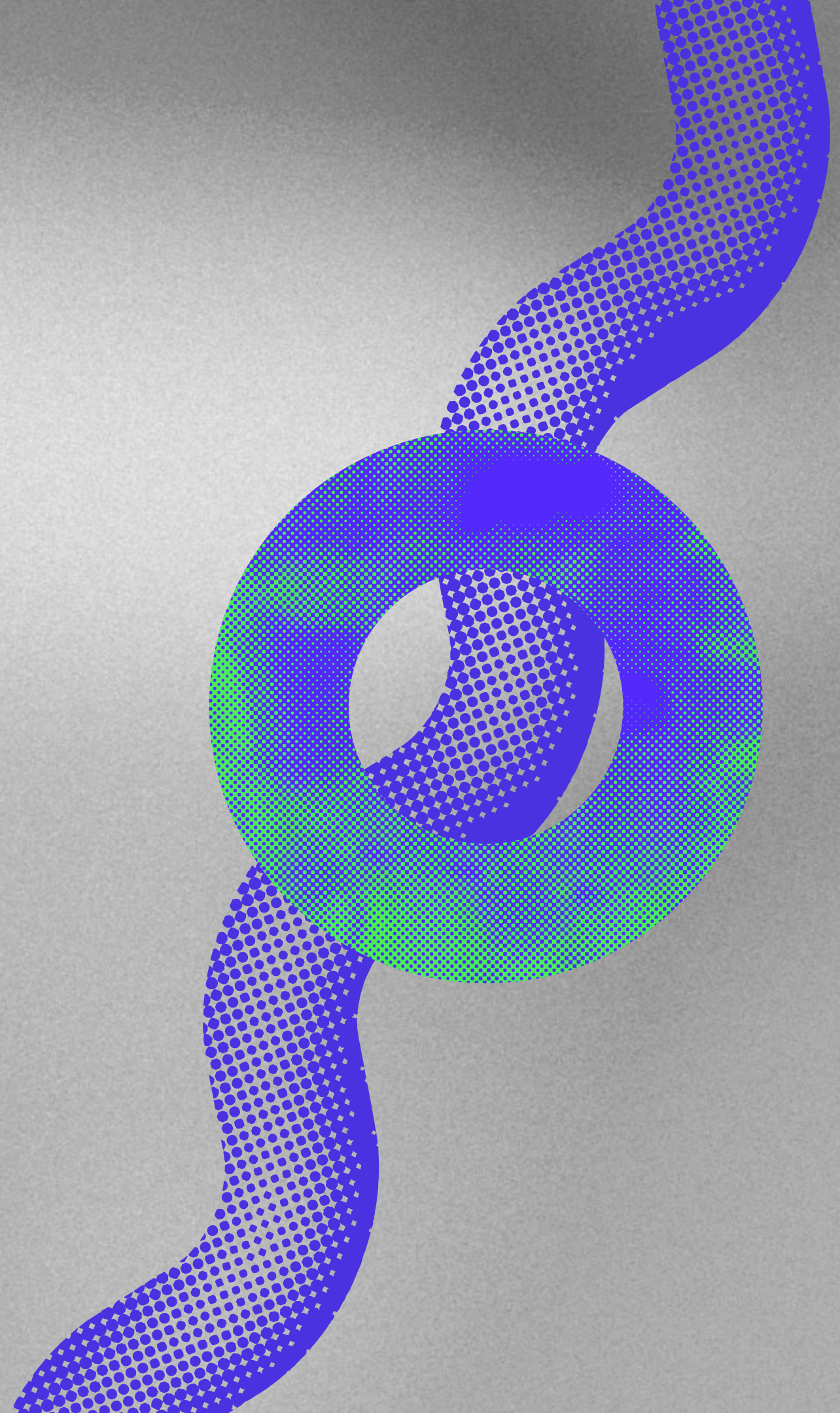




Co-funded by  
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METHODOLOGY HANDBOOK

# we STEAM



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The European Parliament considers careers in STEM (Science, Technology, Engineering, and Math) as ‘the job’ of the future and forecasts around 7 million new STEM jobs by 2025 in Europe [1]

We are at the crossroads where so many positions are needed or will be needed that involve STEM and not enough people to fill the labor market.



Nowadays there are few important tendencies affecting STEM globally. Firstly, they are characterized by the rapid growth of industrialization, more known as the Fourth Industrial Revolution, and by the exponential growth of artificial intelligence and automation of most of the human processes [2]. This requires a lot of workspaces to be created by 2030 – and at the same time a lot of workspaces will be taken by jobs directly or indirectly related to the STEM fields [3]. As a result, most of the jobs we have now will soon change.

Secondly, there is a shortage and therefore desperate need for creative and innovative thinking force to ensure that we build a sustainable future to live in. Recent reports show [4] that employers consider graduates to be deficient in soft skills and expect those who are educated to the human, cultural, and social as well as the computational. Indeed, hard skills and specific competencies are vital in STEM, but alone without soft skills are not sufficient to succeed in modern times – the elements of the competency include adaptability, creativity, curiosity and open-mindedness. It means that STEM is missing a key set of creativity-related constructs that are equally critical to fostering a competitive and innovative workforce. Those skills are summarized under the letter “A” for Arts when it goes to STEAM – the next level of STEM education that implements best Art practices in the process [5].

Thirdly, considering general gender inequality in this area, where the percentage of male students and workers prevail, this could be hard to achieve. Unless changes in the education system are implemented providing equal opportunities to access and benefit from quality STEM education.



**According to UNESCO, only 35% of all students enrolled in STEM-related fields are female and only 28% of all of the world's researchers are women [6]**

**With the underrepresentation of women in STEM we're lacking an extensive pool of talent, and the variety of concepts and ideas that can lead to innovation**

Higher education must advance and should prepare students, female students in particular, for the challenges that await them. According to McKinsey recent research on the labour market in Europe [7], Europe needs to create more training and career pathways. Over the longer term, every country in Europe needs to ensure that its educational system is preparing students to succeed, keeping in mind the abilities required for in-demand jobs, such as STEM skills.

Shifting from STEM to STEAM toward Art integration in science, technology, engineering and mathematics studies is crucial in order to adapt to the fast-paced reality. New industrial era requires new interdisciplinary approaches in STEM education, in learning and teaching activities, integrating Art, because creative human resources are crucial in order to thrive in the labour market and solve future problems, that explosion of technology can bring.

According to Partnership for 21st Century Skills, the top 4 skills required for the Fourth Industrial Revolution are: Critical thinking, Communication, Collaboration, and Creativity [8]. At the same time, World Economic Forum also mentions Problem Solving [9]. To be ready for 2030, students should be able to think creatively, be innovative, develop new ways of thinking, running businesses and enterprises, and create new services, jobs, processes, and new lifestyles. The future calling us to make those changes possible through cooperation and collaboration.

**Developing art thinking and creative skills in STEM-related fields is important to stimulate new ways of thinking that will guarantee a more sustainable life.**

**The EU-funded Erasmus+ project **WeSTEAM** has driven STEAM to increase women's attention and curiosity to STEM by investing in their education process through art thinking development**

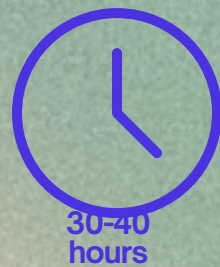
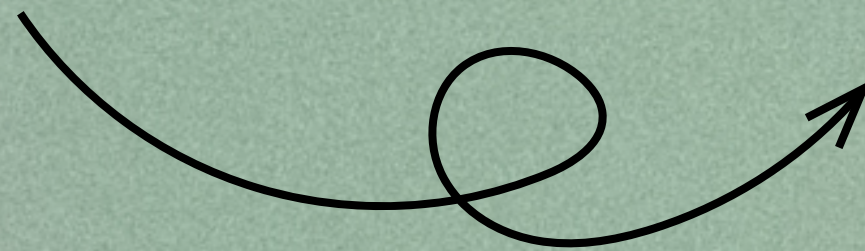


