

# Final Quality Report of MAST project

and *Addendum* to  
Period 01.10.2019 - 30.11.2020

Work Package 5: Deliverable 5.3

Workpackage Leader :



Responsible: Institute of Spatial Design  
Lic.Lic.MFA. **Nayari Castillo-Rutz** (University Research Assistant)  
DI.Dr. **Franziska Hederer** (Assoc. Professor)

Validated by:  
Prof. dr. **Klemen Širok**, MAST external project Quality Expert

To the knowledge of and in agreement with:  
Prof. dr. **Peter Purg**, MAST project lead,  
on behalf of the MAST consortium

# Summary

The present document is the Final Quality Report foreseen in the Project Plan as **Deliverable 5-3**. It gives an overview and general evaluation of the project, and incorporates the last year of implementation including the extension period (WP5-Evaluation/Final Report/Period 01.10.2019-30.11.2020), by building up on past deliverables (5-1 Quality Plan and 5-2 Interim Report Oct18-Sept19. On one hand it shows the *Evaluative Approach* and how it became relevant for the entire project (2018-2020), analyzing different amounts of data carefully distributed and assuring qualitative and quantitative analysis. This final **Deliverable 5.3** has been presented as part of the general MAST Final Report of the consortium. It accumulates or brings together observations, interpretations, qualitative and quantitative analysis of data recollected across the entire project. Specially the solutions and reactions to adversity.

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# 1. Preface

This Deliverable (5-3) or Final Quality Report for Work Package 5 (WP5) on *Evaluation and Feedback* is a document that observes all information concerning WP5 for the project with emphasis in the period established. It gives an accurate account of activities and observations for the period.

Observing the attributions of WP5 is possible to extract:

**“This work package joins all activities related to quality and feedback such as monitoring and interim reports, wrapped up in a final report. For objectivity, it is coordinated by P3, not involved in top-level management.”**

The MAST Quality and Feedback system or Work Package 5 was initially reported as **Deliverable 5-1** (the first progress report or Quality Monitoring Plan ), it presented the framework for the evaluation of the MAST project. It consisted of a Monitoring Plan and the establishment of 6-Months Interim Reports and a Final Quality Report. It was an exhaustive 10 pages document, it presented the overall conceptualisation, changes and improvement measures taken into account in the Evaluation process of the project, including the External QA consultant's collaboration.

Posteriorly the **Deliverable 5-2** (WP5-Evaluation/ Second Progress Report/ Period 01.10.2018-30.09.2019) was created and attached to the second progress report as a 10-pager document observing not only the activities, but the reaction around the exit of a partner (Kitchen Budapest) and the respective actions. The present document: **Deliverable 5-3** presents an overview and incorporates as well, the last year of implementation including the extension period (WP5-Evaluation/Final Report/Period 01.10.2019-30.11.2020). On one hand it shows the Evaluative Approach of the Quality and Feedback System, which was at that point to become relevant for the entire project (2018-2020), analyzing different amounts of data carefully distributed and assuring qualitative and quantitative analysis.

For the months 7-18 (Period 01.10.2018-30.09.2019) accompanying the second progress report as deliverable 5.2, a complete and condensed report was presented according to the above framework and parameters. The third six-months period report has been compressed with the final report for WP5. Since this should have been a third 6-months interim report and due to the extreme situation of Covid-19 many of the activities were reformulated, it was decided to report the period as a whole entity. This report thus presents an acuminous observation of the process occurring from months 19 (October 2019) until 28 (August 2020), including the extension period expanded until the end of November 2020.

This Final Evaluation Report builds up on the Second Progress Report (5-2), expanding the data accumulated during the last period of the project. It takes in consideration and observes the development of the project and activity structure from all other work packages, showing results of monitoring with qualitative and quantitative methods. Special emphasis is made on the set-backs (e.g. covid-19 crisis) and the solutions brought to the table by the consortium (e.g. hybrid events, extension, among others). The report shows the activities, deliverables and their respective evaluation system, displaying an analysis of the obtained data.

## 2. In Retrospective

At the beginning of the implementation period (7-18 months), the consortium had a difficult job to overcome all obstacles, in particular catching the lost time and all inconveniences created on the process of the existing partner (Kitchen Budapest), this set back was nevertheless surpassed with strong decision-making skills and by acting as a cohesive consortium. The approval by the commission new constellation, where responsibilities were divided among the consortium partners proved to be effective. By the start point of the last implementation and reporting period (19-28 months) the problem was solved and most of the activities were smoothly running. At that time, the critical point expressed in the report seeing weakness in the relation with the industry: “the CCS industry relationship had not been completely developed, thus the consortium will lend special attention towards this deficit in the last reporting period.” was a red thread that determined many of the activities, especially the external synergies developed during the period. In the very deep event analysis performed within WP2 it is possible to see, not only the wide range of ILEs that were realized and how they impacted the student life and the different universities mentalities, but also statistics on wordings, educational methods, participation and other important qualitative and quantitative developments. In this document it is possible to see a detailed account of these observations.

During the period, starting in February 2020 the first sounds of the international crisis of COVID-19 had a gigantic impact in the development of the project.

### 3. Implementation: Events, Methods and Timing

All events were thoroughly documented and evaluation systems were deployed (SWOT for internal evaluations, video documentation and Questionnaires for the different stakeholders). Self-evaluation has been key to the changes and developments of the project. In particular, during the first COVID-19 crisis in March 2020, a questionnaire was used to understand the situation of the partners and to give a snapshot of the consortium. This information had an important role in the application for extension that was granted. The consortium responded actively towards the situation by re-allocating resources thought for travelling into Hybrid experiences as the 4th ILE in Graz: part A "Stories of the Neighborhood" (online), and part B "In|filtration" Exhibition. Or the Hybrid Interface Academy in September 2020, a very important gathering showing results, discussing the entire project, and presenting the perspective of students, invited guests and industry persons alike. All these achievements are presented as part of two extra publications that accompany the MAST-Final Report as extra deliverables: The MAST Manual — a printed 1000 exemplars edition of the most important lessons learned, shedding lights on the different formats created under the MAST (MAST Challenge Lab, Innovation Catalyst, among others); and the Spatial Experiments in Art, Science, and Technology that describes and analyses different experiments on spatiality as determinant method to involve the CCS. It is possible to see in the different deliverables coherent strategies for dissemination, evaluation and sustainability.

A fundamental advance for the project happened in the Interface Academy in Rijeka 2019, this gathering was key for the development of the MAST Challenge, the structuration of the MAST Innovation Cycle, the consolidation of ideas around the Innovation Catalyst, and the definition of the second year topic on SOLIDARITY. All events from this point and evaluated under this report deepen forward into these structural concepts. It is necessary to say that the Interface Academy in itself, represented an important evaluation turn point, where the reflection constructed the entire subsequent development.

