THE ART & DESIGN OF XR

SYMPOSIUM PROCEEDINGS

THE ART & DESIGN OF XR

SYMPOSIUM | ERASMUS XR Multiplier Event

23-24 SEPTEMBER 2022
National Gallery, Athens

ORGANIZED BY

HELLENIC REPUBLIC
**National and Kapodistrian
University of Athens**
Department of Digital Arts and Cinema

**ONASSIS
STEGI**

COMMITTEES

SCIENTIFIC COMMITTEE

Dimitris Charitos, Associate Professor, National and Kapodistrian University of Athens - Department of Media and Communication Studies, Head of the Department of Digital Arts and Cinema, Greece.

Adnan Hadziselimovic, Associate Professor, University of Malta - Faculty of Media & Knowledge Sciences, Malta.

Marta Materska-Samek, Associate Professor, Jagiellonian University - Faculty of Management and Social Communication, Poland.

Krzysztof Pijarski, Associate Professor, Lodz Film School, Poland.

Maria Roussou, Assistant Professor, National and Kapodistrian University of Athens - Department of Informatics and Telecommunications, Greece.

Manthos Santorinaios, Director of Fournos Lab of Fournos Multivalent Communication Network, x Professor of Athens School of Fine Arts - Multimedia - Hypermedia Lab, Greece.

Prodromos Tsiavos, Head of Digital & Innovation, Onassis Group, Greece.

ORGANIZING COMMITTEE

Dimitris Charitos, Ino Theodorou, Penny Papageogopoulou, Natalia Arsenopoulou, Louiza Katsarou | Department of Communication & Media Studies, National & Kapodistrian University of Athens, Athens, Greece

Prodromos Tsiavos, Heracles Papatheodorou, Katerina Varda | ONASSIS STEGI Foundation

---

ERASMUS XR PROJECT PARTNERS

THE ART & DESIGN OF XR | SYMPOSIUM PROGRAM

KEYNOTE PRESENTATIONS

Critical XR Futures - promises, presences, practices
Chris Salter

After Venice Immersive 2022, lessons learned about the metaverse
Michel Reilhac

Allotopes XR | Ulysses XR | An Allotropic Allotope for 2122" (Venice Biennale 2022 Invited Proposal)
Marcos Novak

PROJECT PARTNERS PRESENTATIONS

Legal dimension of AR and VR - selected aspects
Monika Hapek, Marzena Baranska

Digital Fashion - Meaning and Practice
Michał Wójciak

XR as innovation priority - the case of Entrepreneurial Discovery Process in Poland
Marta Materska-Samek

Digital Arts Malta
Adnan Hadziselimovic, Fabrizio Cali, Letta Shtohryn

The Visual Narratives Laboratory - combining artistic and research processes in search for the language of XR
Krzysztof Pijarski

Artistic experimentation and education on the creative aspects of XR
Dimitris Charitos, Charalampos Rizopoulos, Penny Papageorgopoulou, Iouliani Theona

THEMATIC 1 - SOCIAL AND CULTURAL PERSPECTIVES OF MULTIUSER VIRTUAL ENVIRONMENTS

@postasis platform paradigm for social interaction and synergies in art and Special Education
Dr. Anastasia-Zoi Souliotou, Dr. Charikleia Kanari, Dr. Stavroula Zoi, Dr. Manthos Santorineos

Investigating the Process of Teaching the Creation of Interactive Art in a Collaborative Virtual Environmental Context
Maria Sounti, Caterina Antonopoulou, Penny Papageogopoulou, Dimitris Charitos, Louiza Katsarou, George Anastassakis

Introducing combined metaverse XR experiences: when the Ionian Film Office also serves as a tourism location guide for Ionian Islands in Greece
Dr. Ioannis Deliyannis, Dr. Andreas Giannakoulopoulos, Dr. Marina Markellou, Dr. Iakovos Panagopoulos

Immersive Narratives for the Old City of Chania: A Social VR system for virtual time-traveling in ten historic locations of Chania
Dr. Konstantinos-Alketas Oungrinis, Marianthi Liapi

The End of Childhood
Angelos Floros

Lessons From The Theatre: Digitally Generated Realities Through The Theatre Lens
Eleni Timplalexi

Designing historical empathy into a shared cultural heritage VR experience
Dr. Akrivi Katifori, Dr. Maria Roussou, Christos Lougiakis, Athanasios Soulis, Dr. Sara Perry, Kristen N O'Connor, Sebastian Vizcay, George Drettakis

Crafting an Xtended apprenticeship for the future
Dr. Polyxeni Mantzou, Dr. Xenofon Bitsikas, Anastasios Floros, Aristeidis Panagiotidis Diktampanis

Ubiquitous Augmented Cultural User eXperience: content, interaction and context aspects
George Caridakis

THEMATIC 2 - XR AS A CREATIVE MEDIUM - STATE OF THE ART AND DESIGN OF XR

Combining extended reality and brain-computer interfaces: Towards new applications of EEG in art and the field of visual interaction experience
Konstantina Vetsiou

Composite extended reality environments and emerging areas of creative experimentation
Dr. Stavroula Zoi

New directions in Interactive XR Dance performances
Spyros Vosinakis, Marina Stergiou, Dimitris Baltas

A study of inserting images into a poetry book in an Augmented Reality environment: the experimental project "After the Fire"
Penny Milia, Dr. Anna Meli

TECHNO-LOGIA Hub | Research Dissemination Hub on Art in a Techno-Logical Society
Giannis Koukoulas, Manolis Simos, Kostas Ioannidis, Aristotelis Tympas

THEMATIC 3 - CINEMATIC VIRTUAL REALITY - IMMERSIVE CINEMATOGRAPHY

Remembrance: Magma
Chanee Choi

Augmented musical heritage and archeosoundscapes: the CIVIS project "Sacred sound-sacred spaces"
Dr. Anastasia Georgaki

Oedipus In search of Colonus
Loukia Alavanou

Narrative research as practice: a methodology of curating
Christiana Kazakou

XR - Cinema - Game - interactive narrative. The need to define boundaries or a new unconditional narrative. The experiment of the art exhibition in the cinema Alphaville
Dr. Manthos Santorineos

THEMATIC 4 - DISTRIBUTION & BUSINESS ASPECTS OF XR

Extended reality Cinema production: innovative workflows and mixed techniques for multiple VR/AR/MR media outputs and platforms
Dr. Nefeli Dimitriadi

Defining the new age of training with Verdu, from RnD to market
Tom Kolokithas

Designing MEDxR applications: Lessons from the field
Dr. Vangelis Lympouridis

THEMATIC 5 - IMMERSING THE AUDIENCE IN THE XR EXPERIENCE AND AFFORDING THE AUDIENCE PARTICIPATION

Gaming the Past
Dr. Manolis Patiniotis

Evaluation of two artistic installations in live performances through user experience : artistic interactive installations case study
Dr. Panayiotis Kyriakoulakos, Anthie Kolokotroni, Genovefa Chatzimenoikou

XRaying the city's past
Dr. Polyxeni Mantzou, Dr. Xenofon Bitsikas, Anastasios Floros, Aristeidis Panagiotidis Diktampanis

Visiting an ancient Athenian home within a multi-visitor, multi-sensorial eXtended Reality storytelling experience
Dr. Maria Roussou, Katerina El Raheb, Dimitris Nastos, Athanasios Soulis, Dimitris Christopoulos, George Sofianopoulos, Katerina Servi, Kleanthis Zoumpoulakis, Lucas Katsikaris, John Parcharidis, Sakis Rogkas, Hara Sfyri

THEMATIC 1

SOCIAL AND CULTURAL PERSPECTIVES OF MULTIUSER VIRTUAL ENVIRONMENTS

@postasis platform paradigm for social interaction and synergies in art and Special Education

Dr. Anastasia-Zoi Souliotou
University of the Aegean, Greece
asouliotou@gmail.com

Dr. Charikleia Kanari
Aristotle University of Thessaloniki, Greece

Dr. Stavroula Zoi
Athens School of Fine Arts, Greece

Dr. Manthos Santorineos
Director of Fournos Lab of Fournos Multivalent Communication Network,
x Professor of Athens School of Fine Arts - Multimedia - Hypermedia Lab, Greece
msantori@otenet.gr

@postasis is a multi-user platform for digital and multisensory projects through distance communication, collaboration and co-creation. The presented workshop with @postasis platform entitled "(Co)creation and interaction in Special Education" was held with undergraduate Special Education students and through collaboration among researchers, academics, artists and university students from the Athens School of Fine Arts (Athens, Greece) and the Department of Special Education, University of Thessaly (Volos, Greece). The workshop falls under the studies and discussions about the benefits –educational and otherwise– of art-and-technology projects and activities for students with disabilities and/or special educational needs. These benefits include academic, cognitive, intellectual, communication, literacy and social skills, digital skills, creativity, etc. The aim of the workshop was to provide undergraduate Special Education students with a new digital art experience and explore their ideas about possible implementations in Special Education.

The workshop unfolded in preliminary activities followed by three (3) consecutive @postasis seminars and it was coordinated by the first author in the frame of the module "Visual Arts in Special Education" at the University of Thessaly. All the members of the team from both cities and Universities were in continuous communication throughout all phases of the workshop. In total, ninety-five (95) undergraduate Special Education students participated in the three @postasis seminars. More analytically, @postasis workshop timeline included: a. the preliminary activities and seminars (Figures 1 and 2) with texture explorations through touching various materials and undergraduate students' creation of collages and experiments, b. @postasis seminar 1, where undergraduate students made collages (Figure 3) on top of the @postasis cubemap templates, c. @postasis seminar 2, which marked the transition from physical to digital space and undergraduate students entered @postasis platform, saw their collages as cube avatars and ground in digital space (Figures 4 and 5) and interacted with each other through the avatars and chat (Figure 5), and d. @postasis seminar 3, where undergraduate students made soundscapes, set attributes to the avatars and Non Player Characters (NPCs) and

interacted with each other and with the researchers from Volos and Athens (Figures 6 and 7). In this last @postasis seminar 35 undergraduate students completed a questionnaire.

Interesting outcomes are presented from @postasis experience through observations of social interaction during the project as well as through the participants' opinions, found within the questionnaire, about possible implementations and synergies in art and Special Education. Undergraduate students described their experience as very creative mentioning positive emotions and stressing their active participation and the opportunities for social interaction. Regarding possible implementations in Special Education, undergraduate students mentioned the opportunities for distance learning and participation in a new and creative way, the enhancement of interaction, collaboration and socialization. They also mentioned outcomes related to various skills (e.g. exploring different materials, coding), knowledge, motivation, curiosity, creativity and opportunities for collaborations and interaction among children with and without disabilities. The latter is considered very important, given the worldwide dominant policy for inclusion and creating opportunities for equal participation and contribution in social and cultural life and at the same time for the motivation of children with and without disabilities. Although @postasis platform was not primarily designed specifically for disabled persons, based on the participants' responses it is thought to have multiple possible implementations and benefits in Special Education. New technologies, accessibility and arts are a promising and continuously expanding field that should enrich future teachers' competencies and provide opportunities for synergies, collaborations, creativity and social interaction to all and in various learning environments.
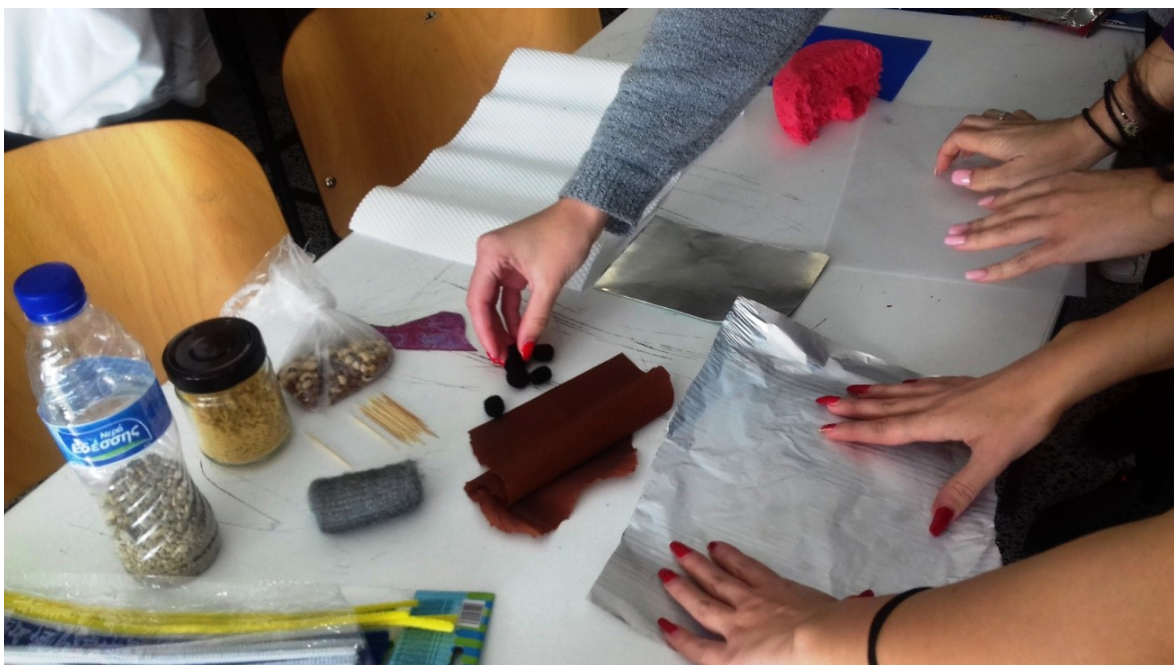

