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SHAPING THE FUTURE

Repertoire of Best Practices

Shaping the Future - 101055789

Deliverable n. D3.1

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DELIVERABLE FACTSHEET

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Abstract (for public dissemination only)	In this document, we define the group of people we refer to as 'Visual Artists', we show the spectrum of digital skills and competencies, map the digital skills relevant to Visual Artists, and show internal and external best practices on digital skills pieces of training.
Keywords	Best practices; tools; methodologies; digital skills; competences; visual artists.

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ACRONYMS AND ABBREVIATIONS

ACRONYM	DESCRIPTION
CA	Consortium Agreement
STF	Shaping the Future
SG	Steering Group
EC	European Commission
DT	Dissemination Team
GA	Grant Agreement
PC	Project Coordinator
WP	Work Package
DGCOMP	Digital Competence Framework for Citizens
JRC	Joint Research Centre

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2. Introduction

2.1. Scope of this Document

This document intends to lay down the technical foundations of the Shaping the Future projects. Shaping The Future is an international project, co-financed by the Creative Europe programme of the European Union, conceived during the Covid19 Pandemic, aimed to foster the capacity of young visual artists and designers to imagine and shape the future through visual arts, design and critical thinking by using the most recent technologies and digital methodologies. The core concept behind the project is that if we can't shape multiple images of the future we won't be able to change it.

The main objective is to create and validate a model to support designers and visual artists in the production of futuristic projects while enriching their competences related to digital technologies and methodologies.

In this document, we define the group of people we refer to as *'Visual Artists'*, we show the spectrum of digital skills and competencies, map the digital skills relevant to Visual Artists, and show internal and external best practices on digital skills pieces of training.

With this document, one can understand the technical scope and relevance of the Shaping the Future project, and one will also be able to understand the background of content decisions of the project team.

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2.2. Intended Audiences for this Document

This document is public in order to serve as a supporting document for understanding the Shaping the Future project training and methodologies.

2.3. Tools and Methodologies used

During our work, we used the following tools and methodologies: desk research interviews and curricula overviews. We started our work by finding and settling on a broad, general reference for digital competencies. Parallel to this we collected digital skills and tools that are well-known to our technical experts, describing the relevance of each group of skills and tools. We then compared the two lists to find the areas we are most competent and the competency areas that are most relevant to us. The next step was to narrow down the skills and tools relevant to visual artists. Parallel to the skills and tools research we collected training modules from the consortia partners, as examples for training methodologies. The most relevant modules were then further investigated and described in this document on a best-practice level.

3. Digital Skills and Competences Needed by Visual Artists

In this chapter, we define the term *'Visual Artists'*, show an overview of studies on digital skills, and review the skills already covered within the consortia partners' curriculum and/or portfolio.

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3.1. Who Are We Considering *'Visual Artists'*?

Target audience is an important factor to consider when designing a training curriculum. It helps to determine the positioning of the content and study modules so that they are tailored to meet the needs of the target audience. Therefore, defining the group of *Visual Artists* is crucial to develop useful content and study plans within the Shaping the Future project.

For the training programme development, we defined Visual Artists as **artists or designers who create, or work with, pieces of art, artefacts, objects, or products with relevant visual qualities.**

3.2. Mapping Digital Skills and Competences

Competences, skills, and attitudes are often mixed up or used interchangeably. In fact these have different meanings, thus referring to significantly different concepts. It is therefore useful to define and differentiate them, to situate the purpose and context of this documentation and the Shaping the Future project in general.

Competences refer to a combination of procedural knowledge (skills, or the ability to carry out processes), factual knowledge (or explicit knowledge), and attitudes.

The Shaping the Future project's goal is to provide a modular support path utilising the best available digital tools and methodologies to improve visual artists' digital skills and

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competencies. To fulfil this goal, the research should focus on the wider concept of digital competence.

The most comprehensive and relevant reference for digital competencies in the EU is the Digital Competence Framework for Citizens, or DigComp in short, a Science for Policy report by the Joint Research Centre (JRC), the European Commission's science and knowledge service. Its current version when writing this documentation is 2.2, however, the latest version is available through its website:

https://joint-research-centre.ec.europa.eu/digcomp_en

DigComp provides a thorough framework and a map for digital competencies, which was used as a reference for the Shaping the Future project team to overview the spectrum of digital competencies.

The DigComp doesn't define the scope of our study, but it serves as a reference to position our search results and expertise in the landscape of a wide spectrum of digital competences. Therefore, it is necessary to define a group of competences on a level lower than those defined in DigComp, that reflect the capacities and experience of the consortium members. As a first step, we collected the study modules relevant to digital tools or competences (Annex 1). We then collected the digital tools consortium members teach or train for or with (Annex 2).

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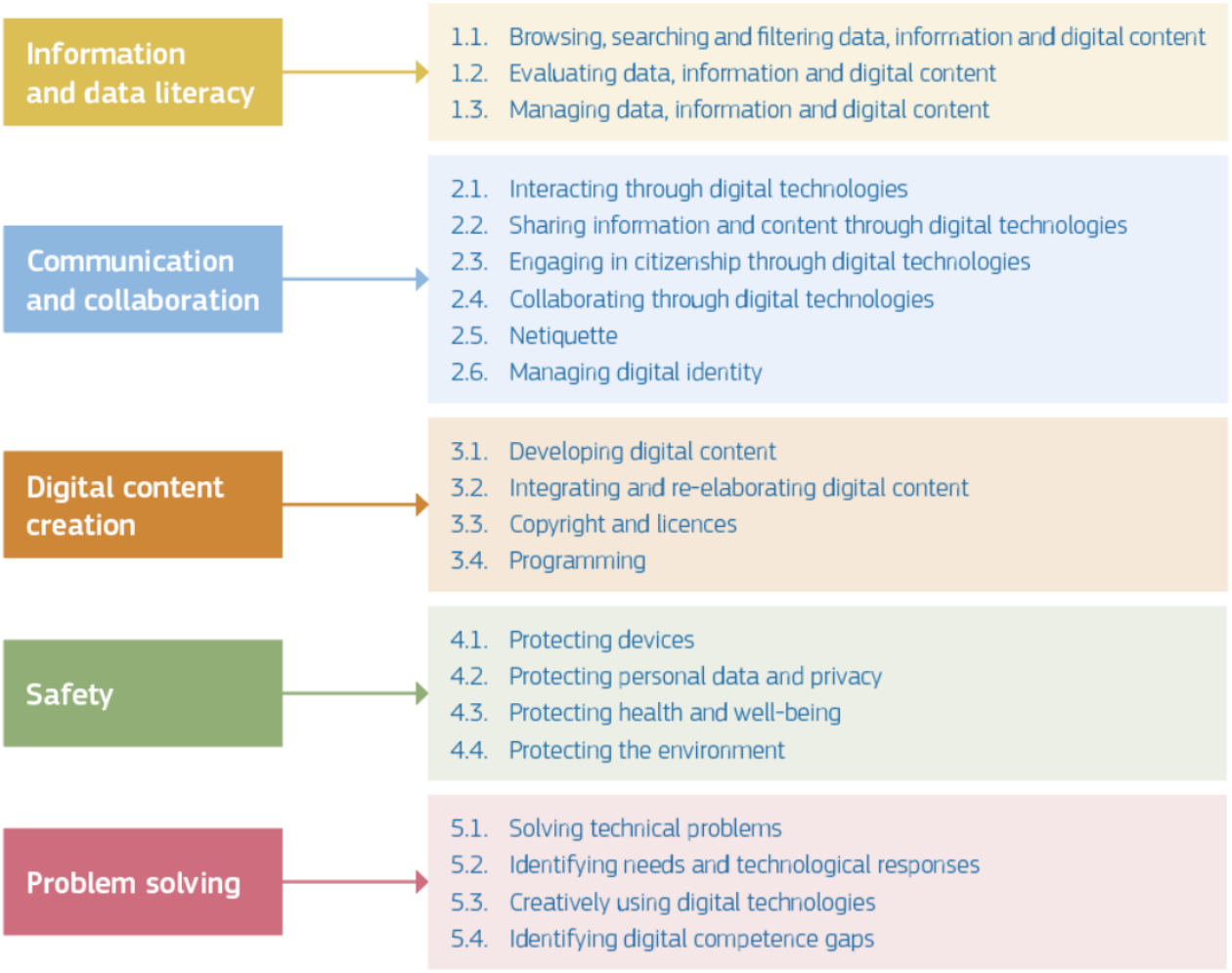

Figure 1: The DigComp Conceptual Reference Model – Source: DigComp 2.2

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3.3. Competency areas

Based on the study modules (Annex 1) and the skills (Annex 2) we identified the main competency areas that are unique to the consortium partners and highly relevant to visual artists.

