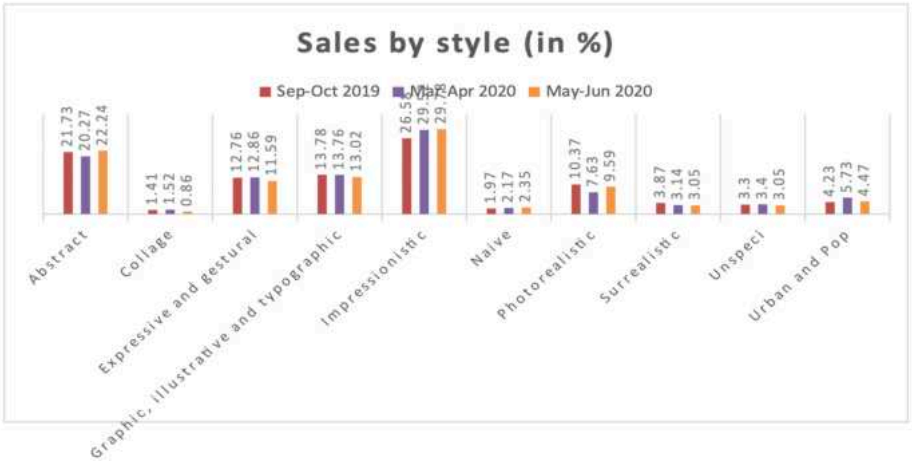

Figure 1 Sales of 10k artists on the Artfinder platform by art style during the beginning of the Covid-19 pandemic.



Figure 2 Sales of 10k artists on the Artfinder platform by theme during the start of the Covid-19 pandemic.

After verifying the meaningfulness of digital art platforms and their current trends, the next research focused directly on exploring the potential of new technologies and thus answering the second research question (VO2): based on the findings about children's and parents' perceptions of VR, is it meaningful to create a sales studio of a VR artist targeting this audience? The results of the second research (Nováková, Štarchoň, 2021, p. 9) showed that factors such as profession, age or gender of the respondents influence the perception of VR. Primary research published at the Dokbat 2020 and 2021 conferences shows that in a sample of a total of 39 respondents of parents (18) and children (21) aged 5 to 13, where women were predominant among parents, children's movement in space was usually more natural and spontaneous than that of their parents, who were even more likely to report fear as their emotion. Although this research was not preceded by any further investigation of how different age groups estimate time, interesting findings regarding time perception emerged from the primary data. Although parents sometimes underestimated and sometimes overestimated the time spent in VR, the average of all their estimates was reasonably accurate (with a margin of error of tens of seconds). Children were off by up to 20 minutes in their estimates of time spent in the digital world, but this may be due to their lesser experience with time estimation or other factors. The actual time children spent in the VR experience in this research, as measured by the researchers, was set at 5 min. As Zelenka (2005, p. 43) states, children begin to think abstractly, logically, and systematically around 11 to 12 years of age, which Piaget's theory of the development of thinking calls formal operational thinking. Children are often more familiar with new technologies than their parents and enjoy VR. According to the primary research cited above, there was a higher percentage of new users among parents than among children, whose responses indicated that

they were new to VR less than half the time. A higher percentage of parents than children needed assistance from researchers to use VR goggles correctly. This was even more intense for handheld controllers. Despite the great interest in VR-related topics, it is not easy to track down research with which to meaningfully contrast one's own findings. According to a research study of 31 semi-structured interviews with fathers/mothers of children aged 3-16, entitled Qualitative Study on Children's Digital Media Use and Parents' Self-interest (Geurts, Koning, Vossen, et al., 2022), the way parents let children use digital media out of self-interest depends on age: "For younger children, parents initiated digital media use or set times when children were allowed to use digital media. For older children, parents used a passive approach by neglecting to restrict their children's use of digital media. Results showed that parents' self-interests in having children use digital media included allowing children to do other tasks without distractions, having some time to themselves, managing children's behavior, avoiding discussions, having moments to use digital media alone, and spending quality time together." Research Systematic literature review and bibliometric analysis on virtual reality and education (Rojas-Sánchez, Palos-Sánchez and Folgado-Fernández, 2023), states that emotions of amazement and joy are more evident than emotions of anger or frustration, so that positive feelings prevail. However, this research focuses on analysing the feelings, words and opinions of users of 12 VR videos on YouTube in order to explore users' reactions to these videos, as well as to determine whether this technology contributes to the sustainability of the natural environment and whether the data generated by users can provide important information for future policy decisions of companies that produce video content.

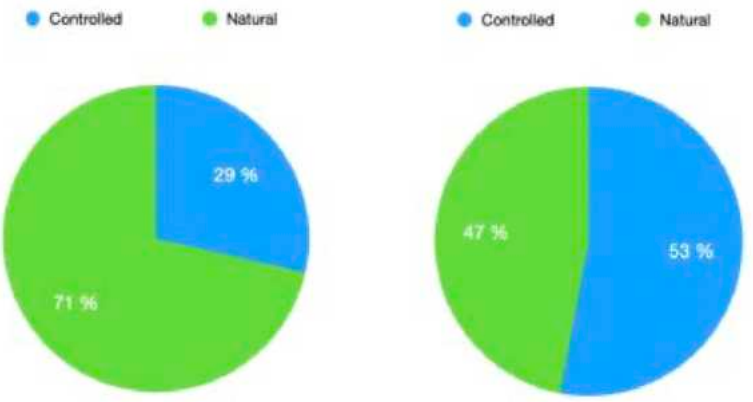

Figure 3 Degree of spontaneity of movement in the VR experience for children (first diagram) and parents (second diagram).

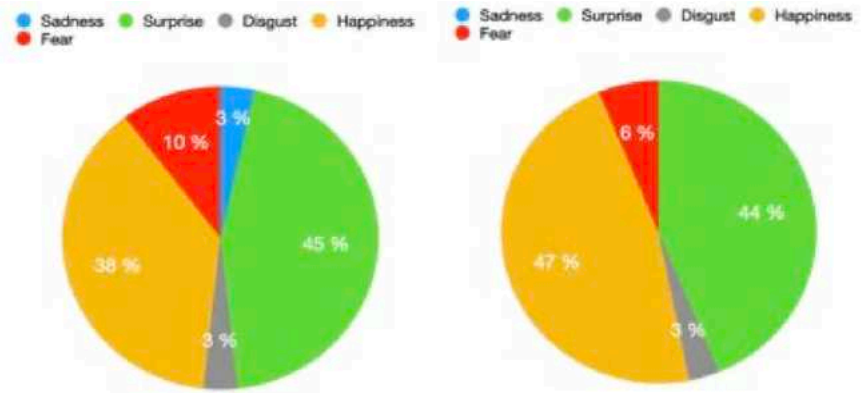

Figure 4 The first diagram shows the most common emotions of children and the second of parents.

The third research provides important insights into the challenges and opportunities presented by the use of XR technologies in the arts environment, answering the third research question (VO3) What are the opportunities and challenges of XR technologies? As has been previously demonstrated by the author and supervisor in their research Creative industries: challenges and opportunities in XR technologies (Štarchoň, Nováková, 2021) published at the EUBA conference, the level of acceptance by different population groups that have had the opportunity to experiment with XR technologies is significantly high: 81% to 100% depending on (1) the respondents (French art students capturing the latest trends, children or parents in the Czech Republic) and (2) the questions asked (Would you like to repeat an AR or VR experience in the future? Would you use AR technology for your projects?). Yet the penetration rate of these technologies, as the research shows, is relatively low and VR and AR technology in the arts is often new to respondents. No other research could be traced from the study region and focus group to put these findings into deeper context. The high level of acceptance of XR was confirmed by the authors of Fully immersive learning with virtual reality for assessing students in art history (Cecotti, Huisinga and Peláez, 2024) who compared VR and web-based tutorials in art history classes with 35 undergraduate students and 77% of students preferred VR, citing high levels of usability and moderate workload, with no differences in students' performance in answering questions. These results are supported by the article Virtual reality technology in art education with visual communication design in higher education: a systematic literature review (Jiawei, Mokmin, 2023), which reported that none of the practitioners interviewed had used fully immersive VR technology in teaching art education with visual communication design during the study period, which the authors concluded presents a great opportunity for researchers to further

develop this area in the future. The research Systematic literature review and bibliometric analysis on virtual reality and education (Rojas-Sánchez, Palos-Sánchez and Folgado-Fernández, 2023) confirms that viewers appreciated features such as video quality and accessibility of the technology in the demonstrations they watched, and videos that are 100% VR and require special glasses to watch them do not have such attendance. However, VR has been perceived as a product that viewers are interested in, and according to Google, searches and sales of VR goggles are increasing during the holiday season. It is also interesting in this context that, although conference proceedings and magazines were the main publishing media about VR five years ago, magazines have recently become the main communication medium. Likewise, if initially the leading research area was computer science, nowadays the number of application areas and the number of countries involved in VR research has increased (Cipresso, Giglioli, Alcañiz Raya and Riva, 2018). Creative industries and related fields are experiencing an unprecedented period of opportunity, combined with factors predicted by Lévy (2000, p. 37), such as digitalization and the spread of 5G, rapid technological advances (Carayannis, 2021, p. 7), combined with Industry 5.0, Society 5.0, transformation, blockchain and the role of artificial intelligence, IoT architecture and significant investments in XR by ICT companies. The positive effects or externalities of XR are visible for both users and producers and affect a wide range of activities based on creativity, the digital world, knowledge or information: from architecture and design to games, software and development. Such an era can be interpreted as the new potential of XR technologies as an interdisciplinary field. With favourable economic developments, an optimistic scenario can be expected for developers with amazing potential and for users who can benefit from the "more for less" factor resulting from the democratisation of the industry, i.e. more content at lower prices, a more immersive experience with faster data transfer and cloud computing in less time. At the same time, these technologies have become significant enough to raise serious ethical, legal and social questions, such as how to deal with digital social alienation and other related issues. The results of the third research serve as a contextual framework for the dissertation and help to evaluate the potential of the selected technologies in art and narrative and to contribute to a relevant and innovative approach in this field, with an emphasis on democratizing the sector.