# This Handbook

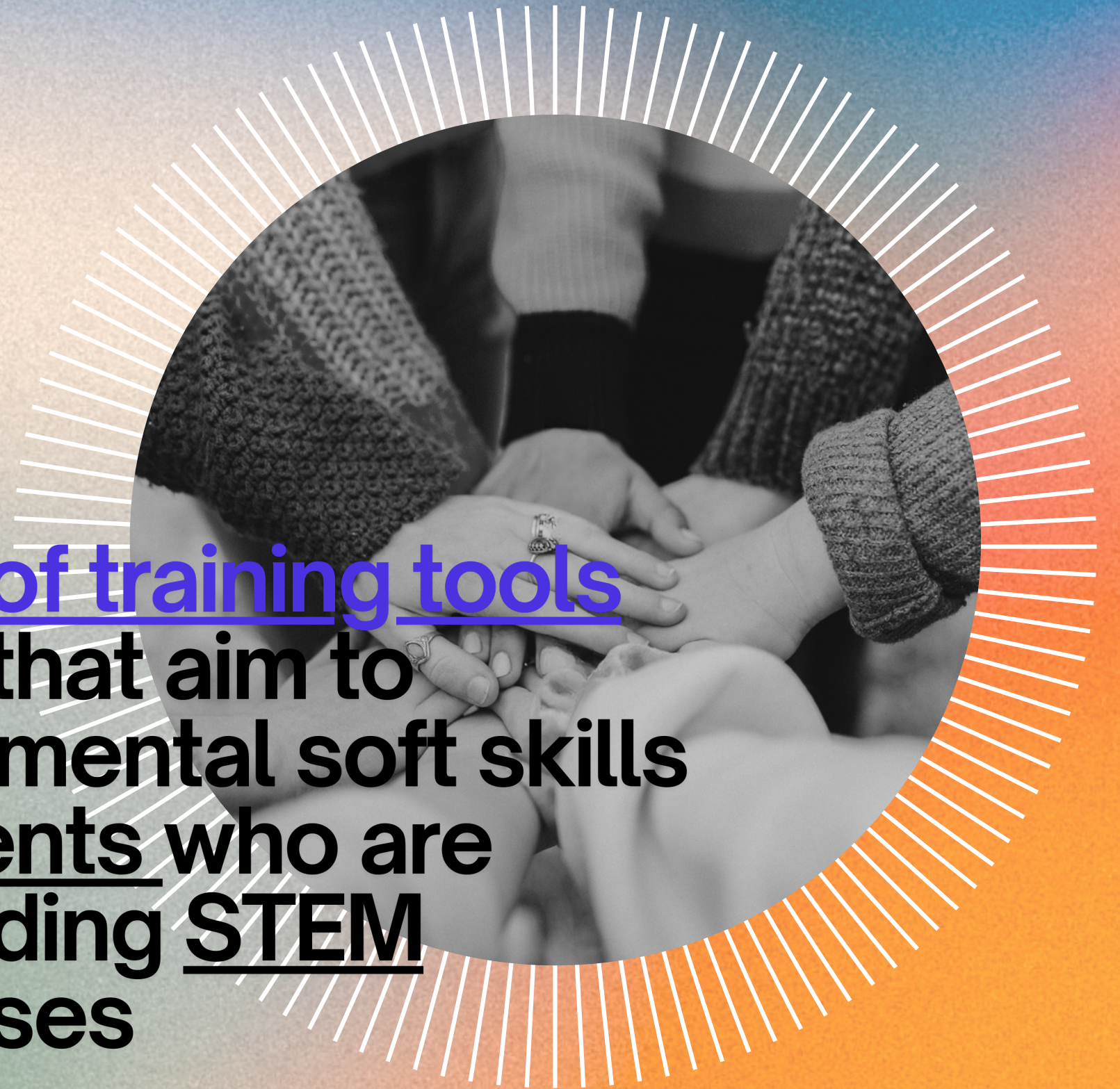
**Has an Aim** to enhance STEM-skills through Art Thinking in female STEM students in order to increase their opportunities of high-level professional attainments and attractiveness of STEM courses.

**Can be used by** educators and teachers who wish to implement an innovative teaching methodology to improve their students' skills.

**Includes 12 activities** that addressed to female students currently enrolled in STEM courses.



provides a set of training tools and exercises that aim to increase fundamental soft skills in female students who are currently attending STEM university courses





Activities and exercises developed within this methodology handbook aim to increase fundamental soft skills in female students who are currently attending STEM university courses. Following the introduction of "Arts" in STEM - i.e. implementation of creative and artistic thinking - we developed a methodology that helps mentoring students while elaborating different types of projects with the aim to empower their skills through an art thinking process. The proposed methodology follows an input-output process that leads students through the development of a project, where each output activity represents the input of the following activity.

The methodology developed follows four stages of the creative process. These phases were previously identified and defined through research based on data generated during focus groups. Through the proposed activities, therefore, this methodology intends to pursue two main objectives:

- Strengthen soft skills in girls STEM students
- Accompany them to develop and finalize the proposed project

In order to create a methodology that incorporates innovative activities and enhances soft skills in STEM students, we started with carrying out a preliminary literature overview considering both academic papers and gray literature (reports, website, educational guidelines). Then, based on this overview, we identified and extracted several best practices and, finally, mapped possible activities to be implemented in the educational process into the phases of the framework developed during the early stages of the project. Specifically, the phases identified are as follows: Incubation Phase, Imagination Phase, Creation Phase and Evolution Phase.

**Methodology follows 4 phases of the creative process, where each phase contains 3 activities – 12 in total – with the aim of guiding the participants through necessary steps to develop and finalize a project (artistic or scientific) and to enhance their skills during this educational and creative process:**

**1**

## **Incubation Phase**

**Creative Visualizations • Connections and Analogies •  
Conceptual Reworking Through Photography**

---

participants carry out research related to the topic of their interest and begin to put the foundations for a more concrete and precise idea.

**3**

## **Creation Phase**

**Shape your prototype • Collecting Feedback •  
Art Data Visualization**

---

project and product development: prototyping and testing; participants begin to understand what works and what should be changed.

**2**

## **Imagination Phase**

**Interactive Mind Maps • Your Project Storyboard •  
Visual Storytelling**

---

participants begin to create and define the key steps for the development of the project; the first goals and objectives are set.

**4**

## **Evolution phase**

**Strengths And Weaknesses • Pitch Your Project Creatively •  
Wind and Anchors of The Project**

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participants aim to complete the project and present it to the audience of experts and can take the key decisions on what should be changed in order to make the project more successful



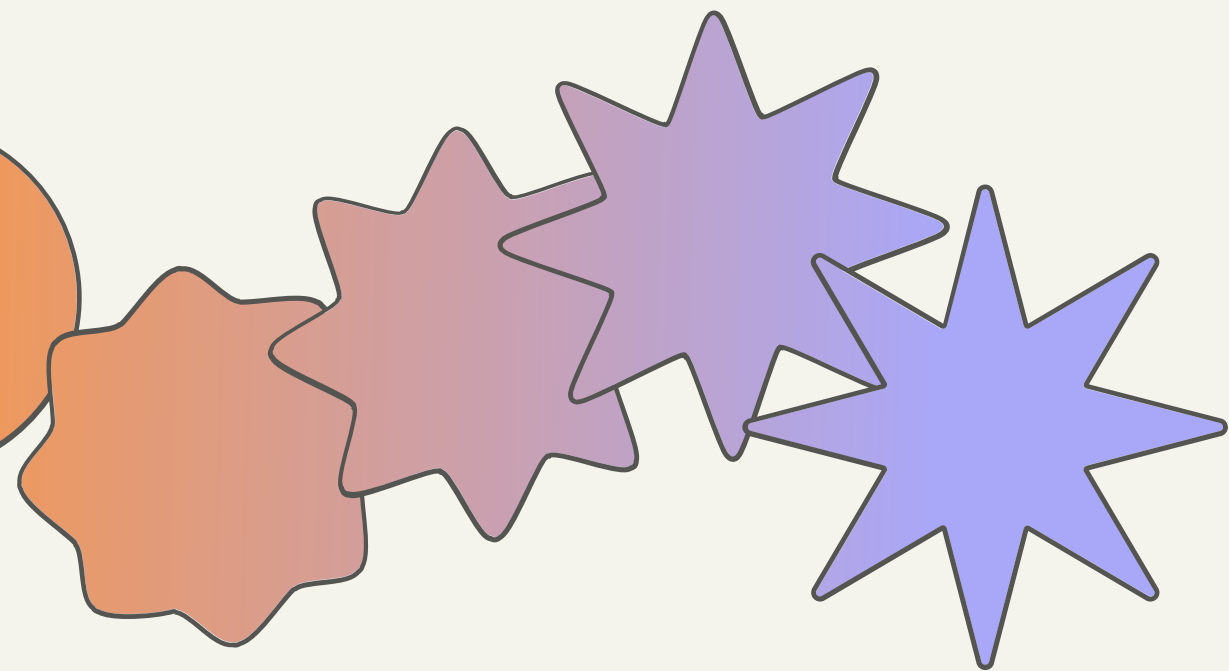
Part of the activities developed were tested previously during the [Ars Electronica training mobility in Linz](#), where 15 girls (STEM students) from the partner countries had the opportunity to start designing virtual reality games to strengthen women's skills through artistic thinking.

In this case, the consortium of project partners decided to set as a final goal of the process the development of a project combining virtual reality, game mechanics and the enhancement of the role of women in society. This choice was done because VR game development is an effective method for imparting art thinking skills in STEAM education, as it facilitates a creative and interdisciplinary approach that encourages innovation and problem-solving. This approach requires a blend of abilities and knowledge from art, design, programming, and engineering. Through VR game development, students can put art thinking skills into practice in a hands-on and engaging way. This involves collaborating with peers, exploring different techniques, and refining their concepts based on feedback. Additionally, VR technology allows students to experience their creations in an immersive and realistic manner, thereby enhancing their learning and motivation.

The effective innovative approach of VR was the main input that led to our choice but also for the artistic-scientific conformation of the consortium of partners in question, however, the implementation of the following methodology can be applied to the creation and development of any type of artistic or scientific project. At the end of these training days we submitted qualitative questionnaires to the participants in order to provide important feedback to improve the proposed methodology and activities. The following activities proposed in this handbook are the result of the study, research and subsequent re-elaboration after this training activity.