3.3.1. Interaction design

This category covers competencies that deal with human-machine and human-object interaction, including visual, tactile and audio interactions.

3.3.2. Design through virtual and material objects

The competence to use tools throughout physical and virtual spaces to solve visual arts-related challenges. For example: 3d-scanning an artwork, modify it in a virtual space and use digital manufacturing (e.g. 3d-printing) to re-create a physical representation of it.

3.3.3. Creation with Generative Algorithms and AI

Practical knowledge and methodologies that enable students to use generative algorithms and AI to solve creative challenges.

3.3.4. Digital manufacturing

Skills and knowledge of using digital manufacturing machines and the connected software, such as laser cutter machine, CNC milling machine, 3D-printing machine, etc.

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3.3.5. Crypto & Art

Using blockchain technology in art, and practical skills to create NFTs.

3.3.6. Game design tools in art

Using game design platforms and game engines in artwork.

3.3.7. Immersive experiences

Creation of experiences in immersive spaces with AR, VR or MR technology.

3.3.8. Graphic and 3D design software skills

Software usage skills, mostly designer software, general skills on software for design development (e.g. CAD).

3.3.9. Digital media crossing with physical space

Extending media art to physical space with projection, mapping, physical interaction, robotics.

3.3.10. Sound design

Competences related to sound and audio experiences.

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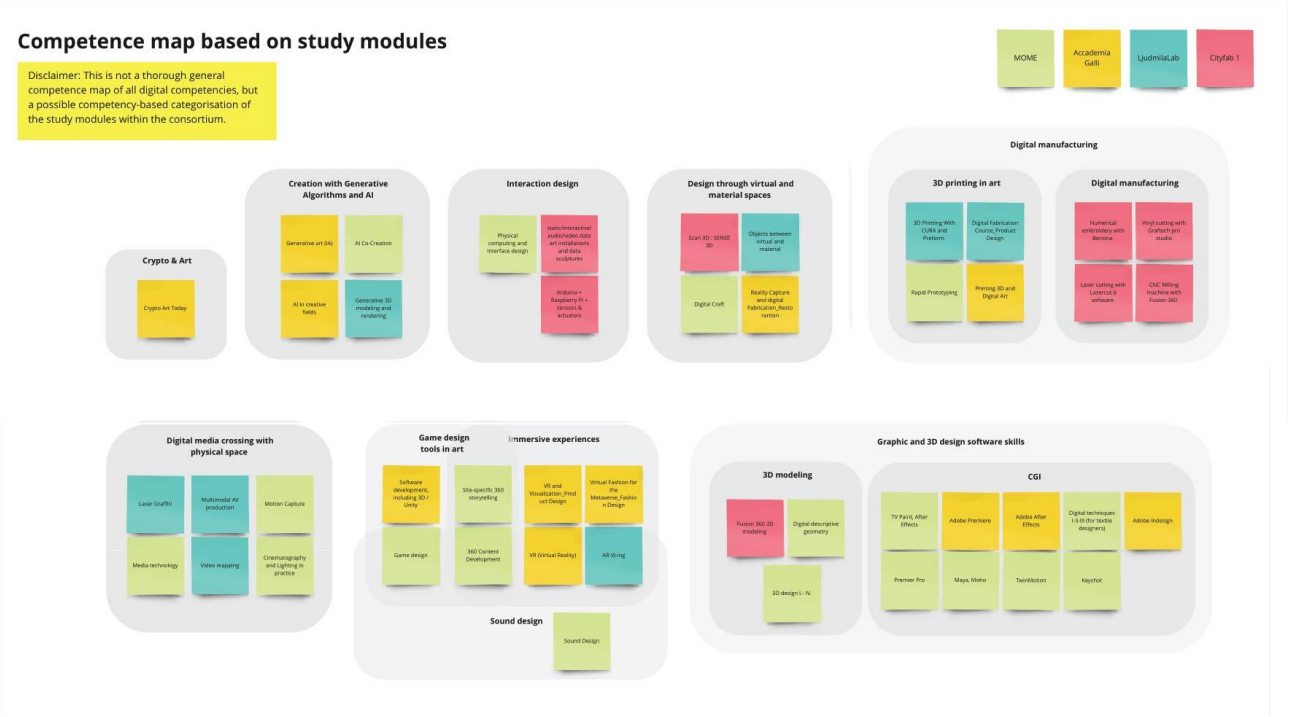

Figure 2: Competence map of the Shaping the Future consortium members based on study modules (see Annex 3)

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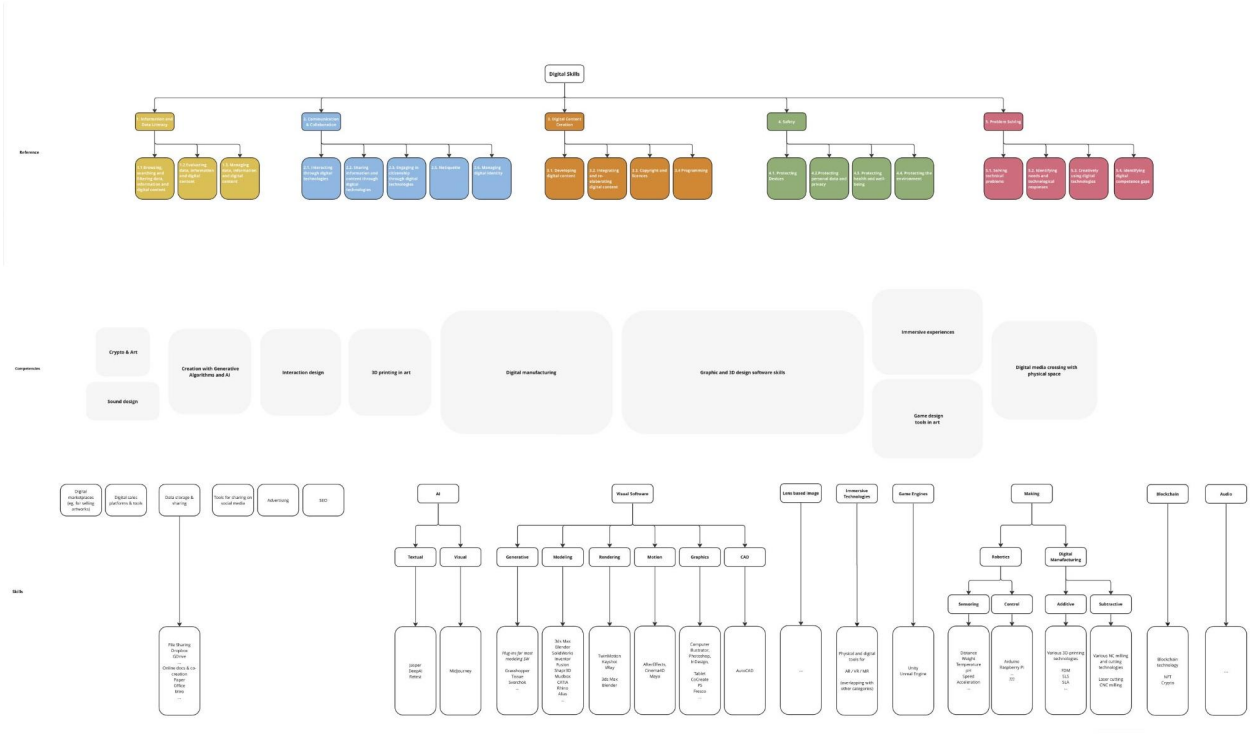

Figure 3: Skills collected by our expert team connected with the competency areas of DigComp – Source: STF MOME Team (See annex 4)

3.4. Criteria for modular support path and call for artists

The call for artists will focus the selection criteria on these parameters.

– Participants should be 22-35 years of age

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– A background in art practice and/or education

– Artists should be resident in one of the EU member states or EU candidate countries.

We assume participating artists to possess the following basic digital skills

– Basic digital literacy[1]

– Intermediate level in office softwares (text editor, presentation)

– Intermediate level in at least one professional software relevant to their field (e.g. Illustrator for graphic designers, Photoshop for photographers and visual artists, etc.)