Figure 1. Photo from the preliminary activities and seminars with texture explorations through touching various materials. © Photo Credits: Anastasia Zoi Souliotou
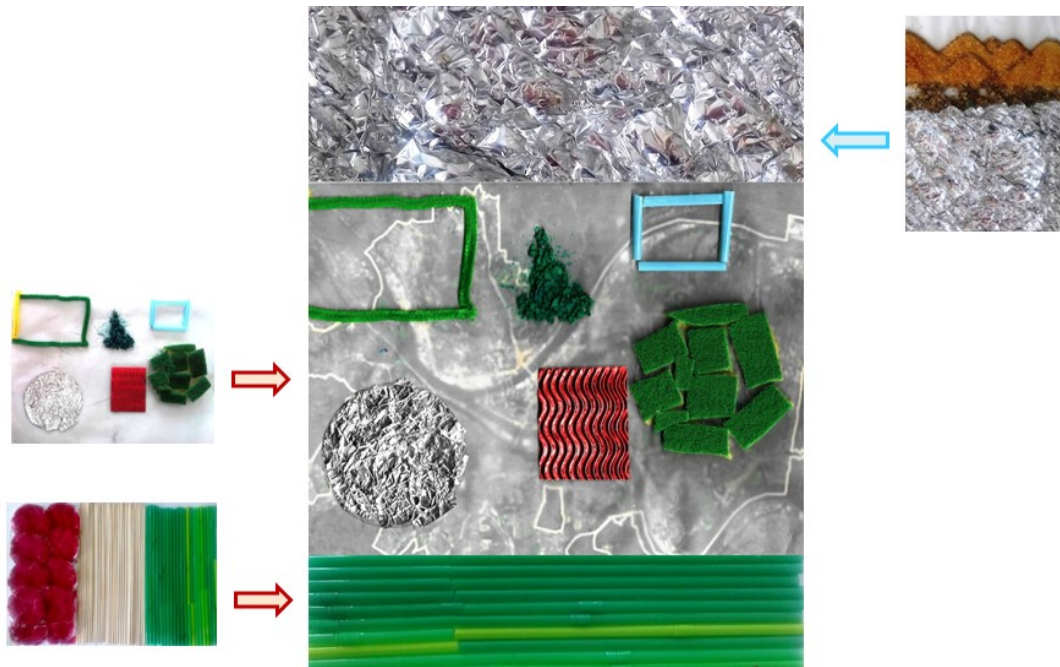
Figure 2. Collage composition for the ground of the digital space in @postasis platform project "(Co)creation and interaction in Special Education". The ground composition is made of the synthesis of students' collages with different textures.

Figure 3. Examples of students' collages, drawings and mixed media techniques on top of cubemap templates for avatars and NPCs in the @postasis platform project "(Co)creation and interaction in Special Education". The collages were created in @postasis seminar 1.
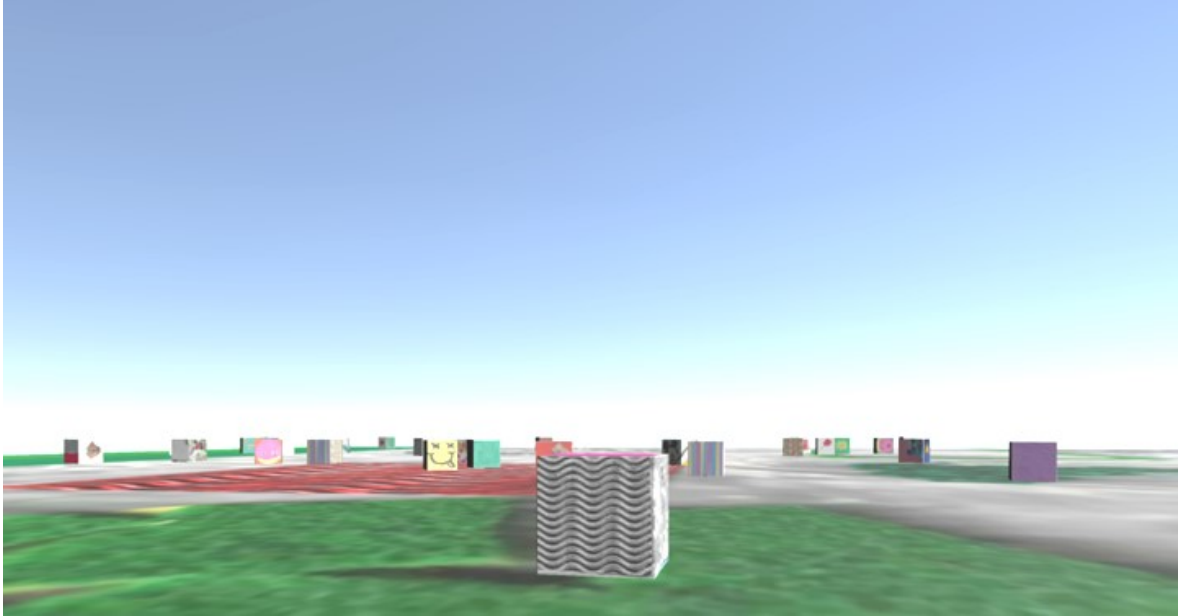
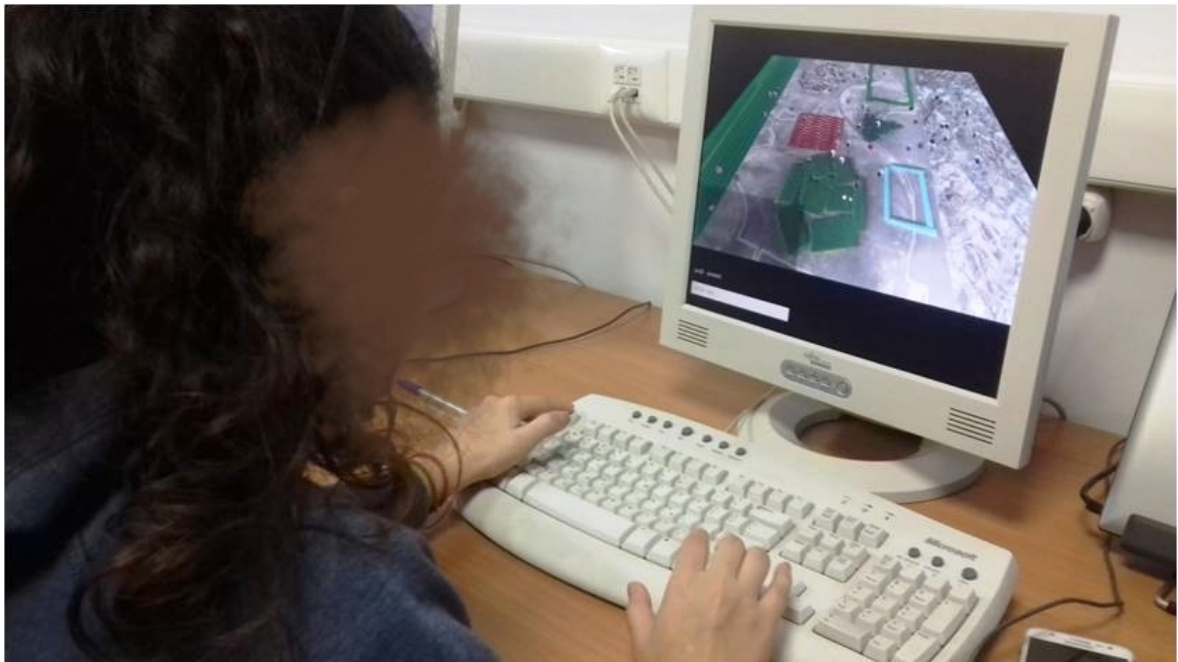Figure 4. Students' collages forming the ground and the cube avatars in @postasis digital space.

Figure 5. Photo from @postasis seminar 2 where the students saw their collages in @postasis digital space. In the picture the student manipulates avatars in God's view and chats with other users. © Photo Credits: Anastasia Zoi Souliotou
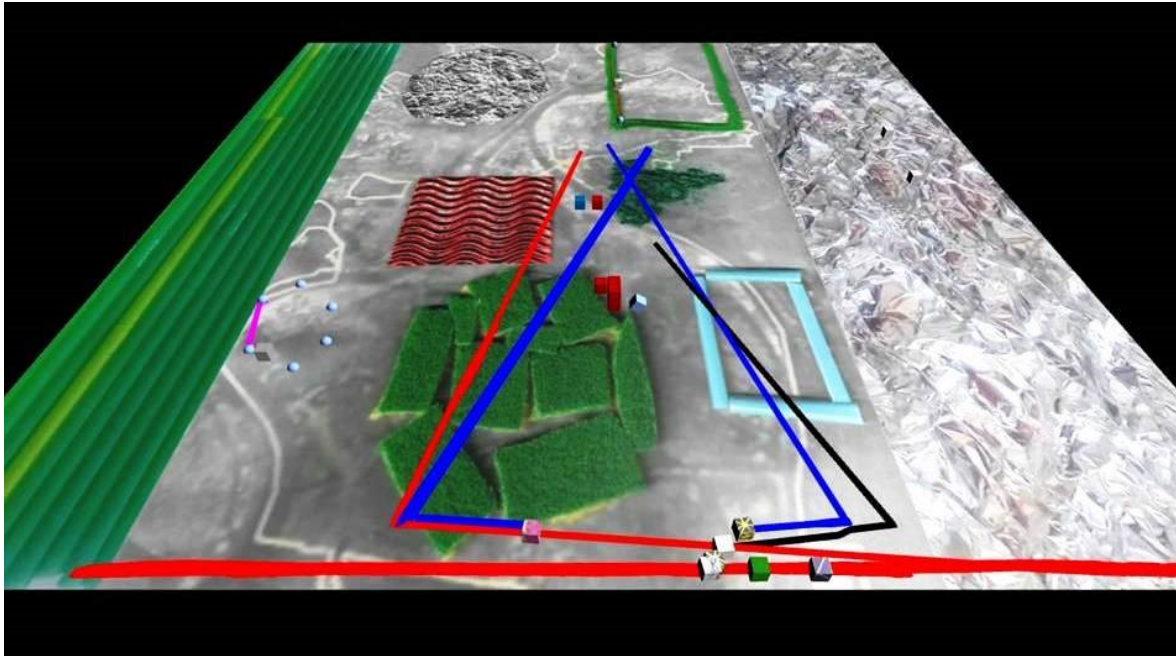
Figure 6. @postasis platform project "(Co)creation and interaction in Special Education", screenshot with God's view of the platform in its final multi-sensory form.
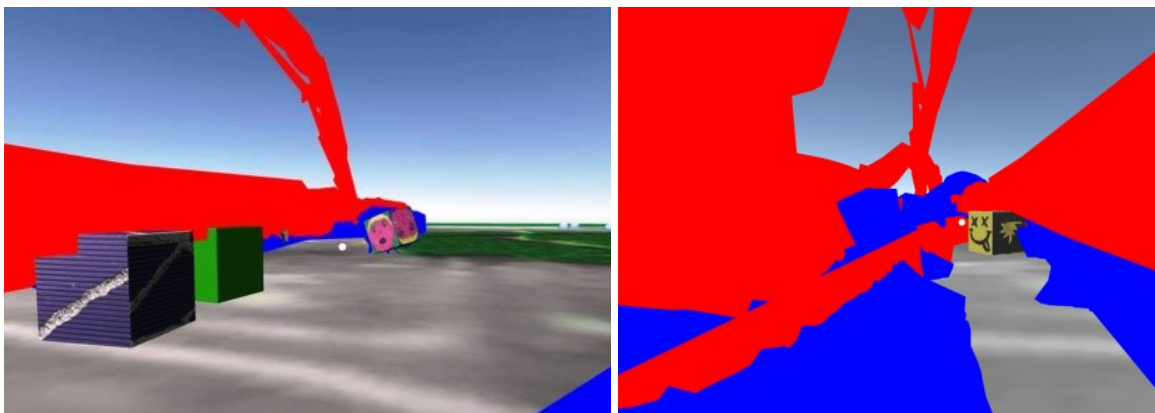

Figure 7. @postasis platform project "(Co)creation and interaction in Special Education". Screenshot with avatar's view (person's view) where cube avatars mapped with collages stroll in the blue and red traces left behind by other avatars.