In the following graphic it is possible to see the complete series of Events happening under the umbrella of the MAST-Project. Just from seeing this and other quantity and quality data analysis reported under WP2 Final Report is possible to see to what extent the MAST-Project was successful. During the MAST Project, 9 Intensive Learning events (ILEs) were organized by the MAST consortium in different locations in Europe. Being most of the events organized face-to-face (7) and some online due to the COVID-19 pandemic (2). Fig. 1 indicates the topics, locations, dates, and formats of the ILEs.

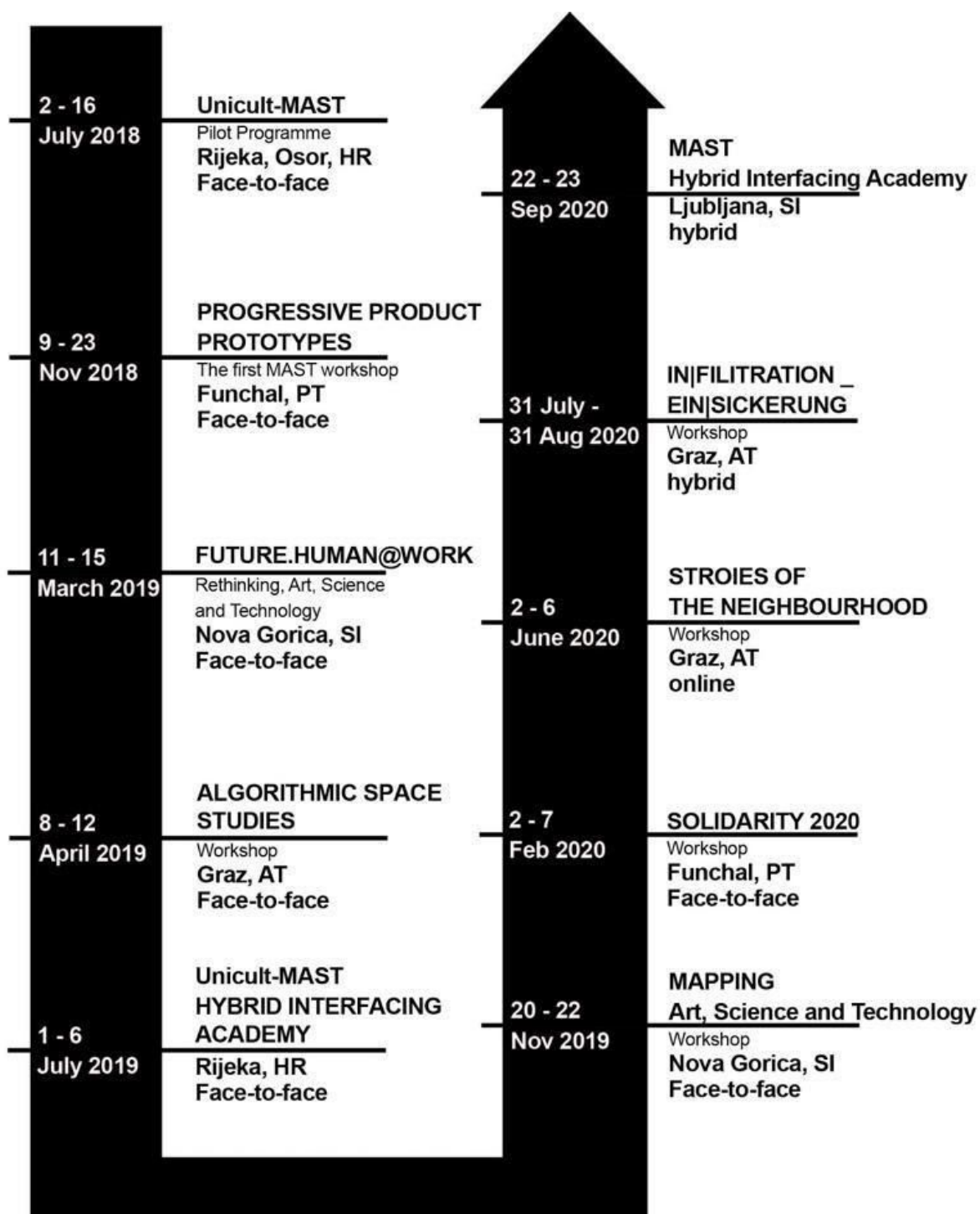


Fig.1.MAST Events

## 4. Set-Back and Solutions

In February 2020 during the Solidarity Challenge Lab in Funchal, Madeira the first signals of a global pandemic crisis started to be common word across the consortium. Even if the first cases were observed it was impossible to predict the consequences and its magnitudes, at that time and preventing that many events were starting to be postponed we deployed a [status-quo questionnaire](#). In it is possible to see answers the questions as:

### Is the Project Plan/Work Package/Agenda affected by the current situation? How?

A1- Completely

A2- Intro note: the consortium is now in the process of prolonging the project – issuing a request with re planning and budgeting. WP1 (Curriculum, >> Teaching & Learning Methods Act 1.2) \_NOT AFFECTED, closed. WP2 (2.1- Partial course implementations) \_ AFFECTED, the Graz ILE (last one) was shifted from April/May onto June 2020 and will take place online only WP3 (3.2- Lessons learnt among the partners >> the Article..) \_ AFFECTED only slightly as collaboration is now slowed down by re-organisations (esp. the Interfacing Academy event), affecting the final scientific article conception and co-writing, as well as the "MAST Manual" as the central, "converging" output and essence of all key deliverables WP4 (Project Management /Lead; >> Meetings) The meeting planned to happen in Graz will converge with the one to take place at the IA event end of September.

A3- Yes, dissemination meetings/workshops cannot take place- dissemination needs to move online. And project results dissemination depends on all other Work packages that may not be finished.

A4- Yes. Mostly because planned physical events can not happen, also because PG meetings at which we would have working meetings for specific tasks can not take place (and is increasingly difficult to synchronize all online meetings as everything is migrating online - the workload increased at least 75 % - 100 % due to inefficiency of online meetings). It is also difficult to draft external experts for the activities planned to be done in person (videos, coordinated efforts for business plan with external advisors, changing and reorganizing - rescheduling already planned activities ...)

A5 Extremely affected, since all the observations are being displaced and most of the events need to be reconfigured. Also elements of the evaluation need to change and measurements need to be taken to assure quality.



**If postponed, how does this affect the economic situation of your institution? What are the financial effects? How will you overcome them?**

A1- Yes, we need to rebudget since there is a shift of our activities from mobility to more online activities

A2- UNG will buffer the prolonged duration of the project in terms of redistributing work onto a longer period and coming up for the last batch of activities with some of their own financing (the 20%).

A3- Pop up event cancelled: As due to COVID 19 the conference back to which the pop-up event for MAST was planned cannot take place in person, we would like to reduce the event catering budget (from 4690EUR to 776 EUR) and the travelling and subsistence budget (from 9950 EUR to 5134EUR).