Modules should be developed to fit the following requirements:

- Maximised output in least amount of time.
- It should focus on providing competencies spanning through analog and digital areas.
- Technical skills taught in the training should have a low entry threshold and use software tools that are well documented and open source or low cost to provide post-training self development opportunities for participants.
- Modules should be eye-opening for the artists and should have a noteworthy result for the art community and the public alike.

[1] Green Paper: Digital Literacy

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- Modules should avoid focusing on software usage only, or theoretical factual knowledge only. Such skills and knowledge should instead always be paired with practical activities.

4. Best practices

4.1. *LEVEL UP* - Game Design + Physical Computing (MOME)

Artistic use of programming, critical approach to technology and experimentation through play - all hallmarks of Creative Coding - have always been some of the main selling points for students applying to the Media Design programme at MOME. Creative Coding is a nebulous term however, touching everything from generative art to human-computer interactions. Usually two courses, Game Design and Physical Computing would take care of these separately, but during the spring semester of 2022 a great opportunity arose to have them combined, leading to a fun and complex design experience for the participating students and tutors alike.

The main objective of the combined courses, now running under the name LEVEL UP, was for each student to design and build a functioning game and a physical controller

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matching their in-game universe, and collectively present them to the public during an exhibition held at the end of semester. There was no predefined theme, students were free to explore their ideas. Based on the short timespan and freshly acquired skills, emphasis was placed on the fun of creation rather than on the perfection of execution. The only limitations were technical in nature, defined by the arcade machines to be built with the students at a later stage.

For the 12 weeks of the semester, the two courses ran concurrently, with about ⅔ of the time allocated to Game Design and the remaining to Physical Computing. In addition, the semester was roughly divided into 3 sections dedicated to ideation, experimentation and execution respectively, but due to the wide range of ideas and complexity, it was maintained mainly on a per student basis.

The first, shorter section was spent on identifying and narrowing down ideas based on complexity, viability and an overall feel of attractiveness, while also trying out games matching the theme and genre.

The second, main section was dedicated to acquiring a wide range of knowledge necessitated by the complexity of the project, with emphasis on breadth rather than

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depth. This section was also responsible for focusing and simplifying the projects further.

Through Physical Computing classes, the students managed to:

- learn soldering, construct simple circuits
- acquire rudimentary programming skills in the C++ language
- get familiar with the Arduino environment, and have their device function as a keyboard / mouse / joystick
- discover multiple methods of sensing input, both from simpler sensors like buttons, potentiometers, light dependent resistors, touchpads, vibration/tilt sensors, reed switches (magnetism), and more advanced sensors like laser time of flight, colour-gesture, sound, breath, human presence

Through Game Design classes, the students managed to:

- get familiar with the Unity game engine
- create and use 2D and 3D assets with the help of quick guides provided or knowledge acquired during previous courses
- build 2D and 3D environments

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- acquire rudimentary programming skills in the C# language and Unity's built in node based visual scripting language
- make interactive scenes with game logic
- identify and apply common game design principles encountered through their own gaming adventures or example games provided

Apart from skills and knowledge closely linked to Game Design and Physical Computing, an introduction to digital manufacturing, namely 3D printing and laser cutting were also included in the course to aid the construction of the game controllers.

By the end of this stage, each student had a simple but working game controller and several interactive virtual environments they could use as a template for their final project. Students were also encouraged to do research, find tutorials fitting their needs to complement the breadth with depth where necessary, but individual tutoring and consultations were also employed for the same reason.

The third, most intense section was focused on reaching a playable state as soon as possible. A major challenge was directing participants to focus on function first, and looks later without hampering creativity. Meanwhile, the custom arcade machines

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were assembled as well with the help of the students, something that would act as a common goal linking the so far individual projects. The arcades also acted as a small sidetrack exploring upcycling and obsolete media technologies, since they were converted from discarded and disassembled CRT monitors, lending an authentic and retro arcade feel for the final outcome.

By the end of the semester each student had a finished game with genres ranging from platformers through visual novels to open world exploration games. Depending on the game idea, each student constructed a fully functioning game controller either built from the ground up or a found object adapted to their needs. During the exhibition, the controllers would also act as a teaser and a launcher (by plugging them in the arcade machines) for their respective games.

While the stated goal of the semester was to have fun through experimenting and get a feel for what being a jack of all trades might be like, several other goals were achieved and skills put to the test, such as improved project and time management, learning coding paradigms independent of used language and applying them in an artistic environment, ability to think and build for both physical and virtual environments, and a general widening of the creative horizon.

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4.2. Spherical Stories - Site specific 360 content development project (MOME)

One of our aims at the MOME Media Design program is to provide art and design students with experience-based research and learning situations while seeking answers to real challenges in real situations. Conceived of as an application for an open public art contest launched by the municipality of the 9th district of Budapest, the project course Spherical Stories gave the opportunity for students to find out more about their local environment and in a dynamic situation connect with their own city and its inhabitants, in the framework of a complex interdisciplinary project.

The chosen site for our intervention was Ferenc Square, a sizable public park with playgrounds and recreational facilities surrounded by apartment buildings in Budapest's 9th district, that once was a peripheric, poor proletarian neighbourhood. After '89, the square went through successive phases of gentrification whereby its character and function as well as the social status of its residents and users changed notably. Our aim was to map and make visible some of the unknown, hidden or suppressed realities history and recent changes have brought about by collecting, and processing into symbolic audiovisual content,

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personal stories and experiences of the inhabitants and regular users of the square. By presenting these virtual stories in the very site they originated from, in Ferenc square, we hoped to enrich the locals' perception of the square as a complex urban reality.

The students worked in self organized teams, helping each other out with their specific competences, but eventually each one was supposed to develop and present their own content which had to be an online 360-degree audiovisual product. 360 content is an immersive media format that displays in all directions simultaneously, spherically, in a full 360-degree view (hence the title of the course). During the 12 weeks of the course the work was distributed into distinct phases:

1. Background research and dissemination
2. Preproduction
3. 360 content development
4. Exhibition and workshops

In the first phase the students were given an overview of the history and methods of participatory public art as well as an introduction to the multimedia technology

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to be used in the project, then they participated together in an on-site guided tour led by a local historian. These provided the bases on which the research started. After locating their point of interest, the students conducted both offline and online (predominantly social media based) research into their chosen topic, and used participatory methods to reach out to the community in order to find data providers. In the following, they conducted organized and/or spontaneous interviews and also collected archive photos and urban planning documentation about the area throughout its history. The interviews were organized in a way to compare the perceptions of the area by old inhabitants and newcomers.

In the preproduction phase, students began to develop their stories based on the local research and the oral history sources. This involved processing their material, typing and editing interviews, preparing visual material, making decisions as to the structure of the narration. This phase organically led to the 360 content development. The students were free to choose their own technique and style for their story. There were still- and moving image based works as well as animation; in some cases they wrote and recorded their own narration based on their research, in other cases, they edited the audio interviews they had made. We encouraged simplicity in regard to technical approaches not only because of the project timespan but also to maximize the value of creativity.

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In the last phase, the result of their joint work was presented in the form of a public presentation and temporary exhibition in Ferenc Square. The project and its outcomes were introduced to the public in workshops, and were made accessible through large format printed illustrations for each story installed in billboard style, on which QR codes led to the actual works. The audience could interact with the produced contents using their own smart devices and VR goggles that we provided during organized events (opening and finissage) and workshops.

As a summary, the students gained insight into interdisciplinary methods in working with orally history and memory politics; into the design and implementation of participatory public art projects; and were introduced to a rapidly developing technology, virtual reality, and its alternative uses in building communities. Last but not least, thanks to 360-degree content development, the local community in Ferencváros was able to experience new and personal reflections of their own dynamically changing environment.

4.3. Co-creation with Technology (MOME)

At MOME we believe artists and designers should be sensitive to society's challenges and changes and work together to solve them. To enable them to make

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such an impact, we believe it is most important to train them to always be critical and purposeful. To look around and find the right tools to help them fulfil that purpose. This means the emphasis is on project work, for which we provide a wide overview of available tools and give space to self-development and peer learning while supporting the process with experienced mentors.

Co-creation with peers and other stakeholders is a standard way to carry out projects, thus well embedded in university curricula. Using computer software as a tool to embody a designer's ideas and vision is also well-known and became a standard in the past decades. However, channelling the *creative* input of an artificially intelligent machine into the process is relatively new – so new in fact that it is contested if we should call the AI's output *creative*. Nevertheless, AI and generative algorithms are powerful and relatively new tools that might change how we approach creative problem-solving in the future. It will surely pivot the importance of several skills and competencies: some will become less important, and others will be more important. Co-creation with technology is one we consider at MOME to be crucially important in the future.