1

# Incubation Phase



# Creative Visualizations

**Actions:** Collecting Inputs and discussing: This activity combines collecting input through research with discussion and presentation through exchange of experience and collection of different keywords (positive and negative features) participants associate with educational games.  
Exploring: Participants can gather stimuli for creatively visualizing the topic through online research and thanks to a visit to some exhibitions.

**The activity could be divided into steps such as:**

- Choose 3 key words related to the topic in question.
  - Explore the literature using specific software such as Google Scholar or Research Rabbit.
  - Select at least 5-10 articles and explore their content by downloading them.
  - Extract key words and main concepts from the selected papers.
  - Catalog the contents in a mind map, which can be created by paper or can be virtual.
- In the latter case, the activity can refer to software such as Miro.com or similar.  
The last part of the activity will be reserved for a face to face feedback round in order to discuss deeply about the results achieved.

**Useful Links:** [Research Rabbit](#), [Google Scholar](#), [Miro](#)

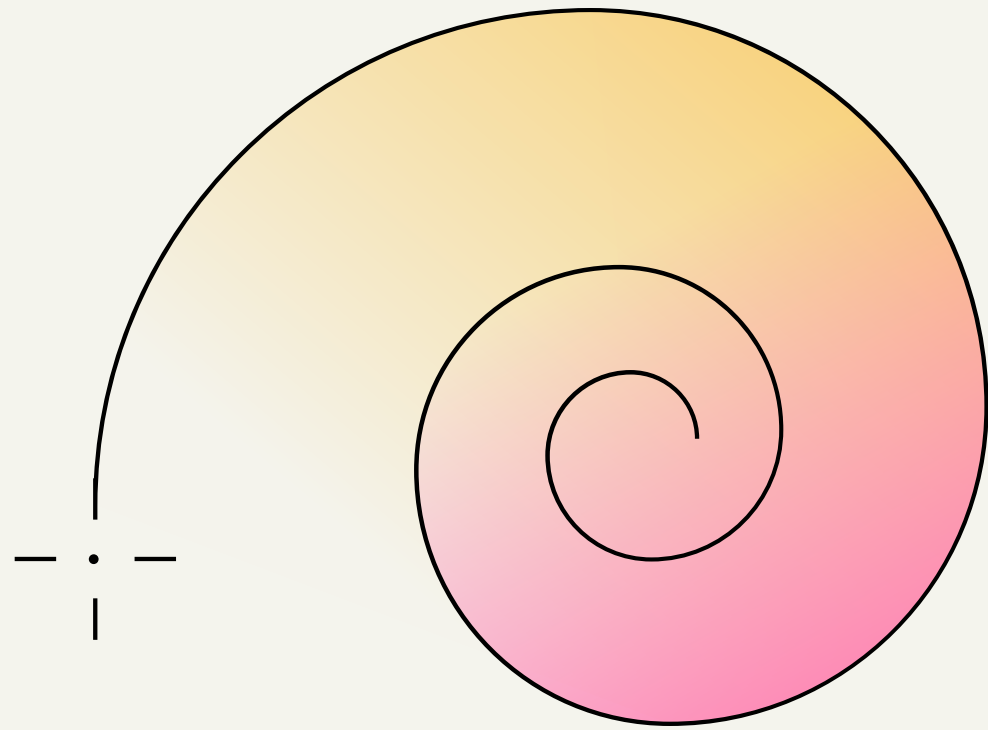
This workshop is aimed at finding ideas and suggestions for games dealing with the topic of girls' involvement in scientific careers. The research aims to generate odds that have never been thought of before and that do not yet exist. Asking questions allows them to question their established systems and offers them the chance to go beyond what is and consider other possibilities. **With the help of specific software, they should research similar projects and then highlight the positive and negative aspects of each**

## Resources you might need



## Skills you'll develop

Analytical thinking • Open-mindedness • Curiosity



## Connections and Analogies

**Actions:** Discussing: deepening the topic through discussions with stakeholders (clients, experts on the topic), using structured tools (e.g., interviews), informal dialogues, or both.

**The activity could be divided into steps such as:**

- a. Take each key word and concept identified in the previous exercise and associate it with a painting, sculpture or art installation. The concept you want to express must be associated with a work of art. Try to find connections between the aesthetics of the artworks and the concepts you want to express in your project
- b. Analyze the artwork and read the information about it.
- c. Then prepare a presentation and present why you have chosen those works of art to explain your main concept.

**Useful links:** <https://artsandculture.google.com/>

Through aesthetic and visual communication and through the analysis of the artworks, participants can broaden and modify their visions and can create new connections and stimuli regarding the concepts they want to analyze.

In this case, this specific activity is linked to the previous exercise. The activity can be divided into two phases. In the first phase the participants have to try to connect the key concepts, which they have previously identified, to some artworks. Once they have connected these concepts to works that are meaningful to them, in the second phase they have to present these works in public and justify their choices.

### Resources you might need

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Tool for artworks search, computer and projectors

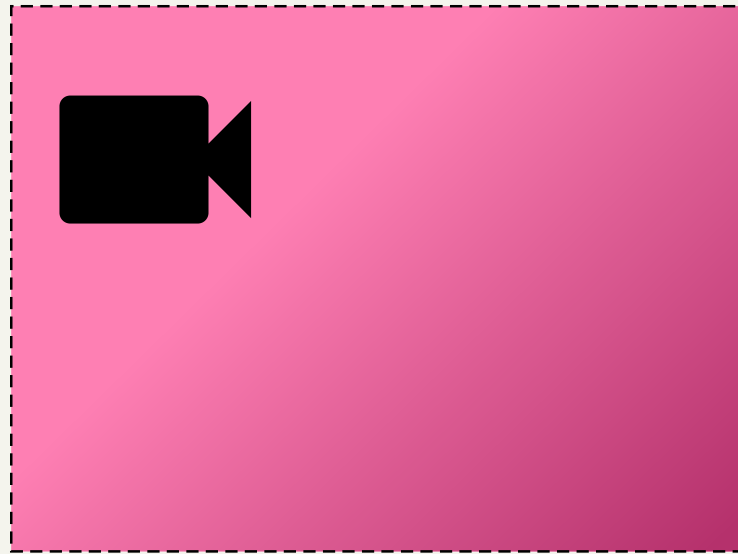


1.5h

### Skills you'll develop

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Empathy • Open-mindedness



# Conceptual Reworking Through Photography

**Actions:** Exploring: gathering stimuli through direct experience, e.g., field trips and visits to museums, exhibitions, research centers.

**The activity could be divided into steps such as:**

The activity can be subdivided as follows:

- a. Participants should take a camera and leave the room they are in. They should go outdoors and explore the world and the environment around them.
- b. Completely immersing themselves in the environment, once they have found an interesting object that can represent the concepts previously identified in the other exercises, participants must take a photo.

The aim is to render the concepts they want to express in everyday visual and aesthetic images.

- c. Once the participants have collected a good number of photographs, they can return to the classroom and collect them into a single presentation. The presentation should be able to express and show the connections between one photograph and another and the connections with the concepts.

This exercise aims to creatively shape and visualize through an artistic medium, in this case photography, the key concepts that participants have identified. In addition, it leads participants to develop a method of transversal imagination open to external and experiential stimuli. Transforming one or more concepts into photographic shots to stimulate the participant to a major visual and conceptual reworking and at the same time wants to put them in touch with reality.

## Resources you might need

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Camera or mobile phone, computer, projector



2h

## Skills you'll develop

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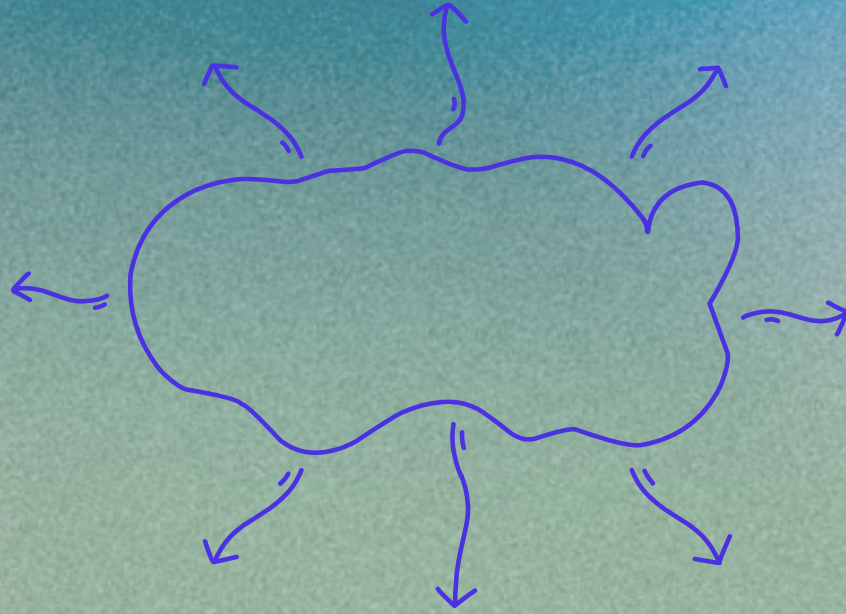
Awareness • Open-mindedness • Curiosity

2

**Imagination Phase**



# Interactive Mind Maps



**Actions:** Choosing tools and content: shaping the idea by establishing its main components (e.g., the materials or tools to be used to implement it and/or the macro-sequence of content that will make up the whole)

**The activity could be divided into steps such as:**

1. Starting from the previous exercise, the participants will have to create a mind map relating to the contents and objectives they want to analyze and express in their project. Using the Miro software, they should enter all the words that come to mind and try to link them together and rank them in order of importance.
2. Starting from this first mind map created, participants will have to create another one with the materials and tools they will have to use to create their project. These should then be ranked in order of importance. At the end of this activity, participants will have an outline of the information organized in radiant form, starting from a center and expanding spatially through ramifications. These general schemes will be useful to clearly understand the development needs of their project. With these mind maps, participants can represent their thoughts and organize their cognitive activities (ideas, concepts) visually and graphically.

