MediaVerse

A universe of media assets
and co-creation opportunities

D7.3

Final Large-scale Pilots Evaluation Report

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Abstract	This document provides an overview of the methodology for Pilot Phase 2 and the main results of all pilot actions across Use Cases. It also presents all the KPIs related to Use Cases and pilot activities, how they were measured and the final achieved results.

Keywords	Evaluation, Pilots, Methodology

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V1.0	29/09/2023	Akis Papadopoulos (CERTH)	Final document

Glossary

ABBREVIATION	MEANING
ACAPPS	Associació Catalana de Famílies i Persones amb Sordesa
AD	Audio Description
AI	Artificial Intelligence
AR	Augmented Reality
ARSAD	Advanced Audio Description Seminar
AS	ArtShare
ASD	Autism Spectrum Disorder
ATC	Athens Technology Center
ATRAE	Asociación de Traducción y Adaptación Audiovisual de España
AVT	Audiovisual Translation
CCT	Cultural Center of Thermi
CEDRO	Centro Español de Derechos Reprográficos
CERTH	The Centre for Research and Technology Hellas
CJ	Citizen Journalism
D	Deliverable
DAMA	Derechos de Autor de Medios Audiovisuales (Rights Management Entity)
DoA	Description of the Action
DRM	Digital Rights Management
DW	Deutsche Welle
EMAV	Escola de Mitjans Audiovisuals
ESCAC	Escola Superior de Cinema i Audiovisuals de Catalunya
EUIT	Escola Universitària d'Infermeria I Teràpia Ocupacional
FG	Focus Group

FIN	Fincons
GDA	Green Digital Accessibility
KPI	Key Performance Indicators
MAAM	Media Asset Annotation and Management
MQM	Multidimensional Quality Metrics
MUTAV	Audiovisual Translation Master's Degree
MV	MediaVerse
NDD	Near-Duplicate Detection
NGO	Non-governmental Organization
ONCE	Organización Nacional de Ciegos Españoles
p2p	Peer-to-peer
PSSUQ	Post-Study System Usability Questionnaire
SO	Specific Objective
STXT	SwissText
STT	Speech-to-text
SUMS	System Usability Metrics
UAB	Universitat Autònoma de Barcelona
UC	Use Case
UXE	User Experience Evaluation
VR	Virtual Reality
VRAG	Vragments
XR	Extended Reality

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Executive Summary

This document is the final public version of D7.3, which describes the evaluation methodology for Pilot Phase 2, the procedures that have been followed, and the main pilot results. In addition, the current deliverable includes the objectives and related KPIs linked to both Use Cases and evaluation methodologies.

Section 2 provides a short overview of the MV methodological approach to evaluation and describes the common core methodological approach for Pilot Phase 2. The evaluation process in Pilot Phase 2 actions relies on a shared questionnaire across pilots (the MediaVerse Questionnaire), together with some specific questionnaires and qualitative data in the form of final focus groups where relevant. In addition, Section 2 provides a clear overview of the procedures that we followed both before and after each pilot action, and it describes the shared structure of all pilot actions.

Section 3 presents a comprehensive documentation along with a summary of the main results of all pilot actions, distributed by Use Cases, considering *ad hoc* pilot actions, as well. Section 4 presents a summary of objectives and related KPIs linked to Use Cases (4.1) or to evaluation methodologies (4.2), together with an indication of the measurement of the KPIs and the final achieved results. Finally, Section 5 includes the aggregated results of all pilot actions in Pilot Phase 2, and Section 6 provides some general conclusions, highlighting the main results of the MV pilot actions.

1 Introduction

D7.3 aims to present a final report on Pilot Phase 2 including different scenarios of the three Use Cases and the involvement of external users through ad hoc actions. This document draws from D7.1 - Pilot description and planning[1], where a brief overview of the methodological approach was presented, and from D7.2 - Evaluation methodology and intermediate validation activities report[2], where the common evaluation methodology across Use Cases was presented, focusing on Pilot Phase 2. In January 2023, an initial version of D7.3, focusing only on the evaluation methodology for Pilot Phase 2, was delivered as an internal deliverable. The current final version updates the evaluation methodology for Pilot Phase 2 and reports on all Pilot Phase 2-related actions and their main results.

Section 2 of this document summarises the evaluation methodology and describes the specific procedures for Pilot Phase 2 to ensure consistency across Use Cases and actions. To achieve this, we designed a shared MediaVerse Questionnaire for all pilot actions, which we also present in Section 2. In addition, this document reports on the main findings of the different pre-pilot and pilot actions developed in Pilot Phase 2 in relation to the three main Use Cases as well as the ad hoc actions, in Section 3. The next section includes an overview of the KPIs related to both Use Cases and evaluation methodologies, with an indication of how they were measured and the achieved results. Finally, we present the aggregated data and the overall results of the Pilot Phase 2 and we conclude with a discussion.

[1] https://mediaverse-project.eu/wp-content/uploads/2021/10/MediaVerse_D7.1_Pilot-Description-and-Planning_V1.0.pdf
[2] https://mediaverse-project.eu/wp-content/uploads/2022/10/MediaVerse_D7.2-V1.0.pdf

2 Evaluation Methodology

Since we have already presented in detail the overall evaluation methodology of the project in D7.2 - Evaluation methodology and intermediate validation activities report[3], this section summarises the main methodological approach for the pilot evaluation and then focuses on the specific methodology developed for Pilot Phase 2 in the following sub-sections.

2.1 The MV Methodological Approach of the Evaluation

In MediaVerse, we follow a user-centric, iterative, and flexible evaluation approach. The main aim of pilot actions is to demonstrate and validate the MV platform in different Use Cases. The methodological framework has considered five core elements:

- **What** to be tested: the MV platform, with users that will be performing different tasks depending on their profile and role.
- **Where** to be tested: in three Use Cases and associated scenarios, plus some ad-hoc cases, namely
  - UC1 Citizen Journalism
  - UC2 Co-creation of new media formats with an educational/social perspective
  - UC3 Hybrid intelligence experimental artwork series pilot scenarios
  - External users engaged through ad hoc activities
- **When**: in two pilot phases, preceded by pre-pilot actions where relevant. Pilot Phase 1 took place in the second year of the project and Pilot Phase 2 took place during the last year of the project.
- **By whom**: by different user profiles, depending on the Use Case (e.g., students, researchers, journalists, artists, etc.).
- **How**: by following a shared methodology, described in the following sections.

2.2 Pilot Phase 2 Methodological Approach

Pilot Phase 2 actions were open and unsupervised, meaning that participants had very limited (if any) support from the pilot leaders, and were carrying out the pilot activities in an unsupervised setting. This implies that there was a much higher likelihood of users dropping out of the pilot activities in case they faced any difficulty or burden during its execution. Therefore, the most suitable methodology was to:

1. Have a short common core questionnaire across pilot actions (see 2.4)
2. Add specific questions and/or plan a focus group, where relevant, at the end of the pilot actions with key user groups to assess the impact on the Use Case aim, following the methodology designed in D7.2.

2.3 Procedure

The procedure consists of different steps, before, during, and after any pilot action.

2.3.1 Information before Pilot Phase 2 Actions

For each pilot action in phase 2, the following are the main decisions:

[3] https://mediaverse-project.eu/wp-content/uploads/2022/10/MediaVerse_D7.2-V1.0.pdf

- **Goal**: what is the goal of the pilot action?
- **Stages (if relevant)/tasks**: the tasks to be performed.
- **Method/metrics**: most pilot actions have used the MediaVerse Questionnaire for Pilot Phase 2. Some actions may have developed specific evaluation methods or metrics where relevant.
- **Participant pool**: who participates (participant profile), and how many participants are included.
- **Recruitment process**: the way we have contacted the participants.
- **Timeline**: when the pilot action takes place, and when the materials should be ready.
- **Place**: where the pilot action takes place (e.g., physical space, online).
- **Language**: the language(s) in which the test takes place, and whether translation support is needed.
- **Materials**: what physical/digital materials should be ready during the pilot action?
- **Preparatory work**: whether and what prep materials should be done before the action.
- **Pilot action leader**: person in charge of leading the pilot action and its evaluation. The pilot action leader filled in a protocol using the template in Annex 1.

2.3.2 Structure of Pilot Actions in Phase 2

Pilot actions in phase 2 were less structured than in Pilot Phase 1, as they were mostly open and unsupervised. Each pilot action leader was responsible for providing details and completing the protocol of the piloting activity. However, there were some shared aspects:

- Each pilot action has a unique code and has been entered in the Pilot Tracking File.
- Ethical approval has been requested and granted in all pilots. Pilot participants signed a consent form either in paper copies or online, using the link (3-in-1) provided by UAB.
- All pilot actions have shared the MV short questionnaire for Pilot Phase 2.
- All pilot actions have provided a protocol to plan the action and a report with the main findings.

2.3.3 After a Pilot Action in Phase 2

Once an action was finished, the pilot action leader performed an initial analysis and filled the evaluation report (Annex 2) to highlight the main findings. All these documents are integrated in the present analysis. All the data gathered through the pilot actions, both in phase 1 and 2, have been uploaded to Zenodo, on the following link: https://zenodo.org/record/8348679. We have included raw data in an Excel file, but also the protocols and the reports generated by the different pilot action leaders, which have been the basis for this deliverable. Although we usually refer to the actions with descriptive names, we include the action code so that information can be easily retrieved from Zenodo's Excel file containing raw data. Zenodo files are organised as follows:

- Table of content
- Folder 00 - General protocols and templates
- Folder 01 - Questionnaire and demographics (raw data)
- Folder 02 - UC1
- Folder 03 - UC2
- Folder 04 - UC3
- Folder 05 - Ad hoc actions

2.4 The MediaVerse Questionnaire (Pilot Phase 2)

We have designed the MediaVerse Questionnaire for Pilot Phase 2, taking into account the following criteria:

- **Length of the questionnaire**. The questionnaire should be as short as possible as to encourage the response process in an open and unsupervised pilot.
- **Object of study.** After several improvements in the front-end based on Pilot Phase 1 feedback, the UI of the platform was considered finished with a satisfactory UX. Therefore, instead of usability, the focus of our research was on:
    - Usefulness;
    - Satisfaction; and
    - Fulfilment of specific aims.
- **Identification.** For each pilot action there was an activity code that participants added in the questionnaire to keep track of the results.
- **Demographics.** No demographics were requested to minimise the length of the interaction. Each pilot leader provided the following information for each of the pilot activities in the pilot action report: number of participants, approximate age range, profile.
- **Questionnaire: format and integration.** There was one single online questionnaire, translated into different languages.

We present the final questionnaire below.

MV QUESTIONNAIRE FOR PILOT PHASE 2

1. Activity code
2. Are you aware of tools that offer similar features? Yes/No/ N/A.
3. If yes, please indicate which ones.

Ratings. For each statement, please rate how much you agree or disagree with what it says in relation to the MediaVerse platform. The scale is from 1 to 5. A rating of 1 means that you strongly disagree with the statement and a rating of 5 would mean that you strongly agree with the statement. A rating of 3 would mean that you are neutral about the statement.

4. It does everything I would expect it to do.
5. I would recommend it to a friend or a colleague.
6. It works the way I want it to work.

2.5 Specific Use-Case Methodologies & Objectives

As indicated above, beyond the shared MediaVerse Questionnaire, Use Cases were encouraged to develop: a) additional specific questions related to their Use Case, and b) focus group guiding questions, where relevant and feasible. We describe the specifics of each pilot activity in the following sections. In this sub-section, we provide an overview of any distinct methodological decisions linked to the individual Use Cases.

2.5.1 Use Case 1 Specific Methodology & Objectives

UC1.1. Citizen Journalism (STXT)

The methodology was designed to explore the capabilities of the MediaVerse platform through unsupervised testing. As a first step, participants should actively engage in the piloting events. They were encouraged to capture videos and pictures using their smartphones, enabling them to provide a unique citizen's perspective on the ongoing activities. This approach aimed to showcase the events through the eyes of citizens and emphasise their active role in the media landscape. The MediaVerse platform served as a central hub for collecting and curating the uploaded content. Participants had access to the platform, facilitating the easy sharing and dissemination of their captured media. This seamless integration ensured that the content was readily available for a wider audience.

To gather valuable insights, participants were encouraged to complete the MediaVerse Questionnaire. Secondly, there was a Use Case specific questionnaire. This second questionnaire primarily focused on evaluating the decrease in average costs incurred by content creators for generating multimedia content. Additionally, it aimed to measure the time spent on marketplace activities related to the sale of content to online platforms and subsequent remuneration. By collecting this data, the methodology sought to provide a comprehensive understanding of the impact and potential benefits of citizen journalism within the MediaVerse platform and these results are in line with specific KPIs of the project. The specific Use Case related questionnaire items were statements on a 5-point Likert type scale (1 stands for “strongly disagree” and 5 stands for “strongly agree”):

- The MediaVerse platform would allow me to spend less time on creating content and thus reduce the average costs to produce multimedia content compared to other tools I previously used.
- It is faster to manage the marketplace activities (uploading, licensing, pricing, etc.) with respect to my current workflow.

UC1.2 Immersive Journalism (DW)

For the evaluation sessions of the Immersive Journalism Experience, DW agreed with VRAG to provide an extra survey form with questions about the satisfaction with the new Fader Interface. Participants were asked to perform a set of tasks on the MediaVerse platform to ensure that they would have all the assets available when they start working with the Fader editor. The specific questionnaire items were two statements to be assessed on a 5-point Likert type scale, along with two open-ended questions:

- Managing MediaVerse assets in Fader was clear and easy.
- Using the Fader Scene Editor was clear and easy.
- Some things were not clear and easy (please provide some insights, share your bad experiences).
- There were also things that I really liked (please provide some insights, share your good impressions).

Comparative tests between the older and newer version of Fader were based on the following statements:

- Comparing the Fader versions, I was able to set up a project and its assets faster in the new version.
- The new editor has allowed me to set up a project scene and its content quicker than before.
- My perceived usability rating for the old Fader version was:
- What I liked most about the Story Template functionality (please provide some insights, share your good impressions)

2.5.2 Use Case 2 Specific Methodology & Objectives

UC2.1 Co-creation of New Media Formats with an Educational/Social Perspective (UAB)

UAB aimed to assess how the MV platform and tools could contribute to the co-creation of immersive videos with an educational or social perspective. In terms of methodology, UC2.1 did not request any specific questions to be added in the general MediaVerse Questionnaire but the development of specific questions in the form of focus groups was prioritised. The questions that were agreed were the following:

- How many people were involved in the co-creation and what content did you co-create?
- How did co-creating 360º content impact social inclusion?
- What was the impact from an educational perspective?
- In which other projects/ways do you think the co-creation of 360º content could be applied? Please explain why.
- For what purpose would you use the MV platform in the future?
- Other comments or opinions of your participation in this project.

UC2.2 Accessibility, Blockchain and Rights Management (UAB)

The second scenario developed under UC2 remained at a more conceptual level and aimed to assess blockchain technologies and rights management from a professional and teaching perspective in several sectors, specifically the Journalism and Audiovisual Translation (AVT) field. This is why we did not use the MediaVerse Questionnaire but we developed specific ad hoc questionnaires.

These included some shared general questions (i.e., 1, 2, and 3 below), some questions only addressed to lecturers (i.e., 4, 5, and 6), and some questions only addressed to professionals (i.e., 7, 8, and 9), as follows:

1. Do you think that the MediaVerse platform could be used in your professional field? Does it have any advantage over the current way of managing [field: the different modalities of AVT and accessibility/ fact-checking] in the media?
2. Within the frame of [field: AVT/Accessibility/Journalism] files (i.e., digital assets) rights management, authors have the moral right over the assets they create. This can never be sold. Thus, assets should be somehow “watermarked” for moral ownership. Do you agree?
3. Should authors be able to establish economic rights and exploitation rights?
4. Do you think that the issue of intellectual property and copyright is relevant for the training of future [field: audiovisual translation/media accessibility/journalism] professionals?
5. As a teacher, have you ever had the need to explain any of the issues that MediaVerse contemplates to your students?
6. Is the subject of intellectual property/copyrights currently covered in any course of the [field: Translation Studies/Journalism]?
7. Do you think that the issue of intellectual property and copyright is relevant for the training of future [field: audiovisual translation/media accessibility/journalism] professionals?
8. From your experience, do you think that young professionals have enough knowledge about the topics covered in the MediaVerse platform?
9. Do you think that questions related to intellectual property and copyright management are covered during the [field: Translation Studies/Journalism Studies]? Do you remember to receive any training on these topics during the studies?

At the end of the focus group, a questionnaire was distributed to participants with the following questions:

a. Would you use the MediaVerse platform in your professional context?
2. Would you use the MediaVerse platform in your teaching context?
3. In your opinion, which are the advantages and disadvantages of the MediaVerse platform in relation to copyright management?
4. Please rate the relevance level of the following blockchain based solutions for your work context (Not relevant at all (1), Not relevant (2), Relevant (3), Somewhat relevant (4), Very relevant (5), N/A).
    a. Decentralised digital content ecosystem: power and ownership return to creators.
    b. New pricing options: new options for creators to earn by selling content.
    c. Monetization of content: content creators can establish direct relationships with customers.
    d. Distribution of royalty payments: near real time payments based on smart contracts.
    e. From DRM (Digital Rights Management) to smart contract: Transparent and "self execute" right management underlying smart contracts.
    f. Attribution: Blockchain increases the visibility and availability of the information regarding copyright ownership.
    g. Copyright management: Blockchain enables content owners to directly manage their works.

UC2.2. RACU testing

One of the ad hoc tests taken on board by UAB was to analyse the RACU workflow. This analysis was performed through a comparison of manual translation and RACU solutions to shed light on the advantages of using machine translation with post-editing to translate and subtitle videos. For this purpose, Multidimensional Quality Metrics (MQM) was used, as described in Section 3 (3.2.3).

2.5.3 Use Case 3 Specific Methodology & Objectives

UC3 specific methodology aimed to assess the user experience and creation of content within the MediaVerse platform. The evaluation focused on co-creation, 360º storytelling, and online content sharing, while exploring the concept of truth in media and the role of user-driven systems in content construction.

To this end, an additional UC3 questionnaire, titled "Co-creation of digital content for artistic experience," was specifically designed for artists and content creators. Its primary focus was to evaluate the reduction in average costs incurred by content creators in generating multimedia content. It also aimed to measure the time spent on marketplace activities, such as content sales to online platforms and subsequent remuneration. Additionally, the questionnaire assessed the effectiveness of monitoring shared online content to improve business activities. By collecting this data, the methodology sought to provide a comprehensive understanding of the impact and potential benefits for digital artists and content creators within the MediaVerse platform, with the results contributing to the key performance indicators (KPIs) of the project. The questionnaire is reproduced next and is always on a 5-point Likert scale. Questions 1 and 2 are common with UC1.

- The MediaVerse platform would allow me to spend less time on content creation and thus reduce the costs of producing multimedia content compared to other tools I have used previously (same question
- It is faster to manage market activities (charging, licensing, pricing, etc.) with respect to my current workflow.
- MV is effectively monitoring shared online content to improve its business activities.

2.5.4 Ad Hoc Actions Specific Methodology & Objectives

CERTH's ad hoc pilot activities focused mainly on the testing and evaluation of the Media Asset Annotation and Management (MAAM) and the VRodos authoring tool. The main evaluation tool that we used was the MV evaluation questionnaire. However, in some cases additional questions were asked to the pilot participants or different questionnaires were preferred that best suited the purpose of the piloting action.

Specifically, in a pilot concerning the VRodos a set of questions were asked to the respondents to assess user satisfaction, ease of use, and the usefulness of the tool. It is a shortened version of the Post-Study System Usability Questionnaire (PSSUQ), which is a 16-item standardized questionnaire (Lewis, 1992). It is widely used to measure users' perceived satisfaction with a website, software, system, or product. PSSUQ originated from an internal IBM project called SUMS (System Usability Metrics) originally proposed by Brook (2013). This set of questions was preferred to better understand the needs of users. This is a continuous process receiving feedback during the developments of the tool. We have changed 2-3 times the final product vision relying on users' feedback, e.g., removing VR glasses that none has or wants to buy, and trying to stick to low-budget equipment. The answers were from 1 to 7 denoting disagreement or agreement with each statement-question, i.e., a 7-point Likert scale with 1 for strong disagreement and 7 for strong agreement. For the results to be easily comparable to the other pilot results we should convert the scale to a 5-point. The questionnaire is reproduced next:

- Overall, I am satisfied with how easy it is to use this system.
- It was simple to use this system.
- I feel comfortable using this system.
- It was easy to learn how to use the system.
- The system gave error messages that clearly told me how to fix problems.
- Whenever I made a mistake using the system, I could recover easily and quickly.
- The information (such as online help, on-screen messages, and other documentation) provided with this system was clear.
- I liked using the interface of this system.
- This system has all the functionalities and capabilities I expect it to have.
- I found it easy to get the system to do what I wanted.

Another piloting activity of CERTH intended to investigate how different Artificial Intelligence (AI) filters can reduce viewers' impact from disturbing imagery, while retaining key information that allows for understanding what the images depict. To evaluate the different AI filters applied on disturbing images we designed the questionnaire "Mitigating Viewer Impact from Disturbing Imagery using AI Filter" with the following items:

- How frequently are you exposed to potentially disturbing content online (e.g., images depicting violence, injury and such like)? (Almost never/ Several times a year/ Several times a month/ Several times a week/ Daily/ N/A)
- How would you describe yourself when it comes to exposure of potentially graphic imagery? (Viewing graphic imagery does not affect me negatively. / I rarely react negatively/ I sometimes react negatively/ I often react negatively/ I almost always react negatively/ Other)
- To what extent did you feel this way while watching the filtered image? Distressed, upset, scared, irritable, nervous, jittery, afraid. (Very slightly or not at all/ A little/ Moderately/ Quite a bit/ Extremely)
- Describe what you think the image depicts.

- To what extent did you feel this way while watching the original graphic image? Distressed, upset, scared, irritable, nervous, jittery, afraid. (Very slightly or not at all/ A little/ Moderately/ Quite a bit/ Extremely)
- If the system you use in the scope of your work would provide the option to inspect images using this filter, to what extent would you use this option? (1=Never, 100=Always).
- You will be asked to compare the different filters. Optionally, you can see the original images by clicking the corresponding link. For a set of images with different filters: How disturbing do you consider the following images? (Not at all/ Low/ Medium/ High/ Very high)
- What is your opinion about utilizing such AI filters in the context of your work (e.g., positive points, possible limitations, etc.)?

Finally, one more question was added to the original MediaVerse Questionnaire in the last ad hoc pilots of CERTH to measure the time needed for ownership identification in the MV platform. This question was designed in collaboration with FIN. The respondents had to answer using a 5-point Likert type scale where 1 stands for "Strongly disagree" and 5 stands for "Strongly disagree" with the statement. It was formulated as follows:

- The MediaVerse platform would allow me to spend less time to identify the ownership of a media content, compared to other platforms I have previously used."

3 Pilots: Main Findings

In this section, we report the characteristics of the pilots in Pilot Phase 2 and their main findings, distinguishing between Use Cases and scenarios, where relevant.

3.1 Use Case 1

Use Case 1 developed two different scenarios: a) MediaVerse for Citizen Journalism, and b) MediaVerse for Immersive Journalism. A total of 351 participants were involved, providing 240 responses to the MediaVerse Questionnaire and involving 640 end users.

The pilot actions included in this Use Case are:

- Scenario 1:
  - GDA conference
  - Live Subtitling and ARSAD conference
  - SGR Hackdays
- Scenario 2:
  - Immersive Journalism
  - Specific Fader Tests
  - Comparative Tests

3.1.1 MediaVerse for Citizen Journalism

In this scenario, Use Case 1 developed two pilot actions in Pilot Phase 2, with a total of 145 participants and 70 users who filled in the MediaVerse Questionnaire. Both used the ATC's MV node.

GDA Conference [Action Code: UXE2-STXT-CJ (GDA)]

On 2nd December 2022, the Green Digital Accessibility (GDA) conference took place in Barcelona. During the conference, we presented the MediaVerse platform and the Citizen Journalism (CJ) Use Case to the participants, who were invited to become journalists during the conference and share the event through their eyes on the MediaVerse platform. Most of the participants were academics working on accessibility and sustainability. The goal of the action was to get feedback on how participants can create content at conferences using a decentralised platform like MediaVerse. Users were free to use the platform as they wished in an unsupervised and anonymous mode.

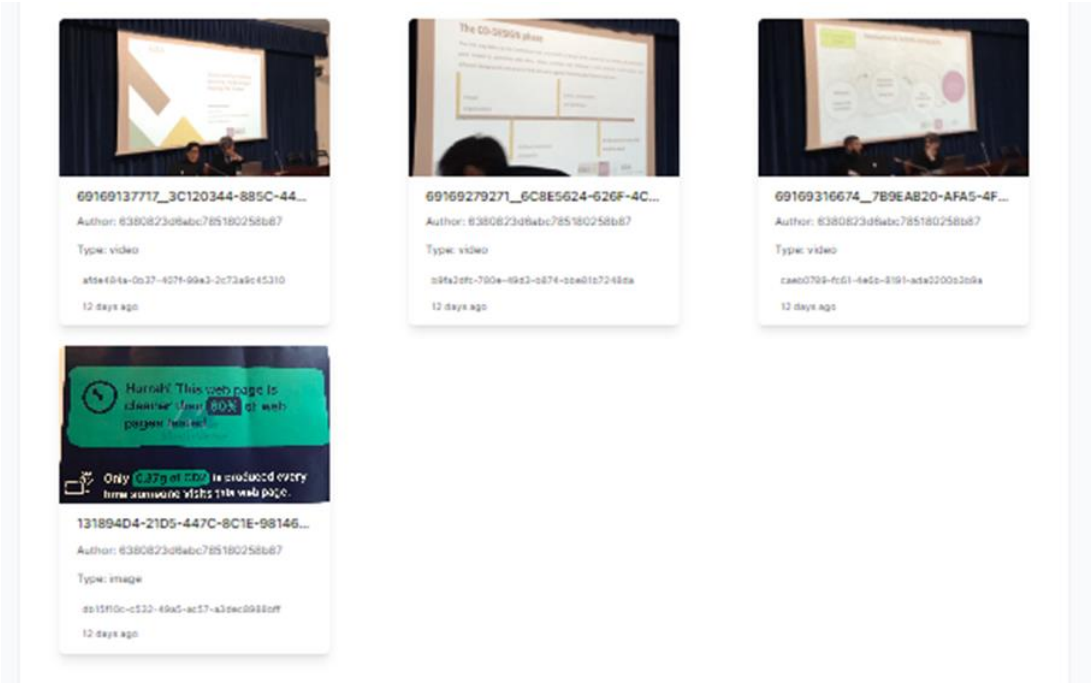


Figure 1: Assets uploaded by GDA participants.

Out of 33 participants, 17 activated their accounts, with a total of 43 posts, including video content (Figure 1). The CJ approach allowed organisers to identify which contributions were popular at the GDA conference. Finally, five participants completed the MediaVerse Questionnaire, and we present their responses in Table 1.

Table 1: Evaluation results of UXE2-STXT-CJ (GDA)

MEDIAVERSE QUESTIONNAIRE									
Are you aware of tools that offer similar features?									
	Yes			**No**		**N/A**	**If yes, please indicate which ones:**		
Number of replies	3			2		0	TikTok, Facebook, Dailymotion, Mastodon.		
Percentage	60%			40%		0%			
Usefulness: It does everything I would expect it to do									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	1	1	1	2	0	4.00	1.26	4.5
Percentage	0%	20%	20%	20%	40%	0%			
Satisfaction: I would recommend it to a friend or colleague									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	3	2	0	0	3.33	0.52	3
Percentage	0%	0%	60%	40%	0%	0%			
Satisfaction: It works the way I want it to work									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	2	1	0	3	0	3.67	1.51	4
Percentage	0%	40%	20%	0%	60%	0%			

Live Subtitling and ARSAD Conference [Action Code: UXE2-STXT-CJ (ARSAD/Live Subtitling Symposium)]

This pilot action lasted three days and took place on 19-22 April 2023 in Barcelona during the Live Subtitling Symposium and the Advanced Audio Description Seminar (ARSAD). Event participants were introduced briefly to the MediaVerse platform and they were asked to create video and photo content during the conference and upload it on the platform. They were also invited to provide feedback through the MediaVerse Questionnaire. This activity was unsupervised, but pilot leaders were available to solve any doubts during the conference.

Most of the participants were interested in accessibility, specifically in terms of audio description and live subtitling. Although there were no professional journalists among the participants, the group consisted of a diverse range of individuals, who were experts in the field of accessibility. The involvement of these experts ensures that the findings are meaningful and relevant to the field and highlights the importance of involving individuals with expertise in research studies. The participant profile included individuals from universities, both researchers and students, as well as broadcasters, interpreters, transcribers, content creators and other people with an interest in accessibility. This group was well-equipped to provide valuable insights into the use of technology assets such as smartphones and computers for accessibility purposes. The age range of the participants varies from 20 to 70, approximately and the group consisted of both men and women.

The study initially had a pool of approx. 145 participants. However, as the pilot was unsupervised and a single login address was used to encourage more participants to use the MV platform during the event, it was not clear how many individuals utilized the MediaVerse platform. However, the participants took a total of 249 pictures and 8 videos over the course of three days. They used various tools and platforms, including popular social media platforms, such as YouTube, TikTok, Twitter, Facebook, and Instagram, as well as media tools such as Google Camera Roll, Vimeo, and Twitch, mentioning also tools such as Brandwatch, WhatsApp, and Google API.

Table 2: Evaluation results of UXE2-STXT-CJ (ARSAD/Live Subtitling Symposium)

MediaVerse Questionnaire									
Are you aware of tools that offer similar features?									
	Yes	**No**	**N/A**	**If yes, please indicate which ones**					
Number of replies	29	24	0	YouTube, Google Camera Roll, TikTok, Twitter, SocialMedia Tools (Facebook, Instagram, Vimeo, Twitch, Brandwatch, WhatsApp), Google API					
Percentage	54.7%	45.3%	0%						
Usefulness: It does everything I would expect it to do									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	3	15	30	5	0	3.70	0.72	4
Percentage	0%	5.6%	28.3%	56.6%	9.4%	0%			
Satisfaction: I would recommend it to a friend or colleague									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	1	10	23	17	2	0	3.17	0.85	3
Percentage	1.8%	18.9%	43.3%	32%	3.8%	0%			
Satisfaction: It works the way I want it to work									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	2	1	0	3	0	3.92	1	4
Percentage	0%	40%	20%	0%	60%	0%			

Although we do not know the exact number of participants who actually used the platform, we know for sure that 53 users effectively filled out the survey, providing valuable insights into the topic of Citizen Journalism. Table 2 shows the evaluation results of the MediaVerse Questionnaire, for this piloting activity. Out of the 53 respondents, 29 users were aware of tools that offer similar features, while 24 were not aware of any. Respondents listed tools like TinEye, Reveal, Google Vision API, Google Camera Roll, Social Media Platforms (e.g., TikTok, Facebook, Instagram, Twitter, Twitch), and Vimeo as some of the tools that offer similar features. The respondents were generally satisfied with the platform's usefulness, with a mean of 3.7 and a median of 4.0, on a 5-point scale. However, they were less likely to recommend the platform to a friend or colleague, with a mean of 3.17 and a median of 3.0, on a 5-point scale.