Currently, there are different study modules running at MOME focusing on different elements of co-creation with technology, all running in the bachelor programmes, each building on the previous.

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In the first year, we provide a complex technological set of modules called Tech4Design. The first module – in the first semester – is split into 6 parts spreading through a semester, each covering a wider field of the technological spectrum. Each part consists of a 1,5hr-long lecture and a 1,5hr-long practical demonstration. A total of 6 fields are covered: Prototyping, Robotics-IoT-Smart Technology, xR (AR-VR-MR), Socal networks-gamification-ethics, Data visualisation-AI-Machine Learning, Cybersecurity-blockchain-NFT. This serves as an introduction for the students to see the opportunities emerging technology holds. In the second module, students select an area of interest from the six areas introduced in the previous semester. They later work on projects through which they can realise a working prototype or a viable concept that utilises technological tools from the selected area. Tech for Design serves as a foundation study for technological awareness, ethical use of technology, and self-education in technological areas. Experience shows that about half of the students are open and keen to learn about technology and can immediately build their new knowledge into project work. On the other hand, half of the students, mostly those who are interested in traditional crafts, are less interested or struggle to connect their work with the provided opportunities.

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Craft students from the second semester can select the specialisation “Digital Craft” – a series of courses building on the similarities of thinking through making in traditional crafts, and creative design aided by emerging technologies. Students work on projects built around pre-defined topics, mentored by experienced designers. They can combine traditional crafts (namely ceramics, glass, and metalwork) with digital design (including generative algorithms) and manufacturing technologies (mostly 3D printing and laser cutting). During the courses, students learn how to aid their thinking with rapid prototyping, how to use generative algorithms in the creative process, and how to extend the opportunities of traditional crafts with the newest technology.

Building on the aforementioned courses and reflecting on the most recent technological advancements, we are working on including artificial intelligence into the curriculum. In 2022, we introduced an ‘AI in creative industry’ course, giving an overview of available tools to students. We also introduced ‘AI co-creation’ to the curriculum with a half-day-long workshop focusing on how to use AI as a useful companion in design projects. The workshop showed examples of AI Bias along with examples of AI providing interesting but wrong results and provided explanations for each example. It then showed an approach to get the best out of visual Ais:

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1) Imagine the results before using AI
2) Explain the vision in words
3) Run image generation with AI
4) Be critical and try to find the prompt roots for each visual element
5) Refine the prompt accordingly or select from the provided options accordingly
6) Repeat 3-4-5 until you reach a satisfying result.

Students learned how to use a visual AI tool (MidJourney) and a methodology to make their work with AI more effective. As AI co-creation is a new and rapidly changing area, we are revising the teaching materials. Since we expect the importance of AI co-creation to increase, we are developing the workshop into a one-week course.

In the near future, we would like to provide courses that enable students to deepen what they learnt in technology courses and integrate them with traditional crafts.

4.4. From virtual to real (and vice versa) (ABAAG)

Nowadays the digital world has become a parallel world to the physical one, everyone is talking about virtual spaces and metaverse But how do the physical

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and the digital interact? How can we move an object or a space from the physical world and place it inside a virtual environment, work on it, modify it, have other people join in locally or remotely and help us in the process and finally turn everything back into a physical object?

We think that artists will have to be capable of transporting information and objects between these two worlds.

A series of courses @ Accademia di Belle Arti Aldo Galli - IED Network focus on this process allowing students to:

- Develop skills in reality capture through digital cameras and 3D scanners
- Create a digital model of an object or a space and be able to modify it or add it to an existing model or space
- Create a virtual space in which to showcase their work and allow other users to visit and participate to their virtual exhibitions
- Create physical objects through digital fabrication techniques like 3D printing, laser cutting.

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4.5. Virtual Fashion for the Metaverse (ABAAG)

The term "Metaverse" is on everyone's lips but few know what it is, and it is rightly so as it is an emerging technology, which promises to be the future of the internet and the market and digital design and fashion. The course provides students with a deep understanding of technology, methodologies production and will give them the technical and production capabilities required by the market.

After providing students with a broad overview of the context, structure, functioning and aesthetics of the available platforms, the course will develop as one series of "hands on" workshops on the creation, publication and use of accessories of fashion and design for the metaverse, also applicable to the world of videogames. The lessons take place in a virtual atelier that will allow students to familiarise themselves with the environment of the metaverse. The course will conclude with a Virtual Catwalk, where students will present their models or collections in a virtual space.

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4.6. How can fablabs help to transpose digital ideas into the real world (CF1)

The development of digital tools has radically modified existing creative practices, while giving birth to new artistic forms, (such as video games, net art, augmented reality or interactive installations etc.). However, digital arts are not only screen or non-tangible arts.

Indeed, thanks to the emergence of new places with variable objectives and dimensions such as digital manufacturing laboratories (fablabs) and other makerspaces, the field of action until then reserved for professionals in the field of design, prototyping or distribution of objects has been opened up to the greatest number of people and has given rise to a new creativity. The accessibility to new tools has given new opportunities and facilities in terms of artistic creation, especially when it comes to transposing a virtual concept into the real world.

Digital controlled tools that can be found in fablabs allow to go from a 2D or 3D model made on a computer to a real object. These products, once created, can also be programmed to interact and communicate to transmit or receive data in order to produce complex and interactive works.

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Learning these technologies in a fablab is characterized by knowledge sharing based on conception and project pedagogy. Cityfab 1 users learn to search for solutions by helping each other and to share their knowledge and skills by documenting their research.

The cityfab1 machines are grouped in 3 categories and each machine has its own initiation module.

- **3D objects**: Digital milling machine CNC, 3D printing SLA and FDM, Thermoforming
- **2D objects**: Laser cutting, Plotter cutting, Digital embroidery machine
- **Programmed/connected objects**: Arduino + Raspberry Pi + sensors & actuators, tactic/interactive/audio/video data art installations and data sculptures.

Thanks to the introduction to the use of each machine mentioned in the first two categories **(3D & 2D objects)**, students will be able to :

- Learn how to avoid errors when modelling 2D and 3D files for transposition into the real world;
- Set up the slicer (software that drives the digital machine) to transpose the digital files into the real world;
- The rules of use and safety of the digital machine;
- The methods of finishing and post-production in order to finish the creation

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For the third category (**Programmed/connected objects)** students will:

- Learn how to extract digital data from the environment, in a broad sense, and bring it back into that environment via software or hardware for interactive, auditory and visual possibilities in art installations. static/interactive/audio/video data art installations and data sculptures;
- discover the possibilities offered by the so-called digital tools to realize objects difficult to realize in a traditional way by exploiting the possibility that offers the transposition of the passage from the virtual to the real.

4.7. Informal art & technology education within a production context - Lighting Guerrilla Laboratory (LASL)

Lighting Guerrilla Laboratory is an informal education program series that Ljudmila Art & Science Laboratory has been running since 2018 in cooperation with one of the most prominent public art festivals in Ljubljana - the Lighting Guerrilla Festival.

In it, mostly young participants upgrade their knowledge and experience and undergo a group production of new works of art that are finally featured at the festival, giving them not only new tools and techniques for producing artworks, but an invaluable experience of the real-world production process on a work of public art. Through this hybrid

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education-production format, the students become at the same time more independent and confident in using a specific technology, but also learn about the value of collaboration within a group, where artistic and technical knowledge and talents come together, complementing each other and leading towards a better production. This gives them invaluable competences as well as important connections which enable them to develop their practice in the technology arts and subsequently take part in real world artistic production contexts.

The domain of light art is a wide field combining art with many varied technologies, which lets us choose a different topic every year. Established artists and technologists first prepare a series of practical lectures, a kind of extended workshop - usually 8 sessions in a series - in which they deliver the required skills and competences to the students, as well as collect students ideas and guide them towards implementing their projects. After the educational meetings, there is usually around one month left until the festival opens. In this time the mentors help students finalise their project, as well as in the process of setting up the actual installation in the public space, which by its nature carries additional requirements, such as making the work resistant to weather and avoiding vandalism during the one month long festival.

In the 5 years to date, the topics of the laboratories were:

- basics of electronics and programming
- interaction with light and sound using capacitive touch sensing
- projection mapping and synchronising visuals with sound

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- augmented reality
- data visualisation as an artistic medium

In 2023, the topic is combining laser projection, laser scanning and sound synthesis based on data into a performative light-and-sound installation.