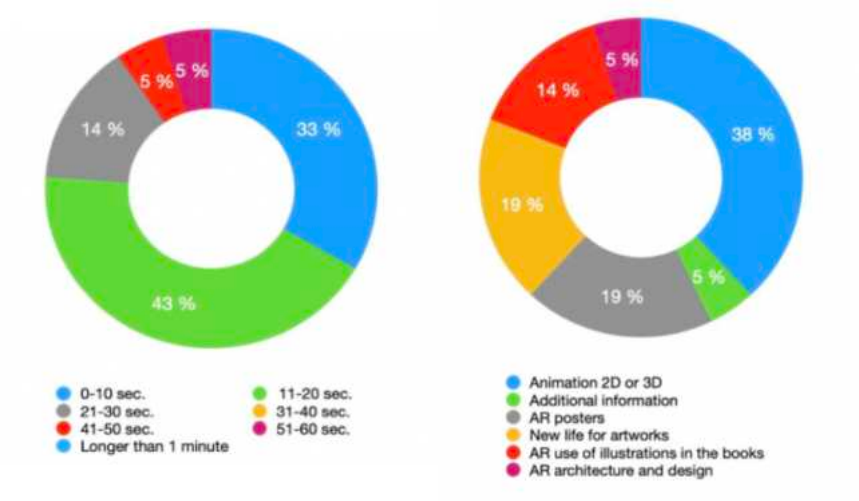

Figure 5 Data from our own research among French art students: how long is the mobile AR experience most popular?

Figure 6 Data from French art students: best use of art-related AR projects from the creators' perspective.

Evaluation, summary and conclusions of the comparative research

Prior to the actual comparative research of 30 VR experiences, it was found that VR experiences enjoy a relatively poorly systematised range of narratives, both from the perspective of the user and the creator. Among the core units, those with qualitative characteristics predominate over quantitative ones. The core set comprises 30 VR narratives. The table below shows an overview of all 30 VR experiences observed. The first column shows the title of the VR experience in the original, followed by the year of publication, which should be no older than 2016. The next column captures the genre (A,D - Art & design, V or E - education/education, T - travel, S - simulation, D - documentary, C - casual, N - narrative, A - adventure/adventure, H - horror, M - mystery). All selected experiences are for a single seated or standing user(S/S). If the manufacturer specifies only for a standing user, this is also indicated in the table. None of the experiences are for a seated-only user, which means that the user can usually sit or stand. The penultimate column shows the number of devices on which the experience worked in the reporting period. Sometimes developers upgrade experiences for multiple devices, the data in the table corresponds to March 2022. A similar restriction applies to the user rating, which is valid for March 2022. The last column captures the number of language versions in which the Art VR experience is available.

The course of the research							
	created	reviews	genre	number of players	space	technology	languages
Eye of the Owl	2016	4,5	A,D,V,S	1	S/S	3	En
Mona Lisa, Beyond the Glass	2020	5	A,D,V,N,C	1	S/S	3	5 languages
Dear Angelica	2018	5	A,D, F, I	1	S/S	3	En
Van Gogh Night Café	2016	4,2	A, D, V, C	1	Standing	3	En
Claude Monet, WarerLilly Obsession	2018	3,9	A, D, V, D, N	1	S/S	7	En, Fr
Dreams of Dalí VR	2018	4,5	A,D V, N	1	Sitting	3	visual
Age of Sail	2018	4,9	A, D, N	1	Standing	5	En
Atelier Antoine Bourdelle	2017	4,7	A,D V	1	S/S	4	Fr
Artifice	2017	4,7	A, D, A, S	1	S/S	3	En
Blind	2019	3,6	A, N, D, M	1	S/S	7	It, En
Torn VR	2018	3,9	A, N, M	1	Standing	5	7 languages
Fujii	2019	5	A, S, D, N,E	1	S/S	8	10 languages
The VR Museum of Immersive Experiences	2018	5	E, A	1	S/S	8	En
Pyramid VR (pyramidy v Gíze, artově)	2017	3	T, A, D, V	1	S/S	3	En
The Kremer Museum of Arts VR	2018	4,6	E,A, D	1	S/S	7	4 languages
T-Rex Sceleton	2019	4,4	E,C, A, D	1	S/S	4	En, Ch
Teracottova armáda	2019	4	E, C, T	1	S/S	4	Ch
Gloomy Eyes	2019	4,6	C, A, A, A, D	1	S/S	8	5 languages
Everest VR	2016	3,6	T, A, D	1	Standing	5	En
The Swedish Virtual Art Gallery	2019	5	A, D, T, D	1	S/S	7	En
Singularity	2017	4,4	A, D, C, M	1	S/S	4	En
AVR Museum	2018	5	A, D	1	Standing	3	En
VeeR	2017	4,7	A, D, H, C	1	S/S	7	ap.
Anim VR	2018	4,2	A,D, C	1	S/S	6	En, Ch, Jap.
Art Plunge	2018	5	A, D, V	1	S/S	3	En
Enter the Maatrix	2018	5	A, D, S, S	1	S/S	2	En
Museum of other realities	2020	4,8	A, D, S	1	S/S	8	En
Back to the Moon (animace)	2018	4,4	A, D, C, N	1	Standing	4	En
The Finnish Virtual Art Gallery	2018	3,7	A, D, E, D	1	S/S	6	En

Table 1 Results of comparison of quantitative parameters of artistic VR experiences. Source: own processing.

By comparison, the added value of VR comes from the fact that it is a technology that allows people to experience and interact with artificial worlds that are created by computers and fully immerse themselves in them. The analysis below reviews the different technical and creative approaches that were observed in a set of 30 VR experiences, and from which 12 principles for better VR were formulated (column 3 of the table). The technical approach (1st column of the table) addresses how to apply specific techniques and methods, such as visualisation, simulation and modelling, to virtual environments. These practices include, for example, the use of sensors and transducers to track the movement and position of the user and their device, the use of displays and projectors to display the virtual environment on a screen or on special goggles, or the use of audio and haptic systems to create sound and touch effects that enhance realism and immersion. These technologies are used differently when the developer wants to create, for example, the emotion of fear and differently when it comes to e.g. inducing a sense of relaxation or e.g. blindness and extra-visual sensory perception. On the developer's side, it is crucial to choose correctly which algorithms and programs to use to generate and control the virtual environment and its elements. The creative process (column 2 of the table) VR creation is closely linked to the technical and

focuses on the application of the concepts behind VR, such as values and methods for expressing virtual worlds. This includes, for example, the introduction of concepts or criteria for VR such as immersion, interactivity, representation, navigation, etc. When exploring the principles of VR, which e.g. relate to the areas of perception, cognition, communication or learning, it is also necessary to consider the creation of VR models and theories such as models of virtual spaces, agents, avatars or communities, etc. These approaches are based on different methods and strategies that are used to achieve the desired effect in VR, such as artistic interpretations or innovative design. These approaches are based, for example, on: creativity and imagination to create original and interesting VR spaces that reflect personal or societal values and interests; the application of experimentation and trials to test and improve VR, which include user testing, evaluation, feedback, etc.; or collaborative interaction and communication to share and exchange, which include principles of co-creation and communication. Thus, the table below seeks to tease out, through examples, what technical and creative areas need to be addressed in VR design and what principles can be formulated from these findings.

Formulating 12 best practices for better VR:

1) Something unattainable is attainable
2) Stick to the genre
3) Attractiveness, meaningfulness or usefulness
4) Believability and wit
5) Interaction and gamification laws
6) Introducing familiar places and phenomena but in a new way
7) Arousing curiosity and fascination
8) Freedom with clear and understandable rules
9) Technical tools and tricks that work in the digital world
10) Layering the experience
11) Results transferable to the real world
12) Limited time and space but unlimited possibilities

Details are explained in the table below and directly in the dissertation.

6. EXPERIMENTAL PART - APPLICATION OF RESULTS

www.ArtStudio.app

Application of research results

The www.Artstudio.app project is, among other things, a tool for testing the findings in practice. The practical part of the project draws on the first research on the impact of the Covid-19 pandemic on the online art market (Nováková, Kazík, Juříková, Štarchoň, 2020) and clearly builds on the research in the following respects:

1. **Growing online art market:** the research shows the steady growth and importance of the online art market during the Covid-19 pandemic. It is therefore important to build a strong presence in the global online market. The www.ArtStudio.app project can highlight the benefits of an online platform that allows artists and galleries to present and sell their works affordably, authentically and online.

2. **Linking the digital and human worlds:** Research highlights the unique combination of the fast and accurate digital world with human solidarity and generosity. Thus, the project could emphasize the link between these aspects provided by the www.ArtStudio.app platform and the real gallery. A beautiful example of an application could be a hand-painted painting, beautifully packaged by a human and commissioned after a virtual visit to the artist's studio on the other side of the world.