**Useful links:** <https://miro.com/templates/>, <https://www.canva.com/graphs/mind-maps/>

This exercise aims to identify the contents and tools that will be useful for creating and developing the project. Using support software such as Miro, participants will be able to create interactive mind maps with the aim of outlining the key steps needed to realize their project. A mind map is a form for capturing ideas, exploring concepts, taking notes and thus gathering information in an understandable format.

## Resources you might need

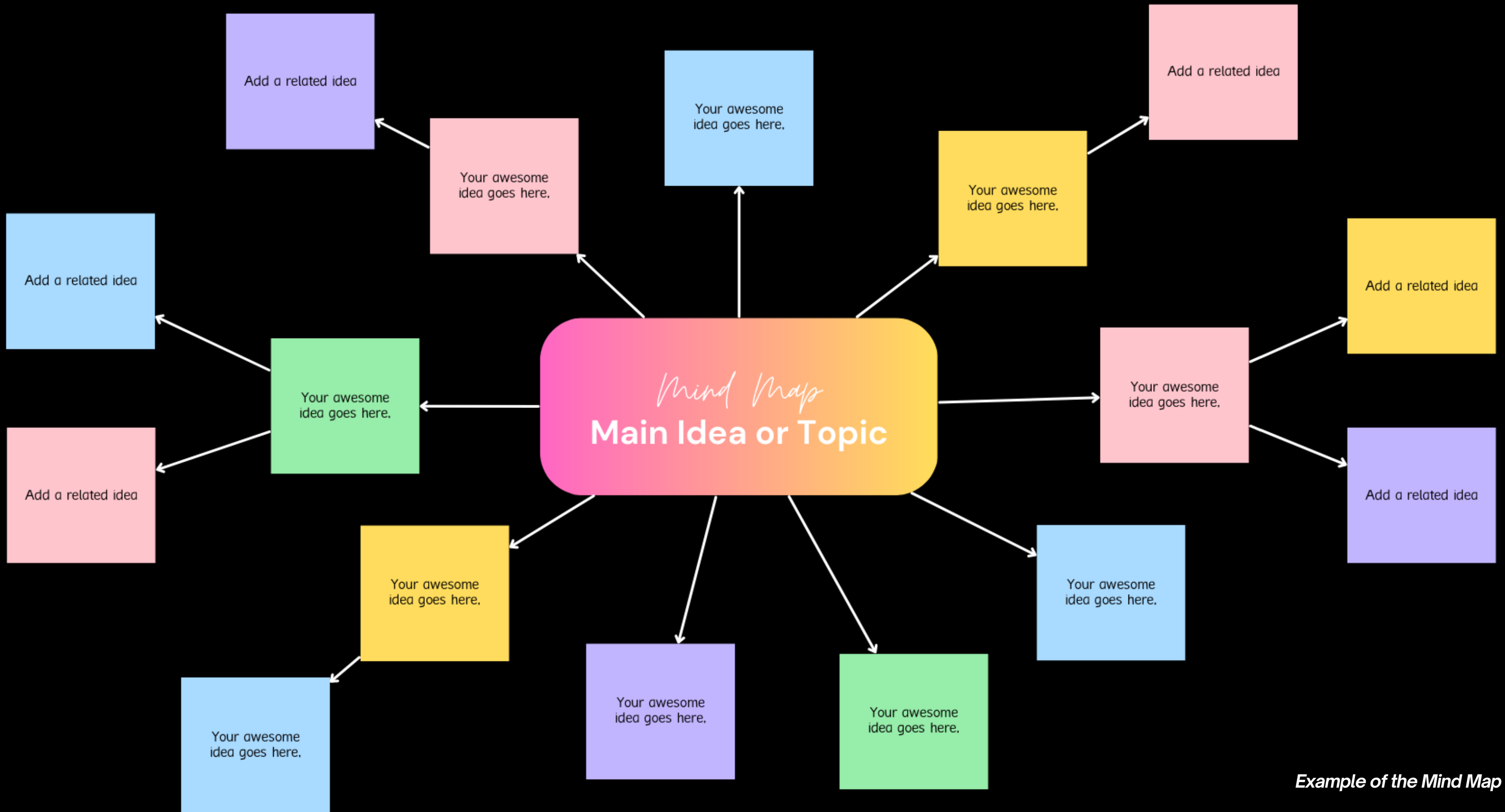
Canva

miro



## Skills you'll develop

Goal-oriented thinking • Open-mindedness •



Example of the Mind Map



## Your Project Storyboard

**Actions:** Visualizing: creating a visual outline of the idea through the use of creative tools (e.g., mind maps, drawings, keywords writing)

First of all, participants should decide to create the storyboard physically or digitally. Subsequently, the activity can be divided into the following steps:

- The first step is to identify the 10 key steps to be taken to build the final product/idea. Participants should try to visually disassemble the final product and then reassemble it into 10 sequences. Write down on a paper what these 10 sequences are and which visual elements should be included in each scene.
- Then participants should start drawing the 10 scenes until they reach the last one that would ideally represent the completion of their final product.

Useful links: [https://www.youtube.com/watch?v=\\_z7YWlshHtE&ab\\_channel=Gorillaz](https://www.youtube.com/watch?v=_z7YWlshHtE&ab_channel=Gorillaz)  
<https://wonderunit.com/storyboarder/>

This exercise aims to identify all the steps for the creation of the project. Once the concept, objectives, materials and tools of the project have been identified, participants must be able to visualize their idea by steps of creation. One of the recommended methods is the creation of a storyboard. The storyboard can be created by drawing sketches with colors and paint, or it can be developed digitally using recommended software. For example, Wonderunit.

### Resources you might need

Papers, colors, pencils, or software



1.5h

### Skills you'll develop

Goal-oriented thinking • Visionary •

17/02/2021



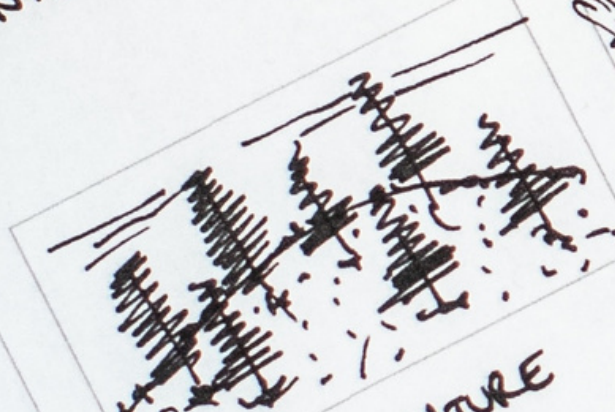
CONTEXTE . FIXE



ITW . FIXE



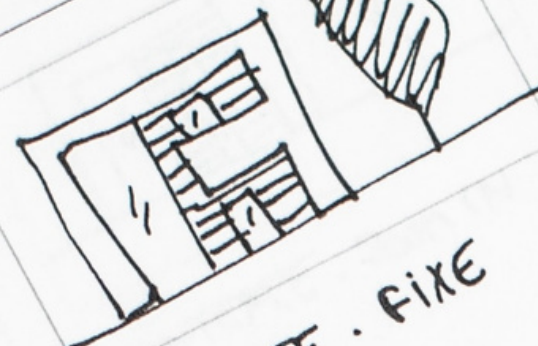
SUN RAYS . STOCK?



ATURE

HOMSPHERE / VIDEO 2

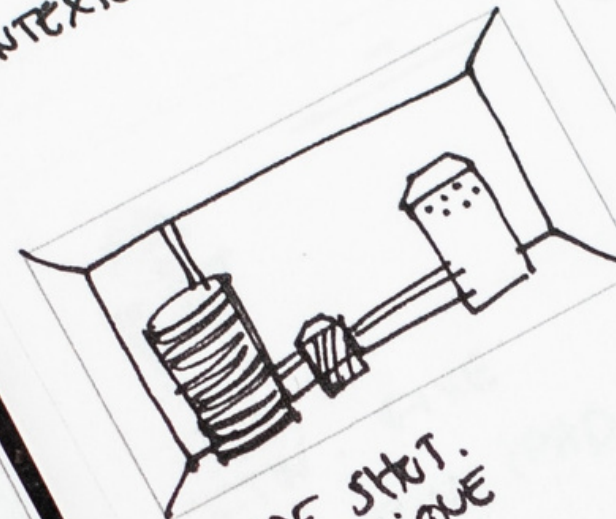
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CONTEXTE . FIXE



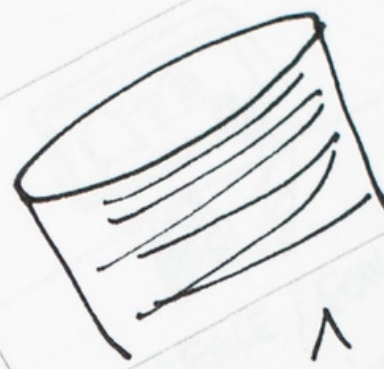
CONTEXTE . ZOOM IN  
DRONE



WIDE SHOT .  
TECHNIQUE



PERSONNE MARCHE  
PORTE .