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5. List of Annexes

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ANNEX 1 - Digital study modules at consortium partners

Best practices	What? (Course name)	Institution	Teacher (also artists)	Why? (what is the purpouse)	How? (which technologies, how often are the technologies used, how many teachers/people involved)	Skills & competencies	Benefits (what's the competitive advantage that the course gives?)	Link:
Reality Capture to Digital Fabrication	Digital Fabrication Course_Product Design	Accademia Galli	Francesco Pusterla	Introduce students to digital fabrication methodologies for rapid prototyping and smal batch production	Software: 3D modelling with Rhino, Meshmixer || Hardware: 3D printing,		Be able to use futureproof fabrication methodologies	https://drive.google.com/drive/folders/1UICQIGV5DHU6mdNp-CGlZkkzYRr2rNFg?usp=share_link
	VR and Visualization_Product Design	Accademia Galli	Francesco Pusterla	Introduce students to realtime visualization methods using video game engines for still images, videos and VR experiences	Software: Rhinoceros, Unreal Engine, Twinmotion, Enscape || Hardware: Dedicated graphic cards Nvidia RTX, Oculus Rift			https://drive.google.com/drive/folders/1bX5XZEdiVD3LmWeSaIlf9UJsWERSDFwR?usp=share_link
Reality Capture to Digital Fabrication	Reality Capture and digital Fabrication_Restorartion	Accademia Galli	Francesco Pusterla	Digital fabrications and reality capture applied to restoration processes can increase the capabilities of renovators using novel techiniques for analizing and developing restoration projects	Software: Metashape, MeshMixer, Rhinoceros || Hardware: Cameras, 3D printing, lasercut			https://drive.google.com/drive/folders/1wM9NzVAHf0wq3iPOeNQxNYhJ6cDoSiFc?usp=sharing
	Virtual Fashion for the Metaverse_Fashion Design	Accademia Galli	Enea Le Fons					
	Adobe Premiere	Accademia Galli	Olo	Mid-advanced course on videoinstallation and videomaking.	Software:		They are also artists and know the VR.	https://olocreativefarm.com/
	Adobe After Effects	Accademia Galli	Olo	Mid-advanced course on videoinstallation and videomaking.	Software:		They are also artists and know the VR.	https://olocreativefarm.com/
	Adobe Indesign	Accademia Galli	Sabrina Rubetti	Introduce students to a Photoshop and Indesign course	Software:			
	Generative art (IA)	Accademia Galli	Matteo Mauro (Artist)	Physical and digital art, NFT& Physical and digital artists, NFT and Cryptoart, teaching on how to manage the process of creating applied digital art in the context of cryptoart			Case History on the Digital Art and NFT Development. Advanced knowledge of english language.	https://matteomauro.com
	Printing 3D and Digital Art	Accademia Galli	Giovanni Motta (Artist)	Creation of sculptures with 3D prints. Physical and digital art, NFT& Physical and digital artists, NFT and Cryptoart, teaching on how to manage the process of creating applied digital art in the context of cryptoart				https://giovannimotta.it
	VR (Virtual Reality)	Accademia Galli	Fabio Gianpietro	Phisycal and digital art, NFT and cryptoart, NFT and Cryptoart, he teaches on how to manage the process of creating applied digital art in the context of cryptoart.			He builds a virtual reality starting from a painting. Physical and digital artists	https://fabiogiampietro.com
	Software development, including 3D	Accademia Galli	Davide Famoso (Teacher and artist)		Software: Unity			
	Crypto Art Today	Accademia Galli	Ivan Quaroni & others (Reasoned Art (Milano); Andrea Salomone, Chief Marketing Officer Reasoned Art; Edoardo Durante, Curator Reasoned Art; Valuart SAGL (Lugano, Switzerland), Etan Genini, Co-Founder Valuart SAGL; Cortesi Gallery, Lorenzo Cortesi; Patrick Jusic, Coordinator Poseidon DAO & Poseidon DAO; Amelia Tommasicchio, Co-founder and editor-in-chief of The Cryptonomist; Riccardo Zanini, The Nemesis (Italia).	To disseminate knowledge and best practices on cryptoart, NFT, with the involvement of young artists active in the digital art field	Cycle of 4 talks in Como and Milan (Italy), starting on september 202 until may 2023	NFT, Cryptoart		
	Objects between virtual and material	Ljudmila Laboratory	Dorijan Šiško	Beginner course on 3D modeling and phygital presentations.	Unity, ZBrush	1.3. Managing data, information and digital content 2.1. Interacting through digital technologies 2.2. Sharing information and content through digital technologies 3.1. Developing digital content 3.4. Programming 5.1. Solving technical problems 5.3. Creatively using digital technologies	Artistic and designer skills, ecclectic blending of different techniques, explore the blending of virtual and physical.	http://dorijansisko.com/,
	Laser Graffiti	Ljudmila Laboratory	Tadej Droljc	Beginner course educating participants on laser animation.	Max, MadMapper (MadLaser extension)	1.3. Managing data, information and digital content 2.1. Interacting through digital technologies 2.2. Sharing information and content through digital technologies 3.1. Developing digital content 3.4. Programming 5.1. Solving technical problems 5.3. Creatively using digital technologies	Master use of a specific presentation technology.	https://wiki.ljudmila.org/Tadej_Droljc:_Laser_graffiti

Best practices	What? (Course name)	Institution	Teacher (also artists)	Why? (what is the purpouse)	How? (which technologies, how often are the technologies used, how many teachers/people involved)	Skills & competencies	Benefits (what's the competitive advantage that the course gives?)	Link:
	Multimodal AV production	Ljudmila Laboratory	Tadej Droljc	Advanced course in Max for developing AV systems.	Max	1.3. Managing data, information and digital content 2.1. Interacting through digital technologies 2.2. Sharing information and content through digital technologies 3.1. Developing digital content 3.4. Programming 5.1. Solving technical problems 5.3. Creatively using digital technologies	Master use of a specific presentation technology.	https://vimeo.com/tadejdroljc
	Video mapping	Ljudmila Laboratory	Stella Ivšek & Anja Romih (BEAM TEAM)	Beginner course educating participants on projection mapping.	MadMapper	2.1. Interacting through digital technologies 3.1. Developing digital content 5.3. Creatively using digital technologies 5.1. Solving technical problems	Master use of a specific presentation technology.	https://www.instagram.com/beam_team_visuals/
	AR VJ-ing	Ljudmila Laboratory	Stella Ivšek & Anja Romih (BEAM TEAM)	Beginner course educating participants on extended VJ practices (green screen, streaming etc.).	OVS	2.1. Interacting through digital technologies 3.1. Developing digital content 5.3. Creatively using digital technologies 5.1. Solving technical problems	Master use of a specific presentation technology.	https://www.instagram.com/beam_team_visuals/, https://youtu.be/ljb740OQqn4
	Generative 3D modeling and rendering	Ljudmila Laboratory	Blaž Miklavčič	Beginner to mid-advanced course in 3D modeling and rendering incorporating generative techniques and principles.	Blender, Houdini	1.3. Managing data, information and digital content 2.1. Interacting through digital technologies 2.2. Sharing information and content through digital technologies 3.1. Developing digital content 3.4. Programming 5.1. Solving technical problems 5.3. Creatively using digital technologies	Mentor has artistic and proffesional skills in 3D computer graphics; master use of a specific presentation technology,	https://www.instagram.com/blazmiklavcic/
Co-Creation with Technology	Tech 4 Design	MOME	Máté Gorka-Focht External lecturers (mostly delegates of tech companies)	The purpose of Tech4Design is to improve digital literacy and to provide a menu for the digital space to all students at MOME.	The module is split into 6 parts spreading through a semester, each covering a wider field of the technological spectrum. Each part consists of a 1,5hr-long lecture and a 1,5hr-long practical demonstration. A total of 6 fields are covered: Prototyping, Robotics-IoT-Smart Technology, xR (AR-VR-MR), Socal networks-gamification-ethics, Data visualisation-AI-Machine Learning, Cybersecurity-blockchain-NFT	1.1 Browsing, searching and filtering data, information and digital content 1.2 Evaluating data, information and digital content 1.3. Managing data, information and digital content 4.1. Protecting Devices 4.2.Protecting personal data and privacy 5.4. Identifying digital competence gaps	It gives an overview of the current state of current and emerging technologies. Students can get an idea of what areas are formed in this spectrum and what is possible using such technologies. This helps them in building interest in the field of technology.	
	Digital techniques I-II-III (for textile designers)	MOME	Endre Földi	Teach digital graphic design basics to textile designers.	The 3-semester-long course focuses on the most relevant offerings of the Adobe suite for textile designers, especially digital drawing and pattern design tools. Software covered: • InDesign • Illustrator • Photoshop • Acrobat	3.1. Developing digital content 5.3. Creatively using digital technologies 5.1. Solving technical problems	Software knowledge supports students in achieving better results in less time.	
	Digital descriptive geometry	MOME	Péter Kőcs (Shapr3d), Csaba Szegedi (MOME)	Descriptive geometry is crucially important for designers to understand how physical objects are formed from basic shapes. To make it enjoyable and interesting for the students, descriptive geometry is taught with intuitive digital tools.	The 3-day-long curriculum covers geometrical and technical description and manipulation of 3-dimensional shapes, from the purpose of technical comminication through the introduction of basic shapes, transformations, features and combinations, to building up complex 3d objects (practically well-known design objects) in a CAD software based on photos. Software: Shapr3D	2.1. Interacting through digital technologies 3.1. Developing digital content 5.3. Creatively using digital technologies 5.1. Solving technical problems	It makes descriptive geometry cool again, which results in students understanding shapes in a much deeper manner.	https://www.shapr3d.com
Co-Creation with Technology	AI Co-Creation	MOME	Lysandre Follet (Nike)	AI bias makes AI-created artwork stereotypical. This course covers the reasons behind this phenomenon, and also gives handy tips to overcome the downside of AI bias and use AI to the best of its knowledge. The course also touches ethical dilemmas and starts a discourse about the future purpose of designers and creatives in general.	The course consists of a 1-hour-long presentation and a 3-hour-long workshop. The lecture serves as a background or behind-the-scenes knowledge sharing tool, and is intended to spark conversation. During the workshop, participants learn easy (analogue) techniques to find the right inputs to achieve the best AI-generated results. Participants use MidJourney as the AI tool.	1.2 Evaluating data, information and digital content 3.1. Developing digital content 5.2. Identifying needs and technological responses 5.3. Creatively using digital technologies 5.4. Identifying digital competence gaps 3.2. Integrating and re-elaborating digital content	Participants receive a perspective on an emerging technology that will possibly change the creative industry.	https://lysandre.ai
	TwinMotion	MOME	István Keszei	TwinMotion is a real-time rendering solution that speeds up the process of communicating one's designs, ideas or concepts in high visual quality.	Online or offline course for 6-8 students focusing on learning how to use TwinMotion.	3.1. Developing digital content 5.3. Creatively using digital technologies	Same as purpose	

