



Accelerating Western Balkans University Modernization by Incorporating Virtual Technologies

VTech@WBUUni

WP2 - DELIVERABLE 2.6.2

Teacher training regarding user interface design, user experience design and VR sickness

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1. Introduction

The scope of the Work package 2.6, are usability aspects of VR solutions and lectures, which will be developed in the scope of this project. The goal of the WP is to provide best user experience in educational content consumption, which requires consideration of usability and user experience guidelines. The emphasis of this document are reports on teacher training regarding user interface design, user experience and VR sickness.

Several trainings on user experience guidelines, user experience in VR and VR sickness, user interface design, etc. have taken place in the scope of the project, described in this document. The trainings were foreseen to be done on site, but due to the pandemic most of them had to be done online.

Institution	Location	Date
University of Ljubljana	Online Zoom	1 st of April 2021
University of Ljubljana	Online Zoom	8 th of April 2021
University of Ljubljana	Online Zoom	26th May 2021
University of Ljubljana	UAMD and online Zoom	1 st of July 2022

The structure of this document is as follows: Each training is described in a section, sorted by the date of training execution.

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2. 1st training on User experience guidelines in VR and AR

The teacher training in Ljubljana took place online over Zoom platform on 1st of April. The training agenda was sent to partners a week before training and was acknowledged by the participating partners. The teaching staff, which attended the training came from the following institutions:

- University of Tartu (UT)
- Lodz University of Technology (LUT)
- European University of Tirana (UET)
- University of Prishtina (UP)
- South East European University (SEEU)
- Aleksander Moisiu University (UAMD)
- Polis University (U_Polis)
- Epoka University (EPOKA)
- University for Business and Technology (UBT)
- Mother Teresa University (MTU)

More than 50 participants from the above institutions attended the training and workshop.

The training was done at the premises of the University of Ljubljana, where a temporary studio was set up for this purpose, with the possibility to show the lectures, speakers, demonstrations, mobile phone screen captures, etc.

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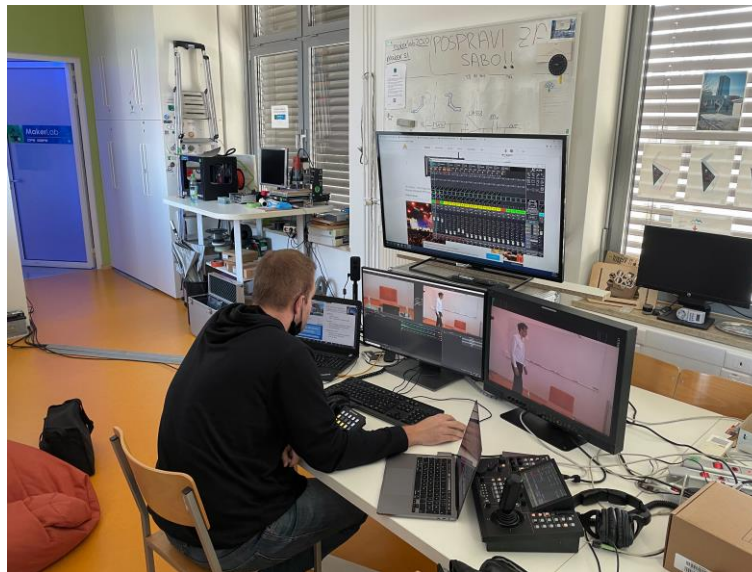


Figure 1. Temporary studio for broadcasting/streaming of the workshop over ZOOM

The training session started with the welcome speech of the rector of University of Ljubljana, who greeted the participants, followed by the presentation of the Faculty of Electrical Engineering and two laboratories (LMMFE and LTFE) by the chairman of the Laboratory of telecommunications Prof. Dr. Andrej Kos.



Figure 2. Lecturer Dr. M. Pogačnik during the presentation of Dr. A. Kos

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The first part of the training was composed of presentations prepared by dr. Jože Guna, dr. Matevž Pogačnik and Klemen Pečnik from the Laboratory of multimedia. This part consisted of lectures regarding user experience guidelines on how to design a VR user interface, taking into account ergonomics, the field of view, human perception and vision as well as movement in VR space, etc. Some emphasis was given to aspects of VR sickness, which will be discussed and presented in more detail in one of the coming workshops.

Additionally, some guidelines were given on AR user interface guidelines as AR technology may also benefit the teaching process and learning in selected cases and courses. These guidelines took into account some specifics related to interactions and user interfaces in AR as these are heavily dependent on the environment, lighting conditions, etc.