Moreover, the platform's automatic labelling feature was well received, as were the "automatic caption" and "find similar" options. However, respondents experienced some bugs, such as the "duplicate search" that was not working correctly, and the platform was not optimized for smartphones. This pilot demonstrates that it is possible to use the platform in a non-professional manner to conduct the unsupervised piloting activities related to the CJ Use Case. However, the issues mentioned in the open-ended questions, indicate that the leap to professional use is not yet possible – even though, compared with previous pilots of this Use Case, progress is visible and shows that the platform is already more stable, and participants are more willing to upload content.

In addition, the study provided valuable insights into the perspectives of citizens regarding the use of technology for accessibility purposes. Through their use, the participants encountered several problems and raised questions that were unclear to them. Firstly, there were instabilities while uploading the pictures. It was not possible to upload content from every smartphone, and users mentioned that it did not work or that several attempts were needed. Similarly, that was also the case with the longer videos, which could not be uploaded. Additionally, pictures often changed orientation turning horizontally, an issue that participants noted both in the survey and directly to us during the activity. Furthermore, comments in the survey mention that sometimes the automated titles of the videos were unclear and thus it was not possible to find a picture or video. Participants could not edit the titles, and they raised this issue directly to us during the pilot.

Overall, the participants found that the platform was helpful, although it is relatively unknown to the public and may not be suitable for professional use. The respondents suggested improvements such as the ability to change the name of uploaded files, easier uploading of multiple images, and preserving metadata when importing images from a CSV file. Based on the participants' feedback, it also seems that the optimization of the platform for mobile devices, such as smartphones, would be very useful.

Table 3: Specific aim evaluation results of UXE2-STXT-CJ (ARSAD/Live Subtitling Symposium)

USE CASE SPECIFIC AIM QUESTIONNAIRE									
The MediaVerse platform would allow me to spend less time on creating content and thus reduce the average costs to produce multimedia content compared to other tools I previously used (1 = strongly disagree, 5 = strongly agree)									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	6	6	2	0	0	2.71	0.73	3
Percentage	0%	42.9%	42.9%	14.2%	0%	0%			
It is faster to manage the marketplace activities (uploading, licensing, pricing, etc.) with respect to my current workflow (1 = strongly disagree, 5 = strongly agree)									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	3	9	2	0	0	2.93	0.62	3
Percentage	0%	21.4%	64.3%	14.2%	0%	0%			

Additionally, the participants answered to some Use Case Specific Aim questionnaire items. Table 3 summarises their responses. It is worth mentioning that one user commented, "If I would understand the platform better, e.g., for license choice, I would save even more time and money", and another one wrote, "It could help but I need to get more familiar with the platform."

SRG Hackdays [UXE2-STXT-CJ (Hackdays)]

During the SRG Hackdays in Zurich, we conducted another pilot action for UC1, which aimed to assess the usability and value of MediaVerse in the context of Citizen Journalism. We collected a total of 160 responses and feedback from participants, who completed the general MediaVerse Questionnaire. Table 4 shows the evaluation results of this piloting activity. 18 of these 160 participants answered a specific questionnaire designed to gather more insights about their experience with MediaVerse. Table 5 summarizes the responses to this specific questionnaire. The group of participants is diverse, consisting of individuals with background in journalism, accessibility experts, vocational trainees, developers, and tech enthusiasts. Yet, all participants had an affiliation or association with the broadcaster. In addition to the 160 participants who provided feedback, there were other 640 participants involved in the event. These participants received the content created by the MediaVerse users and were sometimes featured in the content themselves or were filmed for the platform. They also had the opportunity to hear the MediaVerse introduction, although they did not fill out the questionnaire.

Table 4: Evaluation results of UXE2-STXT-CJ (Hackdays)

MediaVerse Questionnaire									
Are you aware of tools that offer similar features?									
	Yes	**No**	**N/A**	**If yes, please indicate which ones:**					
Number of replies	73	87	0	X (Twitter), Facebook, Instagram, TikTok, Snapchat, Dropbox, Google Pictures, Google Lens, Bing, Banuba, midjourney, YouTube, Vimeo, Shutterstock					
Percentage	45.6%	54.4%	0%						
Usefulness: It does everything I would expect it to do									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	9	37	97	17	0	3.7	0.7	4
Percentage	0%	5.6%	23.2%	60.6%	10.6%	0%			
Satisfaction: I would recommend it to a friend or colleague									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	1	14	41	75	29	0	3.7	0.9	4
Percentage	0.6%	8.8%	25.6%	46.9%	18.1%	0%			
Satisfaction: It works the way I want it to work									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	5	30	80	45	0	3.73	0.8	4
Percentage	0%	3.13%	18%	50%	28.1%	0%			

Users generally found value in the platform for specific Use Cases, particularly in collaborative scenarios like Hackdays and citizen journalism, where it helped to improve credibility and facilitate shared work. However, there were concerns about its usability and intuitiveness, with users noting challenges in navigating the platform and suggesting the need for clearer instructions.

Additionally, technical limitations were mentioned in the open-ended questions, such as difficulties with uploading larger videos and uncertainty about size limits. Some users expressed mixed feelings, finding the platform sufficient for certain Use Cases, but not for private use, emphasizing the need for more image options and improved friend connections for project sharing. Despite these reservations, others recognized the platform's potential and its ability to fulfil specific requirements, acknowledging its current limitations in comparison to proprietary tools. This feedback from both the specific and general questionnaires provided valuable insights into the platform's strengths and areas for improvement.

In general, it is interesting to see that participants really close to the broadcaster are aware of platforms, which are similar to MediaVerse. Although they acknowledge that the tools are different, they identify some similarities between the MV platform and some existing tools.

As for the Use Case specific questions, Table 5 shows that in general, MV platforms helped the participants' workflow in terms of both time and money, contributing also to the achievement of the relative KPIs of the project (see Section 4). The participants showed a strong interest in understanding the CJ journey. Nevertheless, some UX problems arose, and conceptual questions were asked, particularly when comparing the experiences of smartphone and PC users. Participants on smartphones encountered challenges related to screen size and touch navigation, while PC users faced different issues such as slower load times and layout inconsistencies. However, all together, this last user test sheds a very positive light on MediaVerse and it is clear that the participants see the benefits of it.

Table 5: Specific aim evaluation results of UXE2-STXT-CJ (Hackdays)

USE CASE SPECIFIC AIM QUESTIONNAIRE									
The MediaVerse platform would allow me to spend less time on creating content and thus reduce the average costs to produce multimedia content compared to other tools I previously used									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	2	5	7	4	0	3.7	0.96	3.5
Percentage	0%	11.1%	27.8%	38.9%	22.2%	0%			
It is faster to manage the marketplace activities (uploading, licensing, pricing, etc.) with respect to my current workflow									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	2	8	6	2	0	2.3.4	0.9	3
Percentage	0%	11.1%	44.4%	33.3%	11.1%	0%			

3.1.2 MediaVerse for Immersive Journalism

Immersive Journalism [UXE2-DW-IJE01]

The goal of this action, which took place online in May 2023, was to evaluate the satisfaction and usefulness levels of MediaVerse for journalists (co-)creating immersive experiences. To this end, 13 DW journalists and editors agreed to test the MediaVerse platform and the new Fader interface. The evaluation took place on two different days for logistic reasons (mainly availability of the participants), but as the procedure and materials were identical, the results will be summarised as one. The ATOS's MV node was used for both evaluation sessions.

After a short introduction to the MediaVerse project, the participants received an overview of the MediaVerse Platform. Then users were asked to perform the following tasks:

- create an account for the MediaVerse Node,
- share their account name so that they could be added to a common project which provided 360° assets for the Fader story; participants were warned in advance that we would ask to share their user names,
- upload (at least) one asset each and license it; participants were warned not to upload content of a very private nature and encouraged to delete their assets directly after the session,
- explore the platform freely and share any questions or suggestions they might have verbally and in the common MV Platform Survey used in all Pilot Actions,
- log in to the Fader platform, following the link in the MV Node's project folder,
- create a Fader Story with the assets from the project folder (and potentially more), and finally,
- fill in the Fader Survey.

Overall, 13 participants were involved. Both testing groups consisted of DW colleagues. Most of the testers are involved in editorial work. All the participants work with social media and with content production for the different platforms. There are different levels of knowledge about 360° content production, from "active user and content creator" to "never work with 360° videos". All are tech-savvy and interested in new technologies. Five respondent are not native German/English speakers.

All participants replied to the MV evaluation questionnaire. Table 6 presents a summary of the main results from the MediaVerse Questionnaire. Participants noted that although MV appears useful for their daily work, it would require more guidance, such as tutorials for the more complex procedures. In addition, they mentioned the license advisor as a positive example several times, in the open-ended questions. As put by one participant, "It's a great idea for a platform and it's great that you can gather other people's assets and use them for your projects. Having the option to sell your stuff is awesome".

Table 6: Evaluation results of UXE2-DW-IJE01

MEDIAVERSE QUESTIONNAIRE									
Are you aware of tools that offer similar features?									
	Yes	**No**	**N/A**	**If yes, please indicate which ones:**					
Number of replies	1	12	0	There was only one comment from a user, who stated: "Generally any sharing platform like Dropbox or WeTransfer could do some of the things MediaVerse can. Also there is Flickr for photos with all the CC options. But nothing combines as much as MediaVerse does. I guess!"					
Percentage	7.7%	92.3%	0%						
Usefulness: It does everything I would expect it to do									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	7	4	2	0	3.62	0.77	3
Percentage	0%	0%	53.8%	30.8%	15.4%	0%			
Satisfaction: I would recommend it to a friend or colleague									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	1	2	10	0	0	3.69	0.63	4
Percentage	0%	7.7%	15.4%	76.9%	0%	0%			
Satisfaction: It works the way I want it to work									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	1	5	6	1	0	3.54	0.78	4
Percentage	0%	7.7%	38.5%	46.1%	7.7%	0%			

Additionally, participants replied to the following Use Case Specific Aim Questionnaire related to Fader (Table 7).

Table 7: Specific aim evaluation results of UXE2-DW-IJE01

USE CASE SPECIFIC AIM QUESTIONNAIRE									
Managing MediaVerse assets in Fader was clear and easy.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	1	4	3	5	0	0	2.92	1.04	3
Percentage	7.7%	30.8%	21.1%	38.5%	0%	0%			
Using the Fader Scene Editor was clear and easy.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	2	3	6	2	0	0	2.6	0.96	3
Percentage	15.4%	23.1%	46.2%	15.4%	0%	0%			
Some things were not clear and easy (please provide some insights, share your bad experiences)									
One participant thought the interface was still rather complex and would need a written manual. Another one thought that adding scenes in the backend and then editing them in the frontend was not intuitive.									
There were also things that I really liked (please provide some insights, share your good impressions)									
One participant thought that overall it was a better user interface, with "huge progress from the last time I used Fader". Another one said: "Once you understand the steps it seems easy to create but, as I said above, you have to understand how this tool really works". Another statement was: "It was very easy and fast, to get the project registered, to upload the assets, etc."									

Specific Fader Tests [UXE2-DW-IJE 02]

Fader was heavily re-built, both in the backend and in the frontend, to match the needs of the MV Use Case partners and make the best possible use of the connection with the MV platform. After the tests in May 2023, VRAG provided a significant update of the new UI, which we wanted to include in the evaluation. To this end, DW invited four journalists from departments covering India as a target region and two colleagues representing the department of Production, who also look into new media content creation.

After an open talk on the potential of new technologies in this market, trying to find out what differences there may be between the consumer markets in Asia and Europe, the participants saw two example Fader Stories and received a brief introduction to the MV platform. As soon as the participants had created their accounts, they were invited to join a project folder through which we had shared 360° content. Following the link in the project, they were automatically redirected to Fader where they were invited to create their own Fader Stories. The story they had seen as an introduction had been stored as a Template and the users were informed that there is a Template functionality. In order to evaluate how intuitive the new UI is, the participants received no further introduction than seeing two Fader Stories and knowing that there is a Template functionality.

As this test was dedicated to the new Fader UI, to conclude the tests, six participants filled out an online questionnaire on the use of Fader. These participants had far less difficulty using the MV platform than participants in earlier tests and found their ways without further explanation as the platform was merely used to provide them with assets. When asking about the advantages of the Fader tool, one user mentioned the possibility to search content in Wikimedia where he actually found the 360° content for his story. This may prove that the two platforms, MV and Fader, have been integrated seamlessly so that users do not even see them as two different tools but understand MV as a source and repository of assets that they share with their team. Table 8 summarises the answers to the questionnaire related to Fader.

Table 8: Specific aim evaluation results of UXE2-DW-IJE 02

USE CASE SPECIFIC AIM QUESTIONNAIRE									
Managing MediaVerse assets in Fader was clear and easy.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	1	1	4	0	0	0	2.5	0.84	3
Percentage	16.7%	16.7%	66.6%	0%	0%	0%			
Using the Fader Scene Editor was clear and easy.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	4	2	0	0	3.33	0.52	3
Percentage	0%	0%	66.6%	33.4%	0%	0%			
Some things were not clear and easy (please provide some insights, share your bad experiences)									
The main issues that all testers struggled with were 1) the fact that Scenes had to be created outside the Editor, and 2) that new images would not appear in the current view but always at the same coordinates.									
There were also things that I really liked (please provide some insights, share your good impressions)									
The main advantage using the Story Template was that the pre-defined boxes held placeholder content which only had to be exchanged, so that issue number 2 above was no longer a problem. Another positive aspect was the fact that the platform is web-based so that no specific infrastructure or high-end hardware would be needed to create compelling content. The two most promising answers were: “It could be a unique feature for us in our market”, and “Overall idea was so good. And it was easy to create an immersive content experience for the audience”.									

Comparative Tests [UXE2-DW-IJE 03]

Finally, when the new Fader UI was available and especially the Story Templates had been added, the editors who had been trained on the former Fader UI in the pilot activities in May were invited to compare the two versions they knew and to estimate, to what extent this would make the creation easier. We have received three replies, presented in Table 9.

Table 9: Specific aim evaluation results UXE2-DW-IJE 03

USE CASE SPECIFIC AIM QUESTIONNAIRE									
Comparing the Fader versions, I was able to set up a project and its assets faster in the new version.									
	not at all		**by 25%**		**by 50%**		**by more than 50%**		
Number of replies	0		1		2		0		
Percentage	0 %		33.%		66.7%		0%		
Comparing the two versions, users felt that they were 50% faster in setting up a project using the combination of MediaVerse and Fader.									
The new editor has allowed me to set up a project scene and its content quicker than before.									
	not at all		**by 25%**		**by 50%**		**by more than 50%**		
Number of replies	0		1		2		0		
Percentage	0 %		33.%		66.7%		0%		
Comparing the two versions, users felt that they were 50% faster in setting up a Story using the new Fader UI									
My perceived usability rating for the old Fader version was:									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	1	0	1	1	0	0	**2.67**	**1.53**	**3**
Percentage	33.%	0%	33.%	33.%	0%	0%			
My perceived usability rating for the new Fader version is:									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	1	0	1	1	0	0	**3.33**	**0.58**	**3.5**
Percentage	33.%	0%	33.%	33.%	0%	0%			
Two thirds of the respondents rate the new UI equally as they did before, while one ranked up their voting score significantly from 1 to 3.									

What I liked most about the Story Template functionality (please provide some insights, share your good impressions)

- "I found the tool more user-friendly than during our initial testing, although I had to view the screencast beforehand as its functionality isn't entirely intuitive. Incorporating an FAQ or How-To guide directly within the tool might be beneficial. As for the outcome of the story, from what I recall, it seems largely unchanged."
- "Quicker output to get a running version although it took a time to get all assets in from MediaVerse."
- "Comparing the new UI with the old version (as we used it a few years ago), setting up a story is a lot faster and easier now. Having all the assets in one dedicated project folder is a big improvement."

3.2 Use Case 2

Use Case 2 involved two main scenarios: a) Co-creation of new media formats, and b) accessibility, blockchain and rights management. Overall, 328 participants were involved, providing 100 replies to the MediaVerse Questionnaire and reaching 983 end users. The pilot actions included in this Use Case are:

- Scenario 1:
  - Association of persons with hearing loss ACAPPS
  - High School Manuel Carrasco
  - EMAV School
  - Dance and Audio description pilot
  - Nursery and Occupational Therapy School (EUIT)
  - Association of persons with cognitive disabilities (SOM- Fundació)
- Scenario 2: Understanding Production/Distribution/Monetisation of Media Accessibility Assets in various contexts.
  - Audiovisual translation professionals
  - Journalism Teaching context
  - Journalism professionals
  - Video Game Localisation
  - Media Accessibility

3.2.1 Scenario 1

In the first scenario of Use Case 2 (2.1) we developed eight pilot actions in Pilot Phase 2, with a total of 328 content creators, 120 users, 983 end-users involved. We have developed two main types of action: a) type 1 actions in which users were invited to co-create 360º content using Fader and then evaluate the MV platform, and b) type 2 actions in which the 360º video co-creation did not use Fader but users co-created 360º videos and interacted with the MV platform only. When presenting the MV platform, all pilot actions followed the MV User Interface Functionalities ShowCase Guide, which lists the different sections and main functionalities of the platform, such as: Dashboard, Upload, My Assets (including: view, subtitle, licensing), Search, and Projects, next to other functionalities such as Moderation. We present each of the actions below.

TYPE 1 ACTIONS: WITH FADER

ACAPPS Action [UXE2-UAB-ACAPPS]

The goal of this action, which took place in ACAPPS (Barcelona) in April-May 2023, was to assess the user experience of the MV platform for the co-creation and 360º storytelling towards social inclusion of vulnerable populations. Users were asked to co-create a 360º video using Fader, and then evaluate their experience with the MV platform and assess the impact of co-creating 360º content on social inclusion.

ACAPPS is an NGO working for oral deaf people (they use lip-reading instead of sign language) and their families. They just expanded their offices with new spaces and rooms, so they made the most of the MV tools to co-create a 360 tour of their headquarters to show their new space to the members and users. Within the 360 experience, they created videos with subtitles where different professionals explain who they are, their roles in the NGO and in the projects they are involved in to help deaf people in their daily lives.

In the first session of this pilot action, nine users were involved. This number was reduced to five in the second session. They were workers in ACAPPS, with different roles: a social area manager (member of the directive team), a social assistant, a communication and fundraising manager for two years (expert in audiovisual production), a volunteer coordinator at the foundation, and a key reference person for 3 years, expert in live subtitling. The age range was between 30 and 50 years old. The Fader story co-created together with 25 participants and shared with 649 end-users, is available in this link: "Un dia a ACAPPS".

Figure 2: ACAPPS video snapshots.

Although nine participants were involved in the process, only two replied to the questionnaire and took part in the final focus group, namely an expert in live subtitling and the audiovisual and communication manager at the NGO. They were both interested in all MV functionalities. Table 10 presents the results of the questionnaire.

Table 10: Evaluation results of UXE2-UAB-ACAPPS

MEDIAVERSE QUESTIONNAIRE									
Are you aware of tools that offer similar features?									
	Yes	**No**	**N/A**	**If yes, please indicate which ones:**					
Number of replies	0	2	0	-					
Percentage	0%	100%	0%						
Usefulness: It does everything I would expect it to do									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	0	2	0	0	4	0	4
Percentage	0%	0%	0%	100%	0%	0%			
Satisfaction: I would recommend it to a friend or colleague									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	1	1	0	0	3.5	0.70	3.5
Percentage	0%	0%	50%	50%	0%	0%			
Satisfaction: It works the way I want it to work									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	1	1	0	0	3.5	0.70	3.5
Percentage	0%	0%	50%	50%	0%	0%			
Other comments:									
• "I had no preconceived notion of the project's tools, so I find what I've seen so far interesting." • "I miss some internal search or organisation tools for the content, and although it goes against the platform's spirit, the option to limit visibility for sensitive projects could be useful."									

Furthermore, we gathered additional information through the following UC2 Specific Focus Group Questions:

How many people were involved in the co-creation and what content did you co-create?

Participants explained that they "created a presentation of the entity through a 360 video where you walk around our premises. It explains the services we offer and experiences from users". The only participants are the ones appearing in the 360 video. 25 persons took part in the creation process, four of which were students from an Audiovisual Technician course.

How did co-creating 360º content impact social inclusion?

A participant stated that they "would need to see the real impact of the content we created once it is published on our website" and also believed that the project "gave the participants the opportunity to explain their experience to the users themselves" as "they were included all along the process". This was also mentioned by the other participant, who stated that "users were included in the creation process".

What was the impact from an educational perspective?

Participants valued that they learned to use Fader and to create 360 videos and consider that "it is important for social workers to learn about new tools", although "sometimes questions and doubts arose". The main learning derives from the creation process, according to the participants. The participants also referred to the difference in quality when the videos play through MediaPlayer or VLC.

In which other projects/ways do you think the co-creation of 360º content could be applied? Please explain why.

The first participant explained that "at the beginning we had a lot of ideas, but we could not do most of them because we lacked time. That was the main limitation. We were not expecting to need that much time planning, organizing and editing it… We would have liked to create many different 360 experiences". In fact, participants thought that they "could apply it to almost every activity that we do in the organization. It would be very useful". A specific example posed by one of the participants is "an interactive story for kids".

For what purpose would you use the MV platform in the future?

Apart from the suggestions made before, they also expressed that "a lot of the functions in the platform can already be done in other sites" such as a closed Drive folder. The search function is an aspect with possibilities but "it is not still there. We would need a lot of entities to create and upload content for it to become useful".

Other comments or opinions on your participation in this project.

One of the participants thought that "Fader is quite easy and intuitive, but you need to get the hang of it. Maybe we aimed for too much, but we had more work than we expected. The co-creation process was long and hard. We wanted to do an immersive room and through that we were introduced to Fader, and it was very interesting to learn about the technologies", an opinion also echoed by the other participant who mentions how they had to adapt to their initial high expectations.

Manuel Carrasco High School Action [UXE2-UAB-CARR]

In this action, which took place at a high school in Barcelona (INS Manuel Carrasco) in April-May 2023, users were asked to co-create 360º stories using Fader and they were then invited to assess the user experience uploading content to the MV platform. In the 360 co-creation training session, nine users were involved. They were all high school teachers working in a public school in Barcelona, from different subjects such as Mathematics, Music, History or Physical Education. They used the MV authoring tools to create different 360-degree stories with 131 students, which were then viewed by 300 end-users from the educational community.

- Project 1: The 13 Pillars of Holocaust Education: A virtual exhibition on the Holocaust, previously held at Vilapicina Torre Llobeta Library, featuring videos created by 4th-year high school and 1st-year baccalaureate students as part of their history class (Figure 3).
  https://app.getfader.com/projects/2dc94285-5d65-46d5-a5b0-c8e094a88a7e/publish
- Project 2: Virtual Visit to Institut Manuel Carrasco i Formiguera. A virtual tour of our institute showcasing activities through videos and photos, emphasizing our educational engagement and facilities. The story is published in the main page of the school website (Figure 4).
  https://app.getfader.com/projects/91a2d383-05ca-4f01-adf1-ba21605afb34/publish

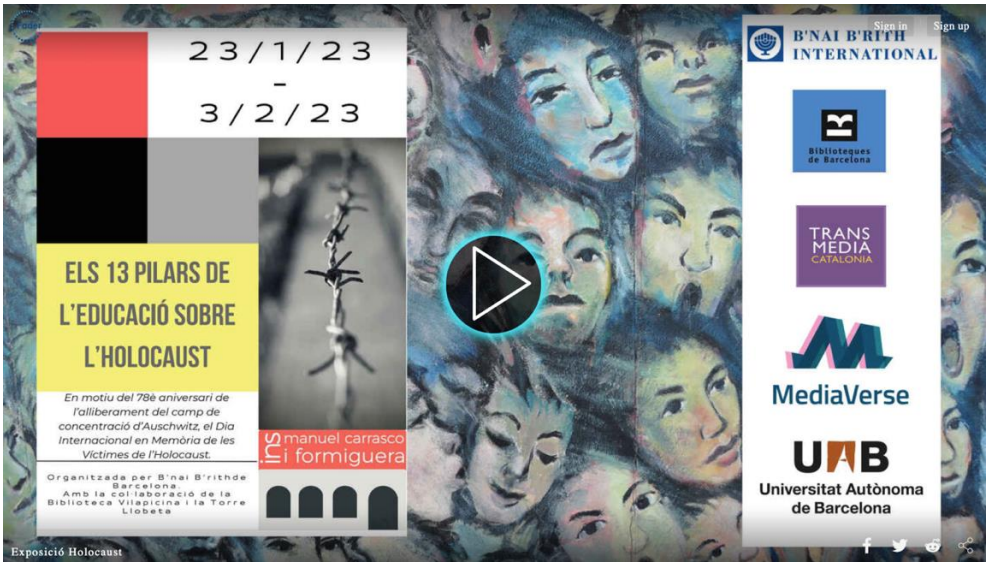


Figure 3: Snapshot of the virtual exhibition on the Holocaust Education.

Figure 4: Main page of the Fader story presenting the high school.

- Project 3: A 360 story about a music concert at the school. The music teacher and many of his students recorded their music performances during the Christmas festival at the school auditorium. The teacher reported that 120 parents watched the videos (Figure 5).
  https://app.getfader.com/projects/c6934122-1f32-4ac6-a6ea-667355fa5512/publish

Figure 5: Music concert Fader story.

The activity had a clear impact on two of the leading teachers, who bought a 360 camera for themselves so that they could do more activities like the ones carried out in the MV project. A clear interest for further collaboration was expressed. When assessing the MV platform, five respondents answered the MediaVerse Questionnaire. Table 11 presents a summary of the main results from the MediaVerse Questionnaire.

Table 11: Evaluation results of UXE2-UAB-CARR

MediaVerse Questionnaire									
Are you aware of tools that offer similar features?									
	Yes	**No**	**N/A**	**If yes, please indicate which ones:**					
Number of replies	1	4	0	YouTube, BlogSpot, Wix, Facebook.					
Percentage	20%	80%	0%						
Usefulness: It does everything I would expect it to do									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	3	2	0	0	3.4	0.54	3
Percentage	0%	0%	60%	40%	0%	0%			
Satisfaction: I would recommend it to a friend or colleague									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	1	1	1	2	0	3.58	0.83	4
Percentage	0%	20%	20%	20%	40%	0%			
Satisfaction: It works the way I want it to work									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	2	2	1	0	3.8	1.30	4
Percentage	0%	0%	40%	40%	20%	0%			
Other comments:									
One participant stated that “It could be more visually appealing”, whereas another one said that “Fader can improve a lot and I think it has a lot of potential in the educational world”.									

As for the UC Specific Aim, five participants also took part in the focus group and we have gathered the following answers.

How many people were involved in the co-creation and what content did you co-create?

For Project 1, the setup allowed around 90 students, including 4th-year high school and 1st-year baccalaureate students, to virtually revisit the exhibition. Content creation involved 2 teachers and 10 students, while the educational tool reached six teachers and 90 students. For Project 2, the project featured 22 scenarios, and content creation involved two teachers and about 30 students. As an educational tool, the entire educational community used it, comprising 300 people. For Project 3, a 360 story about a music concert at the school, the music teacher and seven different groups of his students recorded their music performances during the Christmas festival at the school auditorium. In total, there were 86 students and a teacher involved in the videos. In total, there were 131 participants involved in the co-creation processes, and around 300 people, the whole community, as other end-users involved.

How did co-creating 360º content impact social inclusion?

One participant highlighted the students' interacting and collaborating aspect, whereas another one referred to the Holocaust project and the visibility of the video to many students. This participant also expressed a wish to collaborate further in the future, with higher involvement from students. A third participant highlighted the difficulty "for the students themselves to create the content", as they were 30 students aged 10-11. An idea for the feature includes "creating a Fader about the neighbourhood, talking to people".

What was the impact from an educational perspective?

Participants mentioned the potential of Fader, as an audiovisual tool, but also highlighted the need for training before using it. Another limitation in the version of Fader they used is the file size. An important issue that the participants raised is the internet connection at schools. In fact, a participant said that "360 cameras provide a great tool for students" but was aware that there are students at secondary school "who don't even have computers", hence baccalaureate would be a better suited environment. One of the teachers agreed with the idea of using Fader in research projects, finding it very useful and disagreed with the aforementioned limitations expressed by other participants.

In which other projects/ways do you think the co-creation of 360º content could be applied? Please explain why.

One participant highlighted its potential for "artistic creation", for "having fun", whereas another one explicitly referred to "immersive exhibitions".

For what purpose would you use the MV platform in the future?

One participant mentioned "sharing projects with students", whereas another one found the platform "great, but perhaps more suited for professionals, especially concerning licenses". One respondent agreed it would be useful "for securely sharing photographs among photographers". Another one referred to the fact that from the musical field, "professionals do not upload anything online due to concerns about losing authorship of content" but did not see a clear application of MV for the music industry "because it doesn't allow uploading song versions as it considers them copies, for example".

Other comments or opinions on your participation in this project.

In the final comments, one of the participants wrote, "I had a great time, and I see that the project has a lot of potential" but "technical limitations are a drawback. We need a good computer and reliable internet connection,

which we don't have at the high school". This was supported by another participant, who suggested, "It would have been nice to have a bank of free files to play with". Overall, despite the technical limitations, the feedback was positive and participants urged for a second collaboration with more time for exploring the tools.

EMAV Action [UXE2-UAB-EMAV]

In this action, which took place in an Audiovisual Media School in Barcelona (Escola de Mitjans Audiovisuals, EMAV) in April - May 2023, users co-created 360º videos using Fader and evaluated the MV platform and the impact of co-creation of 360º content on social inclusion. The participants are students working in the same project from different courses such as Audiovisual Production, Audiovisual Direction, Animation or Lightning. They invited other participants in the co-creation such as actors or experts in the subject of their story.

They used MV authoring tools to create a multimedia final exposition as a final project of their course. The subject of the story was the civil war. To tell their story, they created a lot of different content, such as videos, photographs, 360 pictures, animations and even 3D models. They used different scenarios, like bunkers, bomb shelters and war museums in Barcelona. To co-create all the content, they did some research and collaborated with a group of actors. The title of their story is *Escarcha y Plomo*, a speculative fiction story dated in the 60'-70' in Spain, after the dictatorship. They considered deaf people as the audience, so they created subtitles for the videos. The project is available on the following link:
https://app.getfader.com/projects/a2a017fb-22cf-4b1c-83d3-65e18225d5e4/publish

The students performed a presentation of their Fader project in front of 18 teachers and 16 students (Figure 6).