A4- We do not foresee major financial difficulties that would be the sole result of this action (postponement), major difficulties may come as a result of unpredictable circumstances in the future that will require constant reshuffling and rebudgeting of efforts / activities.

A5- TU Graz is terribly affected by the situation, the basic income of one of our workers and student assistants is not warranted. Some of the project parts are in danger and all travel money needs to be allocated in other parts to subvert the situation.

**How does the official extension benefit your institution?**

A1- It is essential for the success of the implementation of MAST in Madeira

A2- The prolongation will relieve the institution in coping with the general and overall prolonging of activities also on other projects, as well as pedagogical activity (School of Arts.), the deliverables will thus become of better quality and the IA event embedded in a supposedly realistic implementation context in a post-covid-19 recovered context of the broader region, and the country.

A3- The longer the time the more thorough and widespread the dissemination can be.

A4- Gives us more time to get at least a large portion of planned activities and deliverables finished.

A5- It gives the possibility to activate the postponed ILEs, it works for us in the production of printed material and deliverables. It is difficult in monetary terms, but very good for the implementation.

By Analyzing the data it was possible to tell that the Consortium needed a solution to keep the <sup>MAST</sup>past during the pandemic. Also because the geographical situation of some of the partners required a different approach towards presential gatherings. A re-budgeting that could ameliorate the situation internally and balance the costs of new implementations was necessary. At that point, to measure the Status Quo of the consortium also a [SWOT](#) was deployed (Funchal Consortium Meeting). These results shed lights for the preparations of the events. In particular the SWOT showed the conceptual directions, and the questionnaire, the practical. After rigorous consideration and many on-line consortium meetings, where the entire team deliberated on pros and cons to do an extension, we decided unanimously to proceed to an extension. The entire proposal was submitted to the European Commission. The approval of the extension until Nov. 2020 gave the MAST-project the necessary buffer to culminate successfully the activities. Also a new budget plan was developed accordingly giving all partners the possibility to solve the internal problems during the crisis.

## 5.Developed Activities/Evaluation Tools

### 5.1 ILEs

For the evaluation of the different ILEs several tools were implemented: The Dilemma diary used in the first period was changed for printed texts that produced student-reflections as [Zé Povinho](#), Statements of the students, video-questionnaires, reflection-round at the end of the workshop with participants and tutors, critical comments from attendees, the results of the workshops in the form of photo documentation and/or video, etc. A repository cluster of reflections, files, videos textual reports etc. is accessible throughout [the list of events](#). Also comprehensive information can be seen published adequately in the web-page and documented in the WP3-Dissemination Report as presented in the **Deliverable 3-1-1**. The documentation can be considered complete, but a necessary structure was imminent. P2 (M-ITI) developed an interesting analysis of data by compiling information of all the events. Here is possible to follow some of these data analysis, well documented as well in the [MAST Manual](#):

*„These events had an average duration of 1 week and participated in each with an average of 10 students and 3 mentors (Fig. 2). In most cases, mentors were from different institutions and in all the cases, had a mixture of different backgrounds (AST). All of them had the involvement of at least one academic partner, and 62% - 5/8 of NGOs and 50% - 4/8 of Industry. The format of the ILEs varied, being a mixture of hands-on and conceptual work (75% - 6/8), with 50% - 4/8 of them combining it with regular lectures, and leading to the materialization of some type of prototype (62% - 5/8), either individually (62% - 5/8) or in group (50% - 4/8)“.*



	Industry	Academia	NCO	Lectures	Hands On	Conceptual	Prototype	Group	Individual	Duration/days	Students	Mentors
1 Unicult-MAST Rijeka, Osor, HR	x	x			x		x		x	15	10	3
PROGRESSIVE PRODUCT												
2 PROTOTYPES Funchal, PT		x	x	x	x	x	x	x	x	15	9	4
3 FUTURE.HUMAN@WORK Nova Gorica, SI		x	x		x	x			x	5	9	3
ALGORITHMIC SPACE												
4 STUDIES Graz, AT	x	x				x	x	x	x	5	22	2
5 World without human Ljubljana, SI; Bratislava, SK	-	-	-	-	-	-	-	-	-	-	-	-
MAPPING												
6 Art, Science and Technology Nova Gorica, SI	x	x	x	x	x	x	x		x	3	9	2
7 SOLIDARITY 2020 Funchal, PT		x	x	x	x	x	x	x		5	10	5
STORIES OF												
8a THE NEIGHBOURHOOD Graz, AT		x			x	x		x		5	11	2
IN FILTRATION _												
8b EIN SICKERUNG Graz, AT	x	x	x	x	x	x		x	x	30	10	2
MAST												
9 Hybrid Interfacing Academy Ljubljana, SI	x	x	x	x					x	2	12	-
Total	5	9	6	5	7	7	5	5	5	7	10	3
										(average)		

Fig. 2 Formats and Participation Index of ILEs

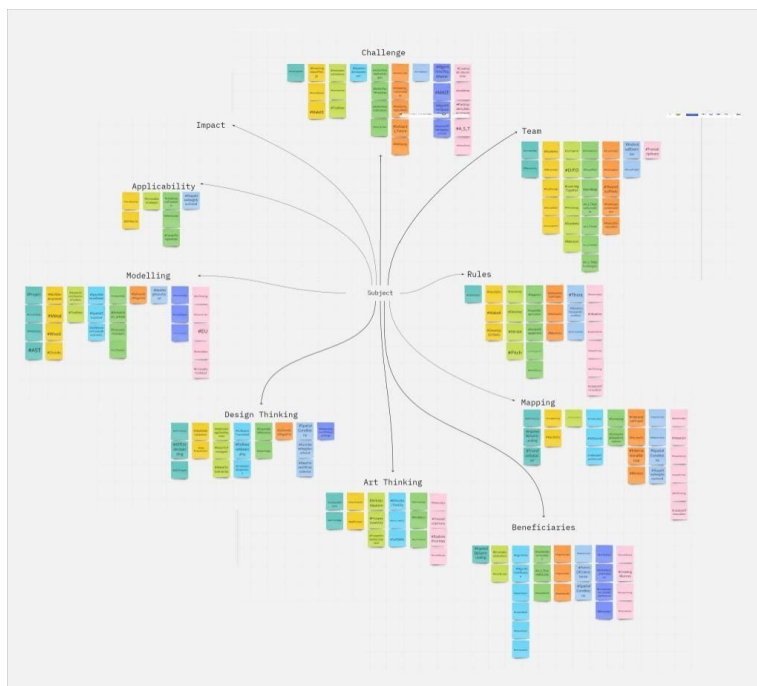


Other material was also analyzed in a very deep way. “The following cluster analysis is based on investigating clear processes and methodological structures implemented during the Intensive Learning events (ILEs). The set analysis started by resorting to MAST website (<https://mastmodule.eu>) and TU Graz’s Research Catalogue pages<sup>1</sup>. These sources were used to gather information about each ILE (Fig.1). For this analysis, it was decided to concentrate on the methodology used at each ILE, and establish a relationship with the 10 steps of the MAST Innovation Cycle (MIC) model proposed by the MAST project. The MIC model proposes the following 10 steps: 1-CHALLENGE, 2-TEAM, 3-RULES, 4-MAPPING, 5-BENEFICIARIES, 6-ART THINKING, 7-DESIGN THINKING, 8-MODELLING, 9-APPLICABILITY, 10-IMPACT.