Best practices	What? (Course name)	Institution	Teacher (also artists)	Why? (what is the purpouse)	How? (which technologies, how often are the technologies used, how many teachers/people involved)	Skills & competencies	Benefits (what's the competitive advantage that the course gives?)	Link:
Co-Creation with Technology	AI in creative fields	MOME	István Keszei	Introduces different AI tools to students, as well as discussing the implications of the emergence of AI.	The course starts from a wider overview of AI in writing, musinc, fine arts, speech, video and design. Then it introduces concrete tools for creating visual AI content, such as Midjourney, Dall-e 2 and Stable diffusion.	3.1. Developing digital content 5.3. Creatively using digital technologies	Introduces future-proof AI tools that could help the students save time in their work. It also shows the shortcomings and downsides of using AI as a design companion.	
Co-Creation with Technology	Digital Craft	MOME	Rea Dóra Kövér	Digital Craft focuses on integrating digital technologies with traditional craft knowledge.	Full-semester project-based design course for students specialising in digital craft (10 ECTS). Students conduct their own research on current social or sustainability challenges. Based on the results they develop a project brief supported be the consultant teacher. The project is then developed through digital prototypes to reach a design concept phase with a usable prototype. Results are presented in a public keynote at the end of the semester. Technologies used (optional): • traditional craft techniques such as warm glass forming, ceramics and metalwork techniques. • 3D-printing (FDM, ceramics printing, SLA) • laser cutting • smart technologies (sensors, microcontrollers etc.) • 2D and 3D design software for digital design	2.1. Interacting through digital technologies 3.1. Developing digital content 3.4 Programming 5.2. Identifying needs and technological responses 5.3. Creatively using digital technologies 5.4. Identifying digital competence gaps 3.2. Integrating and re-elaborating digital content 5.1. Solving technical problems	Combines traditional techniques with digital technologies	
	Keyshot	MOME	Ákos Lőrincz	Helps the students to achieve better rendering results.	Traditional computer software learning course with practice tasks for Keyshot.	5.3. Creatively using digital technologies	Students learn a new software tool.	
	Rapid Prototyping	MOME	Daniel Cseh, Laszlo Halak	Intro to rapid prototyping practices with a strong focus on "robots".	Intro to basic programming, electronics fundamentals, various sensors and motors, rapid prototyping practices, 3D design, 3D printing	2.1. Interacting through digital technologies 3.4. Programming 5.1. Solving technical problems 5.2. Identifying needs and technological responses		
	3D design I.- IV.	MOME	Miklos Falvay	Beginner to advanced level courses on 3D modelling and vfx oriented pipelines	Introduction to 3D and Blender with a strong focus on motion picture and vfx production pipelines.	3.1. Developing digital content 5.2. Identifying needs and technological responses	Blender is a free and open source software with powerful features. The course leader is an expert on the field and the specific elements of the course are custumtailored for our students needs.	https://www.zymzym-studio.com/
	New Media Project	MOME	Daniel Cseh, Laszlo Halak, Jozsef Tasnadi	The aim of the course is the development of responsiveness to the actual social demands, the learning and cognition of multimedia languages and media communication using the potentals of time based media technologies.		1.1 Browsing, searching and filtering data, information and digital content 1.2 Evaluating data, information and digital content 1.3. Managing data, information and digital content 2.1. Interacting through digital technologies 5.1. Solving technical problems 5.2. Identifying needs and technological responses 5.3. Creatively using digital technologies		https://josephtasnadi.hu/
	360 Content Development	MOME	Laszlo Brovinszky, Attila Palfalusi	The course provides an introduction to the world of 360-degree content development, introduces students to the current issues and dilemmas of the field and provides a foundation for individual creative work in this dynamically developing field. Whether applied or autonomous art projects, students who complete the course will be able to select and apply the most appropriate technology for the task, identify the client/artistic needs of the project and provide relevant responses to those needs.	Motion picture based 360 content	1.1 Browsing, searching and filtering data, information and digital content 3.1. Developing digital content 3.2. Integrating and re-elaborating digital content 3.3. Copyright and licences 5.1. Solving technical problems 5.2. Identifying needs and technological responses		
Game design + physical computing+ Site-specific 360° storytelling	Site-specific 360 storytelling	MOME	Miklos Erhardt, Attila Palfalusi	Using 360 content creation practices to develop a project based on participatory storytelling and oral history.	Students carried out field research in a specific district of Budapest. Local residents were interviewed and the stories provided the basis for 360 content development.	1.1 Browsing, searching and filtering data, information and digital content 1.2 Evaluating data, information and digital content 1.3. Managing data, information and digital content 2.1. Interacting through digital technologies 2.2. Sharing information and content through digital technologies 2.3. Engaging in citizenship through digital technologies 3.2. Integrating and re-elaborating digital content	The course provides an introduction to fieldwork, interviewing and content development, while also introducing students to cultural heritage and oral history.	