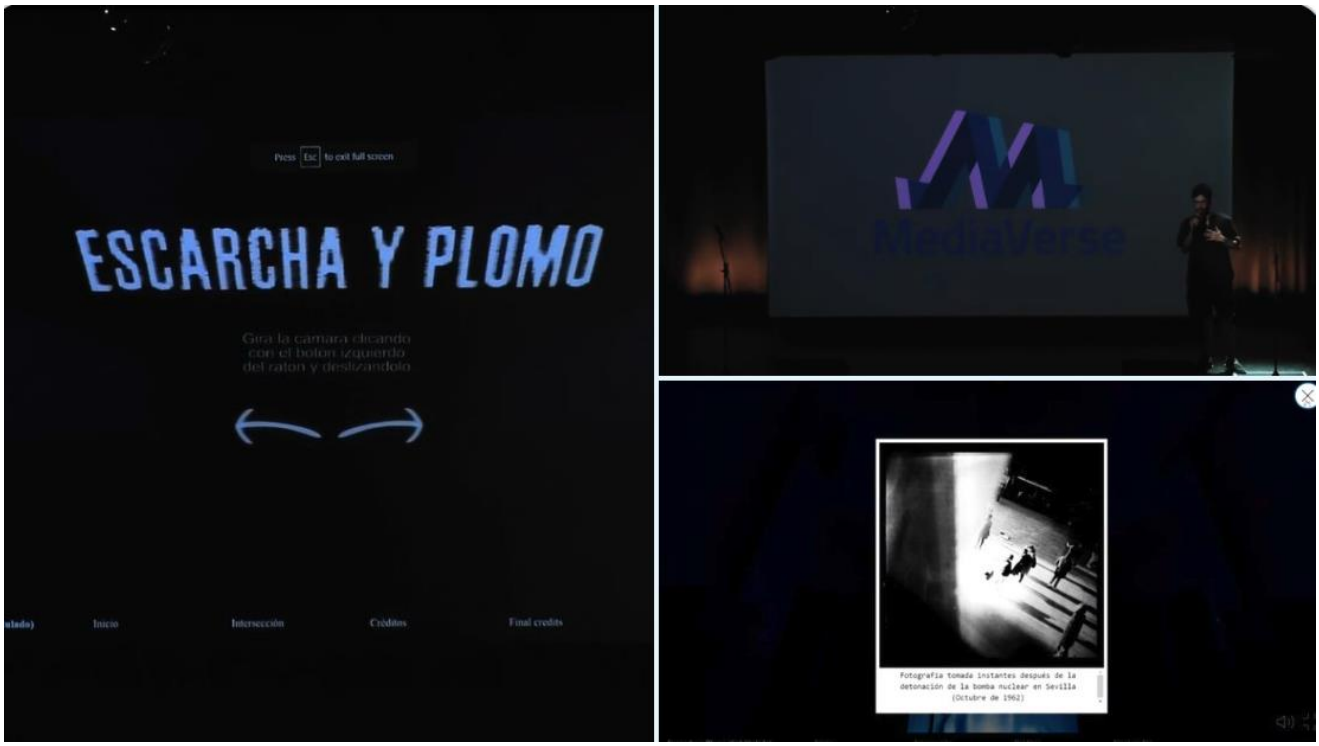


Figure 6: Snapshot of the co-created video
Source: Twitter 23/05/2023 by @emavescola.

Overall, 57 students were involved in the co-creation process and 11 participants replied to the MediaVerse Questionnaire and took part in the focus group discussion. Table 12 presents a summary of the main results from the MediaVerse Questionnaire.

For the UC Specific Aim, we have gathered the following answers through a focus group.

Table 12: Evaluation results of UXE2-UAB-EMAV

MEDIAVERSE QUESTIONNAIRE									
Are you aware of tools that offer similar features?									
	Yes	**No**	**N/A**	**If yes, please indicate which ones:**					
Number of replies	0	10	1	-					
Percentage	0%	91%	9%						
Usefulness: It does everything I would expect it to do									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	1	5	5	0	4.36	0.67	4
Percentage	0%	0%	9%	45%	45%	0%			
Satisfaction: I would recommend it to a friend or colleague									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	1	6	4	0	4.27	0.64	4
Percentage	0%	0%	9%	54%	36%	0%			
Satisfaction: It works the way I want it to work									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	1	2	7	1	0	3.72	0.78	4
Percentage	0%	9%	18%	63%	9%	0%			
Other comments:									
• "It's magnificent". • "When I was trying to choose the license, it would freeze." • "There is a bug that freezes the screen when sharing a project. Besides that, there are some important buttons on the website that are too small or don't stand out enough in terms of their importance. For example, the button to add a license to the content." • "The platform should allow to use multiple currencies, so if you have different currencies in your wallet, you can use them without having to convert them at the moment and with the current exchange rate, doing it at the time of payment or when one decides. Go forward and see how it evolves."									

How many people were involved in the co-creation and what content did you co-create?

There were 57 participants in the co-creation process, including 11 students, 35 actors/models, one participant from the soundtrack (ESMUC), one from graphic design, five collaborating teachers, advice from a lexicography association, and three extra assistants. They created a multimedia virtual exposition with 49 photos, six videos, one 2D animation, three 3D models, four posters, and four newspaper pages.

How did co-creating 360º content impact social inclusion?

Rather than assessing the impact on social inclusion of their content, they made some suggestions. One participant mentioned, "if it was easier to get a 360 camera, you could help promote Spain's depopulated areas, provide immersive access to places inaccessible to people with reduced mobility, bring tourism closer to people who cannot travel or promote places where tourism does not reach". It could also help "raise awareness about

disabilities, such as making an inclusive documentary like 'A Day in the Life of a Person with Down Syndrome'". This participant added, "Co-creation itself facilitates understanding among creators as equals", and "MV provides the tools for co-creation, which is already a tool for social inclusion". A third participant stated, "Having control over your content can help neurodivergent people create content and protect their rights". Another participant presented the following example: "in a village in Peru, a traditional design was plagiarized by a well-known brand. Finally, this brand sued the village for having registered the fabric". According to the student, if this had been documented with MV, this heritage could have been protected.

What was the impact from an educational perspective?

One respondent said that it teaches about licenses, which is very complicated, and makes it more understandable. Another one stated that Fader offers a new way of communication that could be used for artistic projects and exhibitions. Another participant said that MV could help "with knowledge of authors and scientific publications", as content could be taught in a more visual way. Finally, one participant said that books or stories in Fader could teach or convey messages to children: "It would surely captivate children. It could be like an immersive story that branches out according to your decisions".

In which other projects/ways do you think the co-creation of 360º content could be applied? Please explain why.

Two participants mentioned it could be used for "student presentations in class" and to "co-create with colleagues' presentations". Another participant proposed creating immersive stories in 360, like a "gallery of memories and experiences". This participant sees journalistic stories as a potential use next to seeing "experiences from other perspectives, such as watching a play from the stage". Two participants also mentioned it could be used to show museums in "inaccessible places" for those who cannot go.

For what purpose would you use the MV platform in the future?

One respondent said that they would use it to have an "economic benefit from content, creating 3D animations and seeing them already finished in context" without having the finished product yet. Another participant pointed out that Fader and MV need to be integrated, an integration that happened after the action. Participants are also eager to use more tools for co-creation, especially "open-source software". A suggestion was to include a "chat between project participants". One participant said that it could also be used as a "portfolio".

Other comments or opinions on your participation in this project.

Participants highlighted the opportunity to use these technologies and cameras. Some participants made suggestions for improvement, such as "the image bar of Fader (for uploading images, for selecting the photo) appeared too narrow to me" or "it would be a big improvement to be able to play with the perspectives of pictures and elements within the 360-degree Fader, rotate the axis, etc. It would have made the setting easier if Fader had the option to play with the vanishing point or curve of the photo". Another participant also mentioned adding subtitles was difficult: "it clashed with our setting. It would have been useful if the subtitles were in the Fader story itself as an optional choice rather than having to burn them into the videos".

TYPE 2 ACTIONS: WITHOUT FADER

In this type of actions, the participants did not use Fader, but they co-created 360º video content and evaluated the MV platform. We have asked participants to upload content and use the different platform functionalities presented as they wished.

Dance Action [UXE2-UAB-MAG]

This action took place in Biblioteca Francesc Candel and in El Graner - Centre for Creation of Dance and Performing Arts (Barcelona) in May - June 2023. Four participants were involved: a teacher at Pau Vila School, the coordinator of a research project on Audio Description (AD) in Dance for blind people, also serving as the coordinator at El Graner, a student at EMAV (Audio Description training) and an audiovisual producer, collaborating in the AD project.

This pilot was an initiative of a professional leading a research and creative project in Audio Description in Dance for blind people. The project does not aim to audio describe a dance performance for blind spectators, but to create a space where blind and sighted people can dance at the same time and co-audio describe the movements. The main intention of this initiative is to have an inclusive experience. First, the audio description in dance sessions took place. After an initial training session, they co-created 360-degree content in two sessions. The number of participants each week varied; in total, there were 15 participants/ dancers (six of them blind), one person recording with the 360 camera and three facilitators, with a total of 19 participants (see Figure 7). The leader of the project works in Pau Vila School and involved a teacher from this school in co-creating additional 360º video content in an audiovisual workshop with 26 students and two additional teachers.

Figure 7: Participants in the dance pilot.

Overall, there were 48 content creators (dancers, facilitators, teachers, and students). The primary school teacher created 10 360-degree videos with their students, but they are only available for internal use. The AD and Dance team recorded different footage and they are planning to produce three 360º videos in total, which are still under construction.

In the final focus group, four people participated and completed the MediaVerse Questionnaire. Table 13 presents a summary of the main evaluation results.

Table 13: Evaluation results of UXE2-UAB-MAG

MEDIAVERSE QUESTIONNAIRE									
Are you aware of tools that offer similar features?									
	Yes		**No**		**N/A**	**If yes, please indicate which ones:**			
Number of replies	1		3		0	Image and video libraries.			
Percentage	25%		75%		0%				
Usefulness: It does everything I would expect it to do									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	3	0	1	0	3.5	1	3
Percentage	0%	0%	75%	0%	25%	0%			
Satisfaction: I would recommend it to a friend or colleague									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	0	3	1	0	4.25	0.5	4
Percentage	0%	0%	0%	75%	25%	0%			
Satisfaction: It works the way I want it to work									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	2	2	0	0	3.5	0.57	3.5
Percentage	0%	0%	50%	50%	0%	0%			
Other comments:									
• "I would like to see more examples and do more exercises to fully understand it with greater depth." • "I need to practise much more."									

For the UC Specific Aim, we have gathered the following answers through a focus group:

How many people were involved in the co-creation and what content did you co-create?

There were about 20 participants in the workshops, and 26 students and 3 teachers in the classroom. They conducted workshops and recorded them with an artist from El Graner. One participant wanted to "test the tool to see if it could provide an immersive dance experience", with dance and movement at the centre. Another one mentioned that in the AD project with the camera they participated in two working sessions, with a total of 15 participants involved in dancing, one person recording and three teachers. The camera is considered "very easy to use and lightweight" and "becomes another participant", as one can "walk around with the camera without disturbing the scene".

How did co-creating 360º content impact social inclusion?

One participant mentioned that they "talked about the need for audio description since they are working with 360 videos and persons with visual disabilities". They will use this material "for broadcasting" but they "still don't know if it will be accessible for people with visual disabilities". Another participant broadened the scope and mentioned the "possibilities are greater". In fact, as acknowledged by yet another participant, "this gives visibility to the world of audio description and helps with dissemination and outreach".

What was the impact from an educational perspective?

One participant wrote, “It’s a good tool to disseminate these images, and it’s useful to see not only what’s in front but all around, to see different perspectives”. Another one stated: “it is a very useful tool to understand what a flat image is, the 360 degrees”, as it offers more than one perspective.

In which other projects/ways do you think the co-creation of 360º content could be applied? Please explain why.

They mentioned “recording commercials”, “helping with social inclusion and awakening creativity” and “reliving places you cannot access”, which may be especially significant for certain people. Two participants tried to use it outdoors, but the sound quality was not good enough. One participant also acknowledged that “it would be much more realistic with VR goggles”.

For what purpose would you use the MV platform in the future?

There is potential in the educational field: “to be on the same network and share content that is only accessible to us”. One participant found the MV platform “similar to image and video libraries” and would use it “to search for and use content”. Another one would use instead of “big social media platforms, to seek out this more democratic aspect”, although “we would need to see to what extent it becomes democratised”. As put by this participant, “at least it escapes the more capitalist part of other social media platforms”.

Other comments or opinions on your participation in this project.

Overall, it was a great experience, bringing innovative technologies to the students at the school. One participant noted, “As a creative or artistic tool, viewing the images makes me think about the aesthetic aspect. Sometimes it may not fit perfectly. When shapes deform as you approach the camera… it can work for specific styles.” Another one believed the function is more informative rather than creative. A third respondent merged both approaches and stated that it can be used as a preliminary tool in the creative process, “to have information about what you don’t normally see”.

EUIT Action [UXE2-UAB-EUIT]

This action took place at a University near Barcelona in April-May 2023. Escola Universitària d’Infermeria i Teràpia Ocupacional (EUIT) is a higher education institution training future occupational therapists and nurses. They were already involved in a pilot action in Pilot Phase 1. In this second phase, the approach was slightly different and, instead of using Fader, they co-created 360-degree videos to be enjoyed with a VR headset in health centres such as Hospital de Bellvitge, Centre Ninaia and a home care service.

In an initial stage, every co-creation group of students had an interview with their assigned health centre, to gather their main needs, which were the following:

- Hospital de Bellvitge professionals asked to get 360 videos for neurorehabilitation, so users could train and improve neurological disorders such as unilateral spatial neglect. Students created a virtual reality experience where end-users need to find objects or look at things in their affected side.
- Centre Ninaia professionals asked to create 360 experiences to raise awareness about Autism Spectrum (ASD), so parents could have a more realistic and immersive experience to understand how children with ASD perceive the world and experience their daily life activities.

As for the home care service offered by an occupational therapist, different specific user needs were gathered:

- One group interviewed a man that had a stroke. He was a History teacher, interested in the heritage and churches of the city. He could not access them because of his stroke. Students created a VR experience for him, so he could visit his significant places again.
- Two groups interviewed two women with dementia, and designed a VR experience to improve their cognitive, physical and emotional capabilities. They designed cognitive 360 challenges, such as finding objects in a supermarket, and significant and pleasant 360 experiences, such as walking a dog in the park. Due to their advanced state of dementia and vulnerability, they cannot leave their homes anymore so with these immersive experiences, they will be able to transport themselves outside their rooms.

At the end of the co-creation process, the students presented their 360 experiences to the rest of the class and to the lecturers. Some end-users came to the presentation and could see the experiences that students created for them. The VR headset was mirrored into a big screen, so users and students could see what the student was watching and presenting with the headset (Figure 8).

Figure 8: Students presenting their projects.

Apart from the already mentioned 20 students, 16 additional people were involved in the co-creation process: one occupational therapist, three end-users and four relatives from the home care service, two occupational therapists from Hospital de Bellvitge, two occupational therapists from Centre Ninaia, one IT support technician, three occupational therapy teachers, and the communication manager at the university. Another indeterminate number of end-users at Hospital de Bellvitge and parents of children with ASD at Centre Ninaia will experience the 360 videos. Professionals in those centres will be able to use those videos in the future as a tool in their jobs. These videos are available only for internal use, but some excerpts are available online (see Twitter thread).

As for the evaluation, 15 students replied to the MediaVerse Questionnaires, and six students (one representative from each co-creation team) were also involved in the final focus group. Table 14 presents a summary of the main evaluation results.

Table 14: Evaluation results of UXE2-UAB-EUIT

MEDIAVERSE QUESTIONNAIRE									
Are you aware of tools that offer similar features?									
	Yes	**No**	**N/A**	**If yes, please indicate which ones:**					
Number of replies	0	15	0	-					
Percentage	0%	100%	0%						
Usefulness: It does everything I would expect it to do									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	1	4	8	2	0	3.73	0.79	4
Percentage	0%	6.7%	26.7%	53.3%	13.3%	0%			
Satisfaction: I would recommend it to a friend or colleague									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	2	3	6	4	0	3.8	1.01	4
Percentage	0%	13.3%	20%	40%	26.7%	0%			
Satisfaction: It works the way I want it to work									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	4	8	3	0	3.93	0.70	4
Percentage	0%	0%	26.7%	53.3%	20%	0%			
Other comments:									
• "It works well".									

For the UC Specific Aim, we have gathered the following answers through a focus group:

How many people were involved in the co-creation and what content did you co-create?

Overall, 20 students were involved, with 16 extra people involved in the co-creation (professionals in the centres, users, teachers and IT professionals at the university). Two groups worked with children with ASD, three groups provided home care services, and a final group worked with the neuro-rehabilitation section of a hospital.

How did co-creating 360º content impact social inclusion?

One participant stated, "It's not easy to see social inclusion because our goals were very specific". Still, one respondent thought that even if these are specific cases, they are "applicable to many people with the same condition". One of the users believed that the project could help children with autism to enter society and relate better, at school, etc. A participant pointed out that if the parents understand their children better, the children will have a better life. In this regard, the technology was useful for many people to access inaccessible places.

What was the impact from an educational perspective?

As put by one participant, "both the user and we have learned: for example, using 360 tools, interacting with other users and forming a group… The user has learned to share their experience and co-create the 360 story with us". Another one added: "we have learned something completely new from scratch, and they are new tools that we can use in the future". One of the participants stressed that they "didn't know how virtual reality worked"

and “for users it will be like an educational game”. The experience helped them “generate new ideas” and encouraged users “to think about creating new content that doesn’t exist yet”. MV is an “additional tool for the future”, and “it has been interesting to see how we can innovate in this way. Perhaps creating 360 content to improve the user’s situation is a trend for the future”.

In which other projects/ways do you think the co-creation of 360º content could be applied? Please explain why.

Participants referred to “people with reduced mobility, for example in nightclubs”, “teenagers”, who are more used to virtual environments, “for adults to see how activities of daily living are performed”, and “elderly who are physically limited”, as it can help them get to inaccessible places, “with a focus on therapeutic purposes”.

For what purpose would you use the MV platform in the future?

One participant mentioned “hospitals” and said, “They can upload and share their content”, and another one referred to “doctoral students and scientific research”. One comment mentions: “in the field of occupational therapy, I would create a platform to share materials with other therapists and ensure proper attribution”. A suggestion made is to include a specific section in the platform where one can find materials they are interested in, “like a dedicated node”. Some participants saw the relevance of copyright attribution: “it’s a problem we have encountered with colleagues, not knowing who owns certain materials, “it’s important to set conditions for how the content can be shared”. In conclusion, the platform is s “easy and intuitive”, and “it would be easy to protect and manage rights”.

Other comments or opinions on your participation in this project.

One participant “would like to have more time to experiment with the platform”, as “it has been a very good experience”. Another one would like to have “more support when creating content and testing the camera”. The experience “is very motivating for students because there is a clear and rewarding goal”.

Som-Fundació Action [UXE2-UAB-SOM]

This action took place in May-June 2023 and focused only on the MV platform evaluation, namely UI showcase, free exploration, MediaVerse Questionnaire and focus group, due to time and availability constraints. Before Pilot Phase 1, this association of persons with cognitive disabilities already took part in the project and co-created a 360 tour of the Som-Fundació headquarters, which they published on their website. During Pilot Phase 1, they used the MV authoring tools to create a Fader to show the users how to do everyday tasks like going shopping for groceries. The users were involved in the creation process. In Pilot Phase 2 they could not develop any more content but took part in an evaluation of the MV platform to which they uploaded content.

Five participants were involved in Pilot Phase 2, replied to the MediaVerse Questionnaire and took part in the focus group. They were social workers in the NGO with different roles: a social area manager, a social assistant, a communication and fundraising manager, a Volunteering coordinator, and a reference person for users. This was one of the groups of participants with less IT skills, except for the communication manager, who created the story with Fader. Table 15 presents a summary of the main results from the MediaVerse Questionnaire.

For the UC Specific Aim, the following answers were gathered through a focus group:

How many people were involved in the co-creation and what content did you co-create?

There were seven participants involved (social educators and users) co-creating a 360 experience on how to go shopping in a supermarket.

Table 15: Evaluation results of UXE2-UAB-SOM

MEDIAVERSE QUESTIONNAIRE									
Are you aware of tools that offer similar features?									
	Yes	**No**	**N/A**	**If yes, please indicate which ones:**					
Number of replies	1	4	0	-					
Percentage	20%	80%	0%						
Usefulness: It does everything I would expect it to do									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	1	1	3	0	4.4	0.89	5
Percentage	0%	0%	20%	20%	60%	0%			
Satisfaction: I would recommend it to a friend or colleague									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	0	1	4	0	4.8	0.44	5
Percentage	0%	0%	0%	20%	80%	0%			
Satisfaction: It works the way I want it to work									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	1	1	3	0	4.4	0.89	5
Percentage	0%	0%	20%	20%	60%	0%			
Other comments:									
There was only one comment, asking to "incorporate new functions".									

How did co-creating 360º content impact social inclusion?

"Users suffer a digital divide" and there is a need to "help them with digital skills". In this regard, result was "satisfactory and could be useful for users", as "it is a more visual way to teach tasks, and therefore it is more understandable and approachable". Similarly, one participant thought that "Fader is very easy to use if you don't have to edit the clips, although 360 videos were heavy and looked pixelated". Another one considered that there is an impact at two levels: on the one hand, raising awareness among entities and, on the other, the impact on users, as "very few have access to the necessary digital technologies and knowledge".

What was the impact from an educational perspective?

The MV platform is a "pedagogical tool with a training function", where "different disciplines collaborate for the same purpose". This "raises awareness and shows the reality of other areas that you would not have considered". One respondent stated that their goal is "for users to achieve a more independent life", and "with the video we made, teaching tasks, there is an educational impact: their autonomy is reinforced".

In which other projects/ways do you think the co-creation of 360º content could be applied? Please explain why.

This could be applied to "reduce the digital divide in users, especially the elderly". It "provides an interesting tool to play with our relationship with space, and it would have been good to make a video on how to move around the public transport network, for example". One participant suggested that it could also be used to "make videos

to attract new volunteers", whereas another one believed "it must be useful to see what surrounds you", as "if it is other things, the same result can be obtained with a 2D video". As stated by one respondent, "360 videos make the public more curious and eager to access the video", although "this recruitment campaign and its objectives should be very well designed".

For what purpose would you use the MV platform in the future?

One participant believed that "more and more people are living off social media" and the MV platform is a "very simple way to monetize and/or protect your content and have your work recognised". Another one highlighted that "the ability to choose the type of license you want for your content through the license advisor is very useful". The inclusivity of MV is stressed: "there are certain networks that are very exclusive and inaccessible. In contrast, MV provides a platform that is more inclusive".

Other comments or opinions on your participation in this project.

Looking at the whole project, "the first experience was very positive". Still, they also realised that "the teams that use this tool need a professional who knows about audiovisual products" and mentioned aspects such as the fact they did not know that "cash machine screens cannot be recorded".

ESCAC Action [UXE2-UAB-ESCAC]

This action took place at the School of Cinema and Audiovisuals in Catalonia (Escola Superior de Cinema i Audiovisuals de Catalunya, ESCAC), in Terrassa (Barcelona) in May 2023. Participants were students and teachers from the cinema school. One teacher in cinema and script with experience in the field of disability, one lecturer, coordinator of the 360 Narratives and VR Masters, one doctoral student and Master's student in Film and Audiovisual Culture, Degree in Communication, and one Master's student in Film and Audiovisual Culture, Degree in Sociology. Overall, the participants were a diverse group of individuals with expertise in various areas, such as immersive experiences, blockchain research, film directing, sociology, cultural heritage, and academic pursuits. They shared a common interest in studying the impact of new technologies on narrative, particularly in the realm of immersive storytelling.

Due to time constraints and availability, this action did not include a co-creation process but only the platform evaluation. Four participants were involved in the user experience evaluation, responding to the MediaVerse Questionnaire and taking part in the focus group. Still, one response was not successfully registered, leaving us with three replies. Table 16 presents a summary of the main results from the MediaVerse Questionnaire.

For the UC Specific Aim, the questions were slightly adapted given that there was not an actual co-creation process, with the following replies.

How did you think 360º co-creation could impact social inclusion?

As acknowledged by a participant, "people became more aware and worked more autonomously". It "enables digitalizing information, and both older teachers with less knowledge and younger people who do have the knowledge can collaborate and help each other. It creates a dialogue and mutual assistance". Another participant believed that "it could allow people with reduced mobility to access inaccessible places". Still, another one was more critical and "did not find anything in MV that other platforms like YouTube don't offer" and, in fact, "I don't even find it accessible for many people". To sum up, this creator liked "what it represents but in practice I don't quite see its purpose". In this regard, another respondent believed that "blockchain is the most interesting part", although there is "risk that it remains a transitional space and that is not truly inclusive".

Table 16: Evaluation results of UXE2-UAB-ESCAC

MEDIAVERSE QUESTIONNAIRE									
Are you aware of tools that offer similar features?									
	Yes	**No**	**N/A**	**If yes, please indicate which ones:**					
Number of replies	2	1	0	The new web administrator of Pontificia Universidad Católica de Perú facilitates the creation and digitization of information for all university units and faculties. Tools like Notion, Basecamp, and blockchain integration are being used for collaborative project management and exploring payment and rights management.-					
Percentage	66.7%	33.3%	0%						
Usefulness: It does everything I would expect it to do									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	2	1	0	0	3.33	0.57	3
Percentage	0%	0%	66.7%	33.3%	0%	0%			
Satisfaction: I would recommend it to a friend or colleague									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	1	1	1	0	4	1	4
Percentage	0%	0%	33.3%	33.3%	33.3%	0%			
Satisfaction: It works the way I want it to work									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	1	1	1	0	0	3	1	3
Percentage	0%	33.3%	33.3%	33.3%	0%	0%			
Other comments:									
• "Good idea, but needs further implementation: loading issues, slow performance, and design improvements." • "Recommendation: Make the platform available in multiple languages for broader accessibility." • "Questions about incentive model, node functionality, and information distribution in the advanced version of the platform."									

What could be the impact from an educational perspective?

As put by a participant, "the co-creation within MV is different: we need to achieve a dialogue between those who create content and those to whom the content is offered, that's where interesting co-creation lies". In this regard, "we are used to more passive media, but immersive media offer many more choices". MV was seen as "useful for digital literacy and for the elderly", although "it needs to be made more user-friendly". One participant added, "It's a tool that can be further developed to be more accessible". One respondent voiced that "co-creation in practice can be collective" and "it's a field where we can work in the educational context". In this regard, 360 video "showcases the entire community that collaborates". MediaVerse was defined as a "platform for sharing works through nodes (also offered by other platforms) in a protected manner", whereas another participant defined it as "an exhibition platform like Vimeo for others to use".

In which other projects/ways do you think the co-creation of 360º content could be applied? Please explain why.

Participants made different suggestions: "the journalistic field" as "the 360 part is beneficial", "interdisciplinary profiles with knowledge from different areas, merging talents to take advantage of the medium", "surveillance, journalism, for a process of social transformation that involves a degree of trust". One participant considered

that “360 makes it easier to see what we don’t normally see” and another one believed that the co-creation of 360 “depends on the team forming the co-creation”.

For what purpose would you use the MV platform in the future?

It was seen “as a way to teach licences and raise awareness about intellectual rights protection”. One teacher explained that in their school they use **“**Vimeo, so students can present their audiovisual creations to the teachers. It would be good to have a platform like MV to share assets within the school, so we don’t need third party platforms”. The different MediaVerse nodes could be used “to collaborate between other audiovisual schools from all over the country or even over the world”.

Other comments or opinions on your participation in this project.

Suggestions included making the platform’s design more inclusive, and a friendlier, more accessible and attractive design. One participant stated, “I don’t see many differences from other applications, although it serves as an integrator of different applications, like blockchain. Having everything linked to gather it’s a range of tools. But I think it will face a lot of competition because what will make people choose MV? It needs to be more powerful because it depends on the content that is uploaded”. One of the things that users value is the free access to those sites, including storage space, and the concept of democratising the servers. As a participant put it: “there should be transparency about the extent to which you own the content. If it’s hosted on a server and it closes down, what happens?”

ITACA Action [UXE2-UAB-ITACA]

Campus Ítaca is a Summer Camp hosted in UAB and organised by Fundació Autònoma Solidària (FAS), where young people (14 years old) participate every day in a workshop organized by a different research group. MediaVerse organised four workshops, with the same approach but with different groups, lasting a full day (6 hours) each in June and July 2023 at the Universitat Autònoma de Barcelona. In the MediaVerse workshop, students were introduced to audiovisual accessibility, virtual reality, and the MediaVerse project. To this end, they first did some awareness raising activities, such as how to guide blind people (one blindfolded) or how to create an audio description of 360-degree videos, with a VR headset. Then, they co-created a 360 video. Due to the users’ profile, the platform showcase only focused on the main functionalities, without getting into detail in the licensing process or the content moderation tool.

Figure 9: ITACA participants.

Overall, 28 high school students took part in the action next to three university students, who acted as facilitators (see Figure 9). Table 17 shows the responses of the MediaVerse Questionnaire from all 31 participants.

Table 17: Evaluation results of UXE2-UAB-ITACA

MEDIAVERSE QUESTIONNAIRE									
Are you aware of tools that offer similar features?									
	Yes	**No**	**N/A**	**If yes, please indicate which ones:**					
Number of replies	3	28	0	Instagram, CAPCUT, NFT.					
Percentage	9.7%	90.3%	0%						
Usefulness: It does everything I would expect it to do									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	1	5	6	11	8	0	3.65	1.14	4
Percentage	3.2%	16.1%	19.4%	35.5%	25.8%	0%			
Satisfaction: I would recommend it to a friend or colleague									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	2	3	3	14	9	0	3.32	1.28	3.5
Percentage	6.5%	9.7%	9.7%	45.2%	29%	0%			
Satisfaction: It works the way I want it to work									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	2	3	3	14	9	0	3.32	1.28	3.5
Percentage	6.5%	9.7%	9.7%	45.2%	29%	0%			
Other comments:									
One participant "would like it to also protect photos outside the application", whereas another one thought "it should let you edit content in the website". One stated it "has a lot of potential", and another one "liked it", as s/he found it "useful and interesting". Another participant wrote: "It's ok, but I don't find the functions good and I don't understand how to use them", and another one added: "The things it can do is limited and it is not quick if you want to spend time looking at things". To conclude, one state: "very good app, very original".									