The second part of the training consisted of lectures on the production and consumption of 360-degree video, which is one of the approaches to teaching using VR technologies. This technology is especially suitable for the presentation of live demonstrations or presentations of topics, where students (lesson attendants) cannot participate in person due to security, health, or other reasons such as remoteness of the location, etc. Best professional and consumer 360-degree cameras were presented as well as aspects and limitations of head-mounted displays (a.k.a. HMDs or VR goggles), which influence the perceived quality of VR content. The theoretical limitations of video and HMDs' resolution related to human vision were discussed as well as the consequential technical aspects - such as huge bit rates and adaptive streaming of 360-degree videos, for example.

The third part of the training consisted of a practical demonstration related to VR (360-degree) video. The first demonstration included a "How to stream live 360-video". In this scope, a camera-to-smart phone setup was presented, with all the settings explained in combination with YouTube Studio settings for the best quality and lowest streaming latency. The participants could follow the 360° video live stream on the preprepared URL. Using this a short tour of the UL studio setup was given as an example of teaching using VR technology.

The second demonstration included the presentation of the influence of 360-degree video quality (resolution, bitrate) on perceptual quality, considering a limited field of view and quality of the display (HMD, mobile, or PC). A number of high-quality YouTube videos (8K) were used for this purpose, with different resolutions.

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The training was concluded after a fruitful discussion and a Q&A session. The training was recorded and is available to participants for later viewing.

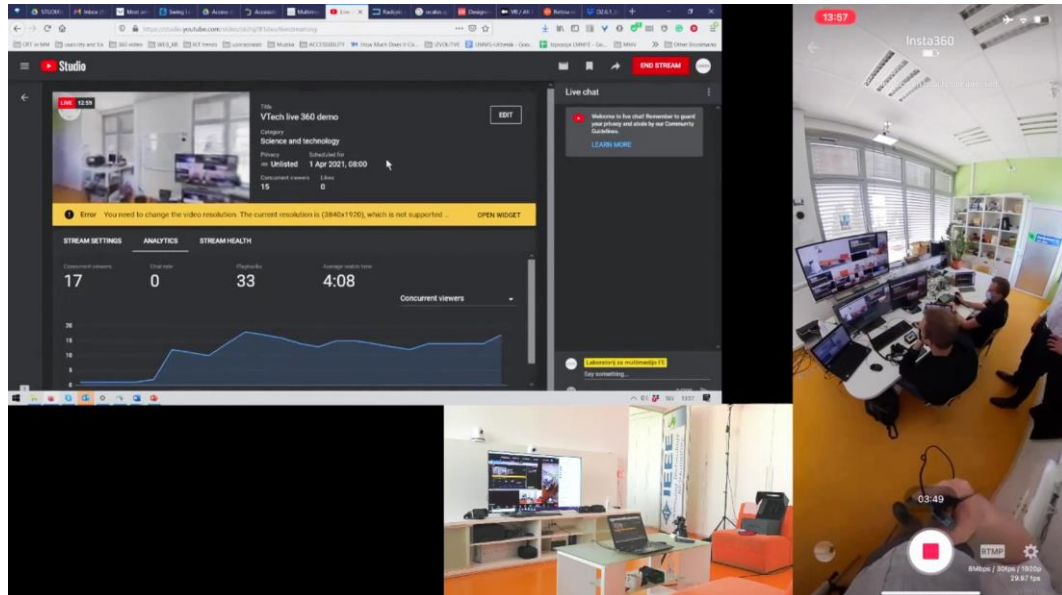


Figure 3. A demonstration of 360-degree LIVE streaming over YouTube

The training session again started with the welcome speech of the rector of University of Ljubljana, who greeted the participants, followed by the presentation of the Faculty of Electrical Engineering and two laboratories (LMMFE and LTFE) by the chairman of the Laboratory of telecommunications Prof. Dr. Andrej Kos.

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3. 2nd training on User experience guidelines in VR and AR

The second training on VR and AR guidelines for user experience was done by the University of Ljubljana team and took place online over Zoom platform on 8th of April. The participants were this time some of the teaching staff, that could not attend the first meeting students. The training agenda was similar to the 1st training, with some differences in the demonstrations at the end of the training session. The teaching staff and students, which attended the training came from the following institutions:

- European University of Tirana (UET)
- University of Prishtina (UP)
- South East European University (SEEU)
- Aleksander Moisiu University (UAMD)
- Polis University (U_Polis)
- Epoka University (EPOKA)
- University for Business and Technology (UBT)
- Mother Teresa University (MTU)

More than 70 participants from the above institutions attended the training and workshop.

The training was again done at the premises of the University of Ljubljana, where another temporary studio was set up for this purpose, with the possibility to show the lectures, speakers, demonstrations, mobile phone screen captures, etc.