3. **Interactive Virtual Viewing:** research shows a growing interest in virtual viewing of artworks. The www.ArtStudio.app project could focus on creating a user-friendly environment that enables interactive viewing and experiencing of artworks in a virtual gallery. It can be enriched with, for example, hand-painted environments, traditional classical animation, imaginative elements such as snowfall, fire crackling in the fireplace, birds singing, the movement of a cat or lights going out.

Based on the research findings of the second research that focused on comparative research on VR experiences and perceptions by children and parents (Nováková, Štarchoň, 2020), the following findings can be applied to the project www.ArtStudio.app:

1. **Availability and price:** research suggests that VR technology still has low penetration among potential customers due to unaffordability. The www.ArtStudio.app project could focus on reducing the costs associated with the use of VR, e.g. the ability to view the 3D space from a mobile phone, and highlight its accessibility to the widest possible audience.

2. **Limitations of VR:** Research shows that virtual reality is currently a rather marginal medium that is not widely and daily used by the masses for the reasons addressed in the research. The www.ArtStudio.app project could consider these limitations and look for ways to motivate users to interact with the virtual gallery and overcome biases and barriers. The conclusions of the research conducted may only be temporary in a dynamic environment of technological advancement. The limitations could change just by using AI, for example.

With the third research focusing on the opportunities and challenges of XR technologies in creative industries (Nováková, Štarchoň, 2021), the following findings can be applied to the www.ArtStudio.app project, which could strengthen its position and bring users an experience that exploits the benefits of XR technologies while dealing with their challenges:

1. **High acceptance of XR technologies:** research shows that different population groups that have had the opportunity to experiment with XR technologies show high acceptance rates (from 81% to 100%). The www.ArtStudio.app project could focus on leveraging these technologies and offer users the opportunity to iterate and deepen their experiences with AR and VR.

2. **Low penetration of XR technologies:** the research also shows that the penetration of XR technologies is still relatively low, especially among respondents who are new to these technologies. The www.ArtStudio.app project could use this as an opportunity to try to illuminate and overcome the preconceptions and barriers associated with XR technologies by making the preview accessible and enjoyable.

3. **Ethical, legal and social issues:** XR technologies also raise important questions in terms of ethics, law and social impact. The www.ArtStudio.app project could address these issues and try to find answers to problems associated with XR technologies, such as digital social distancing or the accessibility of the project even for people who do not have access to VR headsets.

Choosing tools for creating 3D virtual galleries

A comparison of experimentally validated tools (see Table 1) for creating 3D virtual galleries on the ArtStudio.app website compares suitability in terms of aesthetics, time, functionality, cost and benefit. While a hand-painted 3D space emerges from the comparison as a relatively labor-intensive tool that allows for unique and personal expression with limited functionality and static elements, VR, on the other hand, allows for a high degree of immersion and realistic experience. Innovative and creative creation dependent on the dataset and algorithm is then the prerogative of AI-related tools. The following table summarises the information clearly:

Tool	Aesthetics	Time-consumption	Functionality	Finance	Difficulty	Benefit
Hand-painted 3D space	High, depends on the skill and creativity of the artist	High, requires a lot of time and patience	Low, limited to static and solid objects	Medium, depends on materials and tools	High, requires artistic and technical skills	Allows an unique and personal expression
Virtual reality	Medium, depends on quality and resolution of equipment	Medium, requires installation and setup of equipment	High, allows interactive and moving objects	High, requires expensive and specialised equipment	Medium, requires knowledge of software and hardware	Immersive and realistic experience
3D photo tools Medium	Medium, depends on photo quality and lighting	Low, requires only taking and uploading photos	Medium, allows reconstructing and modifying existing objects	Low, requires only a regular camera and software	Low, requires only basic photography and software skills	Allows easy and quick creation of 3D models
Artificial intelligence	High, depends on algorithm and dataset	Low, requires only a description or pattern	High, allows generation and modification of new and original objects	Medium, depends on availability and cost of services and platforms	Medium, requires knowledge of AI principles and capabilities	Innovative and creative 3D model creation
Web-based tools Medium	Medium, depends on the functionality and interface of the tool	Low, requires an internet connection and registration	Medium, allows to create and share simple and basic objects	Low, requires only a web browser and sometimes a fee	Low, requires only basic computer and internet skills	Availability to the user and allows to combine other 3D model creation tools

Table 3 Comparison of tools for creating 3D art spaces. Source: Own elaboration.



Figure 54 Launching ArtStudio.app for HTC Vive. Source: author's archive.

The following is a pictorial documentation comparing the described tools:



Figure 55 A shot of a hand-painted room. Source: Artists & Illustrators, favorites section.



Figure 50 Example of a hand-painted space. Source: www.artstudio.app.



Figure 49 Example of an AI-generated space. Source: www.ArtStudio.app



Figure 51 Example of an AI-generated space. Source: www.artstudio.app



Figure 52 An example of a space taken by the camera in spherical projection. Source: www.artstudio.app.

Interesting choices and experiments

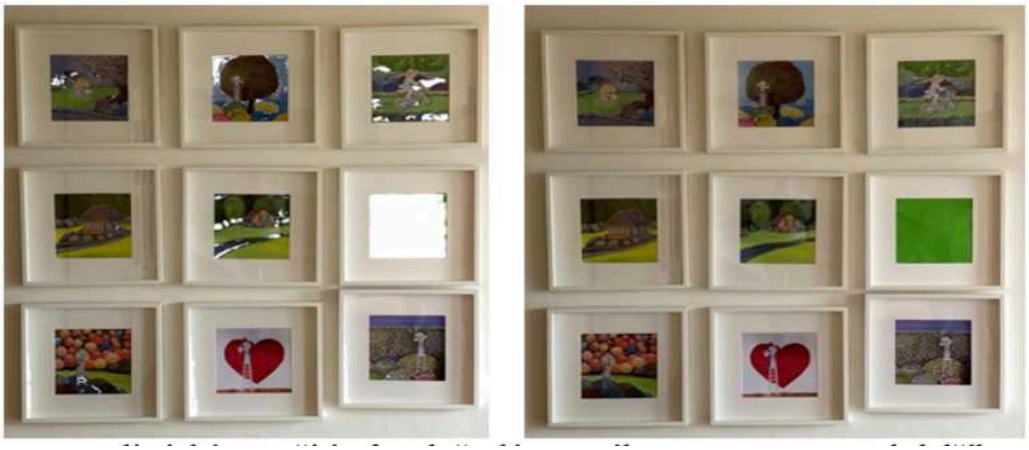

Figure 62 Experiments with greenscreen for canvas replacement. Source: Own archive.

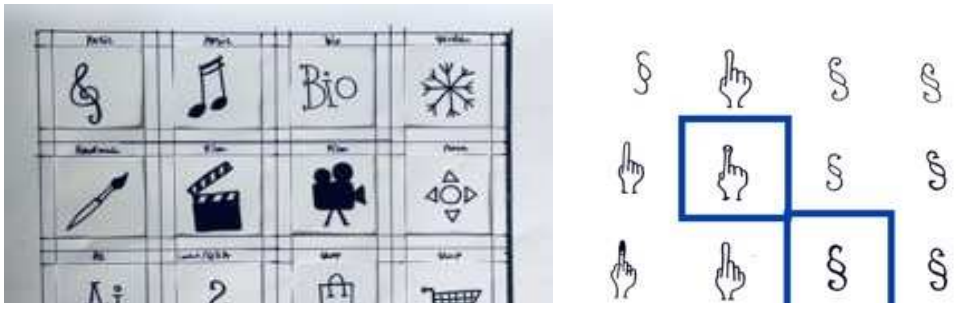

Figure 64 The icons were created using a matrix to have comparable size and alignment. Source. Own processing.



Figure 53 Inserting the cinema into the digital space. Source: www.artstudio.app



Figure 61 Complicated spots in cubic projection. Source: www.artstudio.app



Figure 62 Both spherical and cubic projection bring with them a number of challenges to address. Source: www.artstudio.app.

Evaluation of project effectiveness

Metrics such as the number of visits, feedback and demonstrable awards for progress in production were chosen as indicators tracking objective success. Data sources for these indicators were analytical tools available from third parties such as. Google Analytics VR, Vimeo, Artfinder score review (see Figure 66 and 67), as well as self-monitored feedbacks, testimonials, comments from methodologically unsupervised conversations with clients that are often recorded in the artist's journal, accounting data such as receipts for materials consumed and invoices, a world map with magnets showing the artist's paintings, and last but not least awards, certificates and diplomas. These data have been arranged in the table below for clarity. From the findings, it can be concluded that ArtStudio.app was the best that could be created with limited financial and technical resources during the lockdown period outside the cultural capital, given the circumstances and constraints of the time. The studio proved to be a great PR tool, which without further words can convince the customer of the atmosphere, seriousness, work commitment and depth of the artist's interest in her field of interest, which is the humorous depiction of the world in all its naivety. ArtStudio enjoys a relatively high attendance, especially during periods when it is supported by other PR tools such as exhibitions, articles in local media or very limited activity on social media. The data sources for these indicators were analytical tools available from third parties such as Google Analytics VR, Vimeo, Artfinder score review (see Figure 66) and the Virtual Studio and Image Gallery, for reasons explained in this thesis, does not put its focus on VR, but allows this unique technology, which is looking for its application and whose added value is undeniable, to be compared with others.