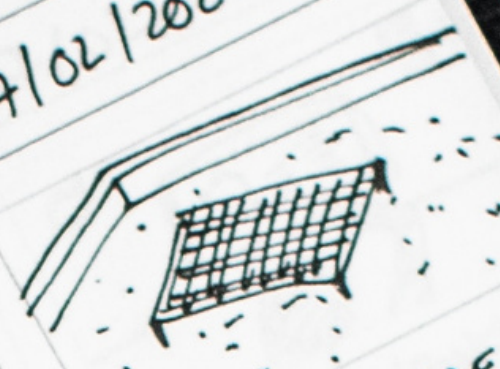
DETAIL 1



PERSONNE DANS  
PIECE DE VIE  
HAND HELD



DETAIL 2



PANNEAU SOLAIRE .  
ZOOM IN .



ITW . FIXE

HOMSPHERE .

Voix OFF : À pré...  
Public cible : du Prim...  
d'environ 1.5 million si ce n...

Idées de vidéos :  
1 ère vidéo : Explication du concept du projet...  
et avantages du projet : Thématiques principales étant la...  
Prises de vue tout le long du projet, fonctionnement et facilité d'uti...  
Présentation générale du projet, fonctionnement et facilité d'uti...  
Homsphere ne nécessite pas à l'habitant de changer son mode de vi...

Transition sans effort. Mise en avant des thématiques principales étant la...  
but de la maison à énergie positive), la finance (réduction des frais de c...  
et mobilité (véhicule électrique inclus), la transition écologique sans eff...  
du mode de vie. La maison du futur existe déjà, c'est la maison Hom...

2 ème vidéo : Présentation de la maison témoin, prise de vue d...  
en toiture et de l'extérieur afin de se rendre compte de l'archit...  
isée, etc), coup d'oeil sur la salle technique...  
filmée à l'extérieur (drone), et dans la salle technique...  
main à Thônex, avec des vues extérieures et l...  
aux photovoltaïques en toiture et l'exté...

technique égaleme...  
la maison. Côté...  
ner un asp...  
l'ipa...



# Visual Storytelling

**Actions:** Planning: developing the plan for implementing the outcome, establishing goals, timelines, human and material resources. This exercise help to come up with more complete idea of what the finished project will look like and to visualise the narrative. The main objective is to find and focus the visual narrative. Are the concepts being clearly presented? What needs to be changed or added, etc? Is the sequence for the development of the project correct or does something else need to be changed or integrated?

**To realise this activity participants will have to follow a few steps, which will be briefly introduced below:**

1. Load the storyboard into a video editing software.
2. Create a timeline. Establish the duration of each animation according to the project.
3. Add sound. Adding dialogue and sound will help visualize scenes better, eliminate unnecessary jokes and create better timing and rhythm.
4. Highlight character movements. Arrows should be added to the animation to show character movement on screen and highlight camera movement to give a more detailed idea of how the finished product will unfold.

Throughout the process, participants should be flexible and open to making necessary changes or cuts.

**Useful links:** [https://www.youtube.com/watch?v=MRyPSOyC7\\_c&ab\\_channel=Gorillaz](https://www.youtube.com/watch?v=MRyPSOyC7_c&ab_channel=Gorillaz)  
[https://www.youtube.com/watch?v=\\_oOtlSB2BG8&t=25s](https://www.youtube.com/watch?v=_oOtlSB2BG8&t=25s),  
<https://www.youtube.com/watch?v=aANb-BpvASK>

This exercise focuses on using the participants' storyboards and creating an animation.

An animatic is a tool used in the audiovisual world to give movement to static images. It is used to give rhythm to the idea that the participants want to create. It is a technique used as the next level after the storyboard, to bring previously drawn images to life. It also allows the synchronized integration of a series of images with voices, sounds and musical effects to illustrate the flow of a moving sequence. Both animatic and storyboard are the basis of animation and the development of an audiovisual product.

## Resources you might need

Video editing software (iMovie, HitFilm, Lightworks)



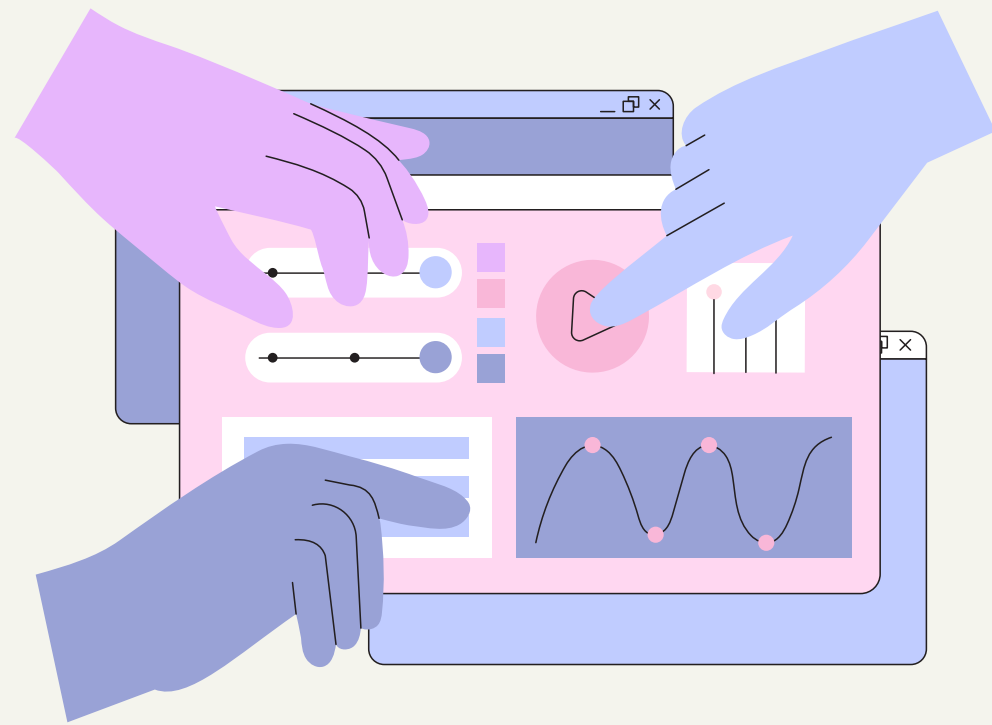
3-4h

## Skills you'll develop

Goal-oriented thinking • Open-mindedness •

3

Creation Phase



## Shape Your Prototype

**Actions:** Prototyping: creating a model of the outcome of a more or less defined level (based on the complexity of the outcome), but effective to be tested (shown/used/experienced, etc.)

The following activity can be divided into five main development phases:

- 1. Rapid prototyping:** Build a small-scale 3D prototype of the world or scene of your concept. Resize it to fit the timescale. Select a key design or mechanism to build in 3D on a 1:1 scale, physical, digital or virtual.
- 2. Communication:** What does the user need to do? What information does the user need to understand?
- 3. Observation:** Does the experience trigger the things you were aiming for? Would the user try it again? To gather feedback from IRL tests, you need to observe not only what people say, but also what they do and how they react.
- 4. Fail fast mentality:** Things will never go as planned. Tests and failures will yield lessons for subsequent iterations.
- 5. Testing:** Finding people. Testing. Iterating.

After carrying out the previous exercises and outlining the key steps to follow, it is time to give shape to your prototype. During this activity, participants will have to create a 3D model of the world or scene they want to create. They can choose whether to create it with materials such as cardboard, colours, supports, etc., or to create the prototype with 3D modelling software. This activity is aimed to introduce rapid prototyping of immersive experiences. The objective is to build, test and rapidly iterate a game mechanism or project with tools such as ShapesXR, Mozilla Hubs, Lego, paper or a physical space.

### Resources you might need

3D softwares, visual art and visual literacy programming software, papers, colours etc



4h

 SketchUp

ZBRUSHCOREMINI

 Processing

Stéphane GINIER

### Skills you'll develop

Awareness • Tolerance for failure •

Useful links:  
<https://www.sketchup.com/plans-and-pricing/sketchup-free>  
<https://stephaneginier.com/>  
<https://www.maxon.net/en/zbrushcoremini>  
<https://processing.org/>



Examples of VR Environments, 3D Prototypes





# Collecting Feedback

**Actions:** Reviewing: collecting feedback through informal or semi-structured methods of discussion (dialogues with stakeholders, questionnaires, focus groups, trial exhibitions or presentations)

**The topic of analysis and research on which participants will have to construct their questions will have to be their virtual game prototype.** Participants will have to decide on the most advantageous sampling method to help them recruit and select participants in order to interview them for feedback. Some sampling methods are: voluntary response sampling, such as posting a flyer on campus and searching for participants based on their responses; convenience sampling of those who are most easily accessible, such as fellow students; stratified sampling of a particular age, race, ethnicity, gender identity or other characteristics of interest to you; or judgment sampling of a specific set of participants you already know you want to include. Once the focus group has been created, participants will set a time and place. After the focus group has concluded, participants will debrief, recording their initial impressions of the discussion and any highlights, problems or immediate conclusions they drew. The next final step will be to transcribe and clean the collected data in order to make it presentable and useful for reading and analysis.