Excerpts of data available from each ILE corresponding to each of the MIC 10 steps were placed in the corresponding intersections between each ILE and MIC. These excerpts were later encapsulated into hashtags. From the 199 hashtags created, it became apparent that some steps had more data available. For instance, each MIC’s step had an average of 20 hashtags, but the TEAM step had a total of 28 hashtags.”

Part of the resulting analysis can be visualized in the following Mind Map, that selects classifies the concepts (fig.3).

Figure 3: Mind Map



<sup>1</sup> <https://www.researchcatalogue.net/view/595459/595460/> and <https://www.researchcatalogue.net/view/711664/711665>

And can be clustered in the following form (fig.4).

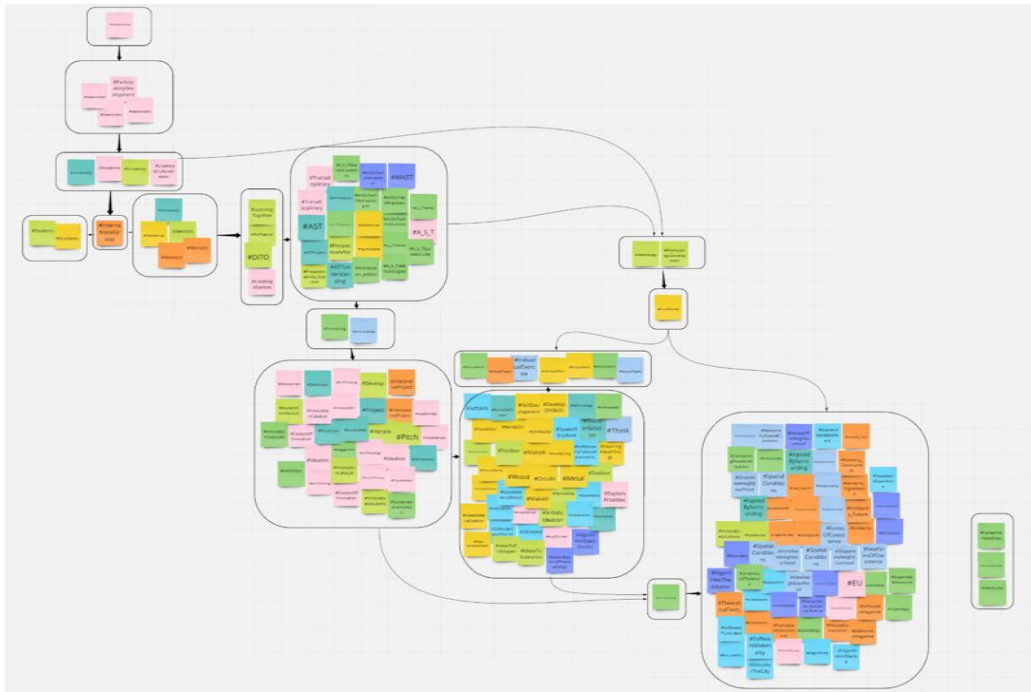


Figure 41: Cluster analysis of MAST ILEs

“A second methodology using text analysis tools was also used to analyze the content and methodology implemented in the different ILEs, KH Coder (<https://kncoder.net/en/>), a free software for quantitative content analysis or text mining utilized for computational linguistics, was used. We computed the co-occurrence of words (verbs and nouns) from the syllabi of all the ILEs (available at <https://mastmodule.eu/events/>). This analysis rendered a co-occurrence word network diagram<sup>2</sup>. A co-occurrence network diagram shows words with similar appearance patterns, by connecting them by lines (edges) according to their frequency of appearance. Only co-occurrences with a correlation value higher than 0.2 are considered for this analysis.”

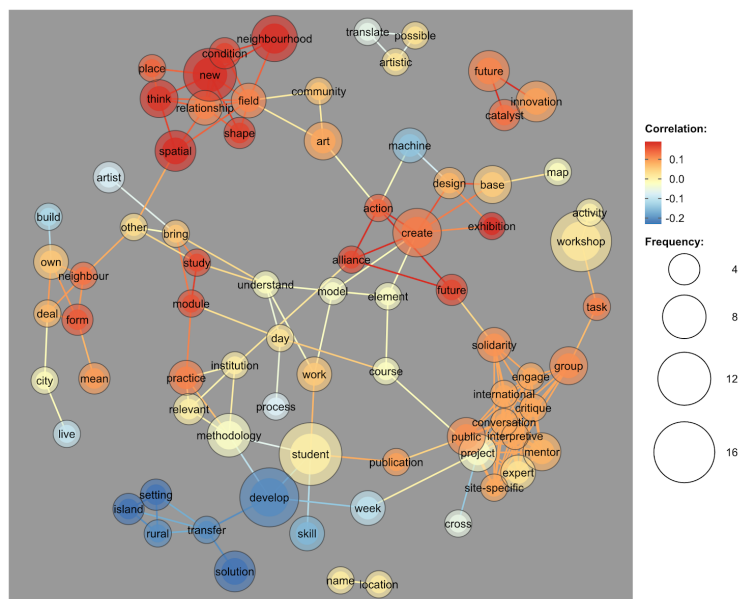


Table 3: Co-occurrence network diagram from the ILEs' syllabi

<sup>2</sup> Higuchi, K. (2016). KH Coder 3 reference manual. Kyoto (Japan): Ritsumeikan University

From this analysis we can conclude that the **MAST methodology to social innovation places the student at the core, who engages with a complex dialog with stakeholders and a critical thinking process for creating innovation with social values through art, and relying on a methodology that primes the understanding and situatedness of solutions.**

This fundamental analysis of activities and conceptual outputs of the MAST ILEs works as important quantitative and qualitative observations. On the one hand quantitative indicators as number of participants, number of events, and or number of used words, shows different aspects of success for the project. On the other hand, the conceptual analysis and the final conclusion, allows us to understand the impact of the teaching methods on the different students. An extended analysis is possible to be seen at the WP2 Events Final Report, presented as **Deliverable 2-1 +3**, and comprehensive reader versions are present within the [MAST Manual](#) and a soon to be published Scientific Paper.