Bibliography & Links

@postasis: Virtual Artistic Laboratory. http://apostasis.eu/

Santorineos, M. & Zoi, S. (2020). Advanced digital technology, science and art as boosters of contemporary social problems. The example of @postasis platform. [in Greek] @postasis: Virtual Artistic Laboratory. Available at: https://www.youtube.com/watch?v=SFXSFo8OLOs&t=36s (Accessed on: 24-10-2022)

Santorineos, M. (2020). Presentation of the platform as a tool of creating experimental courses. @postasis educational material [video] [Greek language]. @postasis: Virtual Artistic Laboratory. Available at: https://www.youtube.com/watch?v=zz2QG7CVzvI (Accessed on: 24-10-2022)

Souliotou, A. Z. (2020). Presentation of the experience of using the @postasis platform in collaboration with the Instructor Dr Anastasia Zoi Souliotou and students of the University of Thessaly [video]. Athens School of Fine Arts – University of Thessaly. @postasis: Virtual Artistic Laboratory. Available at: https://www.youtube.com/watch?v=lJ5b3F99kCw&t=29s (Accessed on: 24-10-2022)

Souliotou, A. Z., Zoi, S. & Santorineos, M. (2020). (Co)creation & Interaction at the crossroad of art, technology & special education. Experimental workshop with the @postasis real-time multiuser collaboration platform. CONFERENCE PROCEEDINGS – 10th International Conference 'The Future of Education' (Florence, Italy, 18-19 June 2020). FILODIRITTO INTERNATIONAL - Filodiritto Editore. Available at: https://conference.pixel-online.net/FOE/files/foe/ed0010/FP/1774-GAME4746-FP-FOE10.pdf (Accessed on: 24-10-2022)

Souliotou, A. Z., Zoi, S. & Santorineos, M. (2020). (Co)creation & Interaction at the crossroad of art, technology & special education. Experimental workshop with the @postasis real-time multiuser collaboration platform. [Power Point Presentation video]. Available at: https://www.youtube.com/watch?v=gBT9-xxb9Ms&fbclid=IwAR2PWRInSfdXRZIIEj9_UVYsVqDpGWHxtcqXKh0fUobe5xO77uj95jtHONU (Accessed on: 24-10-2022)

Investigating the Process of Teaching the Creation of Interactive Art in a Collaborative Virtual Environmental Context

Maria Sounti
Department of Communication & Media Studies,
National & Kapodistrian University of Athens, Athens, Greece
maria.ssounti@gmail.com

Caterina Antonopoulou
Department of Digital Arts & Cinema,
National & Kapodistrian University of Athens, Athens, Greece
cat-ant@dcarts.uoa.gr

Penny Papageogopoulou
Department of Communication & Media Studies,
National & Kapodistrian University of Athens, Athens, Greece
pennypap@media.uoa.gr

Dimitris Charitos
Department of Communication & Media Studies,
National & Kapodistrian University of Athens, Athens, Greece
vedesign@otenet.gr

Louiza Katsarou
Department of Communication & Media Studies,
National & Kapodistrian University of Athens, Athens, Greece
lkatsarou@media.uoa.gr

George Anastassakis
Department of Digital Arts & Cinema,
National & Kapodistrian University of Athens, Athens, Greece
ganast@ganast.com

Due to the outbreak of COVID-19 pandemic, higher education institutes quickly turn to the use of online tools, radically transforming the modes of teaching and communication with students. This educational shift significantly affected the conduct of artistic laboratory courses, where physical presence is essential for students and teaching staff. In order to address this shift, the teaching staff for the laboratory course "Digital Artistic Creation 2", of the Department of Digital Arts and Cinema of the National and Kapodistrian University of Athens adopted a project-based learning methodology and used a combination of teleconferencing tools and multiuser 3D Social Virtual Environments, to teach the creation of interactive and possibly dynamically evolving 3D assemblages and spatial compositions. This paper presents a research study which aims at investigating the result of this teaching course with regards to the educational impact and the experience of the students. The study was conducted at the end of the semester with the use of

questionnaires delivered to the students in order to explore the learning experiences, outcomes and improvisation suggestions concerning this novel, combined form of teaching, as well as to detect the emerging collaborative and self-regulated learning patterns that emerged throughout the course.

Introducing combined metaverse XR experiences: when the Ionian Film Office also serves as a tourism location guide for Ionian Islands in Greece

Dr. Ioannis Deliyannis
Associate Professor, Ionian University - Dept. of Audio and Visual Arts, Greece
yiannis@ionio.gr

Dr. Andreas Giannakoulopoulos
Professor, Ionian University - Head of the Dept. of Audio and Visual Arts, Greece

Dr. Marina Markellou
Post Doc, Ionian University, Dept. of Audio and Visual Arts, Greece
markelloumarina@gmail.com

Dr. Iakovos Panagopoulos
Ionian University - Dept. of Audio and Visual Arts, Greece
info@iakovospanagopoulos.com

This case study describes our attempt to extend the reality of visitors of the Ionian Film Office, a public service inaugurated and supported by the Prefecture of Ionian Islands in Greece, using proprietary Metaverse environments. After the cash rebate regulation law, Greece became one of the most attractive locations to film in Europe. Film Offices is the first stop that a producer or a director makes in order to decide if their going to locate the production of their film in that place of somewhere else. The availability of metaverse environments offering advanced interactivity, supporting various types of interaction modes are important factors that allow virtual/physical collaboration to be realized. In this work we explore various developmental aspects that should be considered from different perspectives that include: adaptation of the intended interactivity scenario and use of the virtual space for other complementary purposes beyond its original intended use; various issues that commonly arise during collaboration as officials have to be present and interact in both the actual and virtual spaces with producers; designing for potential tourists or tourism office representatives who explore the available information gathered from a visiting-touristic perspective; the incorporation of various uses that include providing a shared visiting space for virtual exhibitions within touristic expos; the ethical and legal implications that arise. During the implementation of the project, the research team obtained copyright information on creative materials already existing outside the metaverse, such as paintings, photographs and other images used by the Ionian Islands Film Office as a physical space. For the creative material that is protected by copyright, we ensured copyright clearance, that is, we obtained the required authorizations to reproduce and share online the digitized material for the purposes of the project.With regards to ethical implications, the research team took into serious consideration the ethical challenges raised in a virtual immersive environment by acknowledging that the metaphor of a virtual activity may give rise to a very different digital crime than within the physical world. In light of the above, it was decided that the commercial activities

that require credentialed access to content and engagements will need to have a mechanism of verifying the identity for each user.

Immersive Narratives for the Old City of Chania: A Social VR system for virtual time-traveling in ten historic locations of Chania

Dr. Konstantinos-Alketas Oungrinis
Dean of the School of Architecture,
Professor of Architectural Design and Innovative Technologies, Founder / Director of the Transformable Intelligent Environments Lab (TUC TIE Lab), Technical University of Crete
kouggrinis@isc.tuc.gr

Marianthi Liapi
Architect, MSc , Research Program Director, Transformable Intelligent Environments Lab (TUC TIE Lab), Technical University of Crete
marianthi.liapi@gmail.com

The project was developed to promote the cultural wealth of the Old Town of Chania by presenting the evolution of its ten most historical locations in time through the use of innovative information and communication technologies. It is materialized through two installations:

1. An Environmental Social VR Projection System with interactive content installed inside the Sabbionara Gate that provides an Interactive Virtual Tour. This installation showcases the evolution of each one of the ten locations through time by focusing on more personal and interactive narration experiences for groups of up to 20 people.
2. A Projection Mapping installation on the facade of the "Mikis Theodorakis" Theatre Hall, a historical landmark building located on Katehaki Square at the Old-Port of Chania. It presents selected clips of the historical evolution of the Old City of Chania while highlighting the spatial characteristics of the building. This installation addresses wider audiences through the urban scale of the projection.

The concept guiding the representations created for this project was to emphasize the social and atmospheric aspect of each location, rather than the accuracy of the depicted historical settings. This was achieved through the application of a methodology developed at the Transformable Intelligence Environments Lab (TUC TIE Lab) consisting of three main directions. The first one involves the Visual Layering technique which identifies the semantic impact of the various components in a visual composition. With this technique, one is able to create a richer and more memorable immersive experience where people can imagine themselves participating in the scenes. The second one involves the aspect of the social context, for which the team collected anecdotal stories of the everyday life in each era. The database created includes recipes, announcements, market inventories, even local gossip, selected pieces of which can be heard or read while experiencing the scene. In this way, visitors create an augmented sense of participation in the life of the city's inhabitants and the events unfolding in front of them. In order to stimulate the emotional brain and provide a distinct atmosphere for every location per era, the third direction was created so as to involve sound and smell. Sound was designed to manifest sounds that could be heard at the time, tuned together with a thematic music piece. Smell was also crucial to enhance the sense of presence and was designed to

emphasize distinct odours, such as coffee, sea, trees, burnt wood, and so on. The project was installed during the fall of 2021. It was further fine-tuned and optimized until January 2022 and it is now operational.

Project video link
https://1drv.ms/v/s!AhpiXLg1E_Jal4ZoPa98BHuqfbFTuQ?e=yZXKzf

The End of Childhood

Angelos Floros

Assistant Professor, Ionian University - Dept. of Audio and Visual Arts, Greece
agelosfloros@gmail.com

The End of Childhood is an original artistic project, implemented for the exhibition "Symbols and Iconic Ruins' curated by Panayotis Pangalos. The exhibition was hosted from May 27 up to October 24 of 2021 at the National Museum of Contemporary Art, in greek known as EMST. The thematic of the exhibition gave to participants the motive to deal with the universal role of symbols in human civilization.

The project consists of two applications, the website (the reader) and the exhibition piece (the author). The terms reader and writer have been around since the early days of computers as a basic method of separating us. Are you a reader? Are you an editor? Rights are different. Roles also remain distinct in the early digital age in how we interact with data and information.

The idea, started, exploring ways in which people perceive and approach symbols as a communication language. In modern times the visual information becomes the most popular and sufficient method to transfer messages to general public. Symbols since the prehistoric years are not carriers of content, but traces of key-elements of our history.

A mobile friendly website has been created. The website presents a list of 80 key points in Modern History, according to the British Council's list of "80 moments that shaped the world", as they say. The 80 points are about pivotal moments that changed the course of modern history. Other similar lists of smaller size can be found on the internet, but with minimal differences. The list includes historical events, technological achievements, scientific discoveries and people with work of global scope that significantly influenced the current identity of human civilization.

The website visitor, using the symbols can approach each moment, to hear and read the related content. During the navigation, cookies stores to a database the following metadata: a) unique id for each user, b) selected items, c) active time on every selection. Those metadata store a non-iconic profile of human behaviour of the reader, giving answers to the following questions:

- How we interface with content. In our case the content was about the cultural history of the civilisation.
- How much time do we spent?
- How deep or superficial is our approach to information?

We know data as the alphanumeric value of a phenomenon, subject or object. Information is the designed meaning using specific data. Metadata is widely used by advertising companies as an anthropo-geographical map of human behaviour in our interaction with digital information. It spans a multitude of fields, such as commerce, politics, ideology, music, information, entertainment, etc.. The range is huge because it concerns both the signified and the signifier, giving data both about their preferences and about the method you follow during the selection phase. Metadata is a reliable map of human behaviour in XR environments

The exhibition piece acts as a documentary representative model of human behaviour with the website. In the exhibition piece, an algorithm reads randomly each entry of the database and generates one ballon for every symbol visit and it places the selected symbol as texture. The balloon remains on the sky as much time as the user spent on it. The text of the selected symbol is heard in the exhibition space along with the sounds of creation and destruction of the balloon.

The End of Childhood generates a meta-memorial of cultural memory of the Read and Write permissions (R/W) of human behaviour in the exhibition space along with the other exhibition pieces. The audio scape adds the Execute (E) permission as an augmented reality trace to visitors experience of the space.

Why "The End of Childhood"? Symbols and Historic Ruins help us to cultivate and grow our ideology and identity. Those data are important for our profile in order to form a cognitive model of our society. They make us mature, streaming us from childhood to adulthood and further to the next phase of our life. After childhood, we have all the necessary supplies to propose and generate new data important for the evolution of modern civilization detached from the burdens of the past and history.

Lessons From The Theatre: Digitally Generated Realities Through The Theatre Lens

Eleni Timplalexi
post doc, Laboratory Lecturing Staff member, NTLab,
Department of Communication and Media Studies,
National and Kapodistrian University of Athens, Greece
elentimple@media.uoa.gr

Theatre has pervaded the theory and practice of human-computer interaction (HCI). Laurel (1993) elaborated on this, concluding that both theatre and computers have to do with representation and involve some sort of performance. Following this rationale, digitally generated realities (DGRs) could also be said to resemble theatre. It is argued that the design of DGR may further benefit from an analogy with theatre, should it take into account some "elementary lessons".

In Laurel's analogy, computer users are said to resemble audience members that may get on the stage and interact with actors and props, hence have an impact on the evolving action. Hence, the author implies an "interactive", dramatic theatre performance paradigm, with distinctive but also flexible actor/spectator performative modes, taking place on a traditional stage, with an auditorium reserved for the audience. However, since at least five meanings of the term "theatre" are possible, one may focus on pretence rather than the spatial dimension of theatre performance. In such a performance, there is the simultaneous communication between actor and character (cognitive) and actor and spectator (in the physical world/cognitive), as well as between spectator and character (cognitive) and spectator and actor (in the physical world/cognitive). In this process, it is argued, the character is manifested as an interface outcome for the eyes of the spectator, a sole merged entity comprising both the actor as such and the character, a balance that may be challenged and lead to different grades of distance between the two elements of the theatrical representational interface.

If this finding was to be exported to the domain of HCI, the corresponding theatrical paradigm could be informed as a neo-dramatic (ludic, ergodic and dramatic) one, carried out in a navigable space rather than a stage, by performers that are simultaneously actors and spectators, and, most important, that it is a non-interactive theatre performance, capable of turning into interactive at times. Immersion, or the moment which Laurel describes as the physical involvement of the audience with the stage, actors and props, could then be informed as also comprising a phenomenally immaterial, cognitive investment from the part of the user, relevant to the level of fiction. Hence, HCI immersion is revealed also as a notion analogous to fiction, demarcating the passage from the sensorial to the semiotic, which allows the user not to tell the duality of the interface (hardware/representation). In this case, immersion becomes a synonym with mediation. DGRs are further challenged to incorporate in their design an invitation to users to actively trigger belief in the fiction of the representation, not necessarily in terms of spectacularity and information intensity. Meaning-making, after all, lies in the hands of the perceiver and surpasses the producer's intention and will, as extreme examples of the medial history illustrate (i.e. El Cid in his final ride).

Designing historical empathy into a shared cultural heritage VR experience

Dr. Akrivi Katifori, Dr. Maria Roussou, Christos Lougiakis and Athanasios Soulis
Department of Informatics and Telecommunications,
National & Kapodistrian University of Athens, Athens, Greece &
Athena Research & Innovation Center, Greece

Dr. Sara Perry
Museum of London Archaeology, UK

Kristen N O'Connor
University of York - Dept. of Archaeology, UK

Sebastian Vizcay, George Drettakis
National Research Institute of Computer Science and Automation (INRIA), FR

contact @ mroussou@di.uoa.gr

We present an immersive virtual reality experience in which pairs of remotely located participants collaborate in a virtual reconstruction of the UNESCO Neo-lithic site of Çatalhöyük in modern-day Turkey. The immersive experience has been explicitly designed as a social activity: together, participants enact some of the social practices (inferred through archaeological research to have been common) at Çatalhöyük, from artistic expression of group identity to home repair and burial customs, while engaging in guided exploration and conversation.