During the focus group, we gathered the following replies:

How many people were involved in the co-creation and what content did you co-create?

All the 28 students were involved in the co-creation process, along with the three facilitators. There were four co-creation groups involved in the 360 interactive story co-creation. Every single group participated, producing a 360º video for social inclusion and an audio description to explain the content for blind people.

How did co-creating 360º content impact social inclusion?

One participant said "it attracts more attention with its format, and people engage more with the content", and another one believed "it's more realistic and captures more attention". A positive aspect was that "it helps people who come from another country. With this, maybe they will not feel so alone and will not repeat a year". It was also seen as "a learning tool for those who struggle, or to help people who may not understand the language (like teachers, for example)". One participant defined it "like a new technology that is not commonly used (making 360 videos) and it is more fun", whereas another saw the potential "to raise awareness about women discrimination". Overall, "it depends on each person, it wouldn't raise awareness for everyone". A participant concluded, "people who are blind would appreciate it because we have taken them into account".

What was the impact from an educational perspective?

According to one participant "students can focus on what interests them and captures their attention", as "it's more visual and makes it easier to learn and retain information". "Architecture projects" were considered a good example, as it would allow student "to see how buildings would look before constructing them". A participant believed "it facilitates engagement and allows for conversations and socialisation"; whereas another one stated, "it could help people who want to study abroad, so language isn't a barrier". MediaVerse is a useful tool "to provide psychological support for foreigners and immigrants", and one respondent added: "if taught in a class, it could help children become aware of these issues". Some participants highlighted it is "enjoyable".

In which other projects/ways do you think the co-creation of 360 content could be applied? Please explain why.

Participants were excited about the possibilities of the tool and suggested many possibilities, such as "in creating things and identifying flaws"; in "presenting projects or studying"; in "assisting scientists in explorations"; in "visualising a house before construction"; "in creating more fun and engaging advertisements"; "in helping people who are ill and cannot attend school"; in "showcasing travel photos or staging a play at school"; "to teach about different locations"; to see where someone went on a trip; "to create videos about daily activities or hobbies"; "for concerts"; "for sports"; "for amusement parks"; "to record accidents for prevention and understanding what happened; "for security cameras"; and for "online classes".

For what purpose would you use the MV platform in the future?

One participant "would use it for commercial purposes, to sell content and make money", an opinion also voiced by other participants, who would "sell study notes". This concept of "earning money" was put forward by other respondents ("sell logos", "offer various types of services"). Others referred to the concept of "sharing images for others to edit and create memes" or "sharing study notes" or "viewing the work of other people" without explicitly mentioning the monetisation. The platform "to have copyright and control over my work" and it would "prevent your photos from being stolen", while helping users "gain more visibility".

Other comments or opinions of your participation in the project.

One of the respondents "found MV very useful and I would use it for school projects", and another one "enjoyed the activity because we could choose what to do and see examples from other groups". In this sense, "it fosters a sense of unity". Although one of the respondents was critical and thought "the MV platform is not aesthetically pleasing", another one stated that "it has been great" and yet another one believed "it's a very interesting activity because you work in a group and collaborate to achieve a final product". Although "a bit tedious" at times, the experience was defined as "good" and "cool".

3.2.2 Scenario 2

Six focus groups with different user profiles were carried out with the aim of gaining information about users' needs and expectations of the MV platform concept, in particular the use of blockchain, in the context of audiovisual translation (professional and academia), and journalism (professional and academia) in relation to rights management of media accessibility assets. As already mentioned, rather than performing tasks with the MV platform and replying to the MediaVerse Questionnaire, this pilot remained at a more conceptual level and developed its own ad hoc evaluation instruments. We present the main findings for each focus group together with the results of the questionnaire, where applicable. The results of all UC2.2 pilot actions are presented in the conclusions and have been reported in different conference presentations (Oncins & Serrat-Roozen 2023, Serrat-Roozen 2023a, 2023b) and articles (Orero, Fernández-Torné & Oncins, 2023; Serrat-Roozen & Oncins 2023d).

Action 1. Understanding Production/Distribution/Monetisation of Media Accessibility Assets in Audiovisual Translation (Action Code: PP-UAB-4)

Although this action took place before Pilot Phase 2, it was not reported before and was the basis for the current actions, so this is also presented here. In this case, the questionnaire was not distributed and the questions guiding the focus group were different. This action took place on 08/04/22 online with five professional audiovisual translators. After a short presentation, we used the following guiding questions to facilitate the discussion and reach shared conclusions. The participants were very engaged from the beginning. They stressed the importance and usefulness of applying blockchain to media accessibility assets (e.g., subtitle files, scripts for dubbing, AD scripts, AD voicing, etc.) so that authorship can be attributed to their creators.

As a user, for what would you use the MV platform in your context?

All participants work for majors who have private platforms (i.e., Sfera, Pixelogic) to create subtitles. These subtitles are locked, they are inaccessible, they cannot revise or edit them, or even have a copy of their own subtitles afterwards. Other platforms do allow you to download and edit subtitles once created (e.g., Netflix). Since they work for majors, they do not see the use of MV. They suggest convincing companies (especially majors) to allow subtitlers to work outside such platforms, or to add some of the MV functionalities, such as blockchain to their existing platforms.

Within the frame of accessibility and audiovisual translation files (i.e., media accessibility assets) rights management, authors have the moral right over the assets they create. This can never be sold. Thus, assets should be somehow "watermarked" for moral ownership. Do you agree?

Participants doubt whether that is legally possible. Some know for sure it is so. Exploitation rights can be sold, but not moral rights, which cannot be waived. A differentiation is made between assets that do not generate author's rights (subtitling for the deaf and hard-of-hearing, audio description) as they are not considered literary creations and the right to claim the authorship of such assets. They agree that once it is stated that the authorship of an asset is yours, anybody will need to ask you for permission to use it, regardless of the fact that you hold the exploitation rights for it or not.

Conversation moves to the many elements and stakeholders in an audiovisual translation: translation, lip synch, editor, etc. There are many processes. There is a concern about how to assign and identify authorship in the case of scripts for dubbing: translator and lip synchroniser. Participants suggested the following: a) a shared blockchain of co-authorship; b) two separate authors would need to be identified, as the products are different.

Should authors be able to establish economic rights and exploitation rights?

This is seen with scepticism. Monetising the assets seems to be unattainable for participants, in view of the contracts they have to sign in relation to the economical exploitation of the assets they create. It is considered useful in the case of creators producing assets not to be consumed through the main platforms (i.e., Netflix, TVE).

Licensing and authorship are very interesting and useful functionalities of the platform, especially for author's rights management entities and for any other content to be uploaded to the Internet. An authorship identification code would allow for the easy traceability of the asset, both for author's rights management entities and authors themselves. Also, for companies holding the exploitation rights, since they will be able to control whether the subtitles for which they have paid and of which they hold the exploitation rights are being used somewhere else or by someone else.

An authorship identification code would also allow distinguishing among subtitles of the same audiovisual product created for different supports (e.g., cinema, DVD, etc.) and their probably different authors. In addition, the participants found this feature useful in the case of assets being unlawfully reused (the case of subtitles created for DVD now being ripped, uploaded to the Internet and used without permission). It is considered extremely useful, for example, in the case of YouTubers uploading their content on the web and being able to have a blockchain code identifying their asset and being able to establish the conditions (i.e., license, monetisation) to it.

Concerns about the duplicate detection are expressed: a) if an author wants to upload some assets they created long ago but is already on the Internet (uploaded by somebody else); b) if a fansubber has created the subtitles for a film and you upload yours, which might be similar. Still, it is also considered very useful from the point of view of many other professionals (e.g., screenwriters, film directors, etc.) as there will be a unique identification of the asset linking it to themselves.

They highlight the possibility to easily create a directory of subtitled works, avoiding duplications and enabling the better organisation of the subtitling market. The platform should be set to detect whether two subtitles are the same although timecodes differ (slight offset). It should also detect whether the subtitles are created from the script for dubbing. Software specialised in detecting the % of text matches should be used.

Participants state the most important aspect of the MV concept: control over what you create, authorship, identification, and traceability (how many times an asset was used, especially in the case of teaching materials).

Would a label including information about the translation "ingredients" give any hint about its quality?

All information is useful, but not sure who would be interested in it. It is interesting to know "the synchronised version has used a certain percentage of the translation for dubbing, and it is also interesting to know whether it is a machine translated post-edited version or human translation". There is concern about such labels including too much information about the actual percentage of machine translation used, and there are many other criteria already in place to assess the quality, but there is nobody controlling that such criteria are met.

The results of this focus group, carried out before Pilot Phase 2, was the basis for developing new focus groups dealing with:

- Different audiovisual translation modalities, such as media accessibility and video game localization, as according to participants' feedback copyright management in media accessibility assets remains uncovered.
- Other digital media fields covered in the MediaVerse project, such as journalism.
- Teaching practices in academia related to copyright management in the digital media field.

Action 2. Understanding Production/Distribution/Monetisation of Media Accessibility Assets in Audiovisual Translation (Action Code: PP-UAB-5)

This action took place on 31 January 2023 online with six professional audiovisual translators, all female, aged 25-55. All participants were active audiovisual translation professionals or lecturers, based in Spain with Spanish as their main target language. The aim of the focus group was to gain information about users' needs and expectations of the MediaVerse platform concept, in particular the use of blockchain, in the context of audiovisual translation (professional and academia) and in relation to rights management of media accessibility assets. The final approved conclusions were:

Do you think that the MediaVerse platform could be used in the professional field of translation and/or audiovisual translation? Does it have any advantage over the current way of managing the different modalities of AVT and accessibility in the media?

Most participants reported managing their rights through the organisation DAMA. They all reported not knowing how their work is used outside Spain, which is the country they are based. Most participants consider that the use of the MediaVerse platform would be especially relevant for film festivals. Most times, they do not know the origin of the works they receive (i.e., subtitling templates), and once they deliver their work they do not know where it will be used (i.e., country/context). They all work in the Spanish context with Spanish as their main target language. One participant mentions that the agencies for which she works are responsible for the copyright management of her works. All participants consider that the use of the MediaVerse platform could be beneficial for research dissemination purposes.

Within the frame of accessibility and audiovisual translation files (i.e., media accessibility assets) rights management, authors have the moral right over the assets they create. This can never be sold. Thus, assets should be somehow "watermarked" for moral ownership. Do you agree?

All participants agree that authors should have moral rights over the asset they create. This is especially relevant for participants working on accessibility services such as subtitling for the deaf and hard-of-hearing and audio description as these are not considered literary creations, and they do not have the right to claim the authorship of such assets.

Should authors be able to establish economic rights and exploitation rights?

All participants are sceptical. Monetising the assets seems to be unattainable for participants, in view of the contracts they have to sign with the agencies/clients in relation to the economical exploitation of the assets they create. Nevertheless, all participants agree that authors should be involved in the negotiations to establish the exploitation rights of their works, also depending on the foreseen reuse.

Do you think that the issue of intellectual property and copyright is relevant for the training of future translation and audiovisual translation professionals?

All participants agree that intellectual property and copyright management are very relevant topics for the training of future professionals in the audiovisual translation field. These topics should be properly integrated in Translation Studies at both bachelor and master level. They also mention that these are topics that they do not master in-depth.

As a teacher, have you ever had the need to explain any of the issues that MediaVerse contemplates to your students?

Most participants agree that at some point of the course they have explained questions related to copyright management to their students.

Is the subject of intellectual property/copyrights currently covered in any course in Translation Studies?

All participants agree that there is no specific subject in Translation Studies that covers/deals with copyrights/IP. It is also not a subject/topic included in any syllabus.

As for the questionnaire, Table 18 presents the results from the responses of five participants.

In your opinion, which are the advantages and disadvantages of the MediaVerse platform in relation to copyright management?

The main reported advantages were:

- Manage the moral and exploitation rights of their own work (i.e., audiovisual translations).
- Monitoring their work (who acquires it, who modifies it, etc.)
- Have direct contact with the clients or end-users of their works.
- Tracking and managing copyright of their own works.

The main reported disadvantages were:

- Early stage of development/implementation of the presented platform.
- Need for training. In most cases, clients require a more traditional way to handle copyrights.
- Use mainly restricted to content creators (for fun or leisure).

Table 18: Specific aim evaluation results of PP-UAB-5 (A)

WOULD YOU USE THE MEDIAVERSE PLATFORM IN YOUR PROFESSIONAL CONTEXT?			
	Yes	**No**	**Maybe**
Number of replies	3	0	2
Percentage	60%	0%	40%
Would you use the MediaVerse platform in your teaching context?			
	Yes	**No**	**Maybe**
Number of replies	2	0	3
Percentage	40%	0%	60%

In addition, respondents answered to a group of questions to evaluate the blockchain based solutions in their professional area. Table 19 presents the main findings.

Table 19: Specific aim evaluation results of PP-UAB-5 (B)

USE CASE SPECIFIC AIM QUESTIONNAIRE									
Decentralised digital content ecosystem: power and ownership return to creators									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	0	2	1	2	4.33	0.58	4
Percentage	0%	0%	0%	40%	20%	40%			
New pricing options: new options for creators to earn by selling content									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	1	0	1	3	0	4.2	1.3	5
Percentage	0%	20%	0%	20%	60%	0%			
Monetization of content: content creators can establish direct relationships with customers.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	2	0	1	2	0	3.6	1.52	4
Percentage	0%	40%	0%	20%	40%	0%			
Distribution of royalty payments: near real time payments based on smart contracts.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	1	1	1	2	0	3.8	1.3	4
Percentage	0%	20%	20%	20%	40%	0%			
From DRM (Digital Rights Management) to smart contract: Transparent and "self execute" right management underlying smart contracts.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	1	2	2	0	4.2	0.84	4
Percentage	0%	0%	20%	40%	40%	0%			

Attribution: Blockchain increases the visibility and availability of the information regarding copyright ownership.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	1	1	3	0	4.4	0.89	5
Percentage	0%	0%	20%	20%	60%	0%			
Copyright management: Blockchain enables content owners to directly manage their works.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	1	1	3	0	4.4	0.89	5
Percentage	0%	0%	20%	20%	60%	0%			

Action 3. Understanding Production/Distribution/Monetisation of Media Accessibility Assets in the Journalism Teaching Context (Action Code: PP-UAB-6)

This action took place on 1st February 2023 online with six active professional journalists, who are lecturers at university. These were three men and three women, aged between 35 and 64. The final approved conclusions were as follows.

Do you think that the MediaVerse platform could be used in the professional field of journalism? Does it have any advantage over the current way of managing fact-checking in the media?

One participant points out that it would be a very interesting platform for the advertising field. However, there are some doubts about the access to the platform as a user (not as a creator), and about the preservation of the ownership when downloading the digital content. The participant considers it to be an appealing platform, aimed mainly at audiovisual media content, and to a lesser extent at text, one of the traditional formats of journalism.

All the participants agree on the importance that this platform could have, mainly for individual professionals (e.g., for freelancers) or small organisations, since they often depend on platforms controlled by large companies. One participant is sceptic, but also considers that it would be an effective tool to guarantee authorship through an affordable method. All participants agree that it could be a complementary resource to be more complete in conducting fact-checking, since verification in journalism is very complex.

Within the frame of journalism (i.e., digital assets) rights management, authors have the moral right over the assets they create. This can never be sold. Thus, assets should be somehow "watermarked" for moral ownership. Do you agree?

There is a tendency in the journalism field to think that the digital press belongs to everyone, and in many cases the authorship of a text is not respected. This is an issue that does not happen with traditional media (i.e., written press). A participant emphasizes that this moral right should also be associated with the possible repercussions of bad practices. The same participant also raises the issue of limitations on the right to parody, quote, and even generate memes.

Should authors be able to establish economic rights and exploitation rights?

All participants consider it problematic that an author can establish unilateral agreements, due to the existence of general regulatory frameworks at European and international level. However, all agree on the benefit it would have for small content creators.

Do you think that the issue of intellectual property and copyright is relevant for the training of future journalists?

All participants agree on the great relevance of training in these topics at a university level. They point out that in many cases, students do not know basic concepts related to intellectual property and copyright, even at a

master level. It is mentioned that sometimes students use photos from social networks (e.g., Twitter/Facebook) without indicating the authorship. It is also mentioned that the right to quote/parody (etc.) is there, but as a professional, one must be able to properly use it. All participants agree that one of the problems is that students do not respect copyright issues in digital media as they would in traditional media (print media). Likewise, the growing use of artificial intelligence also poses a challenge in questions related to authorship. All participants stress that more training is needed, also for the teaching staff. One participant points out that in addition to explaining the usual regulatory framework, it would be necessary to deepen in the critical evaluation of sources, such as: if the sources are private or institutional, or assessing other people's work. All participants consider it necessary to train themselves as teachers in topics related to intellectual property and copyright management.

As a teacher, have you ever had the need to explain any of the issues that MediaVerse contemplates to your students?

All participants agree on having had the need to explain intellectual property and copyright issues to the students in the subjects they teach (bachelor/master). In most cases, these topics are part of the syllabus. All participants mention that it is necessary to go deeper into this topic. All agree that topics related to IP and copyright are transversal, and it is necessary to make students more aware of them.

Is the subject of intellectual property/copyrights currently covered in any course of Journalism Studies?

All participants mention that there are subjects that include intellectual property/copyright as part of the syllabus. In some universities, these topics are covered in subjects related to "ethics and deontology", or "documentation" (bachelor level). One participant mentions that in some universities there are also specific subjects at a master level.

As for the questionnaire, Table 20 shows the results from the response of five participants.

Table 20: Specific aim evaluation results of PP-UAB-6 (A)

WOULD YOU USE THE MEDIAVERSE PLATFORM IN YOUR PROFESSIONAL CONTEXT?			
	Yes	**No**	**Maybe**
Number of replies	4	0	1
Percentage	80%	0%	20%
Would you use the MediaVerse platform in your teaching context?			
	Yes	**No**	**Maybe**
Number of replies	5	0	0
Percentage	100%	0%	0%

In your opinion, which are the advantages and disadvantages of the MediaVerse platform in relation to copyright management?

The main reported advantages are:

- Advantages in relation to verification.
- Confidence for the producer and the user. Copyright protection. Gratuity. Information verification.
- Disadvantages: Elimination of intermediaries and excessively bureaucratic processes, favouring the empowerment of the authors.
- Protection of the author's right. It helps to verify the contents. Promotes the responsibility of authors for their works.
- Unification and transparency.

The main reported disadvantages are:

- Decentralization due to lack of control of a supervisory body.
- Control may fall into political powers.
- Bureaucracy. Excessive commodification of intellectual authorship.
- Control of the authorship of the shared.

In addition, respondents answered to a group of questions to evaluate the blockchain based solutions in their professional area. Table 21 presents the main findings.

Table 21: Specific aim evaluation results of PP-UAB-6 (B)

USE CASE SPECIFIC AIM QUESTIONNAIRE									
Decentralised digital content ecosystem: power and ownership return to creators									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	1	2	0	2	0	3.6	1.34	3
Percentage	0%	20%	40%	0%	40%	0%			
New pricing options: new options for creators to earn by selling content									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	1	0	3	1	4.5	1	5
Percentage	0%	0%	20%	0%	60%	20%			
Monetization of content: content creators can establish direct relationships with customers.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	1	0	2	1	1	3.75	1.26	4
Percentage	0%	20%	0%	40%	20%	20%			
Distribution of royalty payments: near real time payments based on smart contracts.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	1	0	0	3	1	4.25	1.5	5
Percentage	0%	20%	0%	0%	60%	20%			
From DRM (Digital Rights Management) to smart contract: Transparent and "self execute" right management underlying smart contracts.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	2	1	1	1	0	3.2	1.3	3
Percentage	0%	40%	20%	20%	20%	0%			
Attribution: Blockchain increases the visibility and availability of the information regarding copyright ownership.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	1	0	4	0	4.6	0.89	5
Percentage	0%	0%	20%	0%	80%	0%			
Copyright management: Blockchain enables content owners to directly manage their works.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	1	1	3	0	4.4	0.89	5
Percentage	0%	0%	20%	20%	60%	0%			

Action 4. Understanding Production/Distribution/Monetisation of Media Accessibility Assets in the Journalism Professional Context (Action Code: PP-UAB-7)

This action took place on 16/02/2023 online with six professional journalists, all male, with age range 25-64. The final approved conclusions were as follows.

Do you think that the MediaVerse platform could be used in the professional field of journalism? Does it have any advantage over the current way of managing fact-checking in the media?

A participant highlights the importance that this platform can have, especially for expensive projects, as for example in the case of war reporters (joint financing through Peer-to-peer, p2p). The participants also highlight the possibility that this platform opens up to establish new business models through micropayments, as well as the option of traceability to measure the viewing and distribution of content. One participant points out that the management of piracy is complicated, since in the world of digital journalism screenshots can be taken and copyright is not considered/recognized.

Most participants highlight the problem of rigour (how to know if the asset that a non-professional user uploads to the platform is really what it says it is, like a photo that says it is from a specific date or place). A participant raises the question of being able to create a (small) company account when it comes to a local medium with few resources to be able to increase views, as well as improving the management of resources that are lower than in the big media. One participant refers to the advantages of the platform as a professional medium, and a decentralized tool, for the exchange of images. It would enable a professional sale of rights, replacing the widespread practice of asking for borrowed images through social networks. Finally, another participant points out that it would be interesting for the platform to allow flexibility (for example, to make individualized agreements like exchanging photos between one and the other).

Within the frame of journalism (i.e., digital assets) rights management, authors have the moral right over the assets they create. This can never be sold. Thus, assets should be somehow "watermarked" for moral ownership. Do you agree?

All the participants agree with this statement. They emphasize that moral recognition and authorship is a fact in photographs, but it is less common in text editing. On TV, no one takes it individually (it is lost and transferred to the television network). A participant mentions that in large communication agencies, the authorship is anonymous and what is sought is the visibility and dissemination of the information. Press offices search for maximum dissemination, and an authorship register like the one proposed by MediaVerse could be considered counterproductive. However, traceability (knowing where the information of a press office has been published) is interesting. A participant mentions that moral recognition is often a question of the circumstances and the agreements with the media companies with which they work.

Should authors be able to establish economic rights and exploitation rights?

All the participants consider this a problematic aspect, since the management of property and exploitation rights is related to previously signed agreements. A participant mentions that there are groups (such as Group Z) in which the authors (content creators) have already signed agreements in which moral rights are not even contemplated. A participant mentions the possibility of the tool to advise on the monetization of the content (recommendations on the economic value of certain contents).

Do you think that the issue of intellectual property and copyright is relevant for the training of future translation and audiovisual translation professionals?

All participants agree. Most participants claim not to be aware of copyright, mainly in news writing. They all emphasize the importance of intellectual property and claim that the authors/creators of photos/images have much clearer rights and are more aware. This is not so clear in news writing. A participant mentions that no one raises this question on television. Although the creation process goes through several steps: editor, copy-editor, camera, presenter, copyright is not contemplated in any of the different phases of the process. Only the rights of the final product are raised.

From your experience, do you think that young professionals have enough knowledge about the topics covered in the MediaVerse platform?

All participants emphasize that the new digital generations assimilate technologies more easily. Therefore, they may have more knowledge in relation to the technology proposed by MediaVerse (blockchain, use, and management of the platform). However, the question of copyright is an area that young people are not fully aware of, and in many cases, they do not even consider it in the work they do.

Do you think that questions related to intellectual property and copyright management are covered during Journalism Studies? Do you remember to receive any training on these topics during the studies?

The youngest participants (around 30-40 years old) mention having received training in these topics; however, they emphasize that it was not an in-depth training: "We received training but very vaguely". The older participants (over 40 years or more) mention that they have not received or do not remember having received this training in their studies.

As for the questionnaire, Table 22 shows the results from the response of five participants.

Table 22: Specific aim evaluation results of PP-UAB-7 (A)

WOULD YOU USE THE MEDIAVERSE PLATFORM IN YOUR PROFESSIONAL CONTEXT?			
	Yes	**No**	**Maybe**
Number of replies	3	0	2
Percentage	60%	0%	40%
Would you use the MediaVerse platform in your teaching context?			
	Yes	**No**	**Maybe**
Number of replies	4	0	1
Percentage	80%	0%	20%

In your opinion, which are the advantages and disadvantages of the MediaVerse platform in relation to copyright management?

The main reported advantages were:

- Better ability to protect copyrights.
- Manage copyrights in a more systematic way.
- Easy access to third-party content.
- Security against plagiarism and hacking.
- Security and access to smart contracts for copyrights management.
- Traceability to know who uses your content.
- Global scalability to sell your content to other users, agencies, media and other countries in the European environment.
- Great possibilities of using different business models: micropayments for content, launching projects, or monetizing a project with payments from companies and users at the same time: p2p, which would help to finance content creators in projects with a larger economic endowment (i.e., traditional media could simultaneously co-finance a project with Ethereum currency without the need to agree between them).

The main reported disadvantages were:

- Usefulness of the platform would depend directly on the existence of a large number of users.
- Usability could be improved in the case of having to register a considerable number of works.

- High marketing investment to render the platform attractive in terms of UX and platform maintenance. Many content creators will always prefer to upload their content to other platforms because they would have more visibility than on this one.
- It is important to mention that two participants highlighted the fact that even if they considered the value of the platform and the use of blockchain technology for copyright management, they reported not having enough knowledge to evaluate it properly.

In addition, respondents answered to a group of questions to evaluate the blockchain based solutions in their professional area. Table 23 presents the main findings.

Table 23: Specific aim evaluation results of PP-UAB-7 (B)

USE CASE SPECIFIC AIM QUESTIONNAIRE									
Decentralised digital content ecosystem: power and ownership return to creators									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	1	1	3	0	4.4	0.89	5
Percentage	0%	0%	20%	20%	60%	0%			
New pricing options: new options for creators to earn by selling content									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	2	2	1	0	3.8	0.84	4
Percentage	0%	0%	40%	40%	20%	0%			
Monetization of content: content creators can establish direct relationships with customers.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	1	1	1	2	0	3.8	1.3	4
Percentage	0%	20%	20%	20%	40%	0%			
Distribution of royalty payments: near real time payments based on smart contracts.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	1	3	1	0	4	0.71	4
Percentage	0%	0%	20%	60%	20%	0%			
From DRM (Digital Rights Management) to smart contract: Transparent and "self execute" right management underlying smart contracts.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	2	0	2	1	0	3.4	1.34	4
Percentage	0%	40%	0%	40%	20%	0%			
Attribution: Blockchain increases the visibility and availability of the information regarding copyright ownership.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	1	2	2	0	4.2	0.84	4
Percentage	0%	0%	20%	40%	40%	0%			
Copyright management: Blockchain enables content owners to directly manage their works.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	0	0	5	0	5	0	5
Percentage	0%	0%	0%	0%	100%	0%			

Action 5. Understanding Production/Distribution/Monetisation of Media Accessibility Assets in the Video Game Localisation Field (Action Code: PP-UAB-8)

This action took place on March 8, 2023 online with four audiovisual translators (three men, one woman, age range 25-64) with experience in the video game industry. The final approved conclusions were as follows.

Do you think that the MediaVerse platform could be used in the professional field of audiovisual translation (video games)? Does it have any advantage over the current way of managing the different modalities of AVT and accessibility in the media?

All participants agree that it might be difficult to use this platform in the environment of large video game developers (Triple A) mainly due to the existence of NDAs (Non-disclosure agreements). These large companies have pre-established and closed processes and workflows. All participants agree that the platform could perhaps be used in the context of "indie" games that have smaller budgets. They also mention the possible interest of the platform for educational and/or open-source video games. In all these cases, the MediaVerse platform could be used to reach a greater number of users and market share.

A participant mentions that the platform would be very useful for uploading the code of the video game. A main problem in game localization is the lack of context, since the professional only receives a decontextualized Excel file with the terms to be translated without any references (i.e., images/audios/videos). Another participant points out that it would also be of great help to address questions related to the accessibility of the video game.

Within the frame of rights management in the video game localization, authors have the moral right over the assets they create. This can never be sold. Thus, assets should be somehow "watermarked" for moral ownership. Do you agree?

All the participants agree that the moral rights of the professionals working in localization should always be recognized, and that this has been a claim in the sector for many years. A participant mentions that in the video game environment, some agencies do not allow professionals to mention the video games they work on. All participants agree that this is a problem in the video game localization sector.

A participant mentions that in some cases, if you work directly for developers (for example Nintendo), moral rights are recognized from the start and a record of this remains. However, this is not always the policy of the different video game developers. One participant mentions the lack of recognition of other agents involved in the localization process (such as reviewers and "testers"). The same person suggests that the work of these professionals should also be recognized in copyright. All the participants agree that one of the main conflicts is in the commercial interest.

Should authors be able to establish economic rights and exploitation rights?

A participant mentions that one of the existing problems in the localization industry in relation to copyright is that video games are not categorized as audiovisual works. Therefore, unlike other forms of audiovisual translation (e.g., subtitling and dubbing), the localization of video games is considered a work derived from the "computer industry" and does not generate exploitation rights. In this sense, DAMA together with Spanish association ATRAE have managed to recognize the copyright of the AVT authors, but to date, these rights are not recognized in the video game localization industry. Two participants mentioned that creativity in the localization of video games is often greater than in the subtitling/dubbing of audiovisual products, so it should be protected and recognized. Two participants mentioned that copyright should be agreed at a joint level (among all agents involved in the localization process). However, to date, there is no clear legal framework that covers this recognition in the video game localization sector.

Do you think that the issue of intellectual property and copyright is relevant for the training of future translation and audiovisual translation professionals?

All participants agree that the issue of intellectual property and copyright management is a relevant issue for the profession. One participant mentions that in many cases the professional who receives the order is not aware of what the video game entails because he/she receives decontextualized information without the necessary reference material. Likewise, companies do not usually mention the issue of copyright and in many cases, professionals are subject to NDA. Professionals in the localization sector are increasingly present on social networks and denounce/claim their visibility in the credits.

From your experience, do you think that young professionals in the field have enough knowledge about the topics covered in the MediaVerse platform?

Two participants mention that younger people are less aware of copyright issues due to the lack of experience. The more experience in the sector, the greater knowledge and awareness of the importance of copyright. All participants agree that the knowledge of copyright among the youngest is directly related to the training they have received. Not all people who work in localization have the same background. They also highlight the importance of being part of an association to understand and become aware of copyright issues.

Do you think that questions related to intellectual property and copyright management are covered during the studies? Do you remember to receive any training on these topics during the studies?

All participants agree that the subject of copyright is not included as part of the content in any of the subjects of Translation Studies. Not even in the most practical subjects of the degree. At the UAB, audiovisual translation master's degree (MUTAV) there is a talk at the end of the master's organized in collaboration with DAMA and ATRAE in relation to these topics. Likewise, copyright is treated at a general level in some subjects.