## 5.2. POP-UP Activities and Synergies

Across the entire MAST Project several Pop-ups were developed, there is documentation through photos and accurate descriptions of these events in the WP2 Final Report. One of the most important considerations on these Pop-Up's Events are the synergies that appear, not only through this various events, but also, in the different implementation levels. So to speak, all these events have a strong legacy potential, in the sense that they articulate also a conforming networking of institutions around MAST. Some of these Events and Synergies have also been well disseminated, multiplying the effect of the MAST dissemination systems. The Pop-up events and other synergies gatherings are portrayed again, as a strong non-academic support for the curriculum.

MAST had a significant symbiotic outreach in a number of events throughout the project duration in addition to the events of the project itself. We mention some of those here below but must add that also within the project events synergies were always sought, with other projects and initiatives.

PIFCamp is a 7-day hacker-base set in Slovenian nature, where art, technology and knowledge meet and **MAST@PIFCamp** in the second project (4.-11.8. 2019, Soča, Slovenia) year was designed as a pop up event where the students of MAST would join a one week prototyping session and get in touch with the projects and individuals (or collectives) that have been successful in "upgrading" their DIY / DITO methodologies and prototypes into business solutions. Two of the MAST students were able to join and a mentor from Kersnikova Institute as the facilitator of the pop-up event.

The first highlight of spreading the project core values and ideas came with the **MAST symposium** (18. & 19.11.2019, Nova Gorica, Slovenia) and the **Pixxelpoint Festival**, which were planned as sister events.

Both explored an open variety of topics among Art, Science and Technology, discussing them through different prisms of the festival topic — “Checked Reality. The Work at the Interface Continues”.

In January 2020 Culture Action Europe, in collaboration with BOZAR LAB and Joint Research Centre (JRC), the partners facilitated a multifaceted evening **Occupying the middle. On Transdisciplinary Research** to debate on the status quo of transdisciplinary research and the challenges of creating a common field which generates new sectoral and cross-sectoral dynamics and the specific contribution of artistic research in setting this new paradigm. The three-part session brought forward the MAST project, showcasing the real-life results of MAST students using **problem finding methods** and introducing the concept of “**mastering art thinking**” as a key competence in creating more profound, plausible and sustainable solutions. Great emphasis was put on the importance of forming the next generation of catalysts of innovation to generate socially meaningful and ethically reflected innovation in today’s big and small organizations.

In July and August 2020, building up a previous collaboration for the first ILE in Graz in 2019, TU Graz worked along with ALMAT ([almat.iem.at](https://almat.iem.at)) producing the transdisciplinary exhibition infiltration in the esc medien kunst labor project space. Infiltration was part of the umbrella project Algorithmic Segments ([algorithmische-segmente.mur.at](https://algorithmische-segmente.mur.at)) in the framework of the Cultural Year 2020 impulsed by the city of Graz and [Conference on Computation, Communication, Aesthetics & X \(xCoAx 2020-https://xcoax.org/\)](https://xcoax.org/). Exploring the potential of algorithms as material to evoke the conjunction of art, science and technology. The synergy produced a coherent amalgam of institutions and persons that will keep sustaining relations in the region. Students were invited to develop, work and live a real CCI experience from conception to implementation, constructing a multi-sensorial space.

## 5.3 Hybrid Interface Academy (HIA)

The main pinnacle of the project dissemination, the concluding event of the project, was the **MAST HYBRID INTERFACING ACADEMY (HIA)** with sessions including participants from a variety of disciplines. The vectors of possible policy impacts and priorities for the future of Europe as well as created alliances for forward-thinking future actions were jointly explored and identified. The range of events included a cutting-edge **symposium** with four acclaimed speakers. The HIA also featured a **speculative situation** to stimulate new pivotal points of innovation processes with a radical approach. Different stakeholders were brought together to ideate primarily with(in) the artistic realm by adopting the methods and formats of a “**challenge lab**” — which is also the core of the recently accredited master study module of MAST! In addition, an overview of best practices and experiments on how “art thinking” could empower future “**innovation catalysts**” were provided in an exhibition, presented (live at the event) by MAST students and mentors. Moreover, two **policy-making workshops** have been organised with strategically architected lists of participants — one pivoting around burning matters of education, the other in the realm of industry.

In conclusion, the fear for a low impact in the CCS on the previous 5.2 Interim Report has been dissipated with this strong arrangement of external synergies, complementing the impact of the consortium, but also expanding the realm of the project into a conglomerate of numerous institutions on the search for better methods in AST. So, our premise of work, where European Social Values are at the front of the enquiry seem to be a wide accepted solution.

## 5.4 Consortium Meetings

Most of the consortium meetings took place as planned and were documented through Minutes as fundamental output. These minutes are systematically developed by UNG (p1) and consensually approved by the consortium. In some occasions a snap-shot of the project status was done through the initial two SWOTs, which have proven to be an adequate tool to make decisions on the spot. Subsequent SWOTs were not anymore considered to be relevant for the objectives of the project. A final SWOT series can be seen in the reflection section. (see 7.)

The MAST Consortium conducted 10 face-to-face meetings during the entire implementation and continuous contact through a total of 39 officially minuted online-meetings, and several additional workgroup meetings.

## 6. Deliverables and Evaluation system

It is appropriate to say that the MAST Project has been a very prolific system, creating, next to the different deliverables promised in the original bid and the one natural for each Work Package, a series of extra material and crystallizations of ideas, that at the beginning were seminal, and now constitute a strong part of the project.

Among the promised are:

- Accreditation
- Business Plan
- Career Development Plan
- IA/Learning Velocity Lab/Experience
- On-line course



In the case of the Accreditation, it is possible to say that the MAST Module has been fully accredited by the UNG as a master program, inside the University of Madeira as a Challenge Lab, and in the TU Graz as an add-on module. A sound Business Plan, a coherent Career Development plan and ILVL methodology have been fully developed. The online course, as a precondition for future implementations and shedding lights to the necessary requirements is fully functional.

In term of the extra crystallizations or deliverable that arose during the process of implementation or were modified and deepen during the two years of the project, we can count important deliverables for the curriculum development:

- MAST Challenge
- Challenge Lab
- Innovation Catalyst
- MAST Manual
- Hybrid Solutions (E.g Double ILE Graz and HIA)
- Scientific Paper
- Spatial Experiments in Art, Science and Technology Book
- PodMAST

The second MAST Challenge on *Solidarity* proved to be an important and timely subject, students and faculty alike profited from the theme and implemented through several workshops (ILEs) and Pop-Up events. This important topic, deeply worked in ILE Madeira February 2020, transformed in a fundamental subject and part of the methodology of MAST, in particular, the ten steps of the innovation cycle are to be used as standard system for future implementations of the MAST and are the basic scaffolding for the MAST Challenge Lab. Another important insight was the understanding and profiling of the Innovation Catalyst, as a final personality evolving from the MAST Module. These and other elements of the methodic are part of the MAST Manual. Within 100 pages of well-structured information, this major deliverable shows how to implement the MAST Module, explaining carefully not only the proceedings, but the lessons learned on the project. This Manual has been created in a collective effort and edited by N.Castillo-Rutz and P.Purg. It is not only a portrait of the project, but its legacy. It shed lights on the different possibilities of MAST in relation with other programs.