Our approach prioritizes historical empathy and sociality as part of an overarch-ing objective to achieve more meaningful user encounters within immersive cul-tural experiences. Drawing from insights collected through the participation of more than 50 users at different venues, in this presentation we highlight the challenges of designing experiences to support social interaction in heritage XR projects.

Links & Further Information
The VR experience demonstrated at the Art and Design of XR event can be downloaded from https://narralive.itch.io/catalhoyuk-vr

For more information about the Çatalhöyük VR experience see
https://www.narralive.org/catalhoyuk-vr/

Related paper: Katifori, A., Lougiakis, C., & Roussou, M. (2021). The Role of High-fiving for Sustaining Engagement in Social VR Experiences. In ACM CHI 2021 SocialVR Workshop. Yokohama, Japan. Retrieved from https://www.socialvr-ws.com/,

https://www.socialvr-ws.com/_files/ugd/3ad93e_bee65f192cf3482f914a1ca27564d7ec.pdf

Crafting an Xtended apprenticeship for the future

Dr. Polyxeni Mantzou
Professor, Democritus University of Thrace, Greece
polmantzou@gmail.com

Dr. Xenofon Bitsikas
Professor, University of Ioannina, Greece
xbitsikas@gmail.com

Anastasios Floros
PhD Candidate, Democritus University of Thrace, Greece

Aristeidis Panagiotidis Diktampanis
MSc student, University of Ioannina, Greece

The proposal seeks to present the experience of an ongoing project regarding the use of XR technologies for the preservation of traditional crafts techniques and the enhancement of the process of apprenticeship. Creative@Hubs: Holistic networking of creative industries via hubs, a GR-IT Interreg project, aims at safeguarding, valorising and passing on the quality of craftsmanship with the utilisation of digital technologies in order to guarantee a constructive future for crafts.

Crafts constitute a major part in the shaping of collective history and culture; in constructing collective identity; in strengthening the sense of belonging; and in relating us to past times and the generations that lived before us. They showcase the interpenetrating relationship between material culture and human beings. Artefacts and traditional objects are cultural products as they accumulate social, personal and cultural memory and knowledge, and they enable the articulation of self-identity in symbolic ways. The transmission and reproduction of traditional know-how is essential for safeguarding, valorising and renovating these cultural products.

The collaborative, slow, manual, additive and non-innovative nature of craftsmanship encompasses its cultural value in apprenticeship. Craftsmanship is performative, corporeal, relational, multisensorial and rooted in learning and making with others. Its empirical nature is based on methods such as learning by doing, trial and error and pregnant mistake.

Through the combination of old crafts techniques with cutting-edge new technologies, new dimensions and opportunities emerge for the preservation and restoration of cultural goods, as well as for novel, high-quality products and services and the creation of new professions. The use of XR technologies aims to integrate design and fabrication; cumulative knowledge and intelligent processing; slow manufacturing to immediate making; local production to global distribution, technology and tradition.

Creative@Hubs aims to extend craftsmanship and apprenticeship by exploring how digital toolkits, can facilitate crafts professionals to design and produce cultural goods and artefacts. Cutting-edge technologies, such as image recognition and machine learning (ML) application to detect material characteristics, knowledge representation schemas of 3D models, authoring tools inserted in VR and XR environments can assist and ease both the

training of craftspeople and the creation process of high-quality goods and services, while Blockchain could be used to enable the exploitation of pre-existing and new assets for protecting intellectual property rights and enhancing circulation.

As a result, crafts would be extended from collective to shared, from hands-on to interconnected, from cumulative to outspread. Their local character will be replaced by ubiquity. Applying digital technologies in a pervasive and explainable way can be the key that allows craft training to become attainable; production to be less challenging and exploitation to restore crafts economic viability. In the new condition of digital craftsmanship, crafts are transformed from a reductive process into a productive one. Our past, the culture of slow, embodied, conscious, collective knowledge, with our future, where technologies and tools can enable us to reconnect to the meaningful and lasting Mitsein (Being-with), that is, being and dwelling in the world, but in an evolving, enquiring, inclusive manner.
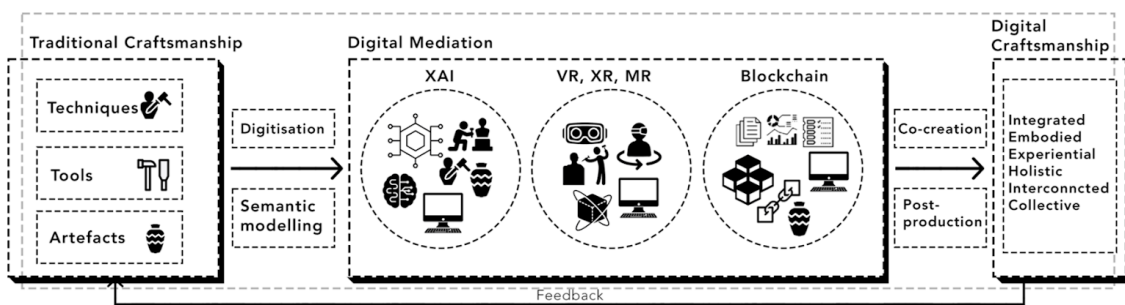
Figure 1. Creative@Hubs concept diagram

Ubiquitous Augmented Cultural User eXperience: content, interaction and context aspects

George Caridakis

Associate Professor, Intelligent Interaction research group (ii.aegean.gr), Department of Cultural Technology & Communication, University of the Aegean & Research Professor, Athena RC

gcari@aegean.gr

Current talk delves into three aspects of Cultural Heritage Digital Management and the respective activity by the Intelligent Interaction research group. Content in terms of data representation and management is approached via Semantic Web Technologies, while the User eXperience during the interaction is formalised towards a Cultural User eXperience (CUX) paradigm incorporating content, interactive technologies and methodologies and user analysis modelling. Regarding the technological aspect, emerging interactive instances are discussed and indicatively include Affective computing, Digital Storytelling, Gamification and Natural Interaction. Finally, the adaptive aspects of the interaction are presented and more specifically context-awareness approaches, regarding the Ubiquitous Augmented Cultural User eXperience, can be categorized in three main axes:

1. Cultural Heritage & Information
2. User Interaction
3. Personalized Experience with Context Aspects

Those axes are correlated, especially in the context of specific projects and applications' implementation.

Regarding data and knowledge representation, the research work of our group is focused on the study and development of ontologies and vocabularies for the production of semantic cultural data and their use in cultural applications for specialized users and the general public. In our spectrum of interests and research activities lies also the search and retrieval of cultural content, data integration, data mining and knowledge extraction, as well as Linked Open Data production. Intelligent Interaction group is developing web publishing platforms for cultural content collections on regional level, operating in full compliance with the national cultural aggregator and meta-aggregator (SearchCulture.gr and Europeana). We have been working with open-source software for the semantic enrichment and interoperability of cultural data following best practices and standards.

The second axe includes: affective computing, mixed/augmented reality, digital storytelling, digital serious games on the domain of education and culture heritage. Our research group focuses in designing and implementing augmented reality applications which display images and animation, as well as audio (narrative and/or audio background) in order to enrich the visit of a cultural space or/and point of interest. Furthermore, our research in Context Awareness (CA) focuses on the integration of CA characteristics in applications and devices of the IoT and its effect on human-computer interaction. Our focus is related to the preventive conservation and personalized cultural experiences. Finally, an additional research axis includes combining aspects of learning with the

playfulness of video for creating engaging game experience (GX) and maximizing user's motivation. The work done within the II group includes the development of serious games that focus on the trainees/users' cultural experience, with focus on such fields as the evaluation of the effectiveness of the playful approach and the contribution of the user's emotional experience.

Finally, our research group has worked extensively on typologies, techniques and methodologies of CUX for the augmentation of a user's participation during their interaction with cultural objects. We aim to go beyond the usability of a cultural product or system, investigating the attributes that could influence a user's positive experience when interacting with the system or product and this will lead to effectiveness of CH activities.

The three above axis have been combined recently in the research project "TRACCE", and the results are presented in this work. TRavelogue with Augmented Cultural and Contemporary Experience (TRACCE) project proposes an innovative approach that enriches and enhances the modern visitors' experience based on specific historic archives. This project offers cultural interpretation services that combine the visit of an area with the acquaintance of the historically recorded and the contemporary touring experience. It includes the design and development of an innovative diffuse platform of cultural routes with the integration of new technologies, such as Semantic Web, Digital Storytelling, Augmented Reality and Enhanced Cultural User eXperience. The results of the project, based on the 3 axis analyzed above, are the following:

1. The representation of the domain of historic and contemporary travelogue experience has led to the Identification and conceptualisation of three interrelated areas: travelogue, travelogue application and cultural Heritage collections. Our research group faced this challenge by reusing the CIDOC CRM ontology and developing a new ontology (the TRACCE Ontology)
2. TRACCE project proposed the combination of digital storytelling with physical tours in order to enhance the historical touring experience, with the use of organized data based on ontologies.
3. To augment cultural user experience in TRACCE, we adopted the McKercher typology in order to create the profiles of the cultural visitors and recommend personalized content.

THEMATIC 2

XR AS A CREATIVE MEDIUM - STATE OF THE ART AND DESIGN OF XR

Combining extended reality and brain-computer interfaces: Towards new applications of EEG in art and the field of visual interaction experience

Konstantina Vetsiou
PhD Candidate, Department of Visual Arts,
Athens School of Fine Arts, Greece
koniv7@gmail.com

Digital art creations present a form of hybridization, incorporating mechanisms from other areas, such as science and technology. Technological advances in processing power, immersive technologies, tracking and sensory equipment are changing the nature of the produced experience, allowing intuitive approaches. Extended reality technologies along with bio-measurement technology, which allows for an immediate access to a person's biofeedback data, may provide new approaches of creation, interaction and outcome interpretation.

Certain consumer-based immersive technology headsets are now using physiological sensors, including eye-tracking, electroencephalography etc. In recent years, more affordable portable EEG devices have been developed. Brain–tracking mechanisms can be used for the creation of artistic experiences, but also as a tool for additional interaction between the participant and the work (i.e. as a neurofeedback loop or controller intervening as such in the work), even allowing for data recordings of the experience (i.e. measuring reaction to an experience).

Based on the above, different case studies developed in the scope of my PhD dissertation with the title "The effect of the visual form in the mental state of the immersed participant. Utilization in experimental scientific tools for emotional management by the use of Virtual Reality" (Supervisor: Prof. Manthos Santorineos). One of the case studies concerns the creation of a system which allows real-time filtering and recording of the brain frequencies while it allows for the raw filtered data, through a scenario that was created in the OpenVibe BCI software, to be streamed into the virtual reality creation program. This system can be utilized either by an artist or a researcher (for artistic or therapeutic approaches) to implement it into their work for tracking and recording the participants' response for further analysis or either the brain activity to be transmitted into a feedback loop. In the other case study, a neurofeedback system, that tracks subjects' electrical brain activity and alters the virtual reality environment accordingly, was created. The subjects receive real-time feedback which enables them to perceive their own brain activity and engage to the experience with themselves through self-regulation of their own activity, such as in a neurofeedback training. For each experiment, different values were linked via code to different triggers and there were visual adaptations representing the user's performance as feedback. Last but not least, my latest experimentation concerns the recording of brain activity of viewers exposed to image properties like primary colors and evaluate as such the effects of image properties on viewers inside a virtual reality experience. Focusing on the study of image through the field of Art in combination with EEG technology can provide essential observations and conclusions for the further development of this area.

Concluding, cooperation between artists and researchers in the fields of cognitive science and technology may provide new perspectives into art practices. Extended reality tools alongside brain-tracking mechanisms are challenging and promising fields for new modes of creation, interaction and assessment. With the development of the technology, reduction in cost and increase in comfort of use and easier implementation, brain-tracking tools along with extended reality systems will be available to a greater public and to a wider range of fields, privacy and data protection issues however should be taken under consideration.

System of real–time brain recording, filtering of raw EEG data

Neurofeedback Prototype System
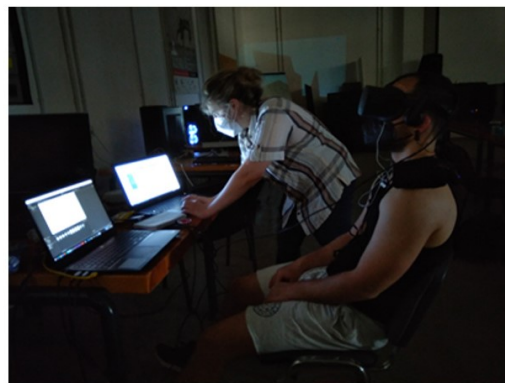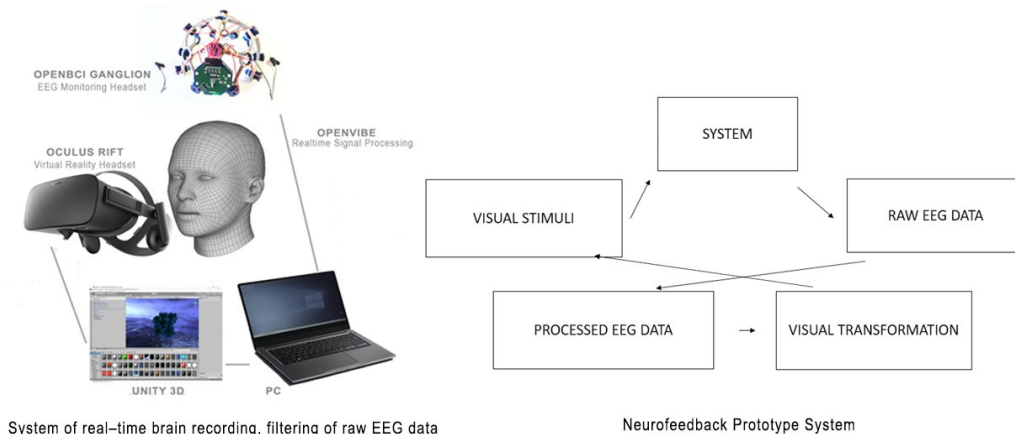
Brain activity recording while exposure to color stimuli

References

Nijholt, A. (2019). Brain Art: Brain-Computer Interfaces for Artistic Expression: Springer International Publishing.