Aspect	Goal	Indicator	Data Source	Result	Conclusion
Participation and involvement of users	Increase the number of visits to the virtual studio and the time spent	Number and duration of visits, average time spent in the studio, number of repeat visits	Analytics tools: wedos, vimeo, google analytics	6237 visits, 3.2 minutes, spent in the studio, 24% return rate, VR: 7 visits	ArtStudio enjoys relatively high traffic, especially after PR text publication in local media
User satisfaction and feedback	Gain positive ratings and recommendations for the virtual studio and own creations	Average rating, percentage of satisfied users, percentage of recommending users	Online customer satisfaction score (CSAT) on online platforms. Offline: customer feedback, assessments and objections addressed post-purchase surveys	CSAT 5/5 with online customers in all aspects. Offline: satisfied customers, 1 critique from a relative of a buyer, tracked indicators, and objections addressed in text	The studio proved to be a great PR tool opening doors to new customers and gallery owners. Not suitable as a sales channel without additional marketing and sales activities. VR awaits a suitable investor and development team
Influence on artistic practice and creation	Improve the quality and uniqueness of artistic work and participation in meaningful exhibitions and events	Number and type of created pieces, number and type of techniques and styles used, number and type of awards or recognitions received	Creation statistics, diaries, materials used, awards, and diplomas	1st place WebTop100, exhibitions: USA ArtExpo (2022), France (2023), involvement of new motifs and techniques (spray, substrates, digital tools)	The authenticity of the digital project significantly helped with offline projects and recognitions and increased online visibility of tracked parameters such as the author's name.

Table 4 Evaluation of the effectiveness of the project in 2022 and 2023. Source: author's archive. Source: own elaboration.

The example of the Online Customer Satisfaction Score (CSAT) shows one of the important indicators of successful product marketing, which in this case is customer feedback when selling paintings and photographs. On a scale of 0 to 5 stars, the seller's communication, delivery and packaging, display accuracy and overall rating are tracked in third-party analytical tools. The result is 100% online client satisfaction.



Figure 66 Feedback is key. Source: www.artfinder.com



Figure 67 Sample page views/page views on the Artfinder.com platform

Platforms for presenting results

Part of the publishing activities of interesting VR projects is communication with the VR community and participation in festivals. There are several professional festivals or festival sections dedicated to virtual and augmented reality in the Czech Republic, but not all of them have only artistic ambitions. These include Signal Festival, a digital and creative culture festival that offers art installations in public spaces, including augmented reality installations

that viewers can view on their smartphones. The festival is held annually in October in Prague. VR festivals directly in schools allow pupils and teachers to try out VR technologies and also to test and comment on various educational or training applications that are prepared for them with expert commentary. The festivals are held continuously in various secondary schools across the country. The Zlín Film Festival for Children and Youth, which usually takes place at the end of May and the beginning of June, also has its own VR section, where the above-mentioned comparative research on the perception of VR experience by children and parents was conducted (Nováková, Štarchoň, 2020). Other events include, for example, the Summer Film School festival in Uherské Hradiště, which focuses on cinema and culture and each year has a thematic focus. This VR section also features, for example, theatre performances in VR and innovations in virtual and augmented reality that offer new ways of storytelling and experiences.

web	when it takes place	where it takes place
Virtual Reality Festival	January	Las Vegas, USA
Sundance Film Festival - New Frontier Project	January	Utah, USA
Boulder International Film Festival (BIFF) - Virtual Reality Pavilion	February	Boulder, USA
Cinequest Film & VR Festival	February-March	San José, USA
SXSW - Virtual Cinea	March	Austin, USA
Lichter Filmfest Frankfurt International	April	Frankfurt, EU
Atlanta Film Festival	April	Atlanta, USA
Tribeca Film Festival	April	NYC, USA
https://www.festival-cannes.com/en/	May	Cannes, France
Nashville Film Festival (NaFF)	May	Nashville, USA
VR Sci Fest	May	Vencouver, Canada
Seattle International Film Festival	May	Seattle, USA
Mountainfilm - Virtual Reality Studio	May	Colorado, USA
Sydney Film Festival - SFF Hub	May	Sydney, Australia
Sheffield Doc/Fest	May	UK
https://www.sunsetfilmfestival.com	June	Santa Monica, CA, USA
Nantucket Film Festival	June	NYC, USA
Melbourne International Film Festival (MIFF)	August	Melbourne, Australia
Australian Virtual Reality Film Festival (AVRFF)	August	Australia

Venice Film Festival	August	Venice, Italy, EU
Toronto International Film Festival - POP VR	September	Toronto, Canada
Raindance Film Festival	September	London, UK
Vancouver International Film Festival - Virtual Reality Day	September	Vencouver, Canada
New York Film Festival (NYFF) - Convergence	September	NYC, USA
https://nouveaucinema.ca/en	October	Montreal, Canada
Adelaide Film Festival - VR Lounge	October	Adelaide, Australia
Busan International Film Festival	October	South Korea
Byron Bay Film Festival (BBFF)	October	Australia
Astra Film Festival	October	Rumania, EU
https://virtualrealityfestival.com	October	GA, USA
https://www.denverfilm.org/programs/	November	Denver, USA
Montreál International Film Festival - Open Immersion	November	Montreal, Canada
camerimage festival	November	Polsko, EU
International Documentary Film Festival Amsterdam - DocLab	November	Amsterdam, EU
Tallinn Black Nights Film Festival - Storytek	November	Estonia, EU
American Film Institue (AFI) Fest - Tech Showcase	December	Los Angeles, USA
Dubai International Film Festival	December	Dubai, UAE
Festival of International Virtual and Augmented Reality Stories (FIVARS)	to be announced	Toronto, Canada

Table 5 VR Festivals by region and time. Source: own elaboration.

The festival takes place every year during the summer holidays. In addition, various events are also held on campus, e.g. the CTU has hosted the VRfest repeatedly thanks to the AVRAR Association . On the previous page you will find a hypertext table of the world's most famous VR and art events , in chronological order. The details of exactly when each festival takes place varies with respect to weekends and days off, so the month is given as a guide only. In general, most VR festivals take place in the spring and autumn. Often these are well-known film festivals that have a VR section.

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The full version of the acknowledgements is included in the dissertation.

7 CONTRIBUTION OF THE WORK TO SCIENCE, ART, PRACTICE AND PEDAGOGY

CONTRIBUTION TO SCIENCE AND ART

Through experimentation with different technologies and presentation formats, the dissertation expands our understanding of what is possible and how art can be interpreted and experienced in the field of interdisciplinarity. By exploring the potential and limitations of using VR to create an experimental and accessible virtual studio outside of the cultural metropolis using artificial intelligence (AI) and other technologies, with an emphasis on democratizing technological advances in the art environment, a project has emerged that can serve as an example of a virtual studio created in the period before the massive emergence of AI and related technologies. A number of creative innovations have emerged in the implementation of the research outputs and project component, perhaps the most valuable contribution of this project in the visual arts is the authenticity of the hand-painted virtual studio project published by Artists & Illustrators (artistsandillustrators.co.uk, 2022), the UK's most widely read art magazine, and its comparison with other technologies such as VR, 3D photo tools, AI and web-based tools in terms of aesthetics, complexity (including time), functionality and benefits. The presentation of the works also takes place in the form of a cinema with animation (e.g. the iris on the wall in the amethyst room rotates in a handheld total animation and is also revealed in its original form of drawn images on the canvas on the bed under the cinema). Some of the images have a form apparent in augmented reality (e.g. the golden cat with the Artivive app). The experimental application of artificial intelligence (third party) to a three-dimensional space versus a hand-painted room was a big learning experience in terms of time and technical excellence. Conversely, the actual icons took more time in digital editing to final graphic form than in hand drawing. An interesting development was the use of natural soundbranding, the main intention of which was to arouse attention at the moment the ArtStudio was opened by the visitor, which was achieved by several effects (the contrast of the visual image of the cat as a predator and the sound of birds, i.e. the messengers of spring when the studio is under snow). An enriching experience was the collaboration with the NFT community, whose products found a gallery in the VR Play Park on Wenceslas Square in Prague. In terms of future development, the extensibility and adaptability of the online gallery is key, not only for the work itself, but ideally also for

the technology and for other artists, including inspiration in terms of industry connections and a demonstration of how technology can enrich and complement the creative process. In particular, the contribution to scholarly knowledge in the field of marketing communications has been the recognition of how artists living outside cultural capitals can emerge from the pandemic richer with a virtual studio and an understanding of the technological advances that are helping to democratize artistic disciplines and overcome the period when brick-and-mortar galleries are closed. The dissertation connects the worlds of art, technology and marketing communication during the Covid-19 pandemic, serving as a valuable resource mapping this unprecedented historical period. The PR communication focused on accurate targeting and possible retargeting if the existing target audience of the online art gallery's customers turned out to be different from the one offered by ArtStudio. The aim was therefore to reach only those potential clients who are interested in the topic, in a digital form, as the project is digital and the works can be purchased mainly digitally. The PR campaign was conducted virtually from a single mobile phone, through channels such as unique messaging with whats'app outreach, sms, email and sending out the www.artstudio.app link to groups of contacts known to be interested in the artist's painting and IT activities with a request for feedback. This request for feedback then served as a solid basis for feedback and further editing. For example, it became apparent that even experienced users were not finding certain functionalities and so-called easter eggs, which led to their subsequent removal to icons on the bar in the so-called landing page. Sending out the www.artstudio.app link to people who had ordered an image in the past, with the understanding that this was the next step in the creation, or the use of existing databases with client contacts. One of the channels of the PR campaign was closed discussion groups, where an informal letter about the project to the heads of online communities such as painting groups, art groups, VR, AR & AI community worked as a form of communication. Communicating with those interested in a similar rendition of their studio or showroom proved to be unexpectedly interesting, part of the PR included redirecting older websites/domains such as www.ArtClicking.com, www.HanaAuerova.com, www.ObrazysPribehem.cz, www.ArtStreet.app, www.ArtWallStreet.app etc. to www.ArtStudio.app. The effect of the campaign was visible in the number of views of the newly activated video on the back wall of ArtStudio from Vimeo and the increase in metrics on online platforms where identical works are offered.Thus, the campaign worked as a way to increase the visibility of Hana Auer's name across online platforms.At the same time, the offline gallery sales agent for the Japanese market at the time, noted the interest in their

region and recommended dramatic price increases across online channels, which proved to be a creative and business savvy move that allowed more time to create fewer works.The project was awarded the prestigious WebTop100 marketing award in 2021 in the Digital PR category (see attached).Followed by real exhibitions in the US (NYC, 2022), France (Nîmes, 2023) and Japan (Chiba, 2023), it could inspire the creation of a virtual studio for artists with limited resources outside of major cultural centres.