Best practices	What? (Course name)	Institution	Teacher (also artists)	Why? (what is the purpouse)	How? (which technologies, how often are the technologies used, how many teachers/people involved)	Skills & competencies	Benefits (what's the competitive advantage that the course gives?)	Link:
Game design + physical computing+ Site-specific 360° storytelling	Game design	MOME	Daniel Cseh, Laszlo Halak	The Game Design course aims to introduce students to the process of game design using the Unity game engine. Over the course of the semester, students will create an interactive game/space/story from a selection of pre-defined genres, which will be played on an arcade game machine reminiscent of the aesthetics of long-closed arcades at the end of the semester.	During the course, students will learn how to program simple interactions, import models, import materials, textures, lights, camera, set up a game space and main menu, and export a game.	1.3. Managing data, information and digital content 2.1. Interacting through digital technologies 2.2. Sharing information and content through digital technologies 3.1. Developing digital content 3.4. Programming 5.1. Solving technical problems 5.3. Creatively using digital technologies	The course offers a compact skillset around the topic of game design from start to publish.	
Game design + physical computing+ Site-specific 360° storytelling	Physical computing and Interface design	MOME	Daniel Cseh, Laszlo Halak	In the Physical Computing - Interface course, students will learn about the possibilities of connecting physical and digital space using the Arduino framework, modules, sensors and actuators.	Throughout the semester, while learning the basics of electronics, physics and programming, students will create their own interactive device, a game controller.	3.4. Programming 5.2. Identifying needs and technological responses 5.3. Creatively using digital technologies 5.4. Identifying digital competence gaps		
Game design + physical computing+ Site-specific 360° storytelling	Media technology	MOME	Daniel Cseh, Laszlo Halak, Santa Balazs, Attila Palfalusi and External lecturers	The aim of the course is to provide the student with a general knowledge of IT and media technology related to the areas of media design.		1.1 Browsing, searching and filtering data, information and digital content 2.2. Sharing information and content through digital technologies 2.5. Netiquette 2.6. Managing digital identity 3.1. Developing digital content 3.3. Copyright and licences 4.1. Protecting Devices 4.2. Protecting personal data and privacy 5.1. Solving technical problems 5.2. Identifying needs and technological responses 5.4. Identifying digital competence gaps		
	Sound Design	MOME	Csaba Hajnoczy			1.3. Managing data, information and digital content 3.1. Developing digital content		
	Motion Capture	MOME	Attila Palfalusi, Balazs Santa and External lecturers	The course offers students the opportunity to learn about motion capture technology. During the workshop, they will learn how to use the Xsens motion capture system, also available at MOME, with the help of prominent representatives of the industry.	Xsens motion capture solution and Unity/Unreal	3.1. Developing digital content 5.2. Identifying needs and technological responses		https://vimeo.com/attilapalfalusi/xsens
	Cinematography and Lighting in practice	MOME	Attila Palfalusi	The aim of the course is to provide the student with the general principles of lens-based imaging, practical and theoretical knowledge of shooting and lighting techniques.		4.1. Protecting Devices 4.3. Protecting health and well-being 5.2. Identifying needs and technological responses		
	TV Paint, After Effects	MOME	Melinda Kadar	Hands on knowledge on software usage	weekly classes, practice base learning			
	Premier Pro	MOME	Judit Czako	Hands on knowledge on software usage	weekly classes, practice base learning			
	Maya, Moho	MOME	Laszlo Brovinszki	Hands on knowledge on software usage	weekly classes, practice base learning			
digital fabrication	Laser cutting with Lasercut 6 software	CF1	Gwenaële de Spa, Marco de Sanctis, Bart Vandeput	Laser cutting is a manufacturing process that consists of cutting material using a large amount of energy generated by a laser and concentrated on a very small surface. Laser cutters can cut or engrave many thin materials. The purpose of this course is to teach students how to cut or engrave a vector file with the laser cutter. This course will teach them how to prepare a file to transform a 2D digital drawing into a real object, the safety rules and good practices related to the machine.	learning the basics in a 2-hours course		The course offers a compact skill set around machining with the laser cutter	
digital fabrication	CNC Milling machine with Fusion 360	CF1	Etienne Pinsky, Gwenaëlle de Spa, Marco de Sanctis	The digital milling machine (CNC) allows the machining of relatively thick materials in 3 dimensions. The machining process is controlled by downloading a file on the machine that contains all the parameters related to the different operations and tools. During this course, students will discover the process to transform a 3D file into a real object, the safety rules and good practices for the use of digital milling machines.	learning the basics in a 6-hours course	prototyping 5.3. Creatively using digital techr	The course offers a compact skill set around machining with the CNC milling machine	https://www.autodesk.com/products/fusion-360/free-trial
digital fabrication	3D Printing With CURA and Preform	CF1	Bart Vandeput, Gwenaëlle de Spa	3D printing consists in superimposing thin layers of material according to coordinates transmitted by a 3D file to form a volume.This training gives the basics of using 3D printing PLA machines and resin printers	learning the basics in a 2-hours course	prototyping 5.3. Creatively using digital techr	The course offers a compact skill set around machining with the 3D printing and its application	https://ultimaker.com/fr/software/ultimaker-cura
digital fabrication	Vinyl cutting with Graftech pro studio	CF1	Gwenaëlle de Spa, Maïté Dupont	This course will teach how to use and prepare a file for the vinyl cutting machine	learning the basics in a 2-hours course	prototyping 5.3. Creatively using digital techr	The course offers a compact skill set around machining with a vinyle cutter	

Best practices	What? (Course name)	Institution	Teacher (also artists)	Why? (what is the purpouse)	How? (which technologies, how often are the technologies used, how many teachers/people involved)	Skills & competencies	Benefits (what's the competitive advantage that the course gives?)	Link:
digital fabrication	Numerical embroidery with Bernina	CF1	Gwenaëlle de Spa, Maïté Dupont	With the digital embroidery course students will discover the different features and methods to transform a digital image into embroidery. This course will review the tools and creative options offered by the Bernina 880	learning the basics in a 2-hours course	prototyping 5.3. Creatively using digital techr	The course offers a compact skill set around machining with The course offers a compact skill set arount embrodery with a numerical embroidery machine	
digital fabrication	Fusion 360 3D modeling	CF1	Etienne Pinsky, Gwenaëlle de Spa	A biginners course on 3D modeling with Fusion 360 to create models working with CNC Machines and 3D printers. This course will overview the basic functionality and processes involved in making a machinable model	learning the basics in a 3-hours course 2 times	prototyping 5.3. Creatively using digital technologies 5.1. Solving technical problems		https://www.autodesk.com/products/fusion-360/free-trial
digital fabrication	Scan 3D : SENSE 3D	CF1	Bart Vandeput, Gwenaëlle de Spa	This course will teach how to use and prepare a file f	learning the basics in a 2-hours course	prototyping 5.3. Creatively using digital technologies 5.1. Solving technical problems		
digital fabrication	Arduino + Raspberry Pi + sensors & actuators	CF1	Bart Vandeput	Extracting digital data from environment, in the broad sense, and bringing it back into that environment via software or hardware for interactive, auditory, visual possibilities within artistic audio/video installations, theatre, performances, ... Learning the possibilities of between physical and digital space with Aruino or RaspberryPi.	Depends all on the chosen topic, idea, ... Technologies: Arduino, RaspberryPi, ..., Javascript, Max (cycling74), Touchdesigner How often: During a 3-4 days workshop How many: 1 teacher <> 8 students, 2 teachers <> 16 students, ...	2.1. Interacting through digital technologies 3.1. Developing digital content 3.4 Programming 5.3. Creatively using digital technologies 3.2. Integrating and re-elaborating digital content 5.1. Solving technical problems	As yet, this is not yet a definite course but some possibilities are: Receiving environmental data in a general sense via sensors, processing and returning this data digitally, displaying it in the environment via actuators in one or both directions, all in many different ways. Learning (and) understanding what sensory data is, using it and then visualising it back into the environment in a hardware or software sense if necessary. Learning (and) understanding the basics of electricity, mathematics, programming, hardware and software. Interface between software and hardware from interactive installations, objects, ..., to IoT applications.	https://www.arduino.cc/ https://www.raspberrypi.org/ https://cycling74.com/products/max https://derivative.ca/UserGuide/Install_TouchDesigner
	static/interactive/audio/video data art installations and data sculptures	CF1	Bart Vandeput	Bringing 'new' digital technologies within digitally created or non-digitally created installations or sculptures to explore and create other possible forms, remix. Combination of old and new, traditional and contemporary, analogue and digital, ...	Depends all on the chosen topic, idea, ... Technologies: Arduino, RaspberryPi, ..., Javascript, Max (cycling74), Touchdesigner How often: During a 3-4 days workshop How many: 1 teacher <> 8 students, 2 teachers <> 16 students, ...	2.1. Interacting through digital technologies 3.1. Developing digital content 3.4 Programming 5.3. Creatively using digital technologies 3.2. Integrating and re-elaborating digital content 5.1. Solving technical problems	As yet, this is not yet a definite course but some possibilities are: Interface between software and hardware for interactive installations, interactive objects, theater, dans, performance, ...	https://www.arduino.cc/ https://www.raspberrypi.org/ https://cycling74.com/products/max https://derivative.ca/UserGuide/Install_TouchDesigner