All the people in the group agree that it would be necessary to include a more specific subject in Translation Studies dealing with copyrights and being part of the syllabus. In many cases, recently graduated people start translating as freelancers without knowing issues related to copyright.

As for the questionnaire, Table 24 shows the results from the response of four participants.

Table 24: Specific aim evaluation results of PP-UAB-8 (A)

WOULD YOU USE THE MEDIAVERSE PLATFORM IN YOUR PROFESSIONAL CONTEXT?			
	Yes	**No**	**Maybe**
Number of replies	4	0	0
Percentage	100%	0%	0%
Would you use the MediaVerse platform in your teaching context?			
	Yes	**No**	**Maybe**
Number of replies	4	0	0
Percentage	100%	0%	0%

In your opinion, which are the advantages and disadvantages of the MediaVerse platform in relation to copyright management?

The reported main advantages are:

- Decentralization and easy access for everyone ensuring that the generated content is always available and authorship can always be recognised.

- Usefulness to develop independent projects. (i.e., create a video game and localize it, rights can be given for localisation to translators, or rights of the graphics can be given to graphic artists). Also, it might be interesting to help developers get recognition for their works.
- Control given to creators over their own content.

The reported main disadvantages are:

- Availability of large video game companies to join the initiative.
- Copyright management conflicts with the commercial interests of many companies.
- Few users and creators may choose to publish their content on larger platforms.

In addition, respondents answered to a group of questions to evaluate the blockchain based solutions in their professional area. Table 25 presents the main findings.

Table 25: Specific aim evaluation results of PP-UAB-8 (B)

USE CASE SPECIFIC AIM QUESTIONNAIRE									
Decentralised digital content ecosystem: power and ownership return to creators									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	0	1	3	0	4.75	0.5	5
Percentage	0%	0%	0%	25%	75%	0%			
New pricing options: new options for creators to earn by selling content									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	0	2	2	0	4.5	0.58	4.5
Percentage	0%	0%	0%	50%	50%	0%			
Monetization of content: content creators can establish direct relationships with customers.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	1	0	3	0	4.5	1	5
Percentage	0%	0%	20%	0%	75%	0%			
Distribution of royalty payments: near real time payments based on smart contracts.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	1	2	1	0	4	0.82	4
Percentage	0%	0%	25%	50%	25%	0%			
From DRM (Digital Rights Management) to smart contract: Transparent and "self execute" right management underlying smart contracts.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	1	1	2	0	4.25	0.96	4.5
Percentage	0%	0%	25%	25%	50%	0%			
Attribution: Blockchain increases the visibility and availability of the information regarding copyright ownership.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	0	1	3	0	4.75	0.5	5
Percentage	0%	0%	0%	25%	75%	0%			
Copyright management: Blockchain enables content owners to directly manage their works.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	0	0	4	0	5	0	5
Percentage	0%	0%	0%	0%	100%	0%			

Action 6. Understanding Production/Distribution/Monetisation of Media Accessibility Assets in the Media Accessibility Field (Action Code: PP-UAB-9)

This action took place on March 28 2023 online with five media accessibility professionals (four women, one men, age range 25-64) working in different modalities (audio description, subtitling for the deaf and hard-of-hearing, live subtitling). The final approved conclusions were:

Do you think that the MediaVerse platform could be used in the professional field of media accessibility services translation? Does it have any advantage over the current way of managing the different modalities of AVT and accessibility in the media?

All the participants agree that the platform could be used in the professional field of AVT and media accessibility. However, they point out that the use of the MediaVerse platform might depend on the type of content in terms of copyright management. A participant mentions that when working with translation agencies for subtitling (pre-recorded), although copyright rights are considered, in many cases agreements are signed and copyrights might be transferred to the company.

Another participant points out that live subtitling works in the abstract, namely there are various people who are part of the subtitling process, so it is difficult to assign copyrights to specific people for this modality. The participant states that the translation agencies keep the exploitation rights. In live subtitling, when the program is long, the subtitling is done between several subtitlers taking turns. In contexts such as TV, most times the subtitling service is externalized, so the question is who owns the rights: the company that offers the services or the TV broadcast?

The same participant mentions the difficulty of recording live subtitles for events or meetings that take place on video conferencing platforms such as Zoom, and again questions who the owner of these subtitles is. In some live events/acts, they ask you to provide the subtitles afterwards. Another participant points out that in the case of semi-direct subtitling (i.e., performing arts), in many cases, copyrights are not even registered, since performances might only be featured one, or two days, and the production might even be subjected to modifications. Finally, a participant points out that the platform would be useful for sharing audio descriptions (AD), since copyrights in this modality are in a grey area.

Within the frame of rights management in media accessibility services, authors have the moral right over the assets they create. This can never be sold. Thus, assets should be somehow "watermarked" for moral ownership. Do you agree?

All the participants agree with this statement. They also mention that in recent years there has been much improvement on the recognition of moral rights, mainly thanks to the work conducted by associations in the AVT sector. A participant points out that in the case of live subtitling, they do sometimes mention who the subtitler is, but many times the users do not even consider that there is a person generating the subtitles. A participant raises the issue of automatic translation and moral rights, how are rights recognized in the case of automatic subtitling? Who owns the work?

Should authors be able to establish economic rights and exploitation rights?

In the case of audio descriptions (AD) and subtitling for the performing arts, this recognition may have a short term, since the productions are limited and subject to modifications. One participant points out that in the case of AD, in some countries the author sells the rights with restricted licences, but these might be managed by intermediaries. Another person points out that live subtitling is very ephemeral, and mentions that the rights should be exploited more, since in many cases the initial subtitles are edited or used for later repositions (mainly

in the television context). In the case of recorded lectures and/or conferences, the initial subtitles are also edited, and no rights are established.

Participants also raise the question of the increasing use of templates (mainly in festivals). In this context, templates are used as a basis for work, and the author is not identified. In some cases, these may even be templates extracted from the audiovisual product through an automatic process. A participant mentions that translation in the AD modality is on the rise. Therefore, it is necessary that professionals working in this modality register the associated rights. In the case of AD, another participant mentions the importance for professionals to participate in the negotiation processes for the management of exploitation/distribution rights to prevent that this accessibility service is centralized solely through one entity (i.e., ONCE), and restricted to their users.

Do you think that the issue of intellectual property and copyright is relevant for the training of future media accessibility professionals?

All participants agree that the issue of intellectual property and copyright is a relevant issue for the profession. A participant mentions that professionals are mainly aware when they start working and/or become an associate to an organisation (i.e., ATRAE). Another participant mentions that you are more aware when you are an independent professional rather than if you work for a large company. Another participant points out that the intermediary agencies usually do not inform you about copyrights.

From your experience, do you think that young professionals in the field have enough knowledge about the topics covered in the MediaVerse platform?

All participants agree that MediaVerse's issues related to copyright are not a matter of age but of experience. A participant mentions that younger professionals perhaps have more knowledge on issues related to the consumption and management of digital assets outside the traditional media. Young generations/professionals might be regular users and consumers of platforms, such as TikTok, Twitch, etc.

Do you think that questions related to intellectual property and copyright management are covered during the studies? Do you remember to receive any training on these topics during your studies?

All participants agree that the issue of copyright is relevant. However, there is a disparity of opinion on the degree of depth that should be reached in the studies. A participant points out that when working as a director of the master's degree, a talk with DAMA about the subject was organised. The participant points out that this is a relevant topic mainly in master designed for professional training. On the other hand, another participant points out that to deal with issues related to intellectual property she provides information about CEDRO to their students, and also refers them to professional associations (i.e., ATRAE). All participants agree that more than training, what is needed might be to raise awareness on these issues.

As for the questionnaire, Table 26 shows the results from the response of four participants.

Table 26: Specific aim evaluation results of PP-UAB-9 (A)

WOULD YOU USE THE MEDIAVERSE PLATFORM IN YOUR PROFESSIONAL CONTEXT?			
	Yes	**No**	**Maybe**
Number of replies	4	0	1
Percentage	80%	0%	20%
Would you use the MediaVerse platform in your teaching context?			
	Yes	**No**	**Maybe**
Number of replies	4	0	1
Percentage	80%	0%	20%

In your opinion, which are the advantages and disadvantages of the MediaVerse platform in relation to copyright management?

The reported main advantages were:

- Easy to share content, not depending on large companies.
- Direct product management.
- Seems snappy to use and quite intuitive.
- Potential for copyright recognition and distribution of content.

The reported main disadvantages were:

- Little control over the content (perhaps sensitive, private content could be published without previously given consent, etc.).
- Complex to manage the professional relationships with companies that own the content.
- Complex to manage unfair and fake content.
- Challenge to "recruit" a broad group of users.
- Copyright is sometimes a bit of a grey area in the world of translation and there are related aspects that may be difficult to put into practice.

In addition, respondents answered to a group of questions to evaluate the blockchain based solutions in their professional area. Table 27 presents the main findings.

Table 27: Specific aim evaluation results of PP-UAB-9 (B)

USE CASE SPECIFIC AIM QUESTIONNAIRE									
Decentralised digital content ecosystem: power and ownership return to creators									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	0	2	3	0	4.6	0.55	5
Percentage	0%	0%	0%	40%	60%	0%			
New pricing options: new options for creators to earn by selling content									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	1	3	0	1	3.75	0.5	4
Percentage	0%	0%	20%	60%	0%	20%			
Monetization of content: content creators can establish direct relationships with customers.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	1	2	2	0	4.2	0.84	4
Percentage	0%	0%	20%	40%	40%	0%			
Distribution of royalty payments: near real time payments based on smart contracts.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	2	2	1	0	3.8	0.84	4
Percentage	0%	0%	40%	40%	20%	0%			
From DRM (Digital Rights Management) to smart contract: Transparent and "self execute" right management underlying smart contracts.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	2	3	0	0	3.6	0.55	4
Percentage	0%	0%	40%	60%	0%	0%			
Attribution: Blockchain increases the visibility and availability of the information regarding copyright ownership.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	2	2	1	0	4.5	0.58	4.5
Percentage	0%	0%	40%	40%	20%	0%			

Copyright management: Blockchain enables content owners to directly manage their works.									
	1	2	3	4	5	N/A	Mean	SD	Median
Number of replies	0	0	2	2	1	0	4.5	0.58	4.5
Percentage	0%	0%	40%	30%	0	0%			

3.2.3 RACU Testing

One of the tests taken on board by UAB was to analyze the RACU workflow. This analysis was performed through a translation comparing manual to RACU solutions to shed light on the advantages of using machine translation with post-editing to translate and subtitle videos. Three sound versions of the same video were produced as a corpus: background noise; Spanish accent; and faster reading than usual. Then we translated the script into French using RACU and converted into subtitles, automatically. We analysed the three resulting texts, measuring the effort it took to post-edit each automatic subtitle file in French compared with the effort it took to do the human translation (without translation memory). Results show that background noise is the most demanding version in terms of editing: the transcription, the translation and the automatic subtitles showed many mistakes and inconsistencies.

Methodology

The Multidimensional Quality Metrics (MQM) was the evaluation system (Ortiz-Boix, 2016), although only the most relevant categories for this case, that is, those related to accuracy and fluency. Accuracy refers to those errors in choosing equivalents or inadequate translation strategies, that is, when the target text does not accurately express the original text. Fluency refers to those errors in the form, content, origin or structuring of the discourse that affect the reading or understanding of the text (Tejeda Achondo, 2020).

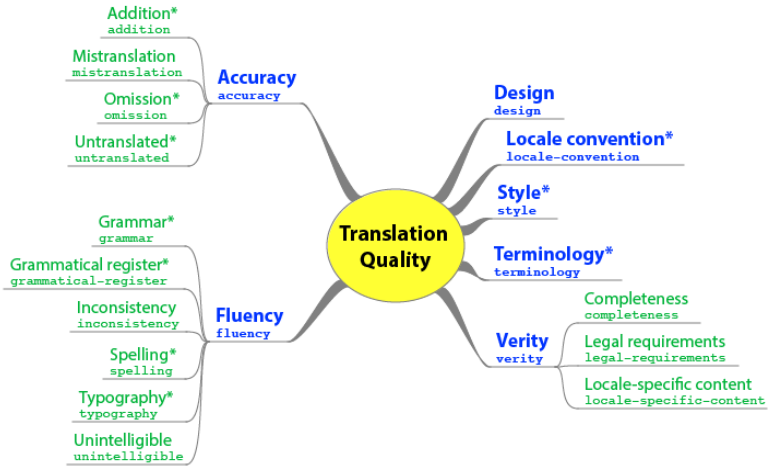


Figure 10: MQM error classification.

We used the MediaVerse promotional video. This is a 1'51" animation in English and narrated by a native woman, who describes the MediaVerse project. The video was then recorded in three ways: background noise, strong Spanish accent and, finally, faster speech. After uploading the three videos to MediaHub, the platform automatically created, through speech-to-text (STT) the three transcriptions corresponding to the video. Once the transcriptions were created, the platform gave the option to correct the errors through the editor. At this stage the analysis of errors for each variable was performed. Errors were classified in three levels and colour coded as follows.

1. Minor errors, which do not affect the understanding of the text too much.
2. Standard errors, which do not affect the flow of the text.
3. Major errors, which changed the meaning of the text.

After analysing the automatic transcriptions, the automatic French translations of these variables were analysed in two phases. In the first phase, an evaluation was performed to assess the quality of each text, using the criteria of Pospelova and Rowda (2016) (see Table 28).

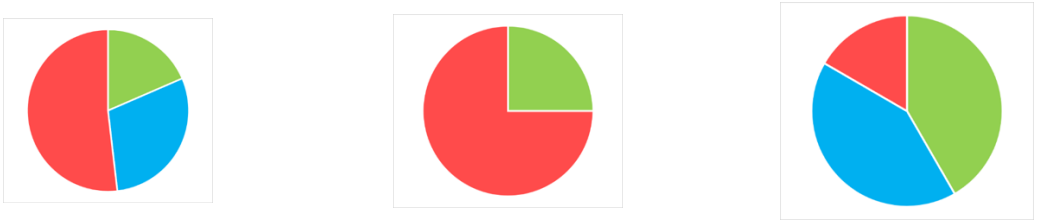
Table 28: Quality criteria for automatic translations

	ACCURACY	FLUENCY
5	keeps all the meaning	perfect
4	the majority	good
3	some	non-native
2	very little	not fluent
1	nothing	incomprehensible

In the second phase of the analysis was the error identification according to the values suggested by MQM. Finally, the .srt files that included both the subtitles in English and the subtitles in French were assessed in terms of effort. In this case, effort was measured in terms of the time taken to do a human translation, including the creation of the subtitles, with the time it has taken to human post-edit the three automatic subtitle files. To calculate the effort made with each post-editing, we used the MateCat platform.

Results: Transcription

Background noise gave poor results as the graphic shows in Figure 11 and the high incidence of major errors in red. Examples for some major errors are: «audio-visual content» was transcribed as «only recently content»; or «and new formats like: 3D models…» for «and these four months left from the models». An example of standard errors is «virtually under their control», for «largely under their control. Minor errors are typos such as «open source platform» that should be “open-source”. For speakers with an accent, there were less mistakes and mainly related to the name of the project MediaVerse, which was mistaken by “Maybe others” and “Media registered”. The version with fast speech offers a small number of mistakes such as «support inappropriate content», rather than «spot inappropriate content»; and «as a call», for «ethical». The typo «audio, visual» for «audio-visual» and «Media verse» for «MediaVerse» (Figure 11).



Background noise Speaker with accent Fast speech

Figure 11: RACU Test results.

Figure 12 presents the final results, color coded as: Background noise, accent, fast speech. These show that 53% background noise is the most problematic with (23%) for fast speaking and (24%) for accent. This is an important

result given the functionality of RACU in MediaVerse, which is to gather videos from a Citizen Journalism approach. These videos are created by non-professionals and in street conditions with environmental noise.

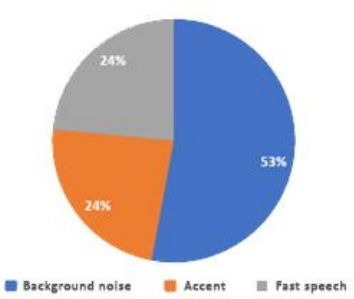


Figure 12: Comparative errors.

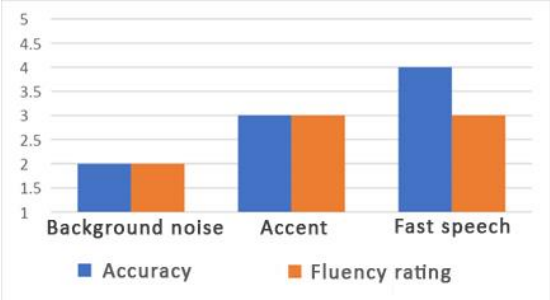


Figure 13: Machine translation accuracy and fluency rating.

In conclusion, two are the main results: i) importance of the background noise towards subtitling quality; and ii) the obvious relationship between the quality of the transcription in the results for the machine translation.

3.3 Use Case 3

Use Case 3 developed one main action (UXE2-ARTS-EX) with four different iterations in Pilot Phase 2, with a total of 1,113 participants and 165 replies to the MediaVerse Questionnaire. In the following sub-sections, we present an overview of the actions and the main results.

In Pilot Phase 2, participants in Use Case 3 explored and co-created using MediaVerse authoring tools, such as 360º stories, project creation, RACU, and TrulyMedia. After this co-creation process, they assessed the impact of co-creating content using MediaVerse tools, particularly with AR/VR-generated content. Participants were engaged in tasks that involve co-creating and manipulating digital video content. The experiences evaluate and explore the impact of co-creation using the platform's authoring tools and TrulyMedia for sharing and tracking content. The participant pool includes artists, amateur creators, and the general public.

Recruitment was conducted through art events and festivals, where AS and STARTS are co-organizing in the region of Aveiro, Canelas and Estarreja, in Portugal. The experiences took place between April and July 2023 in various locations in Portugal. The methodology followed a step-by-step protocol, including introduction, platform presentation, immersive experience, task instructions, questionnaires, and testing XR authoring tool (FADER) and TrulyMedia. Participants provide their feedback and insights through questionnaires and open-ended questions. To this end, as already described above, they used the general MediaVerse Questionnaire and the specifically designed “Co-creation of digital content for artistic experiences” questionnaire.

3.3.1 Action Experimental Artwork Series

The aim of this UC3 pilot action spanned four iterations that took place during local art events, in the region of Aveiro targeting artistic communities:

- **Estacao Viva** - 19-22 April 2023, 400 participants. We engaged the artistic community through a series of activities, starting with a presentation of MediaVerse (MV), followed by a virtual reality (VR) experience, and finally, a hands-on demonstration of MV tools for content authoring.
- **Estarreja Arte Viva** - 21 -28 May 2023, 213 participants. We fostered engagement with both the artistic community and the general public through a comprehensive approach. This involved introducing them to MediaVerse (MV) through a presentation, offering a captivating VR experience, and providing demonstration of MV tools for collaborative co-creation and content authoring, ensuring an immersive and interactive experience for all participants.
- **Arte Viva** - 30 June - 2 July 2023, 300 participants. We actively engaged both the artistic community and the general public to explore the concept of MediaVerse (MV). This included an immersive VR experience, complemented by hands-on demonstration of MV tools for co-creation, authoring, and publishing, creating a holistic and interactive experience for all participants.
- **Arte Viva** - 14 - 16 July, >200 participants. We fostered engagement with the artistic community by presenting MediaVerse (MV), offering an immersive VR experience, and showcasing MV capabilities for co-creation, authoring, and publishing. This comprehensive approach ensured active participation and collaboration within the artistic community.

Figure 14: Event Posters and Announcements in UC3 pilots.

We initiated pilot activities involving artists, which encompassed the use of VR for artistic experiences to address the notion of truth, and the use of the MV platform designed for co-creation, publication, and distribution. They also had access to MediaVerse's available tools, catering to both artists and digital artists. In addition to this, we conducted pilot activities targeting the general public and content creators. This involved offering VR individual experiences and utilising the MV platform for co-creation and publication purposes. Participants also had the opportunity to explore and engage with the various MV tools at their disposal.

To accommodate the large crowds at these events, we structured the pilot activities in a hybrid format. In the initial phase, users were introduced to the VR experience with drones, allowing them to immerse themselves and gather impressions. Subsequently, we provided a concise introduction to the MediaVerse world through small workshops and brief introductions. Following this, participants received written guidelines and links to explore and assess the MV platform and experience independently. We allotted participants a period of 2-3 weeks for their evaluation.

Figure 15: MediaVerse presentation and workshops during UC3 pilots.

Users were asked to perform the following tasks:

1. Do a VR drone led experience and have a customized 'drone work' created.
2. Register and upload all their digital input on MV.
3. Use MV authoring tools and explore their use.
4. Use MV to re-share their content on Twitter.
5. The content on twitter can be re-shared through their own personal channels.
6. Use TrulyMedia (on MediaVerse) to see how their post is performing.

Overall, 200 participants were involved, consisting of artists, digital artists, amateur content creators, and members of the general public (see Figure 15). The pilot activities involved the active participation of a diverse group, including Portuguese and international contemporary artists, as well as the younger population from the Centre and North regions of Portugal (comprising more than 1,113 individuals). Emphasising accessibility and inclusivity, MV offered multiple language options to cater to a broad audience, ensuring that pilot participants from Portugal could fully engage with the platform and make the most of its resources.

UC3, as part of this endeavor, empowered more than 10 artists, more than 200 content creators, and members of the general public, enabling them to enhance their digital and content creation skills while exploring new immersive tools and environments. The project also fostered co-creation by facilitating collaboration and interaction between artists and the general audience, thereby promoting a sense of shared creativity.

Furthermore, UC3's pilot paved the way for novel approaches in creating and delivering artistic experiences. It encouraged artists to explore unconventional methods and formats, fostering a dynamic and forward-thinking environment for artistic expression with the upload of more than 50 videos for the MediaVerse experience. We received 151 replies to the MediaVerse Questionnaire and 165 to the Co-creation of digital content for artistic experiences questionnaire. Table 29 presents the main results from the MediaVerse Questionnaire.

Table 29: Evaluation results of UXE2-ARTS-EX

MEDIAVERSE QUESTIONNAIRE									
Are you aware of tools that offer similar features?									
	Yes	**No**	**N/A**	**If yes, please indicate which ones:**					
Number of replies	68	83	0	YouTube, OpenSea					
Percentage	45%	55%	0%						
Usefulness: It does everything I would expect it to do									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	51	48	52	0	0	3	0.82	3
Percentage	0%	33.8%	31.8%	34.4%	0%	0%			
Satisfaction: I would recommend it to a friend or colleague									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	51	61	39	0	0	2.92	0.77	3
Percentage	0%	33.8%	40.4%	25.8	0%	0%			
Satisfaction: It works the way I want it to work									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	41	56	0	54	0	3.44	1.28	3.44
Percentage	0%	27.2%	37.1%	0%	35.8%	0%			

As for the Co-creation of digital content for artistic experiences questionnaire, which focus on UC3 specific aim questions, Table 30 shows the main results.

Table 30: Specific aim evaluation results of UXE2-AS-EX

USE CASE SPECIFIC AIM QUESTIONNAIRE									
I enjoyed co-creating AR content.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	54	54	57	0	4.01	0.82	4
Percentage	0%	0%	32.7%	32.7%	34.5%	0%			
I would like to do it again.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	61	45	59	0	3.98	0.85	4
Percentage	0%	0%	37%	27.3%	35.8%	0%			
I would recommend it to a friend.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	54	47	64	0	4.06	0.84	4
Percentage	0%	0%	32.7%	28.5%	38.8%	0%			
The MediaVerse platform would allow me to spend less time on content creation and thus reduce the costs of producing multimedia content compared to other tools I have used previously.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	64	52	49	0	3.9	0.82	4
Percentage	0%	0%	38.8%	31.5%	29.7%	0%			
It is faster to manage market activities (charging, licensing, pricing, etc.) with respect to my current workflow.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	58	48	59	0	0	3	0.84	3
Percentage	0%	35.2%	29.1%	35.8%	0%	0%			
MV is effectively monitoring shared online content to improve its business activities.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	92	73	0	0	0	2.44	0.49	2
Percentage	0%	55.8%	44.2%	0%	0%	0%			

How do you think the co-creation of AR content has an impact on your perception of the truth in the real world?

- Experiencing AR and VR makes me think about what is really real. Things get a little confusing.
- VR drones show me things from new angles. It is as if the truth could change depending on what I am seeing.
- VR and AR mess up my senses. It is difficult to trust everything I see and feel now.
- Mixing things from RA in the real world makes everything look super real. It is difficult to say what is true at times.

In what other projects/pathways you think that co-creation of AR content could be applied? Please explain why.

- AR books? Characters emerge, making reading an adventure for children and adults.
- Taking AR for shopping can be incredible. Try furniture at home virtually before buying – saves time and return.
- AR could dive into history. Experience ancient cultures by overlapping ruins with digital reconstructions
- AR in the health field looks incredible. Visualization of anatomy can help students learn and understand patients.

- Co-creation with RA in travel guides would be incredible. Exploring historic sites with digital guides adds depth to the experience.
- Co-creation of AR can expand learning. Imagine history lessons with interactive scenes – making the study more exciting and memorable.
- AR could redefine art by adding virtual layers to paintings, transforming static pieces to dynamic stories.

3.4 Ad hoc Actions

CERTH developed nine ad hoc pilot actions in Pilot Phase 2. Seven of the pilot actions focused on the evaluation of MAAM (Media Asset Annotation and Management), two pilots on the testing and evaluation of VRodos authoring tool, and one activity on the evaluation of different AI filters applied on disturbing images. These pilot actions involved in total 227 participants, who provided 189 responses to the MediaVerse Questionnaire.

- MAAM:
    - Action 1 at the Information Technologies Institute (ITI)
    - Action 2 at the School of Journalism & Mass Communications of Aristotle University of Thessaloniki.
    - Action 3 during Digital Methods Winter School 2023 of Amsterdam Data Sprint.
    - Action 4 at the Journalism Faculty of the Department of Social and Political Sciences of the University of Cyprus.
    - Action 5 and 6 at the School of Journalism and Mass Communications, at Aristotle University of Thessaloniki.
- VRodos:
    - Actions 7 and 8 at Cultural Center of Thermi (CCT).
- AI Filters:
    - Action 9 taking place online.

3.4.1 Pilot Evaluation of Media Asset Annotation and Management Tool

Action 1. ITI [UXE2-CERTH-ITI]

The goal of this action, which took place in Thessaloniki on 29 November 2022, was to test the Media Asset Annotation and Management tool (MAAM) and to assess the user satisfaction and usefulness of the MediaVerse platform through auditing of MAAM by members of Information Technologies Institute for bugs, suggestions for improvements, and ambiguities in the formulation and description of tasks that would be requested in the next piloting activity at Aristotle University of Thessaloniki. Users were asked to perform the following tasks:

- Evaluation of the MAAM platform: administration, search, NDD, and creation tasks.
- Evaluation of the Media Annotation functionality: Annotation task

10 participants were involved. Participants who took part in the internal pilot test were members of the MKLab of CERTH and their ages ranged from 25 to 35 years (Figure 16). All participants were graduates of university institutions and holders of at least a master's degree. Participants had no previous familiarity or interaction with the MAAM module. Nine participants replied to the MediaVerse Questionnaires.

Figure 16: Internal pilot with ITI participants.

Table 31 presents a summary of the main results from the MediaVerse Questionnaire.

Table 31: Evaluation results of UXE2-CERTH-ITI

MEDIAVERSE QUESTIONNAIRE									
Are you aware of tools that offer similar features?									
	Yes	**No**	**N/A**	**If yes, please indicate which ones:**					
Number of replies	3	6	0	TrulyMedia, MindSpaces, online photo repositories (generally).					
Percentage	33.3%	66.6%	0						
Usefulness: It does everything I would expect it to do									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	0	5	4	0	4.44	0.5	4
Percentage	0%	0%	0%	55.6%	44.4%	0%			
Satisfaction: I would recommend it to a friend or colleague									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	0	4	5	0	4.56	0.5	4
Percentage	0%	0%	0%	44.4%	55.6%	0%			
Satisfaction: It works the way I want it to work									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	0	5	4	0	4.44	0.5	4
Percentage	0%	0%	0%	55.6%	44.4%	0%			

Participants were actively involved in the internal piloting activity getting familiarized with MAAM and in addition to the problems they reported, they made many useful suggestions to improve and further develop MAAM beyond standard questions of MediaVerse Questionnaire. In general, the process of the internal assessment of the MAAM module and its functionalities flowed smoothly, and no major issues reported by the participants regarding the completion of the assigned tasks. Some issues regarding the accuracy of results derived by the "find similar" and "find near duplicates" tools were mentioned. Minor technical issues were reported and ideas for further development of MAAM functionalities were proposed. Relying on participants' feedback, the task description guidelines were improved and became clearer. Participants' suggestions could be summarized in two main pillars. The majority were about improving the user's experience and adding more GUI features. Additionally, recommendations for further model improvements to enable more accurate annotations were drawn. Based on the questionnaire's responses, we conclude that participants found MAAM's features interesting and actively contributed ideas for further improving it.

Action 2. AUTH [UXE2-CERTH-AUTH]

The goal of this action, which took place in Thessaloniki on 14 December 2022, was to assess the user satisfaction and usefulness of the MV platform by testing the Media Asset Annotation and Management tool (MAAM). Audit of the MAAM module by graduates and postgraduates of School of Journalism & Mass Communications of Aristotle University of Thessaloniki for improvements, tools, and features that would motivate them to actively be involved and use the MAAM on a daily basis both for personal and professional purposes. Users were asked to perform the following tasks:

- Evaluation of the MAAM platform: administration, search, NDD, and creation tasks.
- Evaluation of the Media Annotation functionality: Annotation task

In this piloting activity, 18 participants (10 female and 8 male) were involved and 18 replies were gathered (Table 32). Participants were graduate and postgraduate students of the School of Journalism & Mass Communications of Aristotle University of Thessaloniki. They had no previous familiarity or interaction with MAAM in a practical manner. Only two of 18 had heard about MV and MAAM about a year ago, and only on a conceptual basis.