## USEFUL LINKS

[https://universityplanning.wp.olemiss.edu/wp-content/uploads/sites/98/2016/05/Trinity\\_Duke\\_How\\_to\\_Conduct\\_a\\_Focus\\_Group.pdf](https://universityplanning.wp.olemiss.edu/wp-content/uploads/sites/98/2016/05/Trinity_Duke_How_to_Conduct_a_Focus_Group.pdf)

The objective of this activity is to gather external feedback on the prototype project which participants are trying to develop. External feedback is always very useful because it broadens perspectives on the analysis and vision of a product.

Participants should work on creating a series of questions to ask the participants of their focus groups. The questions that are asked of the focus group are of fundamental importance for the analysis of the participants. Participants will need to take the time to formulate the questions, paying close attention to the wording. They should be careful to avoid leading questions, which may influence the answers.

## Resources you might need

Computer, pen, pencil, posters, post-it



1h

## Skills you'll develop

Teamwork • Listening • Tolerance for failure



# Art Data Visualization

**Actions:** Iterating: starting from the feedback collected, focusing on strengths and weaknesses of the outcome and return to prototyping, enhancing the strengths and improving the weaknesses.

## Detailed roles and activities:

The aim of this exercise is to summarize the results creatively as art is a powerful educational tool that can amplify the power of a concept or idea. It can act as a catalyst to enhance the creative capacity of the participants.

Each group must choose an appropriate artistic way of presenting the collected feedback in order that helps them identify what they can learn from the feedback. The way of analyzing is free, but should include at least: 5 things that were experienced as great, 5 things that were experienced as improbable and ideas for doing so.

Then the visualizations are presented to the group and mentor to get their feedback as well and to inspire others.

Useful links: <https://www.nathaliemiebach.com/>

Artistic visualization of focus group results. Each group has to artistically represent the results of the focus group feedback collected in the previous exercise. Participants will then transcribe and clean the data gathered from the focus group presentations. They will then decide on a way to visually represent this data in an artistic way, such as creating a collage, abstract painting, 3D sculpture, line art, etc.