Vetsiou, K., Zoi, S., Santorineos, M. (2022). Enhancing virtual experiences through the stimulation of the brain: emerging case studies in the field of higher art education. In 17th International Conference EUTIC 2022 - In the intersection of art, science and technology: Dialogos between humans and machines. (to be published in the proceedings of the EUTIC Conference (Corfu 2022))

Vetsiou, K., Zoi, S., Santorineos, M. (2022). The use of low-cost EEG devices in digital arts education. In DCAC 2022 - 4th International Conference on Digital Culture & AudioVisual Challenges. (to be published)

Composite extended reality environments and emerging areas of creative experimentation

Dr. Stavroula Zoi
Laboratory Instructor, Multimedia Laboratory,
Athens School of Fine Arts, Greece
voula.zoi@gmail.com | vzoi@asfa.gr

The framework of contemporary eXtended Reality (XR) technologies, mainly Virtual Reality (VR) and Augmented Reality (AR), and their convergence with the world of games, allow for new areas of creative experimentation, as well as merging with traditional practices. Composite system architectures emerge that highly affect the workspace of the creator, the production process, and the communication of the produced artwork.

The issue of reading and writing acquires a new dimension, with aspects which are both constructional and performative, as XR spaces enable the development of complex conjunctions between technologies and humans.

Different cases of reading and writing in composite XR environments are presented, developed between 2012-2020, in the scope of research projects of Athens School of Fine Arts (Multimedia Laboratory, Greek-French Master "Art, virtual reality and multiuser systems of artistic expression", in collaboration with University Paris-8, Scientific Coordinator: xProfessor Manthos Santorineos).

A series of experimentatios on the use of games' worlds for writing and reading is reflected in the artworks This is not a game, 2012, a multiuser art game which unfolds within a conceptual 3D world of words [1] (Figure 1), and Epilogi in Crisis, an art game in which players read the written choices and decide through their direction of looking (Figure 2), in order to solve a crisis. [2] [3]

The issue of whether XR constitutes a single space for studying contemporary reading and writing was the main subject of the PhD dissertation, developed by Anna Meli, under the title: Scripture and Image, The Evolution of The Substrate-. From the Space, To the Object, To The Paper, And The Return To The Contemporary Space Of Virtual Reality, supervisor: Prof. Manthos Santorineos, Athens School of Fine Arts, March 2021. [5] Important features of the writer-reader-substrate relationship were identified and analyzed (e.g. orientation of characters, legibility and perspective, scale, body involvement in the reading process etc). Experimental studies of different cases of writings in 3D spaces (Figure 3), highlighted the need for further specifying a tool, which enables the writer to be immersed into the writing space. [6]

In Figure 4, two indicative cases of organizing archival information are illustrated, developed in the context of the research program Helping the Revolution, supporting the creation of a Greek state. From the unknown stories of 1821 (funded by Hellenic Foundation for Research and Innovation, Coordinator: Athens School of Fine Arts). A composite peformance was created, combining reading, theatre, virtual reality and computer games concepts and tools, aimed at the narration of a part of the history of the Greek Revolution of 1821. [8] [9]

Concluding, the issue of reading and writing inside XR spaces is not yet exhaustively investigated. Systematic research is required, as more and more human actions are being transferred inside such spaces.
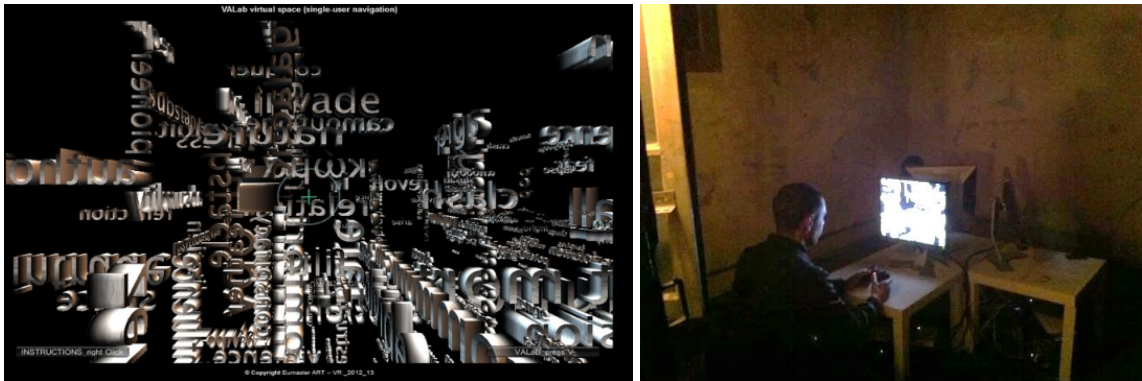

Figure 1. This is not game, multiuser art game developed collaboratively by students and teachers of the Greek-French Master, Academic Year 2012-2013.
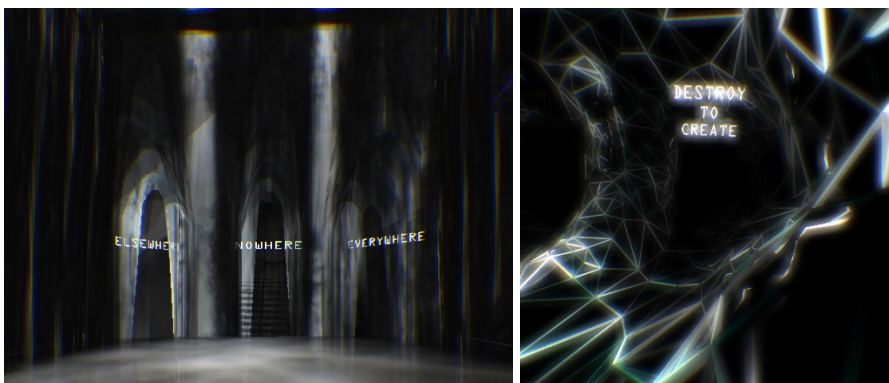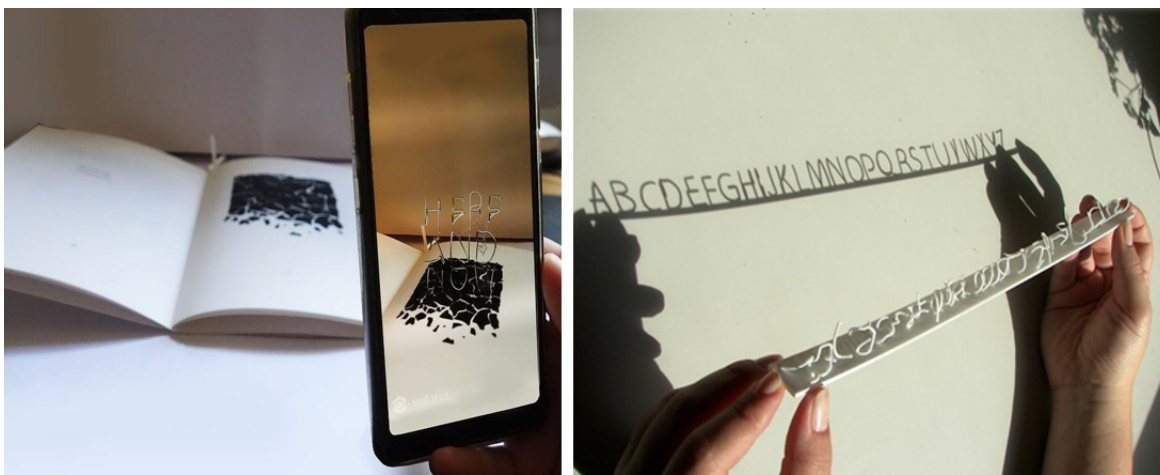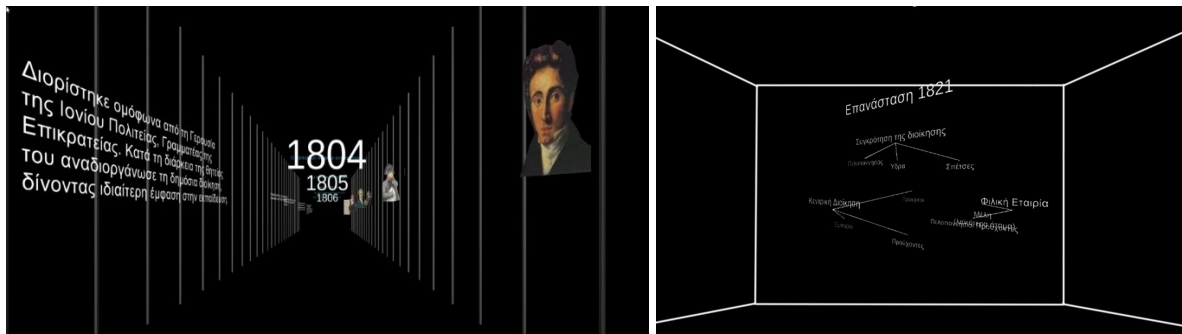

Figure 2. Epilogi in Crisis, art game developed collaboratively by students and teachers of the Greek-French Master, Academic Year 2013-2014.

Figure 3. One Step Away, Augmented Reality book with 3D font, ©Anna Meli, 2018. The reader has to find the correct angle in order to be able to read the 3D text.

Figures 4a, 4b. Cases of organizing archival information, in the composite theatrical performance, developed in the scope of the research program Helping the Revolution, supporting the creation of a Greek state. From the unknown stories of 1821.

References

1. This is not a game, multiuser art game, exhibited in the context of the International Exhibition Thesis@Metamatic: Taf, by Create an accident, 28 March 2013, Athens, Greece (https://vimeo.com/63048045)

2. From the monologue of mass media to the dialogue of new media in the information society. The interactive narrative of digital games as a case study of crisis, Manthos Santorineos, Stavroula Zoi, Nefeli Dimitriadi, John Bardakos, Maria Velaora, Arguro Papathanasiou, Vicky Tselepidou, International Digital Storytelling Conference, Digital Storytelling in Times of Crisis, Athens, May 8-10, 2014 (http://dst.ntlab.gr/)

3. Επιλογη in Crisis. Manthos Santorineos, Stavroula Zoi, Nefeli Dimitriadi, Taxiarchis Diamantopoulos, John Bardakos, Maria Valaora, Arguro Papathanasiou, presented as demo in the IEEE Virtual Reality (VR), 351-352, 2015, 23-27 March 2015, Arles, France

4. Επιλογη in Crisis presentation (https://www.youtube.com/watch?v=ZtL_K8IF4bo)

5. Γραφή και Εικόνα, η εξέλιξη του υποστρώματος. Από το χώρο στο αντικείμενο, στο χαρτί και η επιστροφή στο σύγχρονο χώρο της Εικονικής Πραγματικότητας, Άννα Μελή, διδακτορική διατριβή (Επιβλέπων: Μάνθος Σαντοριναίος), Ανώτατη Σχολή Καλών Τεχνών, 2021.

6. Contemporary possibilities of writing text in the three-dimensional digital environment, Anna Meli, Strand, On Architecture 2021, Facing the future – new challenges, 9th International Conference and Exhibition, Belgrade, Serbia, December 2021

7. The ontology of the on-line performance and a case study: the multiuser performance "Space Xouth. Social experiment in multiple dimensions", Manthos Santorineos, Stavroula Zoi, Digital Research in the Humanities and Arts (DRHA) 2022, 4-7 September 2022, Kingston University, London, UK.

8. https://unknownstories1821.wordpress.com/

9. Η επίδραση της εξελιγμένης τεχνολογίας σε μια νέα μορφή αφήγησης της ιστορίας. Μία σύνθετη προσέγγιση ανάμεσα στην ανάγνωση, το θέατρο, την εικονική πραγματικότητα και το videogame. Μάνθος Σαντοριναίος, Μάνια Παπαδημητρίου, Σταυρούλα Ζώη, προς έκδοση σε συλλογικό τόμο του Ινστιτούτου Ιστορικών Ερευνών.

New directions in Interactive XR Dance performances

Spyros Vosinakis
Assistant Professor, Department of Product and Systems Design Engineering,
University of the Aegean, Greece
spyrosv@aegean.gr

Marina Stergiou
Department of Product and Systems Design Engineering,
University of the Aegean, Greece

Dimitris Baltas
PhD Candidate, Department of Product and Systems Design Engineering,
University of the Aegean, Greece

Recent advances in motion capture, digital characters and cloth animation provide a large and promising design space for interactive dance performances in eXtended Reality (XR). Visualizing dancers' movement in real time can lead to solutions that inspire choreography, experimentation, learning and improvisation in dance practices. Using motion capture systems, varying from motion capture studios and depth cameras to VR controllers and trackers, or even simple cameras with the help of Machine Learning techniques, we can design tools for chorographers to use during the preparation of a performance as well as during its presentation. Features like timing effects (slow motion or delay), different mappings on humanoid or non-humanoid characters, triggered behaviors, and external control of the system's behavior can augment live performances with dynamic content, such as digital dancers and computer-generated visuals and soundscapes. Additionally, digital costumes, dynamically simulated in real time, can shape new experiences in digital dance, such as the creation of novel, inspired or even unimaginable costumes, acting as metaphors for the mover to interact with. Cloth animation and simulation can lead to digital costumes, following the body's motion, with realistic appearances. These pre-rendered or real time simulations can act as tools for experimentation and movement reflection, used in movement research.