Location	Resource	Type	Number of elements	Description
Budapest / MOME	Industrial design prototyping worksho	workshop	50+	Hand tools and mid-sized machines for working with wood, foam, and plaster
Budapest / MOME	Architectural prototyping workshop	workshop	50+	Hand tools and mid-sized machines for working with wood and paper
Budapest / MOME	Metalwork workshop	workshop	50+	Hand tools, mid-sized machines and large machines for metalwork and jewelry crafting and prototyping
Budapest / MOME	Ceramics workshop	workshop	50+	Hand tools, mid-sized machines and large machines for working with clay and ceramics
Budapest / MOME	Warm glass workshop	workshop	50+	Glass oven/hut and cooling chamber with complementary hand tools
Budapest / MOME	Experimental glass workshop	workshop	50+	Tools and machines to mix glass ingredients for special glass material mixtures
Budapest / MOME	Cold glass workshop	workshop	50+	Tools and machines to sand and cut glass
Budapest / MOME	Concrete workshop	workshop	20+	Tools and machines to mix, pour and alter concrete materials and objects
Budapest / MOME	Fiber lab	lab	20+	Tools for fiber-based biomaterial experiments, e.g. micelium
Budapest / MOME	Digital prototyping workshop	workshop	5+	3D printers, laser cutter, computers
Budapest / MOME	Knitting workshop	workshop	10+	Semi-automatic and manual knitting machines
Budapest / MOME	Weaving workshop	workshop	10+	Weacing machines
Budapest / MOME	Leather workshop	workshop	10+	Leather working machines and tools
Budapest / MOME	Fashion workshop	workshop	10+	Hand tools, sewing machines, mannequins
Budapest / MOME	Hat workshop	workshop	10+	Tools for making hats
Budapest / MOME	Mobility design lab	workshop	10+	VR and AR prototyping tools and headsets, automotive clay oven, atuomotive claying desks, high performance computers, wacom tablets
Budapest / MOME	Photo studio	studio	50+	Fully equipped photo-video studio
Budapest / MOME	Space experimental workshop	studio	-	Big empty space with movable stage fixtures (e.g. for spotlights etc.)
Como / ABAG	Large format 3D printers	device	2	Large format 3D printers (40x30x30cm)
Como / ABAG	VR headsets	device	2	Oculus Rift
Como / ABAG	Wood workshop	lab	10+	Wood workshop with saw and milling machines

Competences categories
1.1 Browsing, searching and filtering data, information and digital content
1.2 Evaluating data, information and digital content
1.3. Managing data, information and digital content
2.1. Interacting through digital technologies
2.2. Sharing information and content through digital technologies
2.3. Engaging in citizenship through digital technologies
2.5. Netiquette
2.6. Managing digital identity
3.1. Developing digital content
3.2. Integrating and re-elaborating digital content
3.3. Copyright and licences
3.4. Programming
4.1. Protecting Devices
4.2. Protecting personal data and privacy
4.3. Protecting health and well-being
4.4. Protecting the environment
5.1. Solving technical problems
5.2. Identifying needs and technological responses
5.3. Creatively using digital technologies
5.4. Identifying digital competence gaps

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ANNEX 2.

TABLE OF DIGITAL TOOLS TAUGHT AT CONSORTIUM PARTNERS

Main category	Subcategory	Skill or tool
Blockchain		Blockchain technology NFTs Cryptocurrencies
Lens-based image		Photography, Cinematography, Videography
Audio		Reaper
Immersive Technologies		Physical and digital tools for AR / VR / MR
Making / Robotics	Sensoring	Distance Weight Temperature pH Speed Acceleration Secondary sensing
	Control	Arduino Raspberry Pi
Making / Digital Manufacturing	Additive	*Various 3D-printing technologies* FDM SLS SLA

Creative Europe

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ACCADEMIA DI BELLE ARTI ALDO GALLI IED Network

LJUDMILA

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	Subtractive	*Various NC milling and cutting technologies* Laser cutting CNC milling
Data storage & sharing		File Sharing Dropbox GDrive Online docs & co-creation Paper Office Miro
Visual Software	Computer Generated Image	Premiere Pro After Effects Cinema4D Maya 3ds Max Blender etc.
	Generative	*Plug-ins for most modeling SW* Grasshopper Tissue Sverchok
	Modeling	AfterEffects, SolidWorks Inventor Fusion Shapr3D Mudbox CATIA Rhino

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		Alias
	Rendering	TwinMotion Keyshot VRay
	Motion	3ds Max Blender Cinema 4D
	CAD	AutoCad
	2D Graphics	*Desktop/laptop* Illustrator Photoshop InDesign *Tablet* ProCreate PS Fresco
AI	Textual	Jasper DeepAI Retest
	Visual	MidJourney
Blockchain technology		NFT Cryptocurrencies
Gaming Engines		Unity Unreal Engine
Digital marketplaces		*Not specified*
Digital sales platforms and tools		*Not specified*
Data storage & Sharing		Dropbox GDrive

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	OneDrive
	MS Office suite Miro Dropbox Paper
Tools for sharing on social media	*Not specified*
Advertising	*Not specified*
Search Engine Optimisation	*Not specified*

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Annex 3

Competence map based on study modules

Disclaimer: This is not a thorough general competence map of all digital competencies, but a possible competency-based categorisation of the study modules within the consortium.

MOME | Accademia Galli | LjudmilaLab | Cityfab 1

Crypto & Art
- Crypto Art Today

Creation with Generative Algorithms and AI
- Generative art (IA)
- AI Co-Creation
- AI in creative fields
- Generative 3D modeling and rendering

Interaction design
- Physical computing and Interface design
- static/interactive/ audio/video data art installations and data sculptures
- Arduino + Raspberry Pi + sensors & actuators

Design through virtual and material spaces
- Scan 3D : SENSE 3D
- Objects between virtual and material
- Digital Craft
- Reality Capture and digital Fabrication_Restoration

Digital manufacturing

3D printing in art
- 3D Printing With CURA and Preform
- Digital Fabrication Course_Product Design
- Rapid Prototyping
- Printing 3D and Digital Art

Digital manufacturing
- Numerical embroidery with Bernina
- Vinyl cutting with Graftech pro studio
- Laser cutting with Lasercut 6 software
- CNC Milling machine with Fusion 360

Digital media crossing with physical space
- Laser Graffiti
- Multimodal AV production
- Motion Capture
- Media technology
- Video mapping
- Cinematography and Lighting in practice

Game design tools in art
- Software development, including 3D / Unity
- Site-specific 360 storytelling
- Game design
- 360 Content Development

Immersive experiences
- VR and Visualization_Product Design
- Virtual Fashion for the Metaverse_Fashion Design
- VR (Virtual Reality)
- AR VJ-ing

Sound design
- Sound Design

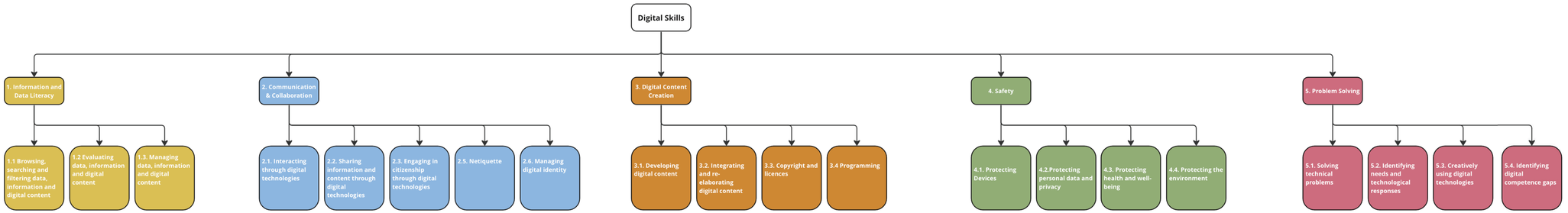
Graphic and 3D design software skills

3D modeling
- Fusion 360 3D modeling
- Digital descriptive geometry
- 3D design I.- IV.

CGI
- TV Paint, After Effects
- Adobe Premiere
- Adobe After Effects
- Digital techniques I-II-III (for textile designers)
- Adobe Indesign
- Premier Pro
- Maya, Moho
- TwinMotion
- Keyshot

Annex 4 - Map of skills and competences

Reference



Competencies

Crypto & Art

Sound design

Creation with Generative Algorithms and AI

Interaction design

3D printing in art

Digital manufacturing

Graphic and 3D design software skills

Immersive experiences

Game design tools in art

Digital media crossing with physical space

Skills