CONTRIBUTION TO PRACTICE

The contribution of research to practice is based on several pillars. The initial investigation yielded insights indicating that during the early stages of the Covid-19 pandemic, the significance of digitalisation in the art domain and the emergence of novel avenues for the sale and presentation of artworks led to the emergence of a novel requirement for It is important to ascertain how artists outside of cultural metropolises can utilise new technologies or be inspired by VR to create their own virtual studios and galleries, thus enhancing their presence on the online art market. The second study, which compared the results with those of scientific articles in a discussion, demonstrated that respondents from Czech families and other locations perceived virtual reality experiences similarly. The majority of respondents have a predominantly positive attitude towards VR technology. However, they do not perceive it as a cost-effective solution for widespread use in comparison to web-based tools or alternative methods such as video from VR. It can be observed that the fascination with the potential of VR is not always reflected in the actual behaviour of users. This discrepancy can be attributed to the fact that the act of purchasing and using a VR headset is not a straightforward process. Furthermore, the headset is relatively uncomfortable to wear during everyday activities and is often positioned far from the VR sensors, particularly when users have more convenient and faster mobile solutions for consuming content. It is recommended that artists engaged in virtual reality (VR) creation in 2020-2021 consider alternative solutions alongside VR. This is particularly relevant for those working in virtual studios, where the use of mobile phones may be a more practical option. Although this has not been explicitly tested, it can be inferred from the data provided by the ArtStudio.app application (6237 visits to the website versus 7 visits via VR in the monitored period) and other secondary sources. The number of reviews of VR experiences on VR platforms (in units of tens) is significantly higher than the number of reviews of comparable videos on YouTube. The accessibility of the project for users and the associated

costs of VR were significant factors in 2020-2021, influencing the perception of VR as a peripheral medium for virtual gallery creation. As indicated by the results of the aforementioned studies and projects, these limitations may be transient, particularly in light of the significant advancement of artificial intelligence and the associated societal transformations. The third study concentrated on ascertaining the attitudes of students of the arts at the Aix-Marseille University Cultural Centre towards XR technologies. In 2020, the combination of different approaches presented in the most accessible manner proved to be an effective solution for the construction of a virtual studio. The generation of a three-dimensional space using AI, the manual painting of a room, and virtual reality (VR) are examples of techniques that can be employed without the stress of combining the costs and inaccessibility associated with VR for the average user. The fourth part of the research is a valuable source of information and inspiration for artists who wish to utilise the potential of VR despite the aforementioned limitations. This is achieved through the formulation of 12 best practices for VR. Artists residing in remote regions distant from cultural hubs may present their 3D virtual studios to visitors, offering a more comprehensive understanding of their creative process. The project ArtStudio.app provides an insight into the atmosphere and environment in which artistic works are created. This has been demonstrated to be an effective and targeted digital PR tool with a global reach. The ArtStudio.app project may serve as an inspiration for other artists and thus contribute to the scope and value of this dissertation.

TEACHING METHODOLOGY

Virtual reality (VR) undoubtedly offers new approaches and methods for teaching. The comparative study of VR perception conducted between parents and children, based on Öchsner's methodological publication (2013, p. 15), "Introduction to Scientific Publishing, Backgrounds, Concepts, Strategies," and the subsequent research presented at a conference The study by Dokbat (Štarchoň, Nováková, 2020, pp. 3-7) raises an intriguing point that could potentially enhance pedagogical practice. Children experience a higher degree of immersion and exhibit less self-control in VR than adults. It can be reasonably assumed that the credibility of digital experiences is higher for children, and that the level of acceptance of this technology is almost 100% if they have had the opportunity to experiment with it. This undoubtedly has a positive impact on the effectiveness of education in overcoming technical, hygienic, legal, ethical and other limitations. It is recommended that educators

combine AR and VR technologies to maintain situational awareness within the classroom, while wearing a headset. As indicated by the creators of VR content (see the practical section), one of the most intriguing benefits of VR is its capacity to facilitate educational experiences. The number of people who can simultaneously visit, for example, culturally interesting locations or events without regard to the limitations imposed by reality is considerable. VR projects included in the comparative study can be regarded as a suitable and well-researched set of projects that could be utilised in educational contexts related to modern technologies and art. Eleven of the thirty art VR experiences included in the comparative study were found to have an educational character, while twenty-nine were of an artistic nature. Seven of these were identified as having a scientific and technical character or a sci-fi flavour. In some cases, the experience involves navigating a gallery, which offers a novel perspective on the appreciation of artistic works. This may entail entering into the image and experiencing the creative process or style of the artist within the context of their studio. In other instances, the user is presented with a creative challenge, such as creating their own content in Fujii or assembling a virtual reality environment in T-Rex VR. Alternatively, they may be prompted to explore a particular theme or concept. One may experience artistic or historical atmospheres or adventures in digitally created environments, such as Egyptian pyramids or the open universe. The ArtStudio.app project may be viewed as a case study, with a meticulously delineated theoretical framework, comprehensive research, and a clear process of creation.

CONCLUSION

This dissertation has revealed the potential and limitations of virtual reality (VR) in artistic expression, with a particular focus on the democratisation of technological progress. A comprehensive examination of the current state of VR, the impact of the pandemic on the online art market, the differences in perception of VR among various groups, and the acceptance of VR by different demographics. Furthermore, the penetration of new technologies in the artistic domain and the comprehension of the possibilities and limitations for creators and users have led to the development of an application for a virtual artist studio and gallery. Following the completion of a comparative analysis of 30 VR experiences, I have identified 12 key principles for the creation of an exceptional VR experience. These principles emphasise the importance of authenticity and the ability to provide users with a sense of accessibility to experiences that may otherwise be inaccessible. The optimal utilization of VR is in domains where the attainment of reality is challenging or costly, such as the movement within an artistic studio on the opposite side of the globe. The success of VR experiences hinges on fidelity to the genre, the appeal of the environment, and interactivity that stimulates curiosity and fascination. A high-quality VR experience should be transferable to the real world, offering limitless possibilities within a constrained timeframe and space. The integration of sensory immersion and interactivity is crucial for user engagement. The entire digital experience can be conceptualised as a representation of evolving systems and algorithms, which are constantly refined through interactions. It is also important to consider the issue of shared reality and critical thinking in the digital environment, where users can construct their own world based on a variety of possibilities. The conducted research led to the successful creation of an application that was subsequently awarded the status of a distinguished digital PR platform. This platform has opened up new avenues for the presentation of artistic creations. One of the key benefits of this project is its capacity to facilitate inspiration and further development in diverse contexts, including the integration with traditional ateliers. The compatibility with Google Street View and the capacity to present exhibitions in different periods, as well as to involve additional artists and researchers in the VR environment, opens up new avenues and prospects. My dissertation demonstrated the potential of artificial intelligence in the creation of a virtual studio, offering greater precision and time savings compared to traditional painting techniques, which possess distinct advantages. The technology of virtual reality for an interactive gallery of an artist outside of a cultural metropolis represents a challenge due to

the low penetration and relatively high costs. It is anticipated that the imminent technological advancement and expansion of the 7G network will result in a significant shift in the accessibility and efficacy of this form of artistic presentation. This will open up new avenues and prospects for further artists and researchers.