Some early works of our research group towards interactive dance performances in XR include: a) a mixed reality dance performance with digital characters, where the dancer's motion was captured in real time and digital dancers recreated the choreography (video 1), b) a methodology for the creation and visualization of simulated cloth motion in immersive environment as precomputed motion or in real-time (Figure1), c) a user study that tests how avatar appearance and clothes affect user movements in immersive VR dancing environments, and d) the use of wearable biosensors for the analysis of audience satisfaction during a dance performance.

Finally, we introduce a novel framework for authoring, executing, and evaluating interactive XR performances (Figure 2). A performance can be presented in a virtual environment or a mixed reality space if the motion data captured from the dancer(s) is transmitted to a server and then used as a basis to create a choreography consisting of physical and digital dancers. Character animation, real-time cloth animation and a set of rules (pre-scripted or triggered in real time) that apply motion transformations can

produce the virtual choreography, and then transmit it in real-time to a fully virtual environment in a preconstructed scene, or to a mixed reality space to augment the physical dancer(s). In the latter case the visualization can take place through projections or projection mapping, or using dedicated devices, such as mobile phones or AR glasses. AR anchors can be a useful tool for defining the position of multiple virtual elements in the physical space. Finally, the audience could also provide appropriate feedback through wearable sensors, that might evaluate the performance or even affect the choreography in real- time. We present a first implementation of the framework, where a performance consisting of a real and several virtual dancers is presented in multiple mobile devices in real-time.

Project Links

Video1: A Mixed Reality Dance Performance by Dimitris Baltas

Video 2: A user study about avatar appearance and clothes in immersive dance experiences

Video 3: A first experiment of the proposed framework using the Kinect sensor, mobile AR and Cloud Anchors
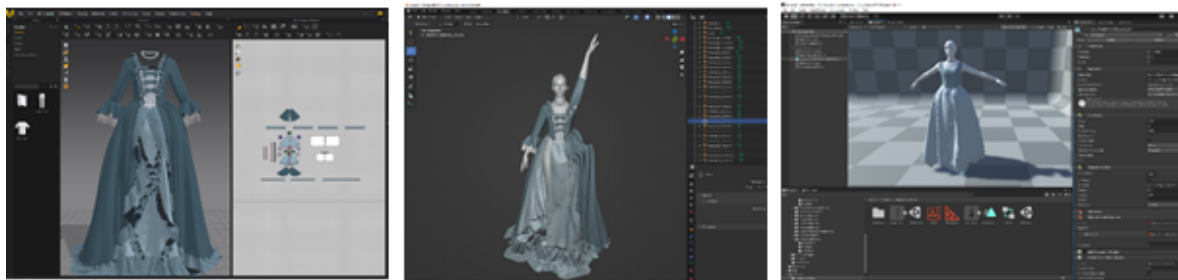
Figure 1. The process of creating a virtual costume and animating it in real-time
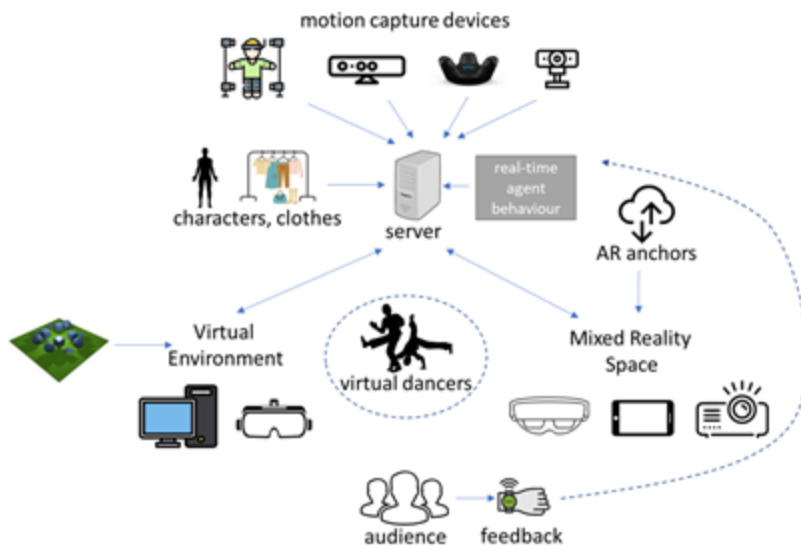
Figure 2. A proposed framework for interactive XR performances

A study of inserting images into a poetry book in an Augmented Reality environment: the experimental project "After the Fire"

Penny Milia

Dr. Anna Meli
annimeli@gmail.com

Actualizing a persistent wish and love for innovation and experiment, in Art and Technology, as they co-form and develop in our era, in interdisciplinarity and aesthetics, the poet Penny Milia and the visual artist and Ph.D. researcher Anna Meli worked together to create a poetry book with an equally powerful visual, namely digital, imprint. That's how the poetry digital artbook After the Fire came up, the first poetry book in Greece utilizing Augmented Reality technology. The cover of the book and the six images are enriched with original three-dimensional art, both visual and textual, that come alive, both in Greek and in English, through the screen of a smart device via the application available online. This project was made in the context of the PhD research of Anna Meli in Athens Scholl of Fine Arts, entitled "Writing and Image: the Evolution of the substrate; From Space, To the Object, To The Paper, And The Return To The Contemporary Space Of Virtual Reality" and it also got a scholarship by the State Scholarships Foundation (IKY). With the valuable help of Dr. Stavroula Zoi, it was published in January 2022 by Kapa Ekdotiki, Athens. The initial idea was to add visual material to all the poems in the collection, and the reader could scan with the camera individual words. But the realization of this idea highlighted other parameters that play an important role in the process of augmenting a text, which are mainly related to the limits of the device. These include the difficulty of the device camera to focus on very small areas, also considering the similarity of certain words to be distinguished (e.g. love / loves). Since the book is something very tangible, the physical space that could be used for three-dimensional objects was very limited. Also, when the device was moved away from the printed word, then due to distance and lack of focus, it could not be recognized. Trying to target whole sentences instead of single words, another important issue appeared: with the detection of the texts only, the boundaries of the page could not be accurately predicted. Great attention was given to the visual rhythm: it is ritualistic, dreamy, and archetypal, both in the material itself, and to the movements and timing, creating a habitat, that does not simply frame meanings and words but transforms them into shapes and visualized symbols, in an organic relation with the poems in a cinema rhythm, like optical sound. Although the augmented illustrations were three-dimensional objects, most elements were based on a two-dimensional logic, like drawings cut out of paper and extended into space, as note-objects. Each page was treated as an independent scene and had to be controlled and re-evaluated after each change in its creation process, from every possible aspect that the reader can view it. This "augmented illustration" can be considered as a form of film or stage-directing, somehow connected to the concept of theatre and performance.

Artist: Dr. Anna Meli & Poet: Penny Milia, Programmer: Dr. Stavroula Zoi

Project Links

Website: https://pennymiliawriting.com/en/after-the-fire/

"After The Fire" project video:
https://www.youtube.com/watch?v=3vVsLtc-4Cc&ab_channel=AfterTheFire

TECHNO-LOGIA Hub | Research Dissemination Hub on Art in a Techno-Logical Society

Giannis Koukoulas
TECHNO-LOGIA Hub Project Coordinator,
Department of Theory and History of Art, Adjunct Faculty, Athens School of Fine Arts
gkouk1969@yahoo.gr

Manolis Simos
Department of History and Philosophy of Science,
Adjunct Faculty, National and Kapodistrian University of Athens

Kostas Ioannidis
Department of Theory and History of Art, Associate Professor, Athens School of Fine Arts

Aristotelis Tympas
Professor, Department of History and Philosophy of Science &
Affiliate Professor, Dept. of Digital Arts and Cinema,
National and Kapodistrian University of Athens

The interrelation between art (τέχνη, technê) and technology (τεχνολογία, technologia) constitutes a fact of the contemporary cultural condition. Nowadays, all too often works of art are composed and communicated with the use of different, multiple and complex technological configurations, while aesthetic and artistic elements are constitutive of current technologies.

TECHNO-LOGIA Hub aims at the dissemination of research on the relation between art and technology, through a series of innovative approaches and initiatives, such as lectures, seminars, workshops, and in situ discussions, along with an online platform, accessible to each individual user. The hub is funded by the Hellenic Foundation for Research and Innovation, and is implemented by the Department of Theory and History of ART (Athens School of Fine Arts) and the Department of History and Philosophy of Science (National and Kapodistrian University of Athens).

With a view to develop and foster collaborations in a series of fields, the present paper aims to communicate the diverse hub initiatives to artists, scientists- technologists, professionals, and all those related to and interested in the interrelation between art and technology.
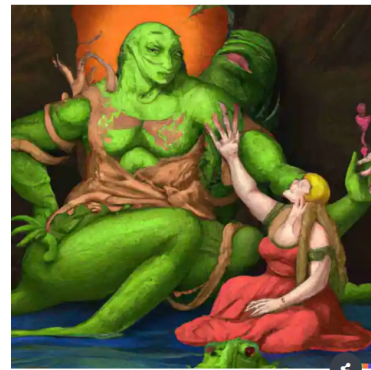
Project Links
TECHNO-LOGIA Hub website: https://techno-logia.gr/

Project presentation: https://www.youtube.com/watch?v=uSbT41QKJAM

The Project Team consists of: Dr. Kostas Ioannidis, Associate Professor, ASFA (Primary Investigator) | Dr. Giannis Koukoulas, Adjunct Faculty, ASFA (Project Coordinator) | Dr. Aristotelis Tympas, Professor, DHPS | Dr. Eleni Gemtou, Associate Professor, DHPS | Dr. Maria Papanikolaou, Adjunct Faculty, ASFA | Dr. Klea Charitou, Adjunct Faculty, ASFA | Dr. Manolis Simos, Postdoctoral Fellow, DHPS | Dr. Anastasia Doxanaki, EDIP, DHPS | Dr. Katerina Dermitzaki, EDIP, DHPS | Dr. Marilena Pateraki, Adjunct Faculty, DHPS | Aspasia Kandaraki, PhD Candidate, DHPS | Giannis Karadimas, MSc, ASFA | Kostas Manousis, Computer Engineer, ASFA

THEMATIC 3

CINEMATIC VIRTUAL REALITY - IMMERSIVE CINEMATOGRAPHY

Remembrance: Magma

Chanee Choi
cchoi8@uw.edu

Remembrance: Magma is a 3D animation displayed in an immersive video installation that addresses the imaginaries of a mind as it is dying of dementia. The work was exhibited at The Jack Straw Gallery in Seattle through a solo show in April to June 2022. Remembrance: Magma incorporates machine learning, cutting-edge research on the aging brain, East Asian crafting aesthetics, and Korean shamanic traditions as it examines the nature of the brain as a sensor that desires data even as it slowly fails. Culturally intersectional, Remembrance explores world-building through the poetic and painful processes of memory degeneration.

The goal of this project is to explore more deeply the nature of dementia, beyond simply its medicalization. It seeks to provide a lens through which the confusion and suffering of our loved ones with dementia can be experienced as something as beautiful as it is excruciating. In preparation for the likelihood of my own early onset dementia, I have developed a poetic understanding of the process which finds an aching beauty in degeneration. The narrative of Remembrance, is a rumination on the inevitable chain of family and disease, centering first on my mother in Korea before moving back through our matrilineal heritage- her mother and her grandmother both of whom also had dementia, and then at last it moves into the present, to me.

Oedipus In search of Colonus

Loukia Alavanou
moving image artist and filmmaker
loukia.alavanou@network.rca.ac.uk

The VR360 film "On the way to Colonus' is shot at the toxic wasteland of the Thriassion Plain in Aspropyrgos, western Athens, at the spot where the Romani ghetto of Nea Zoi is currently located. The film takes as its starting point Sophocles' highly overlooked tragedy 'Oedipus at Colonus', in which blind Oedipus is presented as an aged 'political exile' from Thebes who passed from the same location where Nea Zoi stands today, on his way to Colonus of Athens. The hero was seeking asylum and permission to be "buried", not unlike many Romani people living in Greece today that often straggle to secure the official "burial' of their relatives by the state. Sophocles description of Oedipus' grave was a "bronze-footed threshold to the abyss", a description symptomatically similar to the sight of the endless metal scrap recycling fields that populate today's Thriasian Plain.

The installation of the exhibition "Oedipus in search of Colonus" at the Greek Pavilion at the 59th Venice Biennale" has been based on the "Posture chair for digital projections and Immaterial environments", by the Greek -highly overlooked- futurist architect of the 60's Takis Zenetos. A hybrid version of Zeneto's chair, designed in collaboration with Dimitris Korres, was spread in the pavilion in 15 pieces, on which the VR360 was experienced. There are more than one allegorical connections between the "cloud Colonies" of Takis Zenetos as part of his envisioning of his "City of the Future", and the reality I experienced in the Romani ghetto of Nea Zoi. "Νέα Ζωή" means, paradoxically, "new life" in Greek. Yet, no matter how toxic and marginalized the dumpsite of the ghetto is, there is a certain "lightness" deeply rooted in the Romani, nomadic way of life, not unlike a "cloud colony".

Zeneto's Cloud colonies were portrayed as places in unbreathable atmospheres, as a reaction to escalating uncertainties about the continuation of life on earth. In that sense, both these "Cloud colonies" and the Romani ghetto that is literally built on 'recyclables', are deeply ecological in the way they relate to "materiality". After all, Zeneto's Urbanism suggested that the atmosphere is built vertically in an Electronical city, with the aim to abolish the problem of land ownership. This abolition is at the core of the Romani culture in a way that could be exemplary for the rest of the Western world. A characteristic example is the way the Romani people of Nea Zoi relate to 'electricity' itself: Given that the Greek state is unable to provide benefits for the basic survival needs of the Romani families, while the workers of the electricity companies would be too overwhelmed to enter the dangerous zone of the ghetto, the Romani people "steal" electricity directly from electricity poles, creating their own kind of web of "electronic urbanism".