Necessary is also to state that adversity has been part of the development of MAST, the consortium that, nevertheless, sorted all obstacles and kept the working pace. No long after losing a member of the consortium, when the recovery was knocking at the door, the pandemic changed part of the project schedule. The consortium was able to answer timely and created alternative ways. In particular the Hybrid ILEs (half online, half present in ILE Graz) and the very important Hybrid Interface Academy in Ljubljana (Sept.2020). In both cases the programming was

up-to-date and the resources were used adequately producing several and important reflection moments. An accurate account of this can be seen in the interactive pdf of the [MAST-Manual](#).

Three interesting products of the MAST Project are the scientific paper ***Progressive Pedagogies for Innovation among Art, Science and Technology: The Case of MASTmodule.eu***. More information can be read on the Abstract. The Article has been submitted for review.

#### Abstract

This article describes how European social values can be woven into interdisciplinary education through a curriculum for innovation combining art, science and technology. Drawing on the rich data legacy of the Master Module in Art, Science and Technology (MAST), the emerging graduate profile of an innovation catalyst is explained, and embedded within the developed module syllabus. Reflecting the actual innovation process, the curriculum introduces art thinking as its key stage, before design thinking.

In the MAST module piloting students, with the help of mentors from across realms, responded to challenges in timely topics such as 'The Future of Work' and 'Solidarity'. Along two annual academic cycles of 2018–2020, progressive pedagogical solutions were tested via a cross-disciplinary approach and situated knowledge sharing, attempting to resolve the paradox between technological and social innovation agendas.

Finally, the article evaluates the project results by discursive analysis combined with participant opinions to reflect on the potential of such a curriculum for rethinking social values, if not completely reimagining or even practically redesigning the future world.

The models, experiments and inspirations presented in the article have particular value for innovation, art and design educators interested in new methods and tools to develop teaching and learning approaches that involve a broad range of stakeholders of a much-needed novel pedagogy, both innovative in and critical of itself.

The scientific paper devotes a strong part to analysis and education methodologies, these are also important part of the ***Spatial Experiments in Art, Science and Technology Book*** a compendium of methods and impression surrounding the experiments of TU Graz, that give importance to the expanded network with the CCS and the experience of students in the real industry. Last but not least, is the [PodMast](#), a series of open conversations among relevant voices from the crossings of Art, Science and Technology. Springing from an apparent need for (archiving and reflecting) in-depth knowledge about this timely crossover, it shall remain publicly accessible to incite dialog with other interested practitioners and thinkers. Also it is to serve as study material for the newly developed international Master Module in Art, Science and Technology (MAST).

## 7. Final Reflections

To evaluate the project in its final stages the P3 (TU Graz) developed different methods. On the one hand qualitative and quantitative information was obtained through different questionnaires ([HIA Evaluation Questionnaire](#) and [General MAST evaluation Questionnaire](#) ; on the other hand a series of reflection round-tables were organized in the framework of the Hybrid Interface Academy, presented as **Deliverable 2-2-2** (including ample video documentation of the individual events -- see direct links in the deliverable). Important was above all the *Final Series of SWOTs* & the *Reflection about MAST* from each institution, presented as Annex 1 to this report.

## 8. Conclusion

After analyzing the materials, documentations, proof of actions, reports, MAST Manual, Webpage and the different deliverables it is possible to conclude that the MAST Project was executed exemplary, leaving not only a long trace of its impact among students, faculty and institutions, but also by providing new ways for implementing and coupling educational methods that introduce European Social Values into existing and new program. The overarching goal of producing a flexible Master Module has been therefore obtained. Also, the MAST Manual shows the lessons learned during the project and at the same time, reveals important paths for implementation. The highlights of the projects are then in the curriculum development that includes the crystallization of the MAST Challenge, the methodic implementation summarized in the MAST Challenge Lab with its procedural Innovation Cycle and the creation of an output profile on the students / participants involved in such a project or the Innovation Catalyst. These elements combine into a strong project and a resilient consortium that overcame obstacles as partners exiting the system and an international pandemic, producing high standard events and creating a network of institutions and persons with the ability to perpetuate the key MAST notions, its novel concepts and methodologies.

*This report has been produced along consultations with the External Quality Assurance expert of MAST, Assist. Prof. Klemen Širok; and has been produced and published on project website (only) in agreement with: Prof. dr. **Peter Purg**, MAST project lead, on behalf of the MAST consortium.*

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### Project partners

MANAGERIAL/LEAD | [University of Nova Gorica](#), School of Arts (Slovenia) ACADEMIC, R&D | [Madeira Interactive Technologies Institute](#) (Portugal) | [Graz University of Technology](#), [Institute of Spatial Design](#) (Austria) ENTREPRENEURIAL & PRODUCTION | [Kersnikova Institute](#) (Slovenia) NETWORKING & OUTREACH | [Culture Action Europe](#) (Belgium/EU) | [Croatian Cultural Alliance](#) / Unicult programme (Croatia)

### Associated Partners

[EQ-Arts](#) (Netherlands) | [University of Madeira](#) – UMa(Portugal) | [Stromatolite](#) (Sweden/UK) | [The University of Arts Belgrade](#) (Serbia) | [Institute for Development](#)



*The MAST project is co-financed by the European Union. Entire content of this document reflects the views only of the author(s), and the European Commission cannot be held responsible for any use which may be made of the information contained therein.*

PROGRAMME CONCERNED

(Creative Europe / Connect/2017/3346110) REFERENCE NUMBER OF THE CALL FOR PROPOSALS

Directorate-General for Communications Networks, Content and Technology Media and Data

Industry & Media Support Programm



(Audiovisual



## Appendix 1: Final SWOTs and Reflections by Institution.

### Croatian Cultural Alliance

#### Final SWOT

Strengths:	Weaknesses
<ul style="list-style-type: none"> <li>• Transdisciplinary input of knowledge, creativity and arts from MAST partners and outside collaborators.</li> <li>• Opportunity for the creation of innovative educational curriculum</li> <li>• Social "new normal" for online education and exchange of creative ideas.</li> <li>• Exceptional support from the wide networks from international experts.</li> <li>• Providing first hand mentoring and experience to current and future MAST students.</li> </ul>	<ul style="list-style-type: none"> <li>• COVID-19, inability to produce live educational programs.</li> <li>• The inability to create complete Masters Degree in Art, Science and Technology.</li> <li>• The unequivocal international bureaucratic system between partners.</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>• Creation of the full Master's Degrees in Art, Science and Technology.</li> <li>• Further development on institutions' and NGO's.</li> <li>• Additional collaboration with main and associate partner's.</li> <li>• Creation of innovative career development publication.</li> <li>• Exchange of students in a variety of different artistic programs coming from our own institution's, organizations.</li> <li>• Impacting cultural policies on a national and European level.</li> </ul>	<ul style="list-style-type: none"> <li>• Unstable situation in regards to COVID-19 and prospective development.</li> <li>• Weakened ability to bring forth the anticipated program.</li> </ul>