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LIST OF SYMBOLS AND ABBREVIATIONS USED

AI - Artificial Intelligence

AI HLEG - High-Level Expert Group on AI

API - Application Programming Interface

AR - augmented reality

AVRAR - Association of Virtual and Augmented Reality at the Czech Technical University in Prague

BBC - British Broadcast Company

C++ - C++ is a powerful general-purpose programming language

C# - is a general-purpose multiparadigm programming language

CGI – Computer generated imagery

CSAT - Online customer satisfaction score

CTO - Chief technical officeR

ČVÚT - Czech Technical University in Prague

DNA - deoxyribonucleic acid

DOKBAT - International Bata Conference for Doctoral Students and Young Scientists

EUBA - University of Economics in Bratislava, SK

FPS - Frames per second

GPU - Graphics processing unit

HASTAC - Humanities, Arts, Sciences, and Technology Advanced Collaboratory

HTML - The HyperText Markup Language

IEEE - Institute of Electrical and Electronics Engineers

iOS - Apple's mobile operating system

IS/STAG - Information System / Study Agenda

IT/ICT - Information Technology/ Information and Communication Technology

JIC - South Moravian Innovation Centre in Brno Technology Par

JS - JavaScript, which, along with HTML and CSS, is one of the core languages of the World Wide Web

LiDAR - Light Detection and Ranging

MIT – Massachusetts Institute of Technology

MMO - Massively multiplayer online game

MMORPG - Massively Multiplayer Online Role Playing Game

MR - Mixed reality

NASA – National Aeronautics and Space Administration

NFT - Non-Fungible Token

OGAR - Open Gallery for Arts Research

OS - Open source

px - pixel, 0,26mm

SXSW – Music and media festival including film in Austin, TX, USA

T&C - Terms and Conditions

TA ČR - Technology Agency of the Czech Republic

T. rex – Tyrannosaurus rex

UI - User Interface

UX - User Experience

VDA – Vencouver's Downtown Association, Arts & Music Festival

VR - Virtual reality

VR Lab - Virtual Reality Lab

VRML - Virtual Reality Markup Language

VRX - Virtual Resource eXecutive (NCR Criterion)

VÚT - Brno University of Technology

XR - Extended reality

3D - Three-dimensional

5G - 5th generation wireless

6G, 7G - 6th/7th generation wireless (planned for 2035)

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ANNEX I: ARTISTIC ACTIVITY

- ArtEmy, solo exhibition of 31 paintings, Chiba, Japan, 2023
- Poetism, collective exhibition and animation projection, Lycée Daudet, Nîmes, France, 2023
- ArtExpo NYC, group exhibition, USA, Artavita catalogue, 2022
- ArtStudio.app: digital news opening, NFT, VR Lab, 2022@22:22
- Workshop for children, Treasure on Canvas, Czech Republic, 2022
- ArtEmy, Japan, 10 paintings from the Blue Garden collection, acquisition by a Japanese art agency, 2021
- King House Gallery, 2 paintings and 1 photograph accepted for Seasons group exhibition, UK, 2021
- Musica Holešov, design of some posters for concerts, e.g. A. Dvořák, Czech Republic, 2021
- Dialogue of Man and Artificial Intelligence, solo exhibition, Kavárna Továrna Zlín, Czech Republic, 2021
- Book "Melody of Life" AI Photography, Israel, translated into 6 languages, 2020-2021
- WebTop100, winner of the digital PR category, Czech Republic, 2021
- Artists and Illustrators, magazine, 2 images selected in lockdown challange, UK, 2021
- Commissions and paintings for clients in the Czech Republic, UK and USA
- Summer Illusion XIX, Holešov Castle, collective exhibition, Czech Republic, 2021
- Project Chance, auction of paintings in support of street children + catalogue, Czech Republic, 2021
- Stop-motion workshop for children, Czech Republic, 2021
- Project Chance: jingle created by combining AI photos and classical animation method, Czech Republic, 2021
- Stop-motion and AR workshops for the public, France, 2020
- Holo-ride to explore the future of art, Czech Republic, 2020
- Napolon Hill Music Lounge, images for music productions, Israel, 2020
- Licensing of puzzles from the Blue Garden Collection paintings, for the USA, 2020
- Launch Combster.tv, Head of Content, a digital multimedia platform, 2020
- Catalogue of Central European painters for the Japanese market, collective exhibition catalogue, Japan, 2020
- Cinematography Fund, page 30 of the Catalogue of Czech Animation, Czech Republic, 2020
- The Most Beautiful Gift, Kavárna Továrna Zlín, solo exhibition, Czech Republic, 2019
- Charity gums: packaging design for musical chewing gum, operating in augmented reality, Czech Republic, 2019
- Blue Garden in augmented reality, Alternativa Zlín, solo exhibition, Czech Republic, 2019
- Animated film Blue Garden, premiere in France and Czech Republic, 2019
- Summer Illusions, Holešov Castle, collective exhibition, 17th edition, Czech Republic, 2019
- Night of Galleries, jubilee collective exhibition, Fryšták Town Hall, Czech Republic, 2019
- Stop-motion workshop, La Maison de l'Europe and Centre Culturel La Mareschale, France, 2019
- Irises: augmented reality combined with stop-motion on long screen, 2019
- Water by Hana, a collection of water-themed design products, USA, 2019
- Dydžina, photography exhibition (70 x 50 cm) at the cult music event Brno, Czech Republic, 2018
- Artists and Illustrators, magazine printed the painting "Summer Studio", 2018
- Weekly workshop Summer drawing with children, Czech Republic, 2018

- Premiere of a short animated film, Aix-en-Province, 2018
- Classical animation workshops in Provence, France, 2017
- Exhibition of George Sand's portrait at the elocution of Hana Maciuchová and Ivo Kahánek, Holešov Castle, 2017
- Woodmanstern Wish, license for painting The Best Grapes, The Birmingham Art Museum, UK, 2017
- Workshop for children, painting in igloo, 2017
- Cats, Cats Café, solo exhibition, Prague Czech Republic, 2017
- Solo exhibition of large paintings at Hotel Atrium ****, Czech Republic, 2016
- The Blue Garden, 100 paintings, solo exhibition, Kavárna Továrna, Zlín, Czech Republic, 2016
- Entrepreneur of the Year, Top 10, regional round, 7th place, Czech Republic, 2016
- Exhibition of paintings, Bar Nový svět, Zlín, Czech Republic, 2016
- Art Week with Children, workshop, 2016
- Hřebíček Gallery, Brno, paintings accepted to the gallery, Czech Republic, 2016
- London Calling! Crypt Gallery, group exhibition, London, UK, 2016
- Vznášenie, Kino Fryšták, Czech Republic, collective exhibition, Czech Republic, 2016
- Catalogue Pictures with a Story, exhibition of the 51st edition of The Most Beautiful Czech Books, catalogue section, Czech Republic, 2016
- My First Million, winner of the main category, 2015
- Baby Jesus, animated fairy tale narrated by Josef Somre, Seznam.cz, 2014 - 2015
- Round Fairy Tales, 40 scripts for animated fairy tales, Seznam.cz, 2014-2015
- PTA Reflections Contest, art competition, honorable mention, Oklahoma, USA, 1998
- What is an open society? Open Society Fund, 2nd place, 1997

ANNEX II: RESEARCH ACTIVITIES

IMPACT OF COVID-19 ON THE ONLINE ART MARKET, Nováková Hana; Kazík Martin; Juříková Martina; Štarchoň Peter, DOKBAT 2020 - 16th International Baťa Conference for Ph.D. Students and young researchers, 365-373 PIN 43881451 RIV-ID 63525883 | rok: 2020. [online]. [cit. 2020-11-26]. Dostupné z: https://www.researchgate.net/publication/346585876_IMPACT_OF_COVID-19_ON_THE_ONLINE_ART_MARKET#fullTextFileContent

CREATIVE INDUSTRY: CHALLENGES AND OPPORTUNITIES IN XR TECHNOLOGIES, EUBA 2021/ APPS 2021, Conference paper, Nováková Hana; Štarchoň Peter, 115-124 PIN 43882620 RIV-ID 63531118 | rok: 2021. [online]. [cit. 2021-10-15]. Dostupné z: https://www.researchgate.net/publication/353238072_Creative_Industries_Challenges_and_Opportunities_in_XR_Technologies#fullTextFileContent

IMPLICATIONS OF MARKETING ETHICS: COMPARATIVE RESEARCH OF THE PERCEPTION OF THE VR EXPERIENCE BY CHILDREN AND PARENTS

DOKBAT 2020 - 16th International Baťa Conference for Ph.D. Students and young researchers, Nováková Hana; Štarchoň Peter, 342-354 PIN 43882621 RIV-ID 63531138 | rok:2021. [online]. [cit. 2021-12-15]. Dostupné z: https://www.researchgate.net/publication/354840900_MARKETING_ETHICS_IMPLICATIONS_COMPARATIVE_RESEARCH_OF_VR_EXPERIENCE_PERCEPTION_BY_CHILDREN_AND_PARENTS

CERTIFIKÁT

O ABSOLVOVÁNÍ KURZU ZÁKLADŮ VĚDECKÉ PRÁCE V AKADEMII VĚD ČESKÉ REPUBLIKY

Ing. Hana Nováková

řádně absolvovala týdenní **Kurz základů vědecké práce v Akademii věd ČR**, který se konal ve dnech **16. - 20. září 2019.**

Kurz obsahoval následující témata:

- *Obecné zásady vědecké práce*
- *Prezentace vědeckých výsledků*
- *Financování výzkumu, Grantový systém v EU*
- *Angličtina ve vědecké práci, nejčastější chyby*
- *Time Management*
- *Etika vědecké práce, Bioetika*
- *Průmyslově-právní ochrana vynálezů a komercializace*
- *Pracovní zatížení a úloha stresu*
- *Tvořivost a systémové myšlení ve vědě*
- *Grantový systém v praxi, Grantový systém v ČR*
- *Jak optimálně využít statistiky při zpracování dat*
- *Základy rétoriky a technika mluveného slova*
- *Hodnocení vědy*
- *Moderní informační zdroje pro výzkum*
- *Publikování v časopise z hlediska editorské praxe*
- *Plagiátorství, Rozbor zaslaných názvů a abstraktů*
- *Transfer technologií*

V Brně dne 20. září 2019

Ing. Irena Navrátilová
Ředitelka Kanceláře Sdružení moravských pracovišť AV ČR

1. ART SALES DURING COVID-19 LOCKDOWN

Art sales during COVID-19 lockdown.

Hello,
we would love to ask you for a few minutes of your time. Take those minutes and think about your artistic creation and sales of your artwork during the time of COVID-19 lockdown. We are PhD students of multimedia and design at Tomas Bata University in Zlin and we will use collected data for academic research.
Thank you for your time and your answers
Hana and Martin

* Indique une question obligatoire

1. What artwork styles do you create? *

Plusieurs réponses possibles.