## Resources you might need

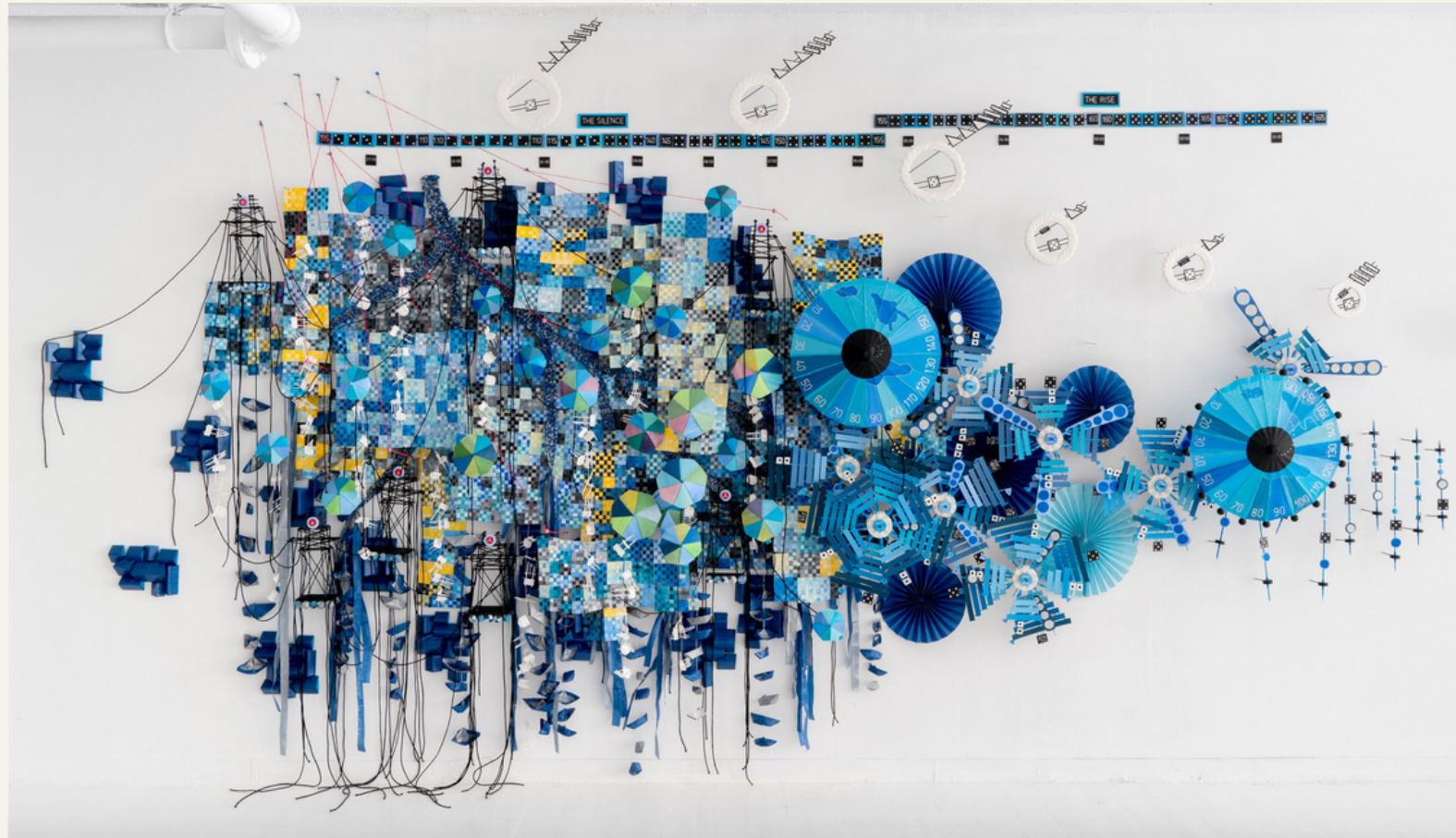
Computer, pen, pencil, posters, post-it



1h

## Skills you'll develop

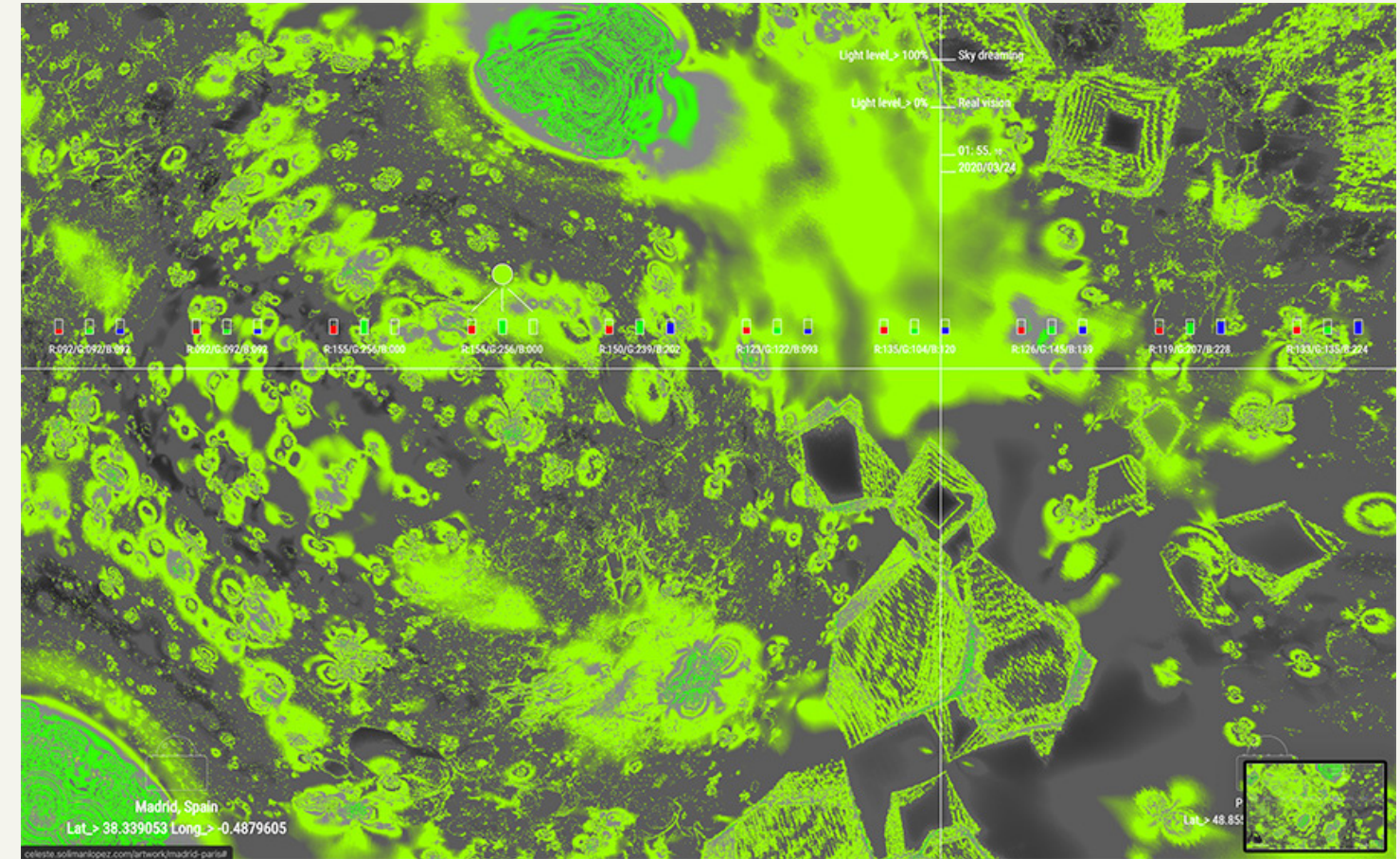
Problem-solving • Disruptiveness •



**Nathalie Miebach - The Burden of Every Drop, 2018**  
**Wood, paper, rope, data / 204”x120”x12”**

This is a story about Hurricane Maria – about the fierceness of the wind and rain, about the data silence as all electrical systems broke down, about the vastly underestimated death toll, about rebuilding and about people leaving the Puerto Rico.

[www.nathaliemiebach.com](http://www.nathaliemiebach.com)



**Soliman Lopez, CELESTE, 2017**

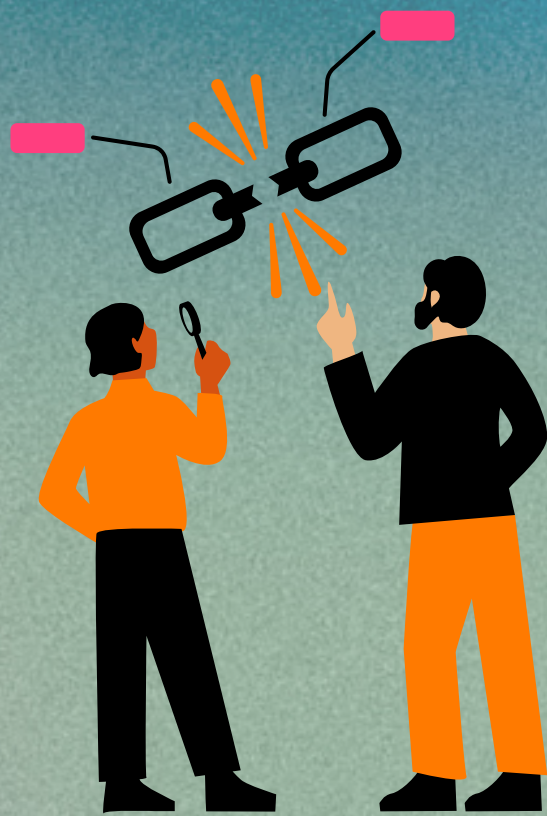
Through a beacon equipped with the necessary material to capture the image of the sky in real time, the system extracts the colours obtained and combines them in a new digital interface that can be visited at the web-site or through different types of installation.

During the night in any of the locations, the system goes into «sleep» mode, accessing a database of images of ideal skies mixed with colour alterations. Solimán Lopez brings together the skies of different cities around the world and displays the colorimetric variations of these unions.

[www.solimanlopez.com/portfolio/celeste/](http://www.solimanlopez.com/portfolio/celeste/)

# 4

## Evolution Phase



## Strengths and Weaknesses Towards the Finalization

**Actions:** Finalizing: completing the outcome at its highest possible level of definition

**Influence diagram Creation:** In the influence diagram they should bring together both the feedback received and their personal reflections. This information contained in a diagram will help to divide each action into categories in order to be able to make the best decisions for the finalization of the project. What do we do? a random variable - What is the result? and a final evaluation - Do we like it?

**Mobile kinetic sculpture:** Mobile sculptures are suspended sculptures that can move through the air. To be constructed, a balance between the various forces in the sculpture is required. In this activity, participants will use the information obtained in the influence diagram and create their own moving sculpture. The mobile will help them artistically visualize how their decisions/outcomes influence each other and how they balance each other.

### Useful links:

<https://www.scientificamerican.com/article/balance-the-forces-within-a-mobile/#>

<https://www.marcomahler.com/how-to-make-mobiles/>

During this activity, participants will try to create two different systems that will enable them to understand what steps they need to take in order to optimally complete their project. This activity will help them take the final decisions on their project and then subsequently continue with its finalization.

During this workshop, participants will first create an influence diagram and then transform their influence diagram into a moving kinetic sculpture. In this way, they will visualize how their final decisions will influence and balance each other, leading them to come up with the best solution to finalize their project.

### Resources you might need

Heavy construction paper/cardstock, Hole punch, Pen, Markers, Scissors, Tape, String, thin wire