#### General Reflection:

The CCA's participation in the MAST Project provided the CCA with new insights, mostly positive. The Unicult2020 program was established in 2015 working directly on the capacity building for art and cultural managers. One obstacle at the beginning of our participation at the MAST project was the need for the UNICULT Program to reinvent itself, during a particular time of instability so the curriculum could be reinvented. Despite the necessary shorter period of instability, we managed to produce and improve the UNICULT Program to a higher level, becoming the first European International Educational Platform for management in arts, culture and cultural policies that combines art, science and technology. The production of the career development guideline for European artist's was a massive achievement and will be distributed first to MAST students, followed by the artistic community as a whole. Another positive impact that our participation had within the CCA was the exceptional collaboration between MAST partner's and the synergy from institution's, NGO's and the entire network. Perhaps the biggest impact that our participation brought to CCA was the ability to work with young artist's, developing their position's and providing them with opportunities and knowledge. We were able to listen to their ideas, visions and input while also interacting in a mutual exchange of innovative practices. We believe that with the aforementioned achievements, the CCA, with its participation in the MAST project, was able to contribute to the overall innovation of educational design.

With our partnership with the MAST Project, we learned about the technological aspects of the process. We also learned that creating innovative educational programs at the European level is possible when the European Commission and Consortium are open in sharing the resources needed for transdisciplinary design for the educational program.

## University of Nova Gorica

### Final SWOT

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>A novel master study carrier module in A-S-T accredited</li> <li>Well profiles list and network of alumni</li> <li>A network of partners to depend on for future endeavors</li> <li>Positive visibility of MAST national and international scale</li> </ul>	<ul style="list-style-type: none"> <li>No stable funding for the core study programme (state concession)</li> <li>No supportive environment for further progress within University at large, and within Municipality/Region</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>Attracting new students</li> <li>Attracting cutting edge lecturers and other collaborators</li> <li>Leading or Partnering in new projects in the A-S-T realm</li> <li>Establishing of the "ekcenter" creative hub and possibly the "Laboratory for Open Artistic Research"</li> <li>Good complementary profile of MAST with ongoing big-scale projects like DIVA and konS; collaboration with CZK (Centre for Creativity)</li> </ul>	<ul style="list-style-type: none"> <li>National and international competition developing similar study module or programme</li> <li>The (post)covid period diverting fund allocation away from progressive and avantgarde study programmes and projects</li> </ul>

### General Reflection:

The MAST module now accredited, with its workshops legacy, its results (es. The MAST Manual), the international networks and alliances brought about a consolidation and steps forward in our innovative approaches to teaching, research, and production processes. The novel course "The Challenge Lab" will attract partners from the NGO sector and from the industry, inc. important new opportunities (incl. Student grants). UNG and in particular School of Arts will continue to develop the Art-Sci-tech teaching methodologies that essentially take in the innovation process in the following two projects of big scale that we acquired within the last two years, and are well in line with the MAST: In DIVA - ArtBiz Innovation Ecosystems (3,5 mio budgeted) project we are building a cross-border (Italy-Slovenia) alliance to base the innovation on artistic thinking, where the MAST theoretical legacy is of key importance; also therein we shall be needing MAST alumni to engage in hub activities and enter pilot project applications. Furthermore, the KONS - Platform for Contemporary Investigative Art (4.5 mio) will be enriched by not only the curriculum of A-S-T and its challenge lab but also by the young talents that will engage in the network of hubs (incl local new hub "ekscenter") and pilot projects therein.

Despite the absence of stable funding for the core study programme (state concession) and a slight lack of a supportive environment for further progress within University at large, and within Municipality/Region, the MAST team at UNG stands strong and decided to build on the positive experience as well as leverage the visibility and the knowhow gathered in the project. After delivering the MAST project management at the best of their capacity, the local MAST team has learned that there should be enough human as well as financial resources allocated to the management of the project. Also it is crucial that such an emerging new module is strategically embedded among other modules and a vertical cohesion assured bot in teaching staff as well as in spatial and equipment resources.



## KERSNIKOVA INSTITUTE

### Final SWOT

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>Development and testing of the concept to involve artist and 'art thinking' into the processes of innovations for social and product innovation</li> <li>The development of the theoretical framework of Innovation catalyst</li> <li>The development of the new methodology of innovation design</li> </ul>	<ul style="list-style-type: none"> <li>The understanding of contemporary investigative art as important art field in real sector is poor</li> <li>So far we have the scarce chances to test the theory in real life</li> <li>The understanding of the necessity and advantages of including artist and art thinking in the processes of innovations is poor and full of biases</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>Well developed discourse that can be explained to artist, creative industry practitioners and beneficiaries</li> <li>An opportunity to form an art market for contemporary investigative art</li> <li>Foreseeing the human - technology cohabitation and coevolution</li> <li>More sustainable, safe and ethical innovations</li> </ul>	<ul style="list-style-type: none"> <li>Methodology not accepted by artist since they still believe that participating in the value-making disables their artistic freedom</li> <li>Non understanding of the meanings created through artworks</li> <li>Difficult and biased understanding about collaboration between innovation participants</li> <li>A Priori expectations from innovations processes (deadlines, financial success, solutionism, ...)</li> </ul>

### General Reflection:

The MAST project gave us an opportunity to dive deeper into the realm of the new paradigm of future making where artists can contribute through their way of art making that we are calling 'art thinking'. We have been enabled to join forces between different stakeholders and meet their mindset that contributed to more elaborate understanding of their specific deontologies. The academic approach with its educational aspirations gave us an opportunity to develop the educational (hands on) tools while the NGO partners coming from the art field were more into practical and applicable solutions looking toward senior artists and possible collaborations with beneficiaries from the field of industry or local communities. The encounters with the representatives of industry and policy making contributed to our understanding of the state-of-the-art situation in the field of innovation which is still somehow a privilege that many of them can not afford for their everyday company management. Since the bold EU policy measures that are encouraging better innovation in EU economy are difficult to develop in only few years, the same goals in parallel projects (Interreg - Diva, konS - cohesion policy) that both University of Nova Gorica and Kersnikova institute are taking part, are substantially contributing to more persuasive results. All three projects are allowing us to approach the challenge for deeper innovations from different angles that make our proposals more robust and resilient. The above mentioned parallel projects also allow us to continue what we have develop in MAST on more theoretical levels.