- [ ] Abstract
- [ ] Collage
- [ ] Expressive and gestural
- [ ] Impressionistic
- [ ] Photorealistic
- [ ] Urban and Pop
- [ ] Surrealistic
- [ ] Naive
- [ ] Graphic, illustrative and typographic
- [ ] Unspecified abowe

2. From which of given categories are the artworks you sell on artfinder? *

Plusieurs réponses possibles.

- [ ] Collage
- [ ] Digital Art
- [ ] Drawing
- [ ] Painting
- [ ] Photography
- [ ] Printmaking
- [ ] Sculpture

3. What are the subjects of your artworks? *

Plusieurs réponses possibles.

- [ ] Abstract and non-figurative
- [ ] Animals and birds
- [ ] Architecture and cityscapes
- [ ] Flowers and plants
- [ ] Landscapes, sea and sky
- [ ] Nudes and erotic
- [ ] People and portraits
- [ ] Still life
- [ ] Transportation and maps

4. What artwork sizes do you offer on artfinder? *

Plusieurs réponses possibles.

- [ ] Smaller than 20cm
- [ ] Any side > 20cm
- [ ] Any side > 40cm
- [ ] Any side > 60cm
- [ ] Any side > 80cm
- [ ] Any side > 100cm

5. What are the average sale price by artwork size mentioned in the previous question? *
Echample: "Any side > 40cm 250$, Any side > 60cm 500$ "

_____

Art sales during COVID-19 lockdown.

Art sales during COVID-19 lockdown. 09.02.2024 20:44

6. What artwork styles do you create? *

Plusieurs réponses possibles.

- [ ] Abstract
- [ ] Collage
- [ ] Expressive and gestural
- [ ] Impressionistic
- [ ] Photorealistic
- [ ] Urban and Pop
- [ ] Surrealistic
- [ ] Naive
- [ ] Graphic, illustrative and typographic
- [ ] Unspecified abowe

7. From which of given categories are the artworks you sell on artfinder? *

Plusieurs réponses possibles.

- [ ] Collage
- [ ] Digital Art
- [ ] Drawing
- [ ] Painting
- [ ] Photography
- [ ] Printmaking
- [ ] Sculpture

8. What are the subjects of your artworks? *

Plusieurs réponses possibles.

- [ ] Abstract and non-figurative
- [ ] Animals and birds
- [ ] Architecture and cityscapes
- [ ] Flowers and plants
- [ ] Landscapes, sea and sky
- [ ] Nudes and erotic
- [ ] People and portraits
- [ ] Still life
- [ ] Transportation and maps

9. What artwork sizes do you offer on artfinder? *

Plusieurs réponses possibles.

- [ ] Smaller than 20cm
- [ ] Any side > 20cm
- [ ] Any side > 40cm
- [ ] Any side > 60cm
- [ ] Any side > 80cm
- [ ] Any side > 100cm

10. What are the average sale price by artwork size mentioned in the previous question? *

Echample: "Any side > 40cm 250$, Any side > 60cm 500$ "

_____

Sales

11. Where do you sell your artwork? *

Plusieurs réponses possibles.

- [ ] Brick and stone Galleries
- [ ] Private webpage
- [ ] Social media
- [ ] Artful
- [ ] ArtFinder
- [ ] ArtGallery.co.uk
- [ ] Art Space
- [ ] Artsy
- [ ] Counter Editions
- [ ] Christie's online auction site
- [ ] Eyestorm
- [ ] New Blood Art
- [ ] Singulart
- [ ] Saatchi
- [ ] Autre : _____

12. How did the lockdown affect online sales of your artworks? *

Choose how have your sales changed during the lockdown month compared to average monthly sales. 100% stands for average amount of artworks sold.

Une seule réponse possible.

- ◯ more than 200% (Your sales have doubled)
- ◯ 151%-200%
- ◯ 125%-150%
- ◯ 105%-124% (slightly better sales)
- ◯ 96%-104% (sales are same as previous months)
- ◯ 75%-95% (slightly worse sales)
- ◯ 50%-74%
- ◯ 25%-49%
- ◯ less then 25% (You have sold less then quater of your monthly average)

13. How did you change the prices of your artworks during a lockdown? *

Plusieurs réponses possibles.

- [ ] I've risen the prices
- [ ] I've kept the same prices
- [ ] I've cut the prices (discounts)

14. Have you changed your pricing policy form normal during the lockdown? *

What we want to know here is if you did something you wouldn do under normal circumstances. Have you for example add a speical discounts or have you kept higher prices then you normaly c

Customers

Please could you tell us who are your avaradge customers and how have they changed during the lockdown?

15. Your customers are more? *

Une seule réponse possible.

- ◯ Male
- ◯ Female
- ◯ Equally both
- ◯ Not sure

16. What countries are your customers mostly from? *

17. What country of origin were your customers from in time of COVID-19 lockdown? *

18. Do you have typical customers? Could you describe them somehow?

19. Do your customers buy more pieces of artworks in one purchase? *

Une seule réponse possible.

- ◯ No
- ◯ Yes often
- ◯ Yes sometimes

20. Did the behaviour of your customers change during COVID-19 lockdown? Could you describe how?

Please tell us about you

21. Are you? *

Une seule réponse possible.

- ◯ Male
- ◯ Female
- ◯ Prefer not to say
- ◯ Autre : _____

22. Where are you from? *

_____

23. Would you like to be contacted for some additional questions?
Please give us your email address so we can contact you if necessary.

_____

Sales

24. Where do you sell your artwork? *

Plusieurs réponses possibles.

- ☐ Brick and stone Galleries
- ☐ Private webpage
- ☐ Social media
- ☐ Artful
- ☐ ArtFinder
- ☐ ArtGallery.co.uk
- ☐ Art Space
- ☐ Artsy
- ☐ Counter Editions
- ☐ Christie's online auction site
- ☐ Eyestorm
- ☐ New Blood Art
- ☐ Singulart
- ☐ Saatchi
- ☐ Autre : _____

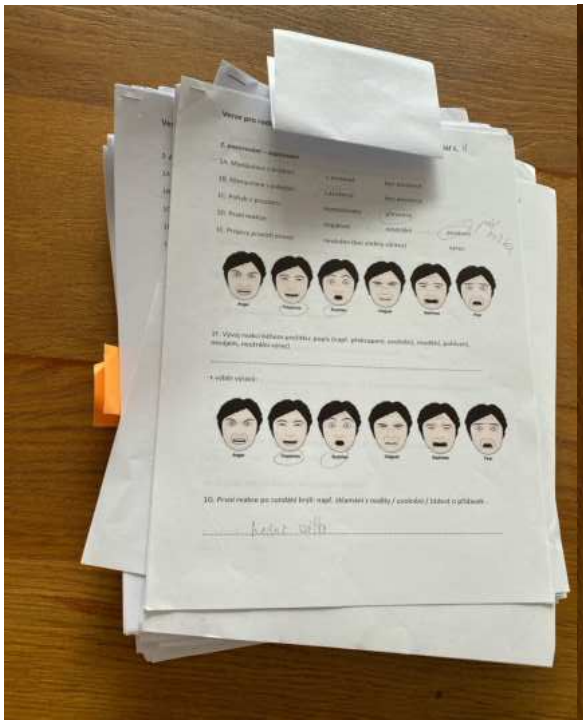
25. How did the lockdown affect online sales of your artworks? *

Choose how have your sales changed during the lockdown month compared to average monthly sales. 100% stands for average amount of artworks sold.

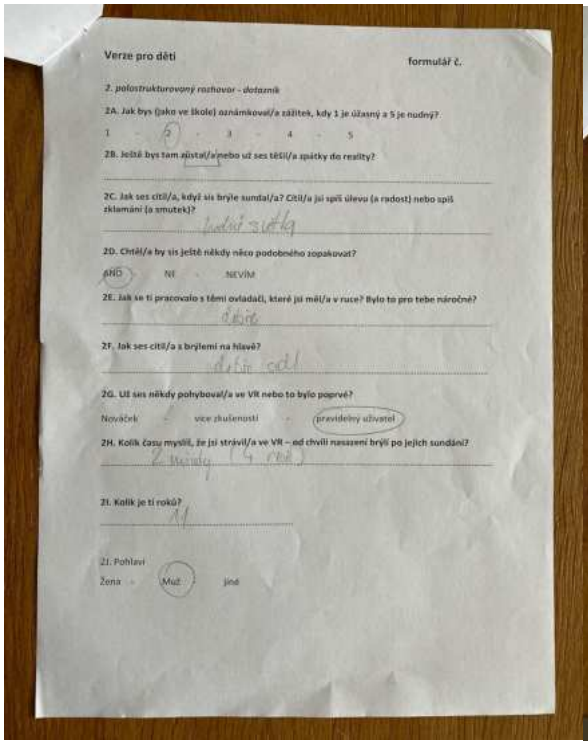
Une seule réponse possible.