Table 32: Evaluation results of UXE2-CERTH-AUTH

MEDIAVERSE QUESTIONNAIRE									
Are you aware of tools that offer similar features?									
	Yes	**No**	**N/A**	**If yes, please indicate which ones:**					
Number of replies	8	10	0	Google Reverse Image Search, TinEye.com, Pinterest, google images, Instagram, Unsplash, Reveal.					
Percentage	44.4%	55.6%	0%						
Usefulness: It does everything I would expect it to do									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	8	10	0	0	3.55	0.51	4
Percentage	0%	0%	44.4%	55.6%	0%	0%			
Satisfaction: I would recommend it to a friend or colleague									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	2	3	8	5	0	3.88	0.96	4
Percentage	0	11.1%	16.7%	44.4%	27.8%	0%			

Satisfaction: It works the way I want it to work									
	1	2	3	4	5	N/A	Mean	SD	Median
Number of replies	0	1	6	10	1	0	3.61	0.7	4
Percentage	0%	5.6%	33.3%	55.6%	5.6%	0%			

Participants were actively involved in the piloting activity getting familiarized with MAAM and suggesting improvements to make it more functional and attractive to potential users. Their suggestions were recorded and categorized in a more insightful way that will enable their accurate integration. The piloting activity for assessing the MAAM module and its functionalities was successful, with no difficulties reported by participants regarding completion of the given tasks. After completing the assigned tasks, the participants started a round of fruitful discussions about potential changes, improvements, and additions to the platform. They were interested in the MAAM module and contributed ideas for further development with the aim of utilizing it both on a professional and personal level.

Based on participants' feedback and taking into account the discussion that took place after the main tasks of the piloting activity we can summarize participants' proposals and suggestions in two main categories. The first category consists of some recommendations that received a positive response from all participants. These recommendations were about users' profiles and the possibility of interaction among them. Specifically, participants found interesting the potential of directly contributing to other users' projects or just visiting their profiles to explore different projects as well as the possibility of new collaborations. The second one featured comments and recommendations for enhancing the user experience and introducing additional graphical user interface capabilities. Additionally, recommendations were made towards further AI model improvements to enable more accurate annotations. Based on the questionnaire's responses, we conclude that participants found MAAM's features interesting and actively contributed ideas for further improving it with the potential of employing the MAAM module in their everyday -professional or/and personal- life.

Action 3. UVA [UXE2-CERTH-UVA]

The goal of this action, which took place online, during the Digital Methods Winter School 2023 of Amsterdam Data Sprint in 9th - 13th of January 2023, was to assess the user satisfaction and usefulness of the MediaVerse platform by testing the Media Asset Annotation and Management tool (MAAM). Audit of the MAAM module was carried out by postgraduate students and early career researchers of Social Science and Media Studies for improvements, tools, and features that would motivate them to actively be involved and use the MAAM to create a project during the Digital Methods Winter School 2023 of Amsterdam Data Sprint. Users were asked to perform the following tasks:

- Evaluation of the MediaVerse platform: administration, search, NDD, and creation tasks.
- Evaluation of the Media Asset Annotation and Management (MAAM) Fork: Annotation task

Participants who took part in the pilot test were postgraduate students or early career researchers in Social Sciences and Media Studies. 25 people attended the presentation and demonstration session (see Figure 17); however only three used MAAM to create and project and participated in the whole piloting activity. Participants had no previous familiarity or interaction with the MAAM module in a practical manner; however, they had access to the general description of MAAM and to demo videos of specific tasks. The affiliation of the participants who used MAAM: University of Amsterdam, University of Oslo, University of Edinburgh. Three users replied to the MediaVerse Questionnaire (see Table 33).

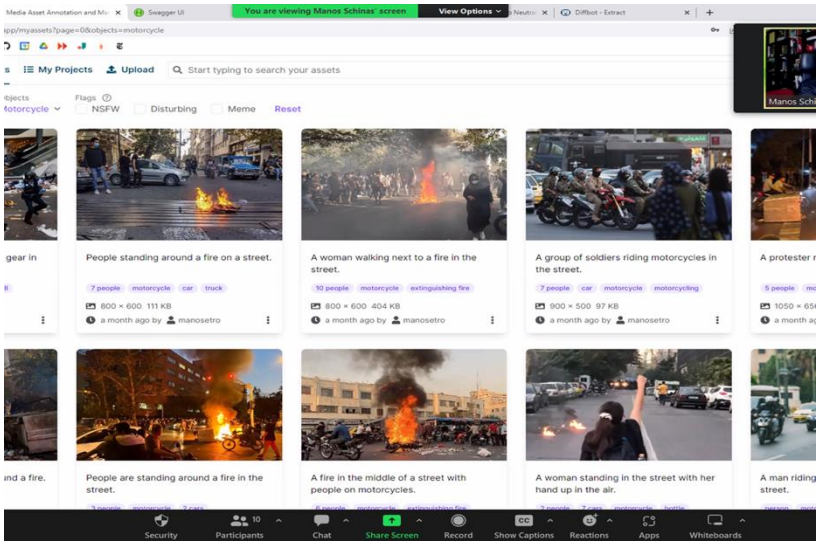


Figure 17: Presenting MAAM at UVA online pilot.

Table 33: Evaluation results of UXE2-CERTH-UVA

MEDIAVERSE QUESTIONNAIRE									
Are you aware of tools that offer similar features?									
	Yes	**No**	**N/A**	**If yes, please indicate which ones:**					
Number of replies	1	2	0	Google vision API					
Percentage	33.3%	66.7%	0%						
Usefulness: It does everything I would expect it to do									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	1	2	0	0	3.66	0.47	4
Percentage	0%	0%	33.3%	66.7%	0%	0%			
Satisfaction: I would recommend it to a friend or colleague									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	0	2	1	0	4.33	0.47	4
Percentage	0%	0%	0%	66.7%	33.3%	0%			
Satisfaction: It works the way I want it to work									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	1	1	1	0	4	0.82	4
Percentage	0%	0%	33.3%	33.3%	33.3%	0%			

Participants were actively involved in the piloting activity getting familiarized with MAAM and suggesting improvements to make it more functional and attractive to potential users. Their suggestions were recorded and categorized in a more insightful way that will enable their accurate integration. The piloting activity for assessing the MAAM module and its functionalities was successful, with no difficulties reported by participants regarding completion of the given tasks. Based on participants feedback the annotations provided by MAAM were very useful. Additionally, participants made recommendations for further improvements of the metadata provided and to allow more flexibility to the users to choose the metadata that are more useful to them. We conclude that participants found MAAM's features interesting and actively contributed ideas for further improving it.

Action 4. UCY [UXE2-CERTH-UCY]

The goal of this action, which took place in the Journalism Faculty of the Department of Social and Political Sciences of the University of Cyprus on 31 March 2023, was to assess the user satisfaction and usefulness of the MediaVerse platform by testing the MAAM. Audit of the MAAM module by undergraduate students of the Journalism Faculty of the Department of Social and Political Sciences of the University of Cyprus, for improvements, tools, and features that would motivate them to actively be involved and use the MAAM on a daily basis both for personal and professional purposes. Users were asked to perform the following tasks:

- Evaluation of the MAAM: administration, search, NDD, and creation tasks.
- Evaluation of the Media Annotation functionality: Annotation task

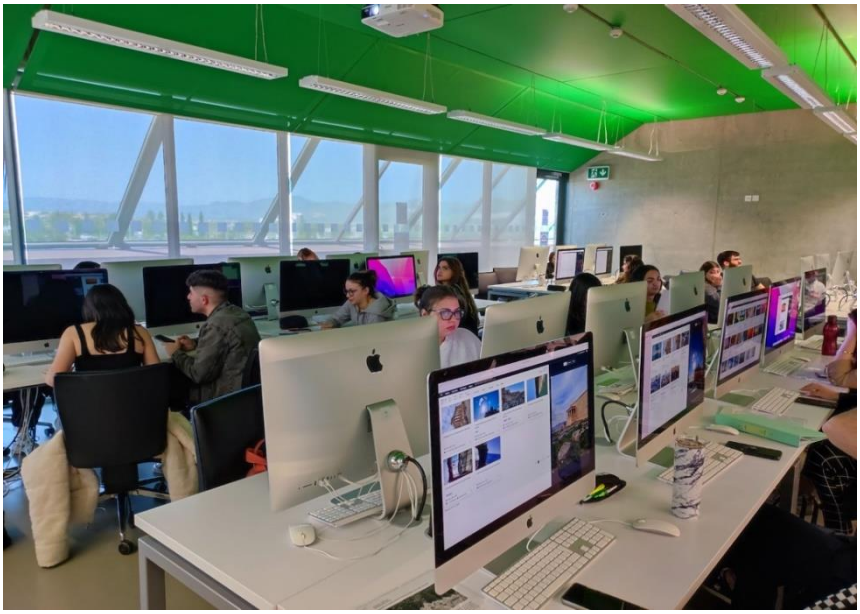


Figure 18: MAAM piloting activity at UCY.

Overall, 30 participants were involved (23 females, 7 males) but only 15 completed the questionnaire. They were undergraduate students of the Journalism Faculty of the Department of Social & Political Sciences of the University of Cyprus (see Figure 18). The analysis in Table 34 considers only the completed questionnaires. Participants had no previous familiarity or interaction with the MAAM module in a practical manner.

Table 34: Evaluation results of XE2-CERTH-UCY

MEDIAVERSE QUESTIONNAIRE									
Are you aware of tools that offer similar features?									
	Yes	**No**	**N/A**	**If yes, please indicate which ones:**					
Number of replies	1	14	0	-					
Percentage	6.7%	93.3%	0%						
Usefulness: It does everything I would expect it to do									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	1	6	6	2	0	3.6	0.8	4
Percentage	0%	6.7%	40%	40%	13.3%	0%			

Satisfaction: I would recommend it to a friend or colleague									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	1	1	1	8	4	0	3.86	1.08	4
Percentage	6.7%	6.7%	6.7%	53.3%	26.7%	0%			
Satisfaction: It works the way I want it to work									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	1	5	9	0	0	3.86	0.61	4
Percentage	0%	6.7%	33.3%	60%	0%	0%			

In general, the assessment of the MAAM module and its functionalities through piloting was considered successful, as participants reported no difficulties in completing the tasks. The participants engaged in productive discussions regarding potential changes, improvements, and additions to the platform. They demonstrated a keen interest in the platform and contributed ideas for further development. They reported that the tool would be useful to them and that they would be able to use it and recommend it to colleagues. A multitude of suggestions focused on operations geared towards persons with sight loss. The students' awareness of persons with disabilities was particularly encouraging and was accompanied by targeted suggestions. Specifically, participants proposed a text-to-speech module to enable persons with disabilities to be aware of the captions generated for images and detected objects and actions. Finally, many students tried to participate through their smartphones, which highlights the need to have a platform optimized for mobile devices.

Action 5. AUTH2a [UXE2-CERTH-AUTH2A]

The goal of this action, which took place in the School of Journalism and Mass Communications, at Aristotle University of Thessaloniki on 23 May 2023, was to assess the user satisfaction and usefulness of the MediaVerse platform by testing the MAAM. Graduates and postgraduates of the School of Journalism and Mass Communications of Aristotle University of Thessaloniki performed audit for improvements, tools, and features that would motivate them to actively be involved and use the MAAM on a daily basis both for personal and professional purposes (see Figure 19). Moreover, the participants assessed the user satisfaction and evaluated the time needed for the ownership identification in the MediaVerse platform.

Specifically, users were asked to perform the following tasks:

- Evaluation of the MAAM: administration, search, NDD, creation, and verification tasks.
- Evaluation of the ownership identification.

A total of 11 participants were involved (7 male and 4 male) and all replied to the MediaVerse Questionnaire. They were graduate and postgraduate students of the School of Journalism & Mass Communications of Aristotle University of Thessaloniki. Half of the participants were already familiar with the MAAM module in a practical manner, since they had participated in a previous piloting activity. However, since then MAAM has changed considerably. Table 35 presents a summary of the main results from the MediaVerse Questionnaire.

Figure 19: AUTH Pilot participants testing MAAM.

Table 35: Evaluation results of UXE2-CERTH-AUTH2A

MEDIAVERSE QUESTIONNAIRE									
Are you aware of tools that offer similar features?									
	Yes	**No**	**N/A**	**If yes, please indicate which ones:**					
Number of replies	6	5	0	Google Lens, Seek, FotoForensics, Reveal.					
Percentage	54.5%	45.5%	0%						
Usefulness: It does everything I would expect it to do									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	3	6	2	0	3.91	0.7	4
Percentage	0%	0%	27.3%	54.5%	18.2%	0%			
Satisfaction: I would recommend it to a friend or colleague									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	2	3	6	0	4.36	0.81	5
Percentage	0%	0%	18.2%	27.3%	54.5%	0%			
Satisfaction: It works the way I want it to work									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	1	3	6	1	0	3.64	0.81	4
Percentage	0%	9.1%	27.3%	54.5%	9.1%	0%			

Some specific questions were added in this pilot action in relation to time evaluation of ownership identification. Table 36 shows the main results.

Table 36: Specific aim evaluation results of UXE2-CERTH-AUTH2A

THE MEDIAVERSE PLATFORM WOULD ALLOW ME TO SPEND LESS TIME TO IDENTIFY THE OWNERSHIP OF A MEDIA CONTENT, COMPARED TO OTHER PLATFORMS I HAVE PREVIOUSLY USED.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	4	5	2	0	3.82	0.75	4
Percentage	0%	0%	36.4%	45.4%	18.2%	0			

Participants were actively involved in the piloting activity suggesting improvements to make MAAM more functional and attractive to potential users. Their suggestions were recorded and categorized in a more insightful way that will enable their accurate integration. Most of the comments and suggestions were related to the improvement of the UI, while the forensics has been a functionality of particular interest for the respondents.

In general, the piloting activity for assessing the MAAM module and its functionalities was successful, with no difficulties reported by participants regarding completion of the given tasks. After completing the assigned tasks, the participants started a round of fruitful discussions about potential changes, improvements and additions to the platform. They were interested in the MAAM module and contributed ideas for further development with the aim of utilizing it both on a professional and personal level. Based on participants' feedback and taking into account the discussion that took place after the main tasks of the piloting activity we can summarize participants' proposals and comments in recommendations for enhancing the user experience and introducing additional graphical user interface capabilities along with accessibility. Additionally, recommendations were made towards AI model improvements to enable more accurate annotations. As for ownership identification functionality, respondents found it a useful and easy-to-use feature. Based on the questionnaire's responses, we conclude that participants found MAAM's features interesting and actively contributed ideas for further improving it with the potential of employing the MAAM module in their everyday -professional or/and personal- life.

Action 6. AUTH2b [UXE2-CERTH-AUTH2B]

The goal of this action, which took place in the School of Journalism and Mass Communications, at Aristotle University of Thessaloniki on 24 May 2023, was to assess the user satisfaction and usefulness of the MediaVerse platform by testing the Media Annotation Fork (MAAM). Audit of the MAAM module by undergraduates of School of Journalism and Mass Communications of Aristotle University of Thessaloniki for improvements, tools, and features that would motivate them to actively be involved and use the MAAM on a daily basis both for personal and professional purposes. To assess the user satisfaction and evaluate the time needed for the ownership identification in the MediaVerse platform. Users were asked to perform the following tasks:

- Evaluation of the MAAM: administration, search, NDD, creation, and verification tasks.
- Evaluation of the ownership identification.

A total of 11 participants (eight female and three male) were involved and eleven replied to the questionnaires (see Table 37). They were undergraduate students of the School of Journalism and Mass Communications of Aristotle University of Thessaloniki. Most of the participants were not familiar with the MAAM module in any practical manner or any similar tool.

Participants were actively involved in the piloting activity suggesting improvements to make MAAM more functional and attractive to potential users. Their suggestions were recorded and categorized in a more insightful way that will enable their accurate integration. Most of the comments and suggestions were related to the improvement of the UI and the improvement of object identification models. In addition, there were some recommendations regarding the compatibility with cloud services, and API access from social media, while more detailed guidelines would create more familiarity with the tool and its functionalities.

Table 37: Evaluation results of UXE2-CERTH-AUTH2B

MediaVerse Questionnaire									
Are you aware of tools that offer similar features?									
	Yes	**No**	**N/A**	**If yes, please indicate which ones:**					
Number of replies	1	10	0	InVID verification.					
Percentage	9.1%	90.9%	0%						
Usefulness: It does everything I would expect it to do									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	4	7	0	0	3.64	0.5	4
Percentage	0%	0%	36.4%	63.6%	0%	0%			
Satisfaction: I would recommend it to a friend or colleague									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	1	7	3	0	4.18	0.6	4
Percentage	0%	0%	9.1%	63.6%	27.3%	0%			
Satisfaction: It works the way I want it to work									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	4	5	2	0	3.82	0.75	4
Percentage	0%	0%	36.4%	45.4%	18.2%	0%			

Some specific questions were added in this pilot action in relation to time evaluation of ownership identification. Table 38 shows the main results.

Table 38: Specific aim evaluation results of UXE2-CERTH-AUTH2B

The MediaVerse platform would allow me to spend less time to identify the ownership of a media content, compared to other platforms I have previously used.									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	1	8	2	0	4.09	0.54	4
Percentage	0%	0%	9.1%	72.7%	18.2%	0			

In this piloting activity, the group of participants had less experience compared with the previous pilot and for most of them, this was their first experience with a platform like MAAM. Therefore, some of the respondents pointed out that better guidelines on how to use the tool would be helpful, especially for someone who uses MAAM for the first time. However, participants enjoyed the overall experience and provided us with useful feedback about potential changes, improvements, and additions to the platform. Specifically, they were

interested in utilizing MAAM during their studies either as a research tool or as a repository of their work. Most of recommendations referred to user experience and the effectiveness of the AI models to enable annotations that are more accurate. As for the ownership identification functionality, similar to the previous pilot, the respondents found it a useful and easy-to-use feature. To sum up, the participants found MAAM attractive with many useful functionalities for their research and studies.

3.4.2 Pilot Evaluation of VRodos

Action 7. CCT1 [UXE2-CERTH-CCT1]

The goal of this action, which took place in the Cultural Center of Thermi (CCT) on 3rd December 2022, was to test the VR tools and functionalities and to assess the user satisfaction and usefulness of the VRodos authoring tool. Evaluation of the VRodos in real conditions:

- Cultural preservation: as the cultural heritage is transferred from old to young generation in a live and digital manner.
- Technological education: in a non-formal way by demonstrating the capabilities of innovative and state - of the - art 3D technologies.

Figure 20: VRodos piloting activity at CCT.

Users were asked to perform the following tasks: demonstration and evaluation of the VRodos authoring tool. Five participants were involved (see Figure 20). The main participants in the virtual production were the following individuals:

- A 94 year-old woman is the oldest citizen of the municipality of Thermi - the municipality where CERTH is located - as she counts 82 years of consecutive residence. She has accumulated experiences from the time before, during, and after World War II when the number of citizens in Thermi was around 100 people, whereas today it is 35,000. She wants to report her experiences to children and the general public. She has been interviewed in the past, even on the national Greek TV channels, but her reports have found limited impact as they are plain verbal mentions of past incidents without any visual stimuli, except some photos.
- The supervisor of all the libraries of the municipality of Thermi and a member of the administration board of the Cultural Centre of Thermi. He has received the latest book about the history of Thermi as it was written by the local authors. He wants to advertise the book so that many young people can loan it from the library and learn about the history of the place.
- The violin teacher in the municipality of Thermi where she has a class of 20 young students. She wants to enhance its lessons with innovative technologies so that her students can broaden their scope. Also, she wants to disseminate her class activities so that she can attract more students to her class.

- Young violin students, who are eager for 3D technologies, but they do not know how innovative technologies can be combined with music.

Five participants replied to the MediaVerse Questionnaires. Table 39 shows a summary of the main results from the MediaVerse Questionnaire.

Table 39: Evaluation results of UXE2-CERTH-CCT1

MediaVerse Questionnaire									
Are you aware of tools that offer similar features?									
	Yes	**No**	**N/A**	**If yes, please indicate which ones:**					
Number of replies	0	5	0	-					
Percentage	0%	100%	0%						
Usefulness: It does everything I would expect it to do									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	2	2	1	0	3.8	0.75	4
Percentage	0%	0%	40%	40%	20%	0%			
Satisfaction: I would recommend it to a friend or colleague									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	1	2	2	0	4.2	0.75	4
Percentage	0%	0%	20%	40%	40%	0%			
Satisfaction: It works the way I want it to work									
	1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	0	3	2	0	4.4	0.49	4
Percentage	0%	0%	0%	60%	40%	0%			

In general, the piloting activity for VRodos and its functionalities was successful, with no difficulties reported by participants. After completing the assigned tasks, the participants started a round of fruitful discussions about potential changes, improvements, and additions to the platform. They were interested in the tool and they were thrilled to hear the narrator through the innovative experience. Some individuals were also able to enter the screen and play songs (All the participant sung Christmas traditional carols, in the end, using violins and lyras).

Action 8. CCT2 [UXE2-CERTH-CCT2]

The goal of this action, which took place in the Cultural Center of Thermi (CCT) on 29 December 2022, was to test the VR tools and functionalities and to the evaluation of the VRodos authoring capabilities. This pilot tested the ability of the VRodos interface to provide authoring capabilities to people that do not have a prior experience in 3D scene authoring. It was about allowing the cultural stakeholders to design their own virtual production environment using a laptop. Users were asked to perform a hands-on session and evaluation of the VRodos authoring tool. Ten participants were involved, namely six females and four males. The average age of the participants was 40.6 years. The age is expected to be high as the stakeholders are mainly persons in high-responsibility positions.

Ten participants replied to a shortened version of the Post-Study System Usability Questionnaire (PSSUQ) (see 2.3.6 for further details). The answers provided in a 7-point scale and Table 40 presents the main evaluation results of this piloting activity.

Table 40: Specific aim evaluation results of UXE2-CERTH-CCT2

USE CASE SPECIFIC AIM QUESTIONNAIRE											
Overall I am satisfied with how easy it is to use this system.											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	0	0	2	3	5	0	6.3	0.75	6.5
Percentage	0%	0%	0%	0%	20%	30%	50%	0%			
It was simple to use this system.											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	0	1	2	4	3	0	5.9	0.94	6
Percentage	0%	0%	0%	10%	20%	40%	30%	0%			
I feel comfortable using this system.											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	1	0	0	0	3	3	3	0	5.5	1.69	6
Percentage	10%	0%	0%	0%	30%	30%	30%	0%			
It was easy to learn how to use the system.											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	0	2	3	3	2	0	5.5	1.02	5.5
Percentage	0%	0%	0%	20%	30%	30%	20%	0%			
The system gave error messages that clearly told me how to fix problems.											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	1	0	1	2	4	2	0	5.4	1.43	6
Percentage	0	10%	0%	10%	20%	40%	20%	0%			
Whenever I made a mistake using the system, I could recover easily and quickly.											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	0	2	2	4	2	0	5.6	1.02	6
Percentage	0%	0%	0%	20%	20%	40%	20%	0%			
The information (such as online help, on-screen messages, and other documentation) provided with this system was clear.											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	0	0	3	4	3	0	6	0.77	6
Percentage	0%	0%	0%	0%	30%	40%	30%	0%			
I liked using the interface of this system.											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	0	0	1	3	5	0	6.44	0.68	7
Percentage	0%	0%	0%	0%	10%	30%	50%	0%			
This system has all the functions and capabilities I expect it to have.											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	0	0	0	5	5	0	6.5	0.5	6.5
Percentage	0%	0%	0%	0%	0%	50%	50%	0%			
I found it easy to get the system to do what I wanted.											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**N/A**	**Mean**	**SD**	**Median**
Number of replies	0	0	2	0	2	3	3	0	5.5	1.43	6
Percentage	0%	0%	20%	0%	20%	30%	30%	0%			

The piloting activity for VRodos and its functionalities was successful, with no difficulties reported by participants. After completing the tasks, the participants started a round of fruitful discussions about potential changes, improvements, and additions to the platform. Overall, the comments were positive about the platform. The users denoted that they need such a platform as it significantly increases the cultural product value and makes it more modern. Users liked the interfaces, where a particular focus has been given on the final result to be lightweight and with few but well-targeted interfaces. In addition, the participants found the system easy to use. There have been developments over the past years toward this goal using templates and drag-and-drop actions. There are some issues in designing new 3D models. The users did not have any experience with 3D authoring tools and some of them found it difficult to position 3D objects in 3D space, which induces some navigational stress. In such a case, 3D design software should be used such as the Blender3D software, which is the most popular open-source software for designing 3D models. Finally, the participants were generally positive about the information provided (such as help). Specifically, the interfaces were enriched with information whenever necessary so that they are self-explainable. On the other hand, some focus should be given to the suggestions on how to fix the problems. A better investment of time in error messages can be done in the future.

3.4.3 Pilot Evaluation of AI Filters

Action 9. AIFilters [UXE2-CERTH-AIFilters]

The goal of this action, which took place between 5th January - 24th February 2023 as an online survey, was to investigate how different Artificial Intelligence (AI) filters can reduce viewers' impact from disturbing imagery, while retaining critical information that allows for understanding what the images depict. Users were asked to perform an evaluation of different AI filters applied on disturbing images.

A total of 107 participants were involved. The survey received 107 responses from more than 42 affiliations, providing a broad range of perspectives and insights on how AI filters can be utilized for mitigating viewer impact from disturbing imagery. Respondents were professional journalists or human rights abuse investigations personnel (e.g., investigators) who are frequently exposed to digital content that may include potentially disturbing or traumatising material. 58 respondents were males and 44 were females, while some respondents preferred not to say. Most of them were 30-45 years old (44.86%) or 45-60 years old (29.91%). In addition, younger respondents participated in the survey, 18-30 years old (22.43%)

In the context of this study, respondents were asked to rate five different filters applied on nine disturbing images. Three different AI filters are involved that aim at transforming an image into a black and white drawing, a slightly coloured drawing or a painting respectively, while the remaining two filters are the image blur and partial blur filters. Last, respondents were asked to rate the intensity of negative feelings that disturbing images (either AI filtered or not) cause to them. Table 41 presents a summary of the main results of this piloting activity.

In general, findings show that AI styles are less disturbing than blurring or partially blurring. However, it seems that despite the fact AI filters are less disturbing, respondents still prefer partial blurring in most cases (with the exception of AI filter 3). Moreover, the AI-based Drawing style filter (AI style 1) demonstrates the best performance, offering a promising solution for reducing negative feelings while preserving the interpretability of the image. Despite the requirement for many professionals to eventually inspect the original images, participants suggested potential strategies for integrating AI filters into their workflow, such as using AI filters as an initial, preparatory step before viewing the original image. Therefore, there are indications that some AI filters can reduce viewers' impact from disturbing imagery, while retaining critical information that allows for understanding what the images depict. This is a useful observation, which we could develop further and apply it in the MediaVerse dashboard and Media Asset and Annotation Management platform.

Table 41: Specific aim evaluation results of UXE2-CERTH-AIFilters

USE CASE SPECIFIC AIM QUESTIONNAIRE									
Exposure to disturbing content: How frequently are you exposed to potentially disturbing content online (e.g., images depicting violence, injury and such like)?									
	Almost never	**Several times a year**	**Several times a month**	**Several times a week**	**Daily**	**N/A**			
Number of replies	5	18	23	37	24	0			
Percentage	4.67%	16.82%	21.5%	34.58%	22.43%	0			
Sensitivity to disturbing content: How would you describe yourself when it comes to exposure of potentially graphic imagery?									
	Viewing graphic imagery does not affect me negatively	**I rarely react negatively**	**I sometimes react negatively**	**I often react negatively**	**I almost always react negatively**	**Other**			
Number of replies	5	39	42	16	2	3			
Percentage	4.67%	36.45%	39.25%	14.95%	1.87%	2.8%			
Negative Feelings reduction rate: {Ai styles, Classic blurring filters} compared to the original images (note: each filter is applied to a different image, i.e., images 1-5).									
	Mean value of negative feelings	**Mean reduction rate**	**Reduction rate per feeling**						
Number of replies	**0**	**2**	**Distressed**	**Upset**	**Scared**	**Irritable**	**Nervous**	**Jittery**	**Afraid**
AI style1 (image 1)	28.79%	0.37	0.45	0.49	0.29	0.27	0.34	0.42	0.31
AI style 2 (image 2)	26.30%	0.17	0.30	0.14	0.20	0.14	0.17	0.11	0.18
Ai style 3 (image 3)	37.65%	0.25	0.32	0.31	0.19	0.27	0.21	0.27	0.16
Partial Blurring (image 4)	30.01%	0.29	0.38	0.39	0.24	0.23	0.29	0.30	0.24
Blurring (image 5)	30.36%	0.24	0.38	0.43	0.13	0.26	0.14	0.18	0.14
If the system you use in the scope of your work would provide the option to inspect images using this filter, to what extent would you use this option? (0=Never, 100=Always).									
Filters						**Mean value**			
AI style 1 (image 1)						50.84			
AI style 2 (image 2)						50.09			
AI style 3 (image 3)						69.72			
Partial Blurring (image 4)						60.00			
Blurring (image 5)						50.47			
Comparison between AI and Classic filters when applied to the same images (i.e., images 6-9).									
Filters						**Mean value**			
AI style 1 (image 1)						39.53			
AI style 2 (image 2)						48.79			
AI style 3 (image 3)						53.83			
Partial Blurring (image 4)						60.05			
Blurring (image 5)						67.43			

Figure 21: Different styles of AI filters.

4 Objectives and Related KPIs

The DoA includes a series of KPIs which have been incorporated in the work plan spreadsheet, as described in D1.1. – Quality and Knowledge Management Plan. From all the KPIs described in D1.1, we present next those that are associated with user pilot activities and distinguish between KPIs that refer to target number of participants and outputs (4.1) and KPIs where an evaluation method needs to be defined (4.2). Overall, most of the KPIs have been successfully achieved across Use Cases. In cases where the KPIs were not achieved, we have provided a detailed description and justification.

4.1 KPIs related to Use Cases

UC1. Citizen Journalism *(partner responsible: STXT)*

Objectives: a) connect across media silos; ii) connect content platforms across Europe; iii) generate a new eco-system consisting of a content hub network; iv) engage and attract software engineers and SMEs across Europe.

Number of content creators/audiences

UC-I1: 3000 creators via communication channels.

- Target: 3,000
- Value achieved: 10,080 (September 2023)

As the MediaVerse platform is still in development and not yet ready for use in the public media sector, we implemented a strategy to increase awareness by publishing additional posts and ads. In order to measure the impact of our efforts, we tracked and counted the impressions generated. This Key Performance Indicator (KPI) provided valuable insights into the reach and visibility of the MediaVerse platform during this promotional phase.

- LinkedIn Post: 800 impressions in Green Accessibility Event.
- LinkedIn Post MediaVerse video (incl. reposts): 2,000 impressions.
- Campaign with MediaVerse video: 3,000 content creators / journalists.

UC-I2: 500 pilot participants via Hackathons performed. Audience included SwissInfo viewers, Swiss people outside Switzerland, people interested in Swiss society.

- Target: 500
- Value achieved: 760

The hackathon took place on the 5th and 6th of September 2023 in Zurich. Around 760 people participated. The previous Hackathon in March was not feasible due to difficulties in the platform testing.

Type and volume of content/licensing model

UC-I3: 15,000 videos (per annum) raised by more than 100% within the project. Free to consume and republish for a specific period, reuse for commercial providers with pricing models.