## Culture Action Europe

### Final SWOT

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>Being able to introduce the concept to a wide network of cultural operators</li> <li>Positive visibility of MAST national and international scale</li> <li>Establishing a network of partners to call on for future endeavors</li> </ul>	<ul style="list-style-type: none"> <li>Without COVID 19 just at the end of the project, it would have been easier to bring to a higher EU policy level the issue of disciplinary silos</li> <li>Experienced the limits of offline collaborations in bringing together actors from different communities of practices</li> <li>Missing one of the original goal of linking the business sector with the applied art education -- and placing students into a different work environment</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>Initiating new endeavours with the network of partners</li> <li>New interdisciplinary approaches for cultural policy-makers</li> <li>Developing concepts and testing them in a smaller scale, in order to take it further and expand the cooperation</li> </ul>	<ul style="list-style-type: none"> <li>Difficulty to break disciplinary silos and to reach peer relations</li> <li>Due to COVID-19 at the end of the project - the momentum that the MAST project established can be lost</li> <li>No takeup from the business world and creating a sustainable path for application</li> </ul>

### General Reflection:

In 2018, one of the three main focus areas identified as strategic priorities for work in CAE's strategy for 2019-2021 was "Artistic and cultural research and STEAM practices". This strand is closely related to the MAST project as it links the disciplines of art, science and technologies. MAST created a clear set of methods by which the art, science, and technology crossover can be embedded with "Social Europe" (SE) values, which is very much in the line of CAE's thinking. CAE will continue to stay connected with the network of excellence of European collaborators in academia, culture and NGOs also beyond the project. Artists, scientists and technologists still face major challenges when they want to work jointly. CAE, as a multi-sectoral platform aims to identify, compile and inform policy makers about these transversal issues and difficulties in order to foster policies that break the disciplinary silos. CAE organised a debate "Occupying the middle: approaches to interdisciplinary research" in Brussels, January 2020 in collaboration with BOZAR LAB and the European Commission's Joint Research Centre (JRC), which debated on the status quo of transdisciplinary research and the challenges of creating a common field which generates new sectoral and cross-sectoral dynamics and the specific contribution of artistic research in setting this new paradigm.

Of particular interest for CAE in the MAST project was the "Challenge lab" methodology, the "Career development guidelines" the "online courses", and the online digital resources: MAST symposium videotalks, Video lectures and Podcasts= PodMASTs, which can build the capacities of CAE membership and the wider cultural sector and can further contribute to CAE's strategic priorities.

## SWOT

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>The strong internal university system</li> <li>Openness</li> <li>Faculty with the initiative to change and implement MAST</li> <li>Interested students</li> </ul>	<ul style="list-style-type: none"> <li>Access to students is reduced</li> <li>The number of faculty involved with the project is reduced</li> <li>No willingness of introducing complete new modules</li> <li>The AST is difficult to sell to architecture students</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>Subjects that can be modified within the master program</li> <li>Continuous education can be used as implementation possibility</li> <li>Erasmus + and other programmes</li> <li>Exchange necessities</li> </ul>	<ul style="list-style-type: none"> <li>Too many programmes at the university</li> <li>Change pace at faculty and university level is slow</li> <li>No will of the authorities for change of new modules</li> <li>The financial situation of such a further implementation has not been clarified.</li> </ul>

## General Reflection:

For a classical education institution as TU Graz, which resources are generally focused on avant-garde scientific research, the involvement in a pedagogical experiment was a novelty. This said, the results of this cooperation have been enormous, not only from the point of view of the lessons learned, but MAST has infiltrated the DNA of the master of architecture by infiltrating knowledge and ways of proceeding that change enormously the consciousness of the students and the faculty.

A significant account of the lessons learned and reflections of TU Graz can be seen in the *Spatial Experiments in Art, Science and Technology book*, where TU Graz systematize the experience across these 28 months of implementation. Also TU Graz had a great influence in the MAST Manual that groups all the lessons learned of the project.

Looking in retrospective, TU Graz started as not being involved in the general administration process, but became a strong force in the conceptual implementation of the project, this due to the interesting consortium, not only at institutional level, but individuals that were able to come together under this project roof, TU Graz faculty and students were an important part of the decision making process across the project and humbly acquired substantial new knowledge to implement within the faculty. The TU Graz was also capable of establishing a sound network across the city that has envired the consortium and the Implementation of the MAST Project.

## Madeira Interactive Technologies Institute / Universidade da Madeira

### Final SWOT

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>Created an innovative pedagogical model on how to integrate AST in education that positions us as strong players in the field.</li> <li>A physical space called the "MAST Challenge Lab" has been created in Madeira with the necessary tools and equipment to implement AST research and education.</li> <li>Synergies with existing ERASMUS+ funding can guarantee the continuation of student and faculty mobility</li> <li>A large and very heterogeneous network of stakeholders in AST has been created with a shared understanding of the challenges</li> <li>A solid AST team</li> </ul>	<ul style="list-style-type: none"> <li>The number of students that fully benefited from MAST is limited</li> <li>Dependency on external funding to organize ILEs as performed in MAST</li> <li>Instability of the M-ITI institution has impacted both faculty and students in MAST</li> <li>The MAST format relied a lot on mobility, and that model is challenged with the current pandemic</li> <li>Impact of MAST beyond the Master of Interactive Media Design, at the large Institutional level, is still small. MAST has not significantly impacted the institution's view on the need for AST education.</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>HEIs are in an excellent position to have an impact with the novel AST modules created in MAST</li> <li>A solid team has been created to apply for new funding opportunities</li> <li>The developed methodologies do not depend on additional funding to be implemented</li> <li>The existence of the "MAST Challenge Lab" in Madeira can act as a catalyst of innovation and research in AST.</li> </ul>	<ul style="list-style-type: none"> <li>Support of continuation of activities depends on individual faculty and institutional agendas from the partners</li> <li>Existing mobility funding will probably be affected in the short future and challenge the MAST network</li> </ul>

### General Reflection:

The MAST project has offered both students and faculty a mind broadening opportunity to explore the transdisciplinary AST field, has consolidated a network of partners and has created trusted and reliable personal relations in the international consortium. Multiple backgrounds with clearly distinct methodologies have come together in a shared understanding and language, and the essential principles of MAST have been generalized and implemented in higher education institutions in the realms of Interactive Media Design, Architecture and Arts. Further, in Madeira, a local capacity - the MAST Challenge Lab - will remain after the end of the project and will continue to help shape new generations of students using the MAST methodologies. Students have shown enthusiasm and commitment to MAST, but MAST activities in the future are subject to too many unknowns, from funding to limitations in mobility due to the pandemic.

However, accreditation of programs of this nature in Portugal is still premature and not standard. As such, it has been integrated as a module within the boundaries of the Interactive Media Design Master program, without requiring a formal evaluation by the accreditation agency. Also, the MAST network relied on "pillars", who have been the faculty committed to the project and goals. These faculty had to "fight" against the status quo to be able to implement the project, whereas the simpler for academic institutions is to remain with the traditional view of separated departments without coordinated agendas.