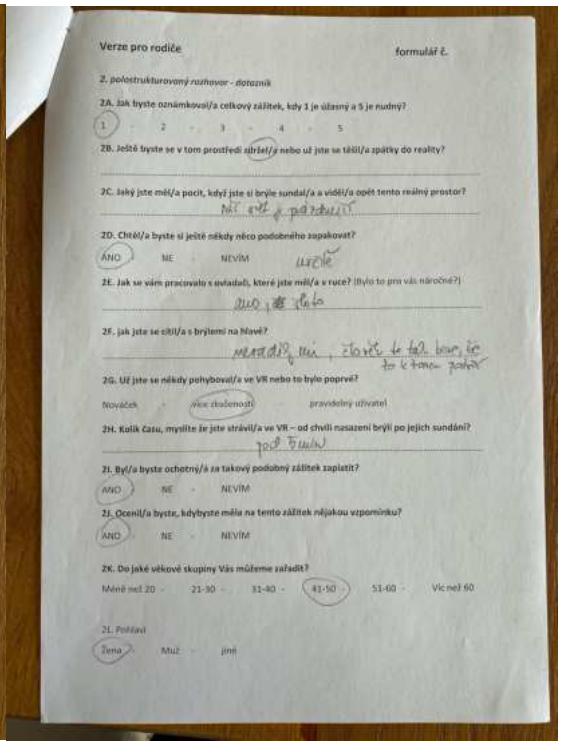
- ◯ more than 200% (Your sales have doubled)
- ◯ 151%-200%
- ◯ 125%-150%
- ◯ 105%-124% (slightly better sales)
- ◯ 96%-104% (sales are same as previous months)
- ◯ 75%-95% (slightly worse sales)
- ◯ 50%-74%
- ◯ 25%-49%
- ◯ less then 25% (You have sold less then quater of your monthly average)

2. MARKETING ETHICS IMPLICATIONS: COMPARATIVE RESEARCH OF VR EXPERIENCE PERCEPTION BY CHILDREN AND PARENTS









Univerzita Tomáše Bati ve Zlíně
Fakulta multimediálních komunikací

research education design red lab.

T A
Č R

Vážený pane, vážená paní,

v souladu se zásadami etické realizace výzkumu[1] Vás **žádám o souhlas** s Vaší účastí ve výzkumném projektu v rámci výzkumného projektu Univerzity Tomáše Bati ve Zlíně a podpořeného z fondů TAČR s názvem „Využití virtuální reality v umění: vytvoření zážitku ve světě fantazie a inspirace Karla Zemana".

Název výzkumu: Vnímání zážitku ve virtuální realitě dětmi a rodiči (dospělými)
Řešitel výzkumu: Ing. Hana Auerová Nováková
Název pracoviště: Fakulta multimediálních komunikací, UTB ve Zlíně
Hlavní řešitel projektu/Garant výzkumu: prof. Peter Štarchoň
Cíl výzkumu: Cílem výzkumu je odhalit rozdíly ve vnímání zážitku ve VR dětmi a jejich rodiči.
Účel výzkumu: Nastavení optimálního zážitku „světa Karla Zemana ve VR" pro děti a jejich rodiče
Realizace: 8. – 9. září 2020, budova U13 UTB
Výzkumný tým: Hana Auerová Nováková, Markéta Nemeškalová, Martin Kazík

Popis výzkumu:
Výzkum se týká Vašeho zážitku ve virtuální realitě. K vytvoření takového zážitku je potřebné, abyste si nasadil/a speciální brýle, sluchátka a uchopil/a do rukou ovladače. V brýlích uvidíte hru, kterou budete moci ovládat pomocí ovladačů. Ve virtuální realitě strávíte několik minut. Tento krátký čas nijak neohrozí Vaše zdraví. Neuvidíte však reálný prostor, což může způsobit mírnou dezorientaci. Pokud Vy (respektive Vaše dítě) pocítíte jakoukoli nevolnost nebo nepohodlí, je možné brýle okamžitě sundat. Obsluha zařízení a výzkumný tým bude po celou dobu k dispozici, aby hlídal Vaše bezpečí, komfort a byl technickou oporou.
Po absolvování zážitku ve virtuální realitě se Vás člen výzkumného týmu zeptá na 10 otázek. Jejich zodpovězení Vám zabere maximálně 5 minut. Vaše odpovědi budou zaznamenány do papírových formulářů. Výzkum je **anonymní** a Vaše jméno se tedy nebude vyskytovat při jakékoli publikaci výsledků tohoto výzkumu. Vaše účast v tomto výzkumu je zcela dobrovolná a máte možnost kdykoli bez udání důvodu výzkum opustit.

.....
datum a podpis řešitele výzkumu

[1] Všeobecnou deklarací lidských práv, nařízením Evropského parlamentu a Rady (EU) č. 2016/679 o ochraně fyzických osob v souvislosti se zpracováním osobních údajů a o volném pohybu těchto údajů a o zrušení směrnice 95/46/ES (obecné nařízení o ochraně osobních údajů) a dalšími obecně závaznými právními předpisy *(jimiž jsou zejména Helsinská deklarace přijatá 18. Světovým zdravotnickým shromážděním v roce 1964, ve znění pozdějších změn (Fortaleza, Brazílie, 2013), zákon č. 372/2011 Sb., o zdravotních službách a podmínkách jejich poskytování (zákon o zdravotních službách), ve znění pozdějších předpisů, zejména ustanovení jeho § 28 odst. 1, a Úmluva na ochranu lidských práv a důstojnosti lidské bytosti v souvislosti s aplikací biologie a medicíny: Úmluva o lidských právech a biomedicíně publikované pod č. 96/2001 Sb. m. s., jsou-li aplikovatelné).*

3. COMPARATIVE INDUSTRIES: CHALLENGES AND OPPORTUNITIES IN XR TECHNOLOGIES





Recherche qualitative et comparaison de la perception des œuvres d'art en réalité augmentée en France et en République tchèque

Etudiants d'Art - France

1) Partie technique

1A) Ai-je réussi à installer l'application sur mon téléphone portable?

a) Oui, c'était …… (facile / stimulant / amusant / ennuyeux…)

b) Non, parce que ……

1B) Voici, mon attitude envers des applications similaires:

a) Positive parce que ……

b) Neutre car ……

c) Négative car ……

1C) Je voudrais encore refaire quelque chose de similaire:

a) Oui, parce que ……

b) Non, car ……

2) Partie créative

2A) Selon vous, quelle est la longueur optimale de la RA via le téléphone?

a) 0 à 20 secondes

b) 21 à 30 secondes

c) 31 à 40 secondes

d) 41 à 50 secondes

e) 51 à 60 secondes

f) 1 à 2 minutes

g) Plus de 2 minutes

2B) Qu'est-ce qui vous étonnerait suffisamment dans l'application AR pour la partager avec des amis?

2C) Utiliseriez-vous la technologie RA dans vos créations?

a) Oui

b) Non

2D) Si oui, comment? Sinon, pourquoi?

2E) À quel type de création pensez-vous que la RA convient?

a) L´animation (2D ou 3D)

b) La visualisation des affiches

c) La renaissance des œuvres d'art

d) La renaissance des illustrations de livres

e) Les informations dans une galerie d´art

f) Dans un nouvel environnement

g) Visualisation en architecture et design

h) Autres, précisez:

3) Répondent

3A) RA c'est pour moi:

a) Une Nouveauté

b) Je connais la RA, mais je ne travaille pas avec

c) Je connais la RA et j'utilise cette technologie

3B) Je suis:

a) Femme

b) Homme

c) Autre

3C) Je me consacre à l'art depuis ..... ans

3D) Mon âge:

a) 0-10 ans b) 11-20 ans c) 21-30 ans d) 31-40 ans e) 41-50 ans f) 51-60 an g) 61-70 ans h) Plus

Véra FICHANT
[redacted]
FRANCE

A Madame Hana Nováková
Fakulta multimédiálních komunikací
Univerzita Tomáše Bati
Zlín,
République tchèque

Chère Madame Nováková,

au nom de l'association Amitié-franco-tchèque en Provence, je suis heureuse de pouvoir vous inviter à un séjour de deux semaines de recherches, du 27 septembre au 12 octobre 2020.

Lors de votre séjour, vos activités se tiendront autour des villes d'Aix-en-Provence, Marseille et Meyrargues. A cette occasion, notre association s'engage à vous aider à accéder aux diverses communautés artistiques et académiques locales.

Nous vous prions de vous procurer une assurance maladie *en bonne et due forme* qui vous sera demandée ici dès votre arrivée.
En cas de changements, en raison de l'épidémie de coronavirus, nous resterons en contact.

Nous nous réjouissons par avance de votre séjour parmi nous, et nous vous prions, chère Madame Novakova, d'accepter nos cordiales salutations.

Association
"AMITIÉ FRANCO-TCHÈQUE"
Tél. + Fax. 04.42.57.57.42
13650 MEYRARGUES
Identification Siren : 440 702 520

V. Fichant

Vera Fichant
Président de l'association
Amitié franco tchèque
Meyrargues
France

Faculté des Arts, Lettres, Langues et Sciences humaines
Aix-Marseille Université

16th July 2020

Aix-Marseille Université: Invitation Letter for Guest Researcher

Dear Hana Nováková,

I am pleased to invite you by our department of Arts at Aix-Marseille Université as a Guest Researcher.

Details:

A guest researcher Ing. Hana Nováková from Faculty of Multimedia communications at Tomas Bata University is invited by Aix-Marseille Université in France to give a series of research investigations with theme of Comparative research of Augmented reality in the area of Aix-en-Provence and Marseille.

- Duration will be maximum of 3 weeks
- There will not be a salary for these appointments
- An honorary certificate may be granted after research is completed

During this period of time, we will provide you with access to your research tested student group and library privileges.

Our University is not responsible for any vice mayor.

Sincerely,



Aix-Marseille Université
Faculté des arts, lettres, langues et sciences humaines
29 Avenue Robert Schuman
13 100 Aix-en-Provence, France

Aix-Marseille université
Faculté des Arts, Lettres, Langues et Sciences humaines
Aix-Marseille Université

ANNEX III: WINNING CERTIFICATE