- Target: 45,000
- Value achieved: In terms of video content, there have been notable contributions across various channels. The MV portal has featured 150 videos, while the CJ App has seen the addition of 240 videos. Furthermore, swissinfo.ch has published 120 videos per year, with a combined total of 5,000 videos

produced by the three Business Units (SRF, RTS, RSI). SWISS TXT has also contributed approximately 100 videos annually. With the hackdays in September 2023, the potential to engage up to 160 active participants and 600 other participants was successfully tested. Out of this pilot, there is a promising opportunity to further increase the volume of content on the platform.

UC-I4: Native language of the content. Swiss languages (German, French, Italian, Romansh) + English.

- Target: 5
- Value achieved: 6

All official Swiss languages have been covered including the widely spoken language English and from the Use Case partner used language Spanish.

UC2. Co-creation of new media formats (partner responsible: UAB)

Objectives: a) explore MV co-creation and immersive authoring potential with non-professional users; ii) deploy and validate accessibility tools; iii) use of media content production tools for educational and social purposes; iv) engage with multiple profiles of users in the pilot to validate it from different perspectives.

Number of content creators/audiences

UC-I5: 400 + participants at Campus ITACA. Changed into different participant profiles such as teachers, social educators or students from different fields (primary and secondary education, health, audiovisual production, cinema, etc.).

- Target: 400
- Value achieved: 513 (UAB)

UC-I6: Other audiences might be involved, extending the audience to 50.

- Target: 50
- Value achieved: 1,087 (including end-users from different services, members of NGOs with access to the 360 stories, and students, teachers and families from the schools) (UAB)

Type and volume of content/licensing model

UC-I7: Footage of different length (50) and 10 full videos made accessible for free

- Target: 50
- Value achieved: 72 videos of which 18 are accessible

UC-I8: Native language of the content. Spanish, Catalan, English

- Target: 3
- Value achieved: 3 (UAB)

UC3. Hybrid intelligence experimental artwork series (responsible AS)

Objectives: a) implement the ICT and Art integration methodology; ii) implement the Experience Readiness Level; iii) integrate a critical, holistic and humanistic approach to user driven social media; iv) engage the STARTS community in MV experiments

Number of content creators/audiences

UC-I9: Selected artists from the STARTS community. Audience: Global STARTS community and wider MV.

- Target: 10 selected artists/300 audience members
- Value achieved: 10 artists/1,113 audience members

Type and volume of content/licensing model

UC-I10: To be decided through the implementation of the art integration methodology. Licensing model to be decided based on artists' input.

- Target: 20 videos
- Value achieved: 56 videos, 20 uploaded images

UC-I11: Native language of content.

- Target: English
- Current value: EN and PT

Additionally, there are some indicators (**SO-I34** to **SO-I37**) linked to the global objective of "perform large sale pilots with diverse stakeholders and end-users", with the following performance indicators and target values.

Number of end-users involved in pilots

SO-I34/I35:

- Target: Content creators ~900
- Value achieved: Current value is above 1,000, including 360 users for UC1, 513 for UC2 and 1135 for UC3

- Target: Media-consumer/prosumers: ~3,500
- Value achieved: 2,235 participants and co-creators involved plus 2,640 end-users, with a total of 4,875 across Use Cases

SOI36/I37. Parties engaged in external pilots

- Target: ~20 organisations/companies
- Value achieved: 48 organisations

- Target: ~100 individuals
- Value achieved: 216

IT-I3. Number of Use Cases tested

- Target: 3
- Value achieved: 3

IT-I4. Number of countries tested

- Target: 5.
- Value achieved: 5

IT-I5. Number of users of the MV platform.

- Target: 2,500
- Value achieved: 1,027 (UC1: 283; UC2: 307; UC3: 333; ad hoc: 215)

The value achieved is lower than the target as the consortium prioritised a wide diversity of pilot actions across Use Cases over a uniform approach with higher number of participants. This strategy required more resources but allowed us to demonstrate the MV platform in diverse scenarios and with diverse users. Additionally, it must be considered that some users logged in using a single log-in user to facilitate participation, so the actual numbers are likely somewhat higher than recorded.

4.2 KPIs Related to Evaluation Methodologies

The following KPIs are related to evaluation methodologies. We indicate objective, performance indicator, target and target value, partner responsible for this KPI and method.

SO-I2 Quality of the network (ATOS). Provide a decentralised framework of next generation interconnected digital asset management systems (i.e., MV nodes) for the communication, the query-driven management and exchange of media content at both node-, and network- level, with integrated content adaptation services to ensure optimal distribution.

- Performance indicator: Latency measurement was changed into “federated search response time”.
- Target: Node asset discovery and response times reasonably close to well-known media platforms
- Value achieved: less than 2s response for one node, full response less than 10s

Since the decentralised network underneath the platform is virtually invisible to the end-user, we decided to change this KPI to reflect a technical measure of the quality of this network. The performance indicators have been changed to a technical measure of response time or latency, hence not linked to Use Case pilot actions. Since we had not previously planned a specific KPI for the measurement of this network, we created an ad hoc development for it. We will also show the result of this measure here, as it was not contemplated when the technical deliverables related to the decentralised framework were published.

The measurement of the decentralised network was based on a gradual increase in requests per second until the responses started to become inconsistent by the test scenario. As mentioned in the deliverables related to the core framework, the network is based on a private IPFS network, and for the test we used the three nodes available at the time. ATOSLAB, ATOS, ATC. It should be noted that the hardware capacity of the nodes is not excessive, each of the three machines has approximately 8 cores and 16Gb of ram, sharing these resources with the rest of the tools of the MV framework. Using the above nodes, we obtained the results in Figure 22.

The connection to federated search is based on websockets. For each interval, the number of requests per second was maintained for 20 seconds. After increasing the number of requests per second to more than 26, and as the response time started to be longer than one second, the framework for opening all these connections started to return errors. These errors are not attributed to the nodes, whose performance only reached 12% of the total processor capacity, but to the machine from which the test was run, which was not able to keep so many websockets open at the same time. However, we can extrapolate the results obtained when the test is consistent, and, given the linearity of the curve, estimate that given the scenario we could receive responses from all nodes in less than 2s at a rate of 40 requests per second. This largely meets expectations, as the KPI sets a minimum of 10s for the response of all nodes. Extrapolating once again, we could handle 200 requests per second with an average response time from all nodes of less than 10 seconds.

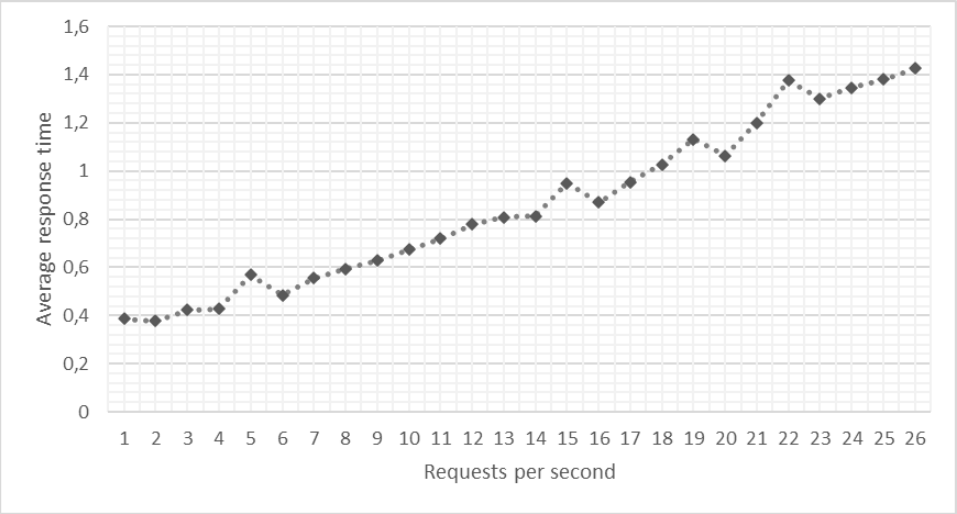


Figure 22: Federated search response time results.

In short, we have validated the IPFS subscription publishing model as valid for creating a decentralised search network. Meeting the requirement in a small environment. In a real production environment, the computing power of the servers would of course be much higher, so many more requests per second could be handled. However, through these tests we have detected some possible improvements for this model.

- Use a programming framework that better handles multiprocessing. For example, the Go language is well known for far outperforming Python.
- If the network were to increase exponentially the number of nodes, each search query to all nodes would increase in the same way. Therefore, it would be good to implement a mechanism to be able to manage the number of nodes queried to be queried gradually, given their proximity for example. However, if the user does not get the expected results, always give him the ability to query the entire network.

SO-I8. Productivity improvement (ATOS). The same objective as for SO-I2.

- Performance indicator: Media professionals productivity improvement
- Target: Relative decrease in effort (time) spent on media production by 30%
- Value achieved: 30%

Method: UC1 pilot actions have included the following statement to be assessed on a 5-point Likert scale: "The MediaVerse platform would allow me to spend less time on creating content and thus reduce the average costs to produce multimedia content compared to other tools I previously used". Table 42 presents the results from the ARSAD pilot and the Hackdays pilot.

Table 42: KPI # SO-I8. Productivity improvement

THE MEDIAVERSE PLATFORM WOULD ALLOW ME TO SPEND LESS TIME ON CREATING CONTENT AND THUS REDUCE THE AVERAGE COSTS TO PRODUCE MULTIMEDIA CONTENT COMPARED TO OTHER TOOLS I PREVIOUSLY USED (1 = STRONGLY DISAGREE, 5 = STRONGLY AGREE)										
		1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
ARSAD	Number of replies	0	6	6	2	0	0	2.71	0.73	3
	Percentage	0%	42.9%	42.9%	14.2%	0%	0%			

Hackdays	Number of replies	0	2	5	7	4	0	3.44	0.86	3
	Percentage	0%	11.1%	27.8%	38.9%	22.2%	0%			

SO-I9 & SO-I10. Ownership identification (FIN). Automate copyright negotiation; support content ownership identification during content Exchange.

- Performance indicator: Time and costs for the identification of the ownership of a specific media content
- Target: 20% less time / 10% less costs, for the identification of the ownership
- Value achieved: 20% / 10%

Method: cost is correlated with time. Different pilot actions have included the following statement to be assessed on a 5-point Likert scale, with a 3.95 mean value (see Table 43).

Table 43: KPI # SO-I9 & KPI # SO-I10. Ownership identification

THE MEDIAVERSE PLATFORM WOULD ALLOW ME TO SPEND LESS TIME TO IDENTIFY THE OWNERSHIP OF A MEDIA CONTENT, COMPARED TO OTHER PLATFORMS I HAVE PREVIOUSLY USED.							
		1	**2**	**3**	**4**	**5**	**N/A**
AUTH 2A	**Number of replies**	0	0	4	5	2	0
	Percentage	0%	0%	36.4	45.4%	18.12%	0%
AUTH 2B	**Number of replies**	0	0	1	8	2	0
	Percentage	0%	0%	9.1%	72.7%	18.2%	0%
TOTAL	**Number of replies**	**0**	**6**	**11**	**15**	**4**	**0**
	Percentage	**0%**	**16.7%**	**30.5%**	**41.7%**	**11.1%**	**0%**

SO-I23. User satisfaction with NERstar editor (STXT). Provide tools that foster accessibility-by-design content creation and enrichment.

- Performance indicator: User satisfaction.
- Target: Satisfaction ≥ ⅘ measured by Likert scale.
- Value achieved : ⅘

Validation test showed high user satisfaction for the NERstar editor of 4/5. In the first version of the NERstar editor it was lower (3/5) because of missing intuitive interface and multiple clicks. The issues have been resolved in the current version. The new NERstar Editor is used for edition of AST / MT for a news show in CH.

SO-I25. Innovative authoring tools improving productivity (VRAG). Provide innovative XR authoring tools for cost-effective production of immersive media experiences.

- Performance indicator: Improved productivity of media professionals and content creators
- Target: Relative decrease in effort (time) spent on immersive media production by 30%
- Value achieved: 30%

A comparison of the old version of Fader with the current will take place in controlled tests with DW users in UC1. Comparative tests reported above with a limited number of users show that most of them felt an improvement in setting up a project, which was situated at 50% in 2 out of 3 cases. An improvement was also perceived in setting up the project scene and its content (2 out of 3 selected again by 50%, 1 by 25%). When comparing the perceived usability, median values move from a mean of 2.67 (median 3) to 3.33 (median: 3.5).

SO-I26. User satisfaction with Fader (VRAG). Same objective as for SO-I25.

- Performance indicator: User satisfaction
- Target: Satisfaction ≥ 4/5 measured by Likert scale
- Value achieved : 4.1

In the test planned for SO-I25, users were asked questions that can be related to satisfaction. Additional satisfaction measures were gathered through the MediaVerse Questionnaire used in UC2 actions in which Fader was used (ACAPPS, Carrasco, EMAV), with most values in the 4-5 range (see Table 44).

Table 44: KPI # SO-I26. User satisfaction with Fader

I WOULD RECOMMEND IT TO A FRIEND							
		1	**2**	**3**	**4**	**5**	**N/A**
ACAPPS	Replies	0	0	1	1	0	0
	Percentage	0%	0%	50%	50%	0%	0%
INS M. Carrasco	Replies	0	1	1	1	2	0
	Percentage	0%	20%	20%	20%	40%	0%
EMAV	Replies	0	0	1	6	4	0
ALL	**Replies**	**0**	**1**	**3**	**8**	**6**	**0**
	Percentage	**0%**	**5.6%**	**16.7%**	**44.4%**	**33.3%**	**0%**

SO-127. Non-expert users creating immersive experiences (VRAG). Provide innovative XR authoring tools for cost-effective production of immersive media experiences.

- Performance indicator: User satisfaction (non-experts)
- Target: Enable non-expert users to build immersive experiences that previously failed to do so.
- Value achieved : TRUE

Use Case 2 in Pilot Phase 1 allowed non-experienced users to create immersive videos, so this was considered achieved in Pilot Phase 1.

SO-I30-I31/132. Social feedback channels (ATC). Provide social feedback channels to the creative editorial process and immersive co-creation opportunities, to leverage the collective potential of groups in generating insights and innovation.

- Performance indicator: Latency of analytics, usability of analytics dashboard, stakeholder's satisfaction measured by time (for latency) and Likert scale (for usability).
- Target: usability ≥ 4/5 & satisfaction ≥ 4/5
- Value achieved : N/A

This has been implemented but not tested due to Twitter API changes.

IT-I7. User satisfaction with new solutions (UAB).Improved users' experiences and new solutions for access to media content.

- Performance indicator: User acceptance of the next generation media based on questionnaires.
- Target: >85%
- Value achieved : >85%

MediaVerse Questionnaire will provide information about user satisfaction. User satisfaction was measured through two statements in the MediaVerse Questionnaire. To the sentence "It works the way I want it to work", more than 60% of the users selected 4 or 5 on a 5-point scale and values below 3 were low (12.5%). Mean was 3.77 and the median was 4.00. As for the statement "I would recommend it to a friend or colleague", values are similar: mean of 3.50, median of 4.00, with 55% of the users selecting values on the 4-5 range and only 17% selecting values below 4.

IT-I10. Management of marketplace activities (FIN). Open and interoperable solutions enabling a genuine Digital Single Market for media.

- Performance indicator: Time devoted to activities related to the selling of content to online platforms and remuneration.
- Target (reformulated): Significantly reduced (based on Likert-scale characterizations of user feedback) time devoted to marketplace activities related to content.
- Value achieved: significantly reduced

Method: evaluation through Likert-scale questionnaires when an interaction with the marketplace is foreseen. Results were gathered during UC1 pilots (Live Subtitling and ARSAD and also Hackdays), with the following results were also gathered during UC3 pilot activities, measuring this KPI in respect to artists and content creating features on MV (see Table 45).

Table 45: KPI # IT-I10. Management of marketplace activities

IT IS FASTER TO MANAGE THE MARKETPLACE ACTIVITIES (UPLOADING, LICENSING, PRICING, ETC.) WITH RESPECT TO MY CURRENT WORKFLOW (1 = STRONGLY DISAGREE, 5 = STRONGLY AGREE)							
		1	**2**	**3**	**4**	**5**	**N/A**
UC1. Live Subtitling & ARSAD	Number of replies	0	3	9	2	0	0
	Percentage	0%	21.4%	64.3%	14.2%	0%	0%
UC1. Hackdays	Number of replies	0	2	8	6	2	0
	Percentage	0%	11.1%	44.4%	33.3%	11.1%	0%
UC3 pilot actions	Number of replies	0	58	48	59	0	0
	Percentage	0%	35.2%	29.1%	35.8%	0%	0%
TOTAL	Number of replies	0	63	65	67	2	0
	Percentage	0%	32%	33%	34%	1%	0%

5 Aggregated Results of Pilot Phase 2

In this section, we present the aggregated data and the overall results of Pilot Phase 2. Our main intention is to summarise the comprehensive information that we presented in the previous section and provide the reader with useful insights in a comparative perspective, where applicable. In Table 46, we present a summary of the users and participants involved in Pilot Phase 2 together with the number of questionnaire responses and videos produced. A more detailed table, in which the different pilot actions are listed, is available in Annex 3. By users, we mean participants actively engaged in testing the platform or in evaluation activities. Participants or co-creators have been involved in the pilot action but have not necessarily interacted with the platform. For example, in UC1 the GDA conference had 33 participants, of which 17 interacted with the platform and 5 finally provided a response to the questionnaire. In UC2, in the Carrasco high school pilot, 131 students co-created content, but nine teachers were the ones involved in the evaluation activities, providing five responses to the questionnaire. Finally, the whole community, i.e., 300 end users viewed the three videos created through this co-creation process.

Table 46: Summary of pilot activities in Pilot Phase 2 per Use Case

UC	Users	Participants/ co-creators	Questionnaire responses	End-users involved	Number of videos
UC1	252	351	240	640	8
UC2	120	328	100	983	31
UC3	200	1,113	165	913	67
AD HOC	205	227	189	N/A	N/A
TOTAL	**777**	**2,019**	**694**	**2,536**	**106**

Quantitative results from all Use Cases to the MediaVerse Questionnaire are available per pilot action in Annex 3 and in an aggregated format in the following tables (Table 47-50).

Table 47: Summary of replies per Use Case: "Are you aware of tools that offer similar features?"

Are you aware of tools that offer similar features?				
UC		**Yes**	**No**	**N/A**
UC1	Replies	139	125	0
	Percentage	52.65%	47.35%	0%
UC2	Replies	8	67	1
	Percentage	10.5%	88.2%	1.3%
UC3	Replies	68	83	0
	Percentage	45%	55%	0%
TOTAL ALL	**Replies**	**139**	**125**	**0**
	Percentage	**52.7%**	**47.3%**	**0%**

Overall, **in terms of quantitative feedback**, one of the strengths of the MediaVerse project is the high number of users involved which have interacted with the project, platform or tools (777 in Pilot Phase 2) and have provided feedback in the form of questionnaire responses (694), across very diverse Use Cases. The user involvement goes beyond these numbers to include more than 2,000 participants or co-creators in this pilot phase, more than 2,500 end-users and above 100 video content produced. In addition to the high number of participants involved to the piloting activities of the project, it is worth mentioning that most usefulness and satisfaction measures are on a 3-5 range on a 5-point Likert scale.

Table 48: Summary of replies per Use Case: Usefulness

USEFULNESS: IT DOES EVERYTHING I WOULD EXPECT IT TO DO.										
UC		**1**	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
UC1	Replies	0	13	60	132	26	0	3.75	0.73	4.00
	Percentage	0%	5.6%	26%	57.1%	11.3%	0%			
UC2	Replies	1	6	20	30	19	0	3.79	0.96	4.00
	Percentage	1.3%	7.9%	26.3%	39.5%	25%	0%			
UC3	Replies	0	51	48	52	0	0	3.01	0.83	3.00
	Percentage	0%	33.8%	31.8%	34.4%	0%	0%			
AD HOC	Replies	0	1	24	38	9	0	3.76	0.68	4
	Percentage	0%	1.39%	33.33%	52.78%	12.5%	0%			
ALL	**Replies**	**1**	**71**	**152**	**252**	**54**	**0**	**3.54**	**0.86**	**4.00**
	Percentage	**0.2%**	**13.4%**	**28.7%**	**47.5%**	**10.2%**	**0%**			

Table 49: Summary of replies per Use Case: Satisfaction I

SATISFACTION: I WOULD RECOMMEND IT TO A FRIEND OR A COLLEAGUE.										
		1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	**Median**
UC1	Replies	2	25	69	102	31	0	3.59	0.88	4.00
	Percentage	0.9%	10.9%	30.1%	44.5%	13.5%	0%			
UC2	Replies	2	6	10	33	25	0	3.76	1.12	4.00
	Percentage	2.6%	7.9%	13.2%	43.4%	32.9%	0%			
UC3	Replies	0	51	61	39	0	0	2.92	0.77	3.00
	Percentage	0%	33.8%	40.4%	25.8%	0%	0%			
AD HOC	Replies	1	3	8	34	26	0	4.13	0.87	4.00
	Percentage	1.39%	4.17%	11.11	47.22%	36.11%	0%			
ALL	**Replies**	**5**	**85**	**148**	**214**	**82**	**0**	**3.50**	**0.98**	**4.00**
	Percentage	**0.9%**	**15.9%**	**27.7%**	**40.1%**	**15.4%**	**0%**			

Table 50: Summary of replies: Satisfaction II

SATISFACTION: IT WORKS THE WAY I WANT IT TO WORK.										
		1	**2**	**3**	**4**	**5**	**N/A**	**Mean**	**SD**	Median
UC1	Replies	0	15	43	108	66	0	3.97	0.85	4.00
	Percentage	0%	6.5%	18.5%	46.6%	28.4%	0%			
UC2	Replies	2	5	16	36	17	0	3.80	0.95	4.00
	Percentage	2.6%	6.6%	21.1%	47.4%	22.4%	0%			
UC3	Replies	0	41	56	0	54	0	3.44	1.23	3.44
	Percentage	0%	27.2%	37.1%	0%	35.8%	0%			
AD HOC	Replies	0	3	19	39	11	0	3.82	0.76	4.00
	Percentage	0%	4.17%	26.39%	54.17%	15.28%	0%			
ALL	**Replies**	**2**	**64**	**134**	**183**	**148**	**0**	3.78	1.01	4.00
	Percentage	**0.4%**	**12.1%**	**25.2%**	**34.5%**	**27.9%**	**0%**			

In terms of **qualitative feedback**, some of the positive aspects highlighted by the users in **the Citizen Journalism UC1** are the platform's automatic labelling features as well as the "automatic caption" and "find similar" options. For the **Citizen Journalism scenario**, it became clear that participants were already familiar with similar products, but not in the form of MediaVerse. This is because MediaVerse offers a large spectrum of tools that can be found in one platform. The platform was gladly used and proved to be mostly useful for the participants in the context.

There were some comments that were considered less intuitive and in some cases, the pilot leaders were asked for help. Overall, the participants are convinced that the platform has been able to achieve its objective. As for the **Immersive Journalism scenario in UC1**, the license advisor was mentioned as a positive example several times. Although some improvements are still needed for the MV platform to become a professional tool used by journalists and media professionals, participants highlighted the progress from Pilot Phase 1 to Pilot Phase 2 in the qualitative comments.

As for the **first scenario in UC2**, focusing on co-creation of new media formats with a social or educational perspective, some of the positive features are the inclusion of diverse users in the co-creation process and the collaboration among students, which is seen as a useful learning process. In this regard, users mention learning about new tools and technologies as a positive impact of the experience, although they also acknowledge the need for training and support and refer to some connection problems and bugs, which were later resolved. Many of them suggest new future applications, especially for Fader stories, but are also aware of the time constraints and suggest some aspects that could be improved. Many of them refer to the "enjoyment" and "motivation" and to the potential of immersive media in educational contexts, next to the fact that the platform tools allow for sharing and new ways of storytelling. Raising awareness and boosting creativity are also stressed by some participants. The licensing aspect is not seen so relevant by some of UC2 users (association of persons with disabilities, high school students), whereas for others (higher education students in Film and technical aspects) it is one of the highlights of the platform as it makes this process more understandable. In this regard, users had different levels of technical expertise and were interested in different features. Some participants stress its decentralized nature, its more democratic approach (dance pilot), the copyright attribution (Nursery School students, Cinema School) features and monetization (ITACA), considering the licensing again one of its main highlights (Som-Fundació). Participants from the Cinema School find the blockchain technology a key asset. The platform is defined as "easy and intuitive" by some users, although some bugs are still reported and some require a more attractive user interface. It is also worth stressing that users from the association of persons with cognitive disabilities had tested the platform in Pilot Phase 1 and the results have improved in terms of not only usefulness (3 to 4.4) and satisfaction (3.67 to 4.4.), but it is also confirmed by their qualitative comments. Specifically, participants think that the outputs co-created through the platform tools can have an impact on persons with disabilities in terms of support and autonomy. Overall, participants show a lot of interest in the possibilities of immersive videos from various perspectives and many ideas for future application are shared in the fields of education, tourism, health, journalism, realtors, simulations, entertainment (music concerts, sports, amusement parks), among others.

As for the **second scenario in UC2**, it took a different approach and focus groups were the methodological choice, with the aim of gathering information about user's needs and expectation in relation to the use of blockchain in the context of audiovisual translation and journalism. In the question "Would you use the MediaVerse platform in your professional context?", 75% of our informants (18 respondents) replied positively and 25% (6 respondents) replied "maybe". In the question "Would you use the MediaVerse platform in your teaching context", positive replies were 55.7% (16) and "maybe" got 33.3% (8) replies. We need to stress that participants reporting "maybe" could be due to their superficial knowledge of the project, as the aim of the focus group remained at a theoretical level.

Reported common advantages of the MediaVerse platform in relation to copyright management across the different groups were the following:

- Easy to share content, not depending on large companies. Decentralization and easy access for everyone ensuring that the generated content is always available and authorship can always be recognised.

- Control given to creators over their own content. Security and access to smart contracts for copyrights management.
- Copyrights management in a more systematic way through direct product management. The platform allows you to monitor your own work (and trace: who acquires it, who modifies it, etc.).
- Scalability to sell content to different users, agencies, media, also in other European countries.
- Potential of creating different business models: micropayments for content, launching projects, or monetizing a project with payments from companies and users at the same time.
- Content verification and transparency.
- Security against plagiarism and hacking.

Reported common disadvantages of the MediaVerse platform in relation to copyright management across the different groups were the following:

- Challenge to "recruit" a broad group of users.
- High marketing investment to render the platform attractive in terms of UX and platform maintenance. Many content creators will always prefer to upload their content to other platforms because they would have more visibility than on this one.
- Complex to manage the professional relationships with large companies that own the content.
- Complex to manage unfair and fake content.
- Copyright management conflicts with the commercial interests of many companies.
- Need for training. In most cases, clients require a more traditional way to handle copyrights.
- Bureaucracy. Excessive commodification of intellectual authorship.

Aggregated data from all focus groups are available in Table 51. Specifically, we present the evaluation results of all the participants to a series of statements assessing the relevance of different blockchain-based solution.

According to the reported results, the most relevant blockchain based solutions according to our participants were copyright management (blockchain enables content owners to directly manage their works), attribution (blockchain increases the visibility and availability of the information regarding copyright ownership) and decentralisation (decentralised digital content ecosystem: power and ownership returned to creators).

According to the reported feedback the following conclusions can be extracted:

- Copyright management is a common problem across the audiovisual translation and journalism fields.
- Fragmentation on copyright management remains a major challenge in the audiovisual industry.
- Creativity and reuse of existing works are not properly protected with copyrights (in the Spanish context).
- Recognition of moral rights might have a direct impact on the reputation of professionals.
- The role of associations to promote the recognition of moral rights (especially in the case of media accessibility and video game localisation) is considered crucial.
- The potential of blockchain remains unknown to most professionals and academics.
- MediaVerse is considered very relevant for copyright management of SMEs and freelancers.

We should stress that copyright management in the digital media value chain differs across countries. The results gathered from these series of focus groups are limited to the Spanish context, as most participants were active professionals and/or academics in this country. Further research needs to be conducted not only in other countries but should include other sectors/industries involved in the content production, media preparation, content distribution, monetisation and consumption of digital media assets, in relation to the use of blockchain for the copyrights management of digital media assets.

Table 51: Summary of replies on blockchain questionnaire

	1	2	3	4	5	N/A	MEAN	SDIATION	MEDIAN
	Decentralised digital content ecosystem: power and ownership return to creators.								
Number of replies	0	1	4	6	12	2	4.32	0.90	5
Percentage	0%	4.2%	12.5%	25%	50%	8.3%			
	New pricing options: new options for creators to earn by selling content.								
Number of replies	0	1	4	8	9	2	4.14	0.89	4
Percentage		4.2%	16.7%	33.3%	37.5%	8.3%			
	Monetization of content: content creators can establish direct relationships with customers.								
Number of replies	0	4	3	6	10	1	3.96	1.15	4
Percentage	0%	16.7%	12.5%	25%	41.7%	4.2%	0%		
	Distribution of royalty payments: near real time payments based on smart contracts.								
Number of replies	0	2	5	8	8	1	3.96	0.97	4
Percentage	0%	8.3%	20.8%	33.3%	33.3%	4.2%			
	From DRM (Digital Rights Management) to smart contract: Transparent and "self execute" right management underlying smart contracts.								
Number of replies	0	4	5	9	6	0	3.71	1.03	4
Percentage	0%	16.7%	20.8%	37.5%	25%	0%			
	Attribution: Blockchain increases the visibility and availability of the information regarding copyright ownership.								
Number of replies	0	0	3	6	14	1	4.48	0.74	5
Percentage	0%	0%	20.8%	25%	54.2%	0%			
	Copyright management: Blockchain enables content owners to directly manage their works.								
Number of replies	0	0	2	4	17	1			
Percentage	0%	0%	16.7%	16.7%	66.7%	0%	4.65	0.66	5

As for **UC3**, qualitative data show the intriguing realm of augmented reality (AR) co-creation and its profound implications on our perception of reality. One of the pivotal questions posed to participants was, "How do you think the co-creation of AR content has an impact on your perception of the truth in the real world?"

The responses resonated with a sense of bewilderment and wonder. Participants found themselves grappling with the thin line between reality and the virtual world as they engaged in AR and virtual reality (VR) experiences. The amalgamation of physical and digital elements, they noted, had the power to blur the boundaries of truth. For instance, VR drones offered fresh perspectives, challenging their understanding of reality as it could shift depending on their vantage point. The immersive nature of AR and VR technology seemed to muddle their senses, leaving them questioning the authenticity of everything they perceived.