Furthermore, the presentation explored nostalgia for the "collective" experience of cinema, and what a VR cinema could mean today. Like the inhabitants of Zeneto's cloud colonies, visitors at the Greek Pavilion were "alone and together" at once, while the exhibition has been questioning how the VR space can be utilized as a space to explore mourning for dying technologies, like cinema. Last, the presentation examined what it means to produce a VR cinama in a context of a Mega Show such as Biennale Arte.

Figure 1. Still from "On The Way to Colonus", VR360, Loukia Alavanou, 2021, produced by VRS, The first edition of "On The Way To Colonus" was powered by Onassis Culture and is part of the Onassis Collection ©loukiaalavanou

Figure 2. Photo - Jacopo Salvi, Courtesy La Biennale di Venezia.

Figure 3. Photo - Jacopo Salvi, Courtesy La Biennale di Venezia.

Narrative research as practice: a methodology of curating

Christiana Kazakou

PhD Candidate: Digital Art & Technology (2018-2023) i-DAT.org,
University of Plymouth, United Kingdom School of Art, Design and Architecture
Funded by UKRI, AHRC Arts and Humanities Research Council
curating.art.science@gmail.com

During this presentation, I will discuss the process of a methodology that was designed in 2019 during the research residency at Blast Theory's studio in Brighton, UK. By de-constructing a set of processes, practices, case studies, initiatives & ecosystems; it looks at 'spatial' perspectives; where those synergies shape and the possibilities of creating a hybrid co-existence by using 'narrativasion' to convey meaning and social reform between variables that suggest possible worlds.

Blast Theory make interactive art to explore social and political questions. The group's work places the public at the centre of unusual and sometimes unsettling experiences, to create new perspectives and open up the possibility of change. Research findings and projects from the collective's long-standing collaboration with the University of Nottingham's Mixed Reality lab will be presented. The core concepts for exploring the collective's multi-spatial practice have been five elements: action, reflection, process, people, and form by investigating their creative process from the microsystem – mesosystem to the macrosystem.

By rehearsing mixed methods, I navigate performative and digital citizenship through participatory systems of representation, modes of collaboration, technology politics and philosophy, and alternative vocabularies of interpretation within the art and science discourse.

Websites
https://www.blasttheory.co.uk

https://www.bloodyminded.org

Videos
Blast Theory: artists-in-residence at World Health Organization | Contagious Cities - YouTube

Bloodyminded by Blast Theory | Trailer - YouTube

Research Links
https://i-dat.org/christiana-kazakou/

http://3d3research.co.uk/student/christiana-kazakou/

XR - Cinema - Game - interactive narrative. The need to define boundaries or a new unconditional narrative. The experiment of the art exhibition in the cinema Alphaville

Dr. Manthos Santorineos
Director of Fournos Lab of Fournos Multivalent Communication Network,
x Professor of Athens School of Fine Arts - Multimedia - Hypermedia Lab, Greece
msantori@otenet.gr

This paper communicates an experience that was basically centered on the process of dialogue between old and new media. However, the central axis in the whole process was the "language". It is the exhibition – installation that took place in December 2021, at the old Alphaville cinema a cult cinema in the center of Athens, highly regarded by cinephiles, in the 90s – 2000s. The exhibition was titled Artificial Intelligence or The New Alphaville, but the word outweighed the word "artificial", almost eliminating it. It was dedicated to Godard and his film ALPHAVILLE (1965).

In the movie, ALPHAVILLE, the city of Alpha, is a city ruled by the supercomputer ALPHA and the scientist who created it. With this idea (the intelligence of machines) as a central axis, I dare, with great respect for Godard, create a dialogue between his film and my own digital works: artificial intelligence then and now, but also the media, the technologies of artistic expression then and now.

The "time", specifically the difference of 65 years between the two works, makes it possible, by means of tools of today's digital culture, to propose another reality for machine intelligence that Godard would probably have agreed with.

It is the point and moment when dialogue takes place between, on the one hand, the concept of Godard's supercomputer, the thinking machine of a disturbed scientist who desires another order of things, upset by humans, and, on the other hand, contemporary powerful personal computers or computational mechanisms, a Promethean gift, in my opinion, to anyone, if they are willing to use it creatively.

All areas of the cinema building were transformed into extended reality structures where viewers were invited to enter them and experience the past, the present and the future that, according to the exhibition, belongs to them, if they are ready to claim it.

THEMATIC 4

DISTRIBUTION & BUSINESS ASPECTS OF XR

Defining the new age of training with Verdu, from RnD to market

Tom Kolokithas
Chief Innovation Officer at DTMH & President of VR&AR GR Chapter
kolokithas.thomas@gmail.com

VR technologies build new brain rules and play with our senses to convincingly transport us to any environment by interpreting it as a new world. Within this context, skill-building must catch up with the rate of technological progress.

During educational experiments with complex structured tasks, groups trained with VR outperformed groups that used classic training methods, especially when it came to reducing errors during task performance. Moreover, motor skills are acquired through real-world experience and that is what VR training actually does: it resembles real life situations. On-the-Job performance is enhanced as VR trainees demonstrate more cognitive capacity for processing interfering tasks during a real operation.

Taking the above into consideration, DTMH created the VERDU brand, a smart, powerful and innovative VR learning solution, offering a blended, experiential learning curriculum and addressing the modern challenges of corporate training. Verdu and its family of products, such as Verdu Solo & Verdu Bespoke, were created with the purpose to help small businesses and blue-collar workers bridge the communications gap with equal knowledge and less effort.

MAIN CHARACTERISTICS

EFFICIENT: Verdu offers an immersive learning experience where trainees can interact with their environment in a simple, yet powerful way.

TRANSPARENT: Verdu's reporting platform provides a variety of statistics, reports and trainee data in order to evaluate all aspects of the learning program.

CUSTOMIZABLE: Verdu comes in a fully customizable environment that can be branded according to the specific needs of an organization and meet any CI demands.

BENEFITS

Revolutionary employee training with immersive learning experiences that help trainees acquire new knowledge and skills, offering a higher level of engagement and understanding, by building muscle memory.

Enhancing empathy, creativity & critical thinking.

Offering a broad variety of skills within each trainee.

Focusing on short, "stackable" self-driving courses.

Using free gamifications [e.g. Kahoot] to verify the knowledge retention & measure the effectiveness of the training program.

Saving training time & money.

DESIGN PRINCIPLES

COMFORT: no more than 20mins, monoscopic.

EASE OF USE: UI principles from e-commerce, multiple choice verification question.s

AFFORDABLE: integrate Samsung Gear VR, 2d studio recording for content.

VERDU Solo: a Greek innovative product that solves the problem of long and expensive professional seminars & courses. Verdu Solo uses VR technology for fast and effective training of frontline workers. It is the most cost-effective solution on the European market that combines a package of 9 ready-to-use trainings of different professional disciplines and skills and 5K equipment of the latest technology:

1. Health & Safety

2. Basics of sales

3. Personal Skills

4. Learn & Observe

5. Floorboards

6. Waiter Training

7. Warehouses & Handling

8. How to run a sustainable business

9. Corporate Social Responsibility

VERDU Bespoke: with Verdu Bespoke and in collaboration with our specialized team, you can create your own custom-made training programs, from prototyping to scaling. Our team will create custom content (360° photo & video) with engaging storytelling, suitable to your training purpose and goals, for a specific function or process of your business. Additionally, they will liaise with your IT and Operations team to ensure successful deployment and a great end-to-end user experience.

THEMATIC 5

IMMERSING THE AUDIENCE IN THE XR EXPERIENCE AND AFFORDING THE AUDIENCE PARTICIPATION

Gaming the Past

Dr. Manolis Patiniotis
Professor of History of modern Science and Technology,
Department of Sociology, National and Kapodistrian University of Athens, Greece
mpatin@soc.uoa.gr

For almost two centuries, academic history has been the meticulous examination of the (usually written) remnants of the past with a view to reconstructing the causal sequences that led to particular historical events. However, as a consequence of such an approach, a great part of the past was always missing from historical narratives. The possibilities that were not realized and, thus, not invested in the then future events were entirely disregarded or barely mentioned for the sake of historical complexity. The assumption that will be made in this presentation is that history is both the realized and unrealized possibilities of the past. And the most appropriate way to build such a perspective is to employ digital technologies that enable the re-enactment of the potentiality of the past. Quite unexpectedly, these technologies have long been used in the machines of fantasy: Historical games and Alternate Reality Games. What happens, then, when gaming crosses paths with the archive? Which are the historiographical challenges that arise from our ability to take advantage of the navigation techniques and open-world maps of the virtual realm? And how do these challenges affect both the self-image of academic history and the perception of historical time by the individuals?

Evaluation of two artistic installations in live performances through user experience : artistic interactive installations case study

Dr. Panayiotis Kyriakoulakos
Assistant professor of University of the Aegean,
Department of Product & Systems Design Engineering
pank@aegean.gr

Anthie Kolokotroni
PHD candidate, University of the Aegean,
Department of Product & Systems Design Engineering
anthiekoloko@gmail.com

Genovefa Chatzimenoikou
Graduate of University of the Aegean,
Department of Product & Systems Design Engineering

The present paper is focusing on the evaluation of two artistic installations to draw conclusions regarding user experience from both a technological and an aesthetic point of view. The works, presented and analyzed here, are based on modern technology which is developed in the first case via an interactive installation that combines the performing arts of dance with holographic projection and is entitled "The other me", and in the second case via an interactive audiovisual installation that combines live music performance and animated graphics with the use of arduino, and is entitled 'imusicWALL'.

The first work is an artistic digital installation that enables the audience to watch a dance performance in real time. It takes place in a specially designed interior space, which covers the needs of the installation with main components being the computer, speakers, projector and original elements designed for the specific application (panels, pyramid and other decorative elements).The installation enables a passive interaction of the work with the public, inviting them to move in the space to come up close with, with the real dancer and to watch the digital holographic projection while walking around the perimeter.

The second project is an interactive installation that offers an audiovisual experience to the guests / participants of a live music performance. It is a modular spatial installation, which requires an "empty" interior space or an existing specially designed one, in which the necessary media objects can be installed (projector, speakers, seats, computer, midi and led strips). In addition, the participation of a musician / performer who directs the music and the image live (video projection) in real time is fundamental, as well as the presence of an audience, which can intervene with its movements, causing some changes in the image (video projection).

During the evaluation of the above installations, the dynamics of technology within contemporary art are analysed and presented: According to the types of interactivity presented by Cornock and Edmonds (static, dynamic-passive, dynamic-interactive, dynamic-interactive varying) both installations are considered dynamic-interactive