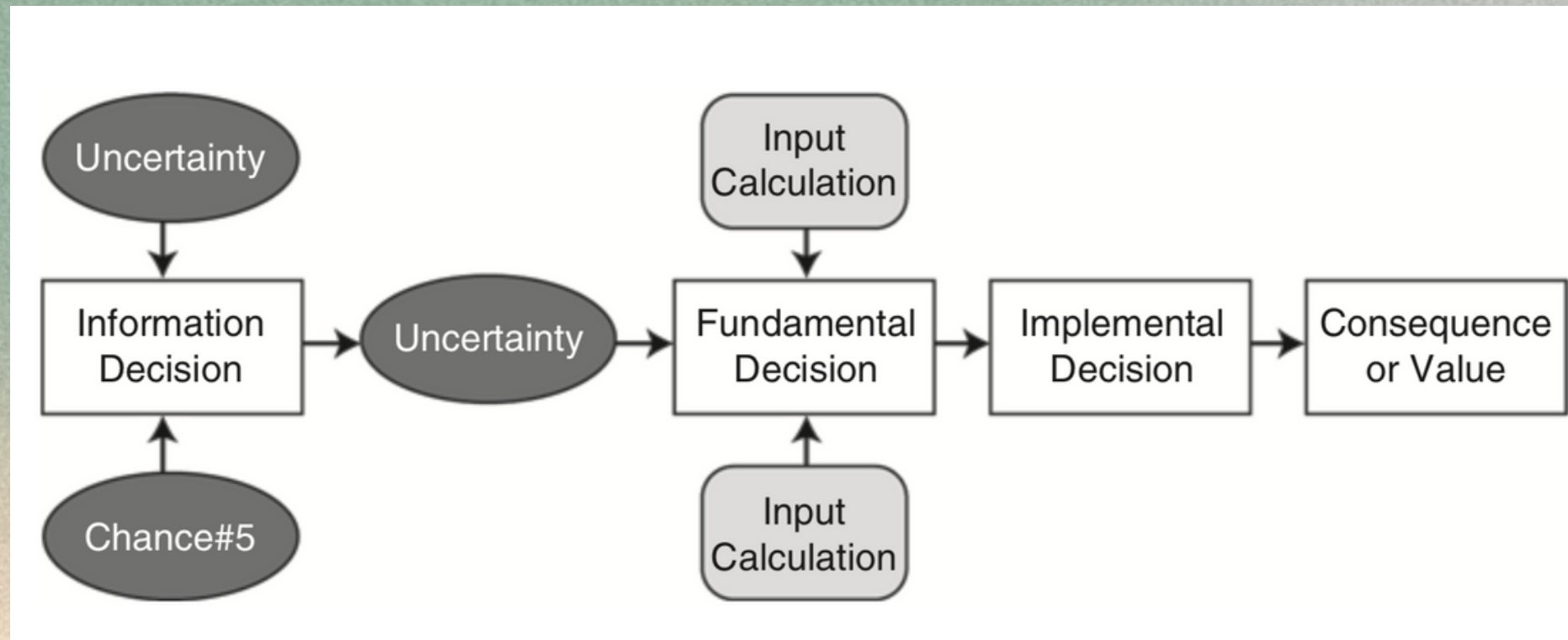


6h

### Skills you'll develop

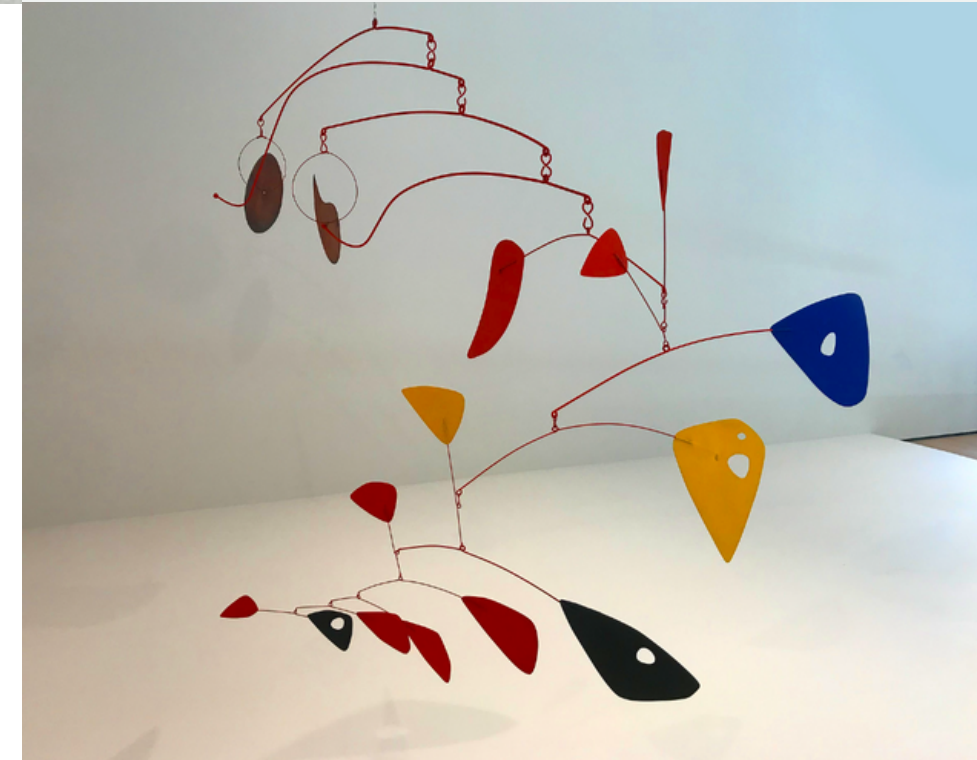
Observation • Passion •

## Influence diagram



Hall, W. L. (2010). Constructing a Decision Model. Sustainable Land Development and Restoration, 111.

## Mobile kinetic sculpture



Alexander Calder "Mariposa" 1951 (1), "Double Gong" 1953 (2)



# Pitch Your Project Creatively

**Actions:** Communication: identifying who the main target audiences of the outcome are and developing one or more ideas for its dissemination, considering both the "message" (key words and concepts to make it understood its meaning, value, etc.) and the tool (presentations, catalogs, etc.)

**The creation of the presentation can be structured as follows:**

- a) Identifying the target audience for the presentation.
- b) Reflect on the construction process of the project (how the outcome changed between the idealisation and finalisation phases, which aspects were most exciting, which aspects most interested the stakeholders) and identify the key elements to be encapsulated in the presentation.
- c) Preparing the presentation pitch
- d) Once the project has been presented in public, participants should reflect on how to improve the idea based on the feedback received (what are the strengths and weaknesses of the idea?).

During this activity, participants will learn how to creatively present their project/idea to a specific audience. There are various ways to present a project to an audience: through structured presentation methods such as a pitch, or they can present it through a performance or visually using previously developed material, introducing sounds and voices to narrate the process in a creative video. For this activity we will focus on the pitch presentation method. The aim is to create a presentation that can be used by various target groups.

## Resources you might need

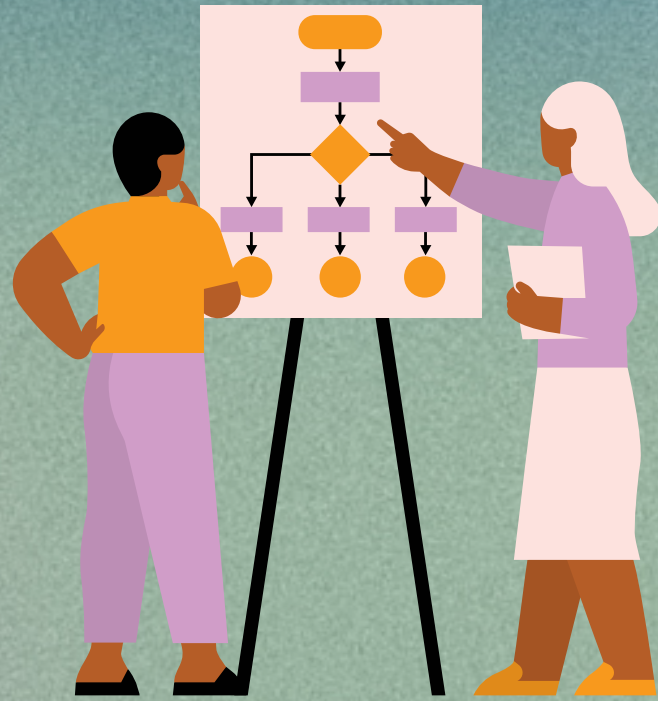
Computer and projector



2h

## Skills you'll develop

Communication



## Wind and Anchors of Your Project

**Actions:** (Further) developing: reflecting on the process in retrospect (how did the outcome change between the idealization and finalization phases, what were the most exciting aspects, what were the aspects that most interested stakeholders) and imagine what could be the starting point to begin a new process.

Participants will have to associate each piece of the sailboat with an element of their project such as: a risk (the anchors), the difficulties to be overcome (the rocks), innovation (the wind) etc. The end result should be a creative design characterized by the important points of the project. Similar themes can be grouped together and the team can discuss their findings and vote on which action items to use to improve the evolution of the project or how to move forward.

**Useful links:** <https://miro.com/miroverse/sailboat-retrospective>  
<https://miro.com/guides/retrospectives/how-to-run-sailboat-retrospective>

This activity is an engaging way for participants to honestly evaluate and reflect on their projects and to understand which is the best way forward to possibly implement new changes or to understand how to continue implementing the project.

Participants should be able to compare their project to a sailing boat, which should be characterised by different elements such as anchors, sail and wind, rocks and so on.

### Resources you might need

Pen, pencils, whiteboard, sticky notes, computer



1.5h

### Skills you'll develop

Observation   Critical Thinking •



# Conclusion

**Creative skills within women-STEM students is a key driver of growth and step to a more inclusive society, where both men and women have equal access to STEAM education and careers. New sources of growth are urgently needed to achieve stronger, more inclusive, and more sustainable development. Innovation can offer vital solutions, at affordable cost, to economic, social, and cultural dilemmas. Innovative economies are more productive, more resilient, more adaptable, and better able to support higher living standards [10]. That's why developing art thinking and creative skills in STEM-related fields is important to stimulate new ways of thinking that will guarantee a more sustainable life.**



**The EU-funded Erasmus+ project “WeSTEAM” has driven STEAM to increase attention and curiosity of women in STEM by investing in their education process through art thinking development. Creative skills within women-STEM students is a key driver of growth and step to a more inclusive society, where both men and women have equal access to STEM education and careers.**

1. [https://www.europarl.europa.eu/RegData/etudes/STUD/2015/542199/IPOL\\_STU\(2015\)542199\\_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2015/542199/IPOL_STU(2015)542199_EN.pdf)
2. [https://www3.weforum.org/docs/WEF\\_Future\\_of\\_Jobs\\_2018.pdf](https://www3.weforum.org/docs/WEF_Future_of_Jobs_2018.pdf)
3. [https://www.europarl.europa.eu/RegData/etudes/STUD/2015/542199/IPOL\\_STU\(2015\)542199\\_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2015/542199/IPOL_STU(2015)542199_EN.pdf)
4. <https://conexxeurope.eu/en/portfolio/skills-4-employability/>
5. <https://knilt.arcc.albany.edu/images/e/e2/The-Prospect-of-an-A-in-STEM-Education.pdf>
6. [https://www.unesco.org/en/articles/new-unesco-report-sheds-light-gender-inequality-stem-education?TSPD\\_101\\_R0=080713870fab200015d15278ceb718dd6f8df9c413e4902a049c55623470d3ac187c2083bad60e2b08f797e853143000d25f06cd353a7abbbdd6bb17c534ec2a78f300a03d1d65277f33802e8bc4d3d3d8b229525cf71dc3b8f8b19d8cf5a2f1](https://www.unesco.org/en/articles/new-unesco-report-sheds-light-gender-inequality-stem-education?TSPD_101_R0=080713870fab200015d15278ceb718dd6f8df9c413e4902a049c55623470d3ac187c2083bad60e2b08f797e853143000d25f06cd353a7abbbdd6bb17c534ec2a78f300a03d1d65277f33802e8bc4d3d3d8b229525cf71dc3b8f8b19d8cf5a2f1)
7. <https://www.mckinsey.com/~media/mckinsey/featured%20insights/future%20of%20organizations/the%20future%20of%20work%20in%20europe/mgi-the-future-of-work-in-europe-discussion-paper.pdf>
8. [https://static.battelleforkids.org/documents/p21/P21\\_Framework\\_Brief.pdf](https://static.battelleforkids.org/documents/p21/P21_Framework_Brief.pdf)
9. <https://www.weforum.org/agenda/2020/10/top-10-work-skills-of-tomorrow-how-long-it-takes-to-learn-them/>
10. [https://www.oecd.org/education/2030/E2030%20Position%20Paper%20\(05.04.2018\).pdf](https://www.oecd.org/education/2030/E2030%20Position%20Paper%20(05.04.2018).pdf)

# Resources