Intriguingly, the exploration extended beyond mere perception. Participants were prompted to ponder the potential applications of co-created AR content in various realms. The question, "In what other projects/pathways do you think that the co-creation of AR content could be applied? Please explain why," inspired a plethora of innovative ideas. The possibilities seemed boundless. AR books emerged as a promising avenue, with characters coming to life and transforming reading into an adventure for both children and adults.

Shopping was envisioned as an entirely novel experience, where AR allowed consumers to virtually try out furniture before making a purchase, streamlining decision-making processes. Historical exploration took on a new dimension, as participants envisaged AR contributing to enhanced cultural experience. In healthcare, the visualization of anatomy through AR held immense potential for enhancing learning and comprehension among students and medical professionals alike.

The concept of co-creating AR content extended into the realm of travel guides, where AR could serve as digital companions, providing insightful commentary and enriching the exploration of historic sites. Education was set to benefit significantly, as AR offered interactive scenes that could revolutionize history lessons, making learning more engaging and memorable. Finally, the world of art stood to be redefined, with virtual layers breathing dynamic narratives into static paintings.

In summary, this pilot study unearthed a rich tapestry of ideas and perceptions, illustrating the transformative potential of AR co-creation and content licencing in the context MediaVerse not only in challenging our understanding of reality but also in opening doors to a host of innovative applications from content creators across various domains.

As for the **ad hoc actions led by CERTH**, they tested different functionalities and tools such as the Media Asset Annotation and Management tool (MAAM), VRodos or the AI filters for disturbing content with positive results. The evaluation of the MAAM module and its functionalities was positive, and no major issues were reported. Only minor suggestions for improving the user experience were made next to some recommendations for further improvements of the automatically generated metadata, which were taken on board by technical partners. Some participants found interesting the potential of directly contributing to other user's projects and exploring new collaborations and others found the ownership identification functionality useful and easy to use. As for the qualitative comments on VRodos, participants did not report any difficulties in completing the assigned tasks and were engaged with the tool. They considered that it significantly increases the value of cultural products and also viewed it as easy to use. Finally, in relation to AI filters, the study demonstrated that AI styles are less disturbing than blurring or partially blurring although respondents still prefer partial blurring in most cases.

6 Conclusions

In conclusion, this document has described in detail the evaluation methodology followed in MediaVerse, both from a general perspective and specifically in Pilot Phase 2. One of the main contributions in this regard is the shared MediaVerse Questionnaire, which has been used across pilot actions, together with clear procedures to be followed before, during and after pilot actions. Additionally, each Use Case developed, where relevant, a specific methodology to fulfil its objectives. One of the challenges is that the MV platform has such a wide array of components and features that it is difficult to analyse each of the aspects in open pilots such as the ones that have been performed.

Focusing on Pilot Phase 2, one of the highlights has been the diversity of pilot actions performed and the diversity of users involved:

- Citizens acting as journalists at multiple events (GDA, ARSAD, Live Subtitling Conference, Hackdays) and sharing posts through the platform.
- Journalists and media experts testing new immersive journalism experiences.
- Students at different educational levels (high school, university, vocational training) and from different fields (Nurses and therapists, Film Studies) co-creating immersive videos with educational perspective.
- Workers from associations of persons with disabilities co-creating content with a social impact.
- Dance professionals working on audio description for persons with sight loss through MV tools.
- Professionals and academics from both translation and journalism discussing blockchain and rights management in relation to MV.
- Artists exploring 360º storytelling and online content sharing while exploring the concept of truth.
- Students from Journalism and Communication and participants in events testing some of the MV tools such as MAAM, VRodos or the AI Filters.

Regardless of their different background, users generally express their satisfaction with the MV platform and tools. Some of the positive aspects highlighted by users are:

- Only about half of the participants report being aware of tools that offer similar features, being most of these professionals. In UC2, where participants come from the educational and social fields, only 10% acknowledge being familiar with such as tool. Hence, MV is seen as an innovative solution.
- The MV platform is seen as useful by most participants, with 28.7% selecting 4 on a 5-point Likert scale, 47.5% selecting 4 and 10.2% selecting 5. When asked if they would recommend it to a friend or a colleague, values on the 3-5 range are similar: 27.7%, 40.1%, and 15.4%.
- MV includes a large spectrum of tools that can be found in one platform, an aspect highlighted as positive by participants.
- Users assess positively different features according to their profile and interests. For example, professionals in UC1 and students from Film Studies in UC3 welcome the license advisor, whereas others put the focus on its decentralised nature or monetisation.
- The MV platform is generally considered easy and intuitive. For example, 75% of the journalists and translators in UC2.2 state they would use it in their professional context. Still, some professionals in UC1 suggest further improvements before the tool is incorporated in professional settings.
- The MV tool is especially valued by professional journalists and translators for the copyright management, attribution, and decentralisation: the MV tool is seen as a decentralised tool that facilitates easy access and recognises authorship while giving creators control over their own content. Participants in UC2.2 also see security against plagiarism and content verification as key aspects.

In relation to use-case related KPI, this document has provided data about their fulfillment in most of the cases. In this regard, some of the main findings are:

- A high number of participants have been involved, be it as users interacting and testing the MV platform, co-creators generating or contributing to content or end users consuming this content. Even a higher number of creators has been reached through communication channels.
- Content has been created in multiple languages (i.e., Catalan, English, German, Romansh, Spanish, and Portuguese) across different countries.
- The number of video content produced has exceeded the expected KPIs.
- The quality of the network has been proven by a technical measure of response time or latency.
- Most respondents in the Hackdays, an action that took place in September 2023, when the MV platform is fully implemented, perceived a productivity improvement.
- Most users state that the MV platform would allow them to spend less time to identify the ownership of a media content compared to other platforms.
- MV has allowed non-expert users to create multiple immersive experiences. These users express their satisfaction with the process with most satisfaction values on the 4-5 range on a 5-point Likert scale.
- MV is seen as a tool that allows managing marketplace activities faster with respect to current workflows by most participants responding to this question (68% selecting 3 to 5 on a 5-point Likert scale).

To conclude, we provide an overview of the final numbers including all pilot phases. Results are presented by Use Case, but more detailed data is available in Annex 3, in a table including all data per pilot action. In Table 52, the results show the wide variety of pilot actions involved in the project and the high number of users interacting with the platform or platform tools (more than 1,000), and producing content (138 videos), taking part as participants or co-creators (more than 2,200), responding to questionnaires (860), being direct end-users (more than 2,600).

Table 52: Total number of actions, users and responses per UC

UC	USERS	PARTICIPANTS/ CO-CREATORS	QUESTIONNAIRE RESPONSES	OTHER END-USERS INVOLVED	NUMBER OF VIDEOS
1	283	360	249	640	8 videos
2	307	513	235	1087	57 videos
3	222	UP	187	913	73 videos
AD HOC	215	227	189	N/A	N/A
TOTAL	**1027**	**2235**	**860**	**2640**	**138**

7 References

Brooke, J. (2013). SUS: a retrospective. Journal of usability studies, 8(2), 29-40.

Lewis, J. R. (1992, October). Psychometric evaluation of the post-study system usability questionnaire: The PSSUQ. In Proceedings of the human factors society annual meeting (Vol. 36, No. 16, pp. 1259-1260). Sage CA: Los Angeles, CA: Sage Publications.

Oncins, E. & Serrat-Roozen, I. (2023). Making accessibility agile: new challenges and opportunities. Media for All 10 Conference: Human Agency in the age of technology 2023. University of Antwerpen, Belgium, 5-7 July 2023.

Orero, P., Fernández-Torner, A. & Oncins, E. (2023). The visible subtitler: Blockchain technology towards right management and minting. Open research Europe. https://doi.org/10.12688/openreseurope.15166.1

Ortiz Boix, C. (2016). Machine translation and post-editing in wildlife documentaries: challenges and possible solutions. Hermeneus. Revista de la Facultad de Traducción e Interpretación de Soria (18), 269-313.

Serrat-Roozen, I. & Oncins, E. (2023a). The use of blockchain in media accessibility. 8th International Symposium on Live Subtitling and Accessibility 2023. Universitat Autònoma de Barcelona. Spain, 19 April 2023.

Serrat-Roozen, I. & Oncins, E. (2023b). Towards a decentralized solution for copyrights management in audiovisual translation and media accessibility. International Conference on Human-Informed Translation and Interpreting Technology (HiT-IT 2023). Naples, Italy, 7-9 July 2023.

Serrat-Roozen, I. & Oncins, E. (2023c). Towards a decentralized solution for copyrights management in audiovisual translation and media accessibility. Proceedings of the International Conference HiT-IT 2023, p. 177–187, 7-9 July 2023, Naples, Italy. https://hit-it-conference.org/wp-content/uploads/2023/07/HiT-IT-2023-proceedings.pdf

Pospelova, O. & Rowda, J. (2016). Human Evaluation of Machine Translation. Tech Ebay. https://tech.ebayinc.com/engineering/human-evaluation-of-machinetranslation/

Tejeda Achondo, I. (2020). La aplicación de sistemas de traducción automática estadística y neuronal para la traducción del inglés al español de artículos especializados en el campo de las ciencias de la ingeniería [Trabajo de fin de máster: Universidad Oberta de Catalunya]. http://hdl.handle.net/10609/108607

Annex 1: Template for Each Pilot Action in Phase 2

ID:	Specific protocol
1. GENERAL INFORMATION	
• Goal:	
• Tasks:	
• Method/metrics:	MediaVerse Questionnaire (and add if any other tool)
• Participant pool:	
• Recruitment process:	
• Timeline:	
• Place:	
• Language:	
• Materials:	
• Preparatory work:	
• User experience evaluation leader:	
2. PROTOCOL: step-by-step description of the pilot action.	

Annex 2: Template for the Evaluation Report

ID:	Report
1. General information	
• Goal:	
• Tasks:	
• Methods/metrics:	
• Timeline:	
• Place:	
• Number of participants:	
• Pilot leader:	
2. Overview of the action	
Describe how the action developed.	
3. Results	

Participant profile. Provide a written summary of the participant profile: how many participants, age range and profile (professional/non-professional journalists, artists, etc.).

Questions.

1. Are you aware of tools that offer similar features:

	Yes	**No**	**N/A**
Number of replies			
Percentage			

2. Usefulness: It does everything I would expect it to do.

	1	**2**	**3**	**4**	**5**	**N/A**
Number of replies						
Percentage						

Mean:

SDiation:

Median:

3. Satisfaction: I would recommend it to a friend or a colleague.

	1	2	3	4	5	N/A
Number of replies						
Percentage						

Mean:

SDiation:

Median:

Satisfaction: It works the way I want it to work.

	1	2	3	4	5	N/A
Number of replies						
Percentage						

Mean:

SDiation:

Median:

UC Specific Aim Questions. If you have added any additional evaluation task to gather information about the specific aim, please provide the results here.

4. Researcher observations

Provide any relevant information about the development of the evaluation and its results.

Annex 3: Quantitative Data for All Pilot 2 Actions

Table 53: Summary of the different pilot activities in Pilot Phase 2

UC	PILOT	NODE	USERS	PARTICIPANTS/ CO-CREATORS	QUESTIONNAIRE RESPONSES	OTHER END-USERS INVOLVED	NUMBER OF VIDEOS
1	GDA	ATC	17	33	5	N/A	43 posts
	ARSAD/Live Subtitling Symposium	ATC	53	145	53	N/A	8 videos (&249 pictures)
	Hackdays	STXT	160	160	160	640	N/A
	Immersive Journalism	ATOS	13	13	13	N/A	N/A
	Fader specific test	Fader	6	0	6	N/A	N/A
	Fader comparative test	Fader	3	0	3	N/A	N/A
	TOTAL UC1		**252**	**351**	**240**	**640**	**8 videos**
2	ACAPPS	CERTH	9	25	2	649	1
	Manuel Carrasco High School	CERTH	9	131	5	300	3
	EMAV	CERTH	11	57	11	34	1
	Dance	CERTH	4	48	4	N/A	13
	EUIT	CERTH	20	36	15	N/A	6
	SOM	CERTH	5	0	5	N/A	1
	ESCAC	CERTH	4	0	3	N/A	-
	ITACA	CERTH	31	31	31	N/A	6
	UC2.2-Action 2	ATC	6	0	5	N/A	-
	UC2.2-Action 3	ATC	6	0	5	N/A	-
	UC2.2-Action 4	ATC	6	0	5	N/A	-
	UC2.2-Action 5	ATC	4	0	4	N/A	-
	UC2.2-Action 6	ATC	5	0	5	N/A	-
	TOTAL UC2		**120**	**328**	**100**	**983**	**31**
3	**TOTAL UC3**	CERTH, ATC, ATOS	**200**	**1113**	**165**	**913**	**67**
AD HOC	ITI	MAAM	10	10	9	N/A	N/A
	AUTH	MAAM	18	18	18	N/A	N/A
	UVA	MAAM	3	25	3	N/A	N/A
	UCY	MAAM	30	30	15	N/A	N/A
	AUTH2a	MAAM & ATC node	11	11	11	N/A	N/A
	AUTH2b	MAAM & ATC node	11	11	11	N/A	N/A
	CCT1	VRodos	5	5	5	N/A	N/A
	CCT2	VRodos	10	10	10	N/A	N/A
	AIfilters	AI filters	107	107	107	N/A	N/A
	TOTAL AD HOC		**205**	**227**	**189**	N/A	N/A
ALL	**TOTAL**		**777**	**2019**	**694**	**2536**	**106**

Quantitative results from all Use Cases are presented next separately and in an aggregated form.

Table 54: Summary of replies per pilot action: "Are you aware of tools that offer similar features?"

ARE YOU AWARE OF TOOLS THAT OFFER SIMILAR FEATURES?					
UC	**Pilot**		**Yes**	**No**	**N/A**
1	GDA	Replies	3	2	0
		Percentage	60%	40%	0%
	ARSAD/Live Subtitling Symposium	Replies	29	24	0
		Percentage	54.7%	45.3%	0%
	Hackdays	Replies	73	87	0
		Percentage	45.6%	54.4%	0%
	Immersive Journalism	Replies	1	12	0
		Percentage	7.7%	92.3%	0%
	TOTAL UC1	**Replies**	**139**	**125**	**0**
		Percentage	**52.65%**	**47.35%**	**0%**
2	ACAPPS	Replies	0	2	0
		Percentage	0%	100%	0%
	INS M. Carrasco	Replies	1	4	0
		Percentage	20%	80%	0%
	EMAV	Replies	0	10	1
		Percentage	0%	91%	9%
	DANCE	Replies	1	3	0
		Percentage	25%	75%	0%
	EUIT	Replies	0	15	0
		Percentage	0%	100%	0%
	SOM	Replies	1	4	0
		Percentage	20%	80%	0%
	ESCAC	Replies	2	1	0
		Percentage	66.7%	33.3%	0%
	ITACA	Replies	3	28	0
		Percentage	9.7%	90.3%	0%
	TOTAL UC2	**Replies**	**8**	**67**	**1**
		Percentage	**10.5%**	**88.2%**	**1.3%**
3	**TOTAL UC3**	**Replies**	**68**	**83**	**0**
		Percentage	**45%**	**55%**	**0%**
AD HOC	ITI	Replies	3	6	0
		Percentage	33.3%	66.6%	0%
	AUTH	Replies	8	10	0
		Percentage	44.4%	55.6%	0%
	UVA	Replies	1	2	0
		Percentage	33.3%	66.7%	0%
	UCY	Replies	1	14	0
		Percentage	6.7%	93.3%	0%
	AUTH2a	Replies	6	5	0
		Percentage	54.5%	45.5%	0%
	AUTH2b	Replies	1	10	0
		Percentage	9.1%	90.9%	0%
	CCT1	Replies	0	5	0
		Percentage	0%	100%	0%
	TOTAL AD HOC	**Replies**	**20**	**52**	**0**
		Percentage	**27.78%**	**72.22%**	**0%**
ALL	**TOTAL ALL**	**Replies**	**139**	**125**	**0**
		Percentage	**52.7%**	**47.3%**	**0%**

Table 55: Summary of replies per pilot action: Usefulness

USEFULNESS: IT DOES EVERYTHING I WOULD EXPECT IT TO DO.								
UC	**Pilot**		**1**	**2**	**3**	**4**	**5**	**N/A**
1	GDA	Replies	0	1	1	1	2	0
		Percentage	0%	20%	20%	20%	40%	0%
	ARSAD/Live Subtitling Symposium	Replies	0	3	15	30	5	0
		Percentage	0%	5.6%	28.3%	56.6%	9.4%	0%
	Hackdays	Replies	0	9	37	97	17	0
		Percentage	0	5.6%	23.1%	60.6%	10.6%	0%
	Immersive Journalism	Replies	0	0	7	4	2	0
		Percentage	0%	0%	53.8%	30.8%	15.4%	0%
	TOTAL UC1	**Replies**	**0**	**13**	**60**	**132**	**26**	**0**
		Percentage	**0%**	**5.6%**	**26%**	**57.1%**	**11.3%**	**0%**
2	ACAPPS	Replies	0	0	0	2	0	0
		Percentage	0%	0%	0%	100%	0%	0%
	INS M. Carrasco	Replies	0	0	3	2	0	0
		Percentage	0%	0%	60%	40%	0%	0%
	EMAV	Replies	0	0	1	5	5	0
		Percentage	0%	0%	9%	45%	45%	0%
	Dance	Replies	0	0	3	0	1	0
		Percentage	0%	0%	75%	0%	25%	0%
	EUIT	Replies	0	1	4	8	2	0
		Percentage	0%	6.66%	26.67%	53.33%	13.33%	0%
	SOM	Replies	0	0	1	1	3	0
		Percentage	0%	0%	20%	20%	60%	0%
	ESCAC	Replies	0	0	2	1	0	0
		Percentage	0%	0%	66.67%	33.33%	0%	0%
	ITACA	Replies	1	5	6	11	8	0
		Percentage	3.2%	16.1%	19.4%	35.5%	25.8%	0%
	TOTAL UC2	**Replies**	**1**	**6**	**20**	**30**	**19**	**0**
		Percentage	**1.3%**	**7.9%**	**26.3%**	**39.5%**	**25%**	**0%**
3	**TOTAL UC3**	**Replies**	**0**	**51**	**48**	**52**	**0**	**0**
		Percentage	**0%**	**33.8%**	**31.8%**	**34.4%**	**0%**	**0%**
AD HOC	ITI	Replies	0	0	0	5	4	0
		Percentage	0%	0%	0%	55.6%	44.4%	0%
	AUTH	Replies	0	0	8	10	0	0
		Percentage	0%	0%	44.4%	55.6%	0%	0%
	UVA	Replies	0	0	1	2	0	0
		Percentage	0%	0%	33.3%	66.7%	0%	0%
	UCY	Replies	0	1	6	6	2	0
		Percentage	0%	6.7%	40%	40%	13.3%	0%
	AUTH2a	Replies	0	0	3	6	2	0
		Percentage	0%	0%	27.3%	54.5%	18.2%	0%
	AUTH2b	Replies	0	0	4	7	0	0
		Percentage	0%	0%	36.4%	63.6%	0%	0%
	CCT1	Replies	0	0	2	2	1	0
		Percentage	0%	0%	40.0%	40.0%	20.0%	0%
	TOTAL AD HOC	**Replies**	**0**	**1**	**24**	**38**	**9**	**0**
		Percentage	**0%**	**1.39%**	**33.33%**	**52.78%**	**12.5%**	**0%**
ALL	**TOTAL ALL**	**Replies**	**1**	**71**	**152**	**252**	**54**	**0**
		Percentage	**0.2%**	**13.4%**	**28.7%**	**47.5%**	**10.2%**	**0%**

Table 56: Summary of replies per pilot action: Satisfaction I

SATISFACTION: I WOULD RECOMMEND IT TO A FRIEND OR A COLLEAGUE.								
UC	**Pilot**		**1**	**2**	**3**	**4**	**5**	**N/A**
1	GDA	Replies	0	0	3	2	0	0
		Percentage	0%	0%	60%	40%	0%	0%
	ARSAD/Live Subtitling Symposium	Replies	1	10	23	17	2	0
		Percentage	1.8%	18.9%	43.3%	32%	3.8%	0%
	Hackdays	Replies	1	14	41	75	29	0
		Percentage	0.6%	8.8%	25.6%	46.9%	18.1%	0%
	Immersive Journalism	Replies	0	1	2	10	0	0
		Percentage	0%	7.7%	15.4%	76.9%	0%	0%
	TOTAL UC1	**Replies**	**2**	**25**	**69**	**102**	**31**	**0**
		Percentage	**0.9%**	**10.9%**	**30.1%**	**44.5%**	**13.5%**	**0%**
2	ACAPPS	Replies	0	0	1	1	0	0
		Percentage	0%	0%	50%	50%	0%	0%
	INS M. Carrasco	Replies	0	1	1	1	2	0
		Percentage	0%	20%	20%	20%	40%	0%
	EMAV	Replies	0	0	1	6	4	0
		Percentage	0%	0%	9%	54%	36%	0%
	Dance	Replies	0	0	0	3	1	0
		Percentage	0%	0%	0%	75%	25%	0%
	EUIT	Replies	0	2	3	6	4	0
		Percentage	0%	13.33%	20%	40%	26.66%	0%
	SOM	Replies	0	0	0	1	4	0
		Percentage	0%	0%	0%	20%	80%	0%
	ESCAC	Replies	0	0	1	1	1	0
		Percentage	0%	0%	33.33%	33.33%	33.33%	0%
	ITACA	Replies	2	3	3	14	9	0
		Percentage	6.5%	9.7%	9.7%	45.2%	29%	0%
	TOTAL UC2	**Replies**	**2**	**6**	**10**	**33**	**25**	**0**
		Percentage	**2.6%**	**7.9%**	**13.2%**	**43.4%**	**32.9%**	**0%**
UC3	**TOTAL UC3**	**Replies**	**0**	**51**	**61**	**39**	**0**	**0**
		Percentage	**0%**	**33.8%**	**40.4%**	**25.8%**	**0%**	**0%**
AD HOC	ITI	Replies	0	0	0	4	5	0
		Percentage	0%	0%	0%	44.44%	55.56%	0%
	AUTH	Replies	0	2	3	8	5	0
		Percentage	0%	11.1%	16.7%	44.4%	27.8%	0%
	UVA	Replies	0	0	0	2	1	0
		Percentage	0%	0%	0%	66.7%	33.3%	0%
	UCY	Replies	1	1	1	8	4	0
		Percentage	6.7%	6.7%	6.7%	53.3%	26.7%	0%
	AUTH2a	Replies	0	0	2	3	6	0
		Percentage	0%	0%	18.2%	27.3%	54.5%	0%
	AUTH2b	Replies	0	0	1	7	3	0
		Percentage	0%	0%	9.1%	63.6%	27.3%	0%
	CCT1	Replies	0	0	1	2	2	0
		Percentage	0%	0%	20.0%	40.0%	40.0%	0%
	TOTAL AD HOC	**Replies**	**1**	**3**	**8**	**34**	**26**	**0**
		Percentage	**1.39%**	**4.17%**	**11.11**	**47.22%**	**36.11%**	**0%**
ALL	**TOTAL ALL**	**Replies**	**5**	**85**	**148**	**214**	**82**	**0**
		Percentage	**0.9%**	**15.9%**	**27.7%**	**40.1%**	**15.4%**	**0%**

Table 57: Summary of replies per pilot action: Satisfaction II

SATISFACTION: IT WORKS THE WAY I WANT IT TO WORK.								
UC	**Pilot**		**1**	**2**	**3**	**4**	**5**	**N/A**
1	GDA	Replies	0	2	1	0	3	0
		Percentage	0%	40%	20%	0%	60%	0%
	ARSAD/Live Subtitling Symposium	Replies	0	7	7	22	17	0
		Percentage	0%	13.2%	13.2%	41.5%	32%	0%
	Hackdays	Replies	0	5	30	80	45	0
		Percentage	0%	3.1%	18.8%	50%	28.1%	0%
	Immersive Journalism	Replies	0	1	5	6	1	0
		Percentage	0%	7.7%	38.5%	46.1%	7.7%	0%
	TOTAL UC1	**Replies**	**0**	**15**	**43**	**108**	**66**	**0**
		Percentage	**0%**	**6.5%**	**18.5%**	**46.6%**	**28.4%**	**0%**
2	ACAPPS	Replies	0	0	1	1	0	0
		Percentage	0%	0%	50%	50%	0%	0%
	INS M. Carrasco	Replies	0	0	2	2	1	0
		Percentage	0%	0%	40%	40%	20%	0%
	EMAV	Replies	0	1	2	7	1	0
		Percentage	0%	9%	18%	63%	9%	0%
	Dance	Replies	0	0	2	2	0	0
		Percentage	0%	0%	50%	50%	0%	0%
	EUIT	Replies	0	0	4	8	3	0
		Percentage	0%	0%	26.66%	53.33%	20%	0%
	SOM	Replies	0	0	1	1	3	0
		Percentage	0%	0%	20%	20%	60%	0%
	ESCAC	Replies	0	1	1	1	0	0
		Percentage	0%	33.33%	33.33%	33.33%	0%	0%
	ITACA	Replies	2	3	3	14	9	0
		Percentage	6.5%	9.7%	9.7%	45.2%	29%	0%
	TOTAL UC2	**Replies**	**2**	**5**	**16**	**36**	**17**	**0**
		Percentage	**2.6%**	**6.6%**	**21.1%**	**47.4%**	**22.4%**	**0%**
3	**TOTAL UC3**	**Replies**	**0**	**41**	**56**	**0**	**54**	**0**
		Percentage	**0%**	**27.2%**	**37.1%**	**0%**	**35.8%**	**0%**
AD HOC	ITI	Replies	0	0	0	5	4	0
		Percentage	0%	0%	0%	55.56%	44.44%	0%
	AUTH	Replies	0	1	6	10	1	0
		Percentage	0%	5.6%	33.3%	55.6%	5.6%	0
	UVA	Replies	0	0	1	1	1	0
		Percentage	0%	0%	33.3%	33.3%	33.3%	0%
	UCY	Replies	0	1	5	9	0	0
		Percentage	0%	6.7%	33.3%	60%	0%	0%
	AUTH2a	Replies	0	1	3	6	1	0
		Percentage	0%	9.1%	27.3%	54.5%	9.1%	0%
	AUTH2b	Replies	0	0	4	5	2	0
		Percentage	0%	0%	36.4%	45.4%	18.2%	0%
	CCT1	Replies	0	0	0	3	2	0
		Percentage	0%	0%	0%	60.0%	40.0%	0%
	TOTAL AD HOC	**Replies**	**0**	**3**	**19**	**39**	**11**	**0**
		Percentage	**0%**	**4.17%**	**26.39%**	**54.17%**	**15.28%**	**0%**
ALL	**TOTAL ALL**	**Replies**	**2**	**64**	**134**	**183**	**148**	**0**
		Percentage	**0.4%**	**12.1%**	**25.2%**	**34.5%**	**27.9%**	**0%**

Table 58: Total number of users per pilot action

UC	Phase	Pilot Action Code	Users	Participants/ co-creators	Questionnaire responses	Other end-users involved	Number of videos
1	Pre-pilot	PP-STXT-1	7	N/A	-	N/A	N/A
		PP-DW-1	6	N/A	-	N/A	N/A
	1	UXE1-STXT-CJ	6	N/A	6	N/A	N/A
		UXE1-DW-IJE	3	N/A	3	N/A	N/A
		UXE2-STXT-CJ (GDA)	17	33	5	N/A	N/A (43 posts)
	2	UXE2-STXT-CJ (ARSAD/Live Subtitling Symposium)	53	145	53	N/A	8 videos (and 249 pictures)
		UXE2-STXT-CJ (Hackdays)	160	160	160	640	N/A
		UXE2-DW-IJE01 (Immersive Journalism)	13	13	13	N/A	N/A
		UXE2-DW-IJE 02 (Specific Fader pilot actions)	6	6	6	N/A	N/A
		UXE2-DW-IJE 03 (Comparative Fader pilot actions)	8	3	3	N/A	N/A
		TOTAL UC1	**283**	**360**	**249**	**640**	**8 videos**
2	Pre-pilot	FABER_FG_FM1	4	4	-	1	1
		FABER_FG_FM2	7	7	-	1	1
		FABER_FG_FP1	5	5	-	6	1
		PP-UAB-1 EUIT	5	5	-	-	-
		PP-UAB-2 CEPAIM	7	7	-	-	-
		PP-UAB-3 SOM	5	5	-	-	-
		UXE1-UAB-CROMA	76	76	7	-	9
		UXE1-UAB-CEPAIM	11	11	3	10	1
		UXE1-UAB-SOM	9	9	6	2	1
		PP-UAB-4	5	0	-	-	-
		UXE1-UAB-EUIT	31	28	26	83	8
		UXE1-UAB-ITACA	22	20	22	-	4
	2	UXE2-UAB-ACAPPS	9	25	2	649	1
		UXE2-UAB-CARR	9	131	5	300	3
		UXE2-UAB-EMAV	11	57	11	34	1
		UXE2-UAB-MAG	4	48	4	N/A	13
		UXE2-UAB-EUIT	20	36	15	N/A	6
		UXE2-UAB-SOM	5	0	5	N/A	1
		UXE2-UAB-ESCAC	4	0	3	N/A	-
		UXE2-UAB-ITACA	31	31	31	N/A	6
		PP-UAB-5	6	0	5	N/A	-
		PP-UAB-6	6	0	5	N/A	-
		PP-UAB-7	6	0	5	N/A	-
		PP-UAB-8	4	0	4	N/A	-
		PP-UAB-9	5	0	5	N/A	-
		TOTAL UC2	**307**	**513**	**235**	**1087**	**57 videos**

3	Pre-pilot	PP-ARTS-1	5	5	5	N/A	N/A
	1	UXE1-ARTS-EX	17	17	17	N/A	6 videos (& 20 images)
	2	UXE2-ARTS-EX	200	1113	165	913	67
		TOTAL UC3	**222**	**1135**	**187**	**913**	**73 videos**
AD HOC	Pre-pilot	PP-CERTH-1	6	N/A	N/A	N/A	N/A
		PP-CERTH-2	4	N/A	N/A	N/A	N/A
	2	UXE2-CERTH-ITI	10	10	9	N/A	N/A
		UXE2-CERTH-AUTH	18	18	18	N/A	N/A
		UXE2-CERTH-UVA	3	25	3	N/A	N/A
		UXE2-CERTH-UCY	30	30	15	N/A	N/A
		UXE2-CERTH-AUTH2a	11	11	11	N/A	N/A
		UXE2-CERTH-AUTH2b	11	11	11	N/A	N/A
		UXE2-CERTH-CCT1	5	5	5	N/A	N/A
		UXE2-CERTH-CCT2	10	10	10	N/A	N/A
		UXE2-CERTH-AIfilters	107	107	107	N/A	N/A
		TOTAL AD HOC	**215**	227	**189**	N/A	N/A
TOTAL			**1027**	**2235**	**860**	**2640**	**138**

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