varying, as they allow modifications from humans as well as from a software program. Respectively, according to the 5 dimensions interaction theorized by Gillian Crampton Smith and Kevin Silver (1D words, 2D visual representations, 3D physical objects / spaces, 4D time, 5D behavior), in the first installation four of the five dimensions of interactivity are observed, while in the second the three. Finally, according to the types of interactivity presented by Yvonne Rogers et al (guidance, conversation, manipulation, exploration), in the first installation the exploration is included, while in the second are included only the manipulation and the exploration.In addition, the installations were prototyped and then the behavioral and physiological measures, the self-report measures and the success of the work were examined. The results of the evaluation showed that both projects proved to be understandable and simple to use, evoked feelings of curiosity, intensity and fun, the overall atmosphere was dynamic and harmonious and finally in terms of the technology's performance, it proved to be fully functional. According to the results of the evaluation of the artistic installations, the users considered the experience positive and attractive and led to some issues for further consideration regarding the installation of the systems and the user experience.
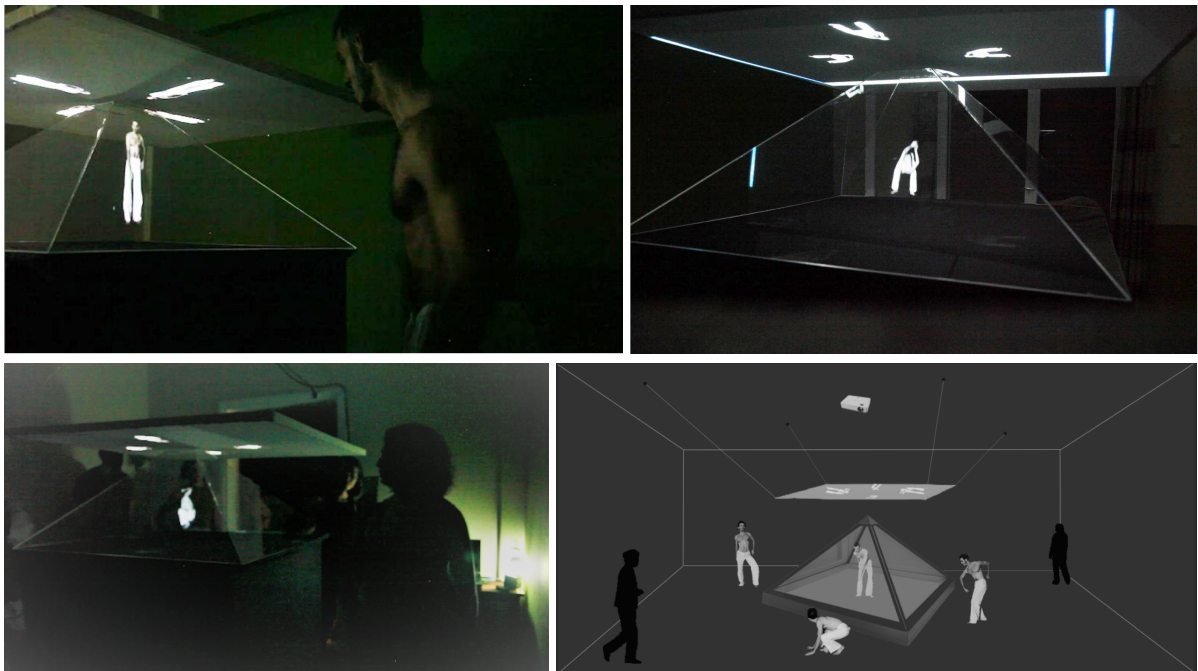
Figures 1a,1b,1c,1d. The other me
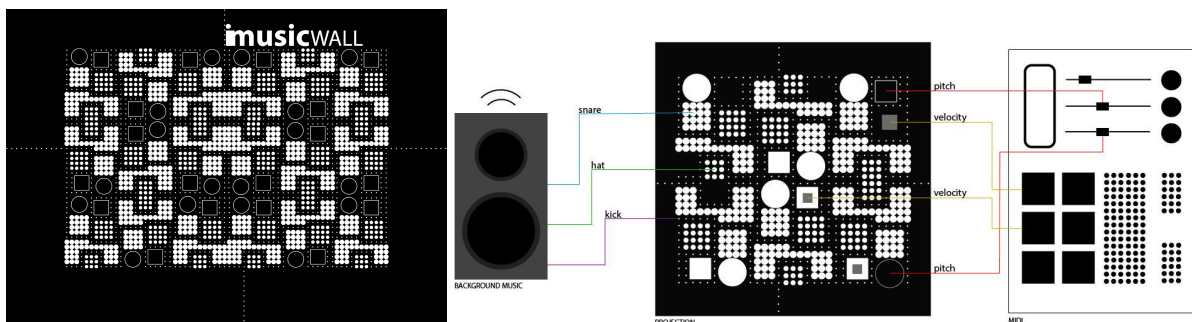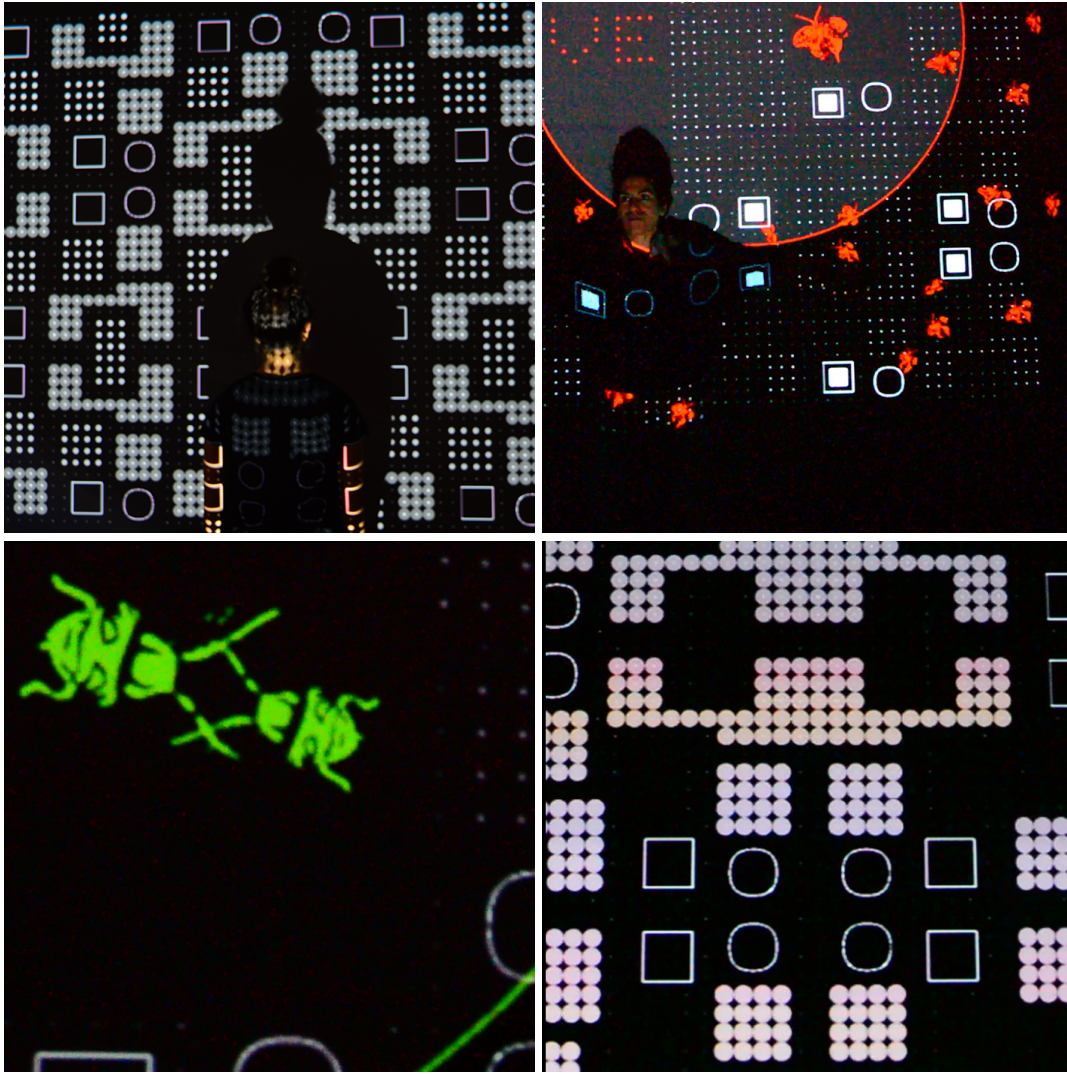
Figures 2a,2b,2c,2d, 2e, 2f: imusicWALL

XRaying the city's past

Dr. Polyxeni Mantzou
Professor, Democritus University of Thrace, Greece
polmantzou@gmail.com

Dr. Xenofon Bitsikas
Professor, University of Ioannina, Greece
xbitsikas@gmail.com

Anastasios Floros
PhD Candidate, Democritus University of Thrace, Greece

Aristeidis Panagiotidis Diktampanis
MSc student, University of Ioannina, Greece

The proposal seeks to present the experience of PALIMPSEST, a GR-IT Interreg project, where extending the reality of the city is attempted through the insertion of art installations that refer to, document and reconstruct stories and events of the city's past. The project aimed at the creation of an augmented, multi-layered and enriched museum experience in the open urban space, by using digital technologies and co-creation methods. The project is based on the understanding of the city as a palimpsest, where the city's public space is reconstructed by its time layers that are overlaid making visible the vertical time development of the city.

Artists, architects, software engineers, archivists, educators collaborated in a participative and engaging process in order to revive hidden and even lost layers of the city's Immaterial Cultural Heritage and extend the reality of the present by activating its co-existence with the past. PALIMPSEST extends the urban space in a way that digital and physical spheres concur, creating an immersive merge of fiction and reality. There are no fixed roles, as spectators and protagonists alternate and interchange, blending everyday life with art, thus blurring distinctions and categorisations.

The project was set in three distinct, but interconnected phases. The first phase was about the creation of an archive, with the participation of schools and trans-generational collaboration. Students found stories related to the city's past, from elder people in their familiar environment. Then they transcribed, tagged, and archived them. In the second phase the collected material was uploaded on a digital mobile Application. The users can search for stories using filters; add stories and comments and suggest links among them. They can also use the Booth, an integrated tool in the App, in order to automatically produce animated visualisations of their narrated stories. The App and the Booth constitute tools that help the city's past extend on virtual spheres. In the last phase, PALIMPSEST focused on the creation of art installations in the urban space. Artists selected stories from the archive and then they reinserted them in their original location as art installations. These settings, activated by visitors, are interactive and multi-sensory, with no visible footprint in the urban area.

PALIMPSEST proposes a different museum experience, immersive, personalised, open-air and extended in the city's public space, not in an enclosed building. Exhibits are re-contextualised, re-inserted in their original place, as they are transformed from objects to events, spontaneous and not programmed, creating an evanescent, dreamlike atmosphere. The museum's authority is questioned as it becomes more participatory and the traditional bisection between curators and spectators is defied. The public can post-produce with different media, co-curate and disseminate the content of the museum in a ceaseless creation process of recycling, reusing and remixing cultural assets.

PALIMPSEST extends time through the preservation, merging and co-existence of different time layers; time linearity is abandoned as extension is developed. Consequently, traditional classifications are reconsidered; continuities are restored; interesting assemblages are facilitated; and the complexity of the city's experience, which was sometimes lost, is now restored.
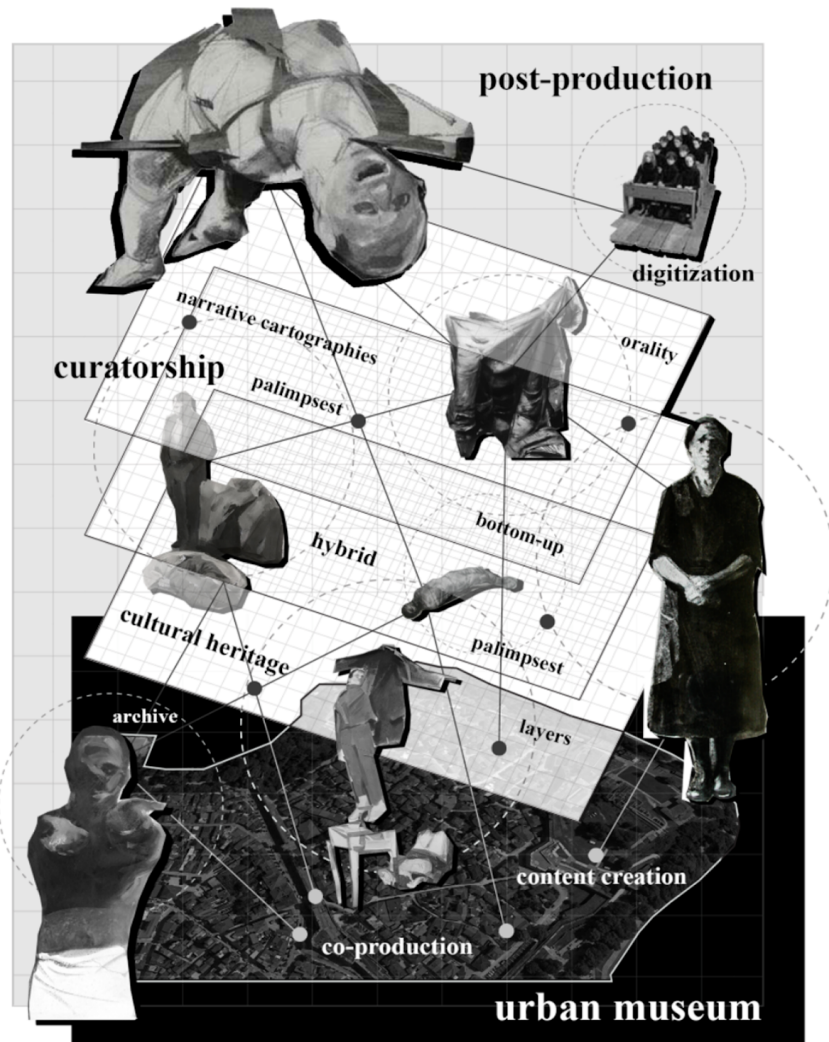

Figure 1. PALIMPSEST's concept diagram

Figure 2. Example of PALIMPSEST's art installations

Visiting an ancient Athenian home within a multi-visitor, multi-sensorial eXtended Reality storytelling experience

Dr. Maria Roussou, Katerina El Raheb, Dimitris Nastos, Athanasios Soulis
Department of Informatics and Telecommunications, National and Kapodistrian University of Athens, Greece

Dimitris Christopoulos, George Sofianopoulos, Katerina Servi, Kleanthis Zoumpoulakis
Foundation of the Hellenic World, Greece

Lucas Katsikaris, John Parcharidis, Sakis Rogkas, Hara Sfyri
Bolt Virtual, Greece

contact @ mroussou@di.uoa.gr

In this talk, we present the design and reflect on the challenges of creating a multi-user, multisensory eXtended Reality experience in an informal learning context. The XR platform has been installed at the Hellenic Cosmos Cultural Center of the Foundation of the Hellenic World in Athens, Greece and the ap-plication is currently undergoing formative evaluation.

The XR experience is designed for groups of up to 5 users who partake in a guided storytelling scenario inspired from daily life in Classical Athens. Visitors may choose their own character and assume the roles of guests invited to the household of a middle-class pottery maker/merchant in Ancient Athens. The group enters the XR experience in a specially constructed physical space that matches the walls of the virtual house. Greeted by their virtual hosts, visitors are able to physically walk around the house (even ascend to the upper story), in-teract with the virtual characters, smell the food being cooked, pray to the gods, and generally interact with virtual and physical objects by using their actual hands and gestures.

Our aim is to leverage such an interactive, social and participatory multi-sensorial experience, combining historical accuracy in representation with dra-matic storytelling, to enhance knowledge about the past, historical empathy, and resonance.

The BRIDGES project is novel in the integration of various off-the-shelf hard-ware components; a proprietary location tracking and synchronisation system for the movement of the players in the physical space; and the proprietary software of the platform. It is envisaged that the platform, after the conclusion of the pro-ject, will be utilised in developing XR experiences that will fuse the physical and the virtual world, allow movement and interaction between large groups of play-ers, and expand the boundaries of

what a shared experience looks-and feels-like within a merged physical/virtual environment. Art, edutainment, vocational training and gaming are some of the sectors that have been identified by the BRIDGES project partners as the most promising.

The Athenian House experience was jointly developed by the Foundation of the Hellenic World, Bolt Virtual and the National and Kapodistrian University of Athens.