The structure of the training was the same as the one during the first training, with the first part consisting of lectures regarding user experience guidelines on how to design a VR user interface, taking into account ergonomics, the field of view, human perception, and vision, movement in VR space and VR sickness, etc. This was later followed by a session on user experience guidelines in AR applications.

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The second part again consisted of lectures on production and consumption of 360-degree video, its specifics, benefits and (technical) drawbacks.

The third part of the training again consisted of practical demonstration related to VR (360-degree) video, starting with a “How to stream live 360-video” over YouTube using YouTube Studio and its settings. This was followed by a demonstration, which included the presentation of the influence of 360-degree video quality (resolution, bitrate) on perceptual quality, considering a limited field of view and quality of the display (HMD, mobile, or PC). This time a virtual presentation of the Faculty of Electrical Engineering was used to demonstrate different quality settings, with specially prepared transcoded material, which was recorded for the purpose of UL FE promotion. Finally, the virtual tour of UL FE was used as an example of good practice VR content for promotional purposes.

The training was concluded with a long and fruitful discussion and a Q&A session. The training was recorded and is available to participants for later viewing.



Figure 4. A virtual, 360° presentation of UL FE

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Figure 5. Dr. M. Pogačnik and K. Pečnik answering the questions of the participants

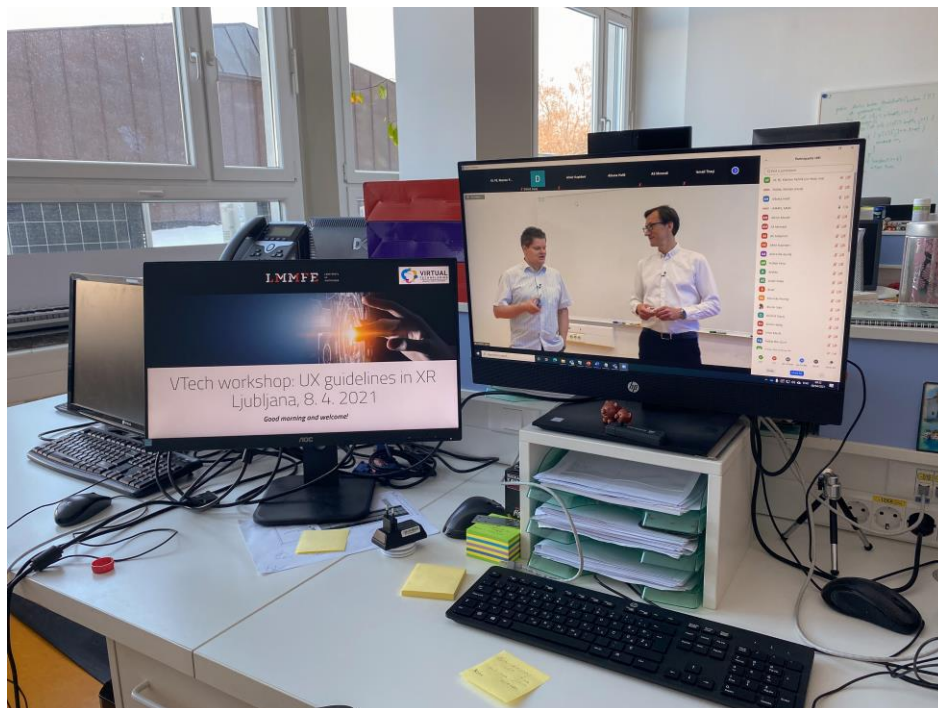


Figure 6. A control view of the training session

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4. 3rd training on VR evaluations and VR sickness

The third training on user experience evaluations in VR with an emphasis on VR sickness was done by the University of Ljubljana team and took place online over Zoom platform on 26th of May.

The participants were the teaching staff and students from the following institutions:

- European University of Tirana (UET)
- University of Prishtina (UP)
- Aleksander Moisiu University (UAMD)
- Epoka University (EPOKA)
- University for Business and Technology (UBT)

There were **14 participants** from the above institutions attending the training and workshop.

The training was again done at the premises of the University of Ljubljana over the Zoom platform, with the possibility to show the lectures, speakers, videos, etc.

The structure of the training was introductory topics on AR/VR technology and related interaction basics with a summary of user experience aspects related to VR. This was followed by a core lecture on user experience evaluations, VR sickness aspects, and consequently evaluations of VR sickness. The lecture included study examples, trends, and challenges in this domain.

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User eXperience in VR Evaluation of Ux in VR and VR sickness

Asst. Prof. Dr. Jože Guna, Assoc. Prof. Dr. Matevž Pogačnik

Figure 7. Agenda and start of the lecture

LMMFF

Data analysis (handbook&excel tool)

- Pragmatic & hedonic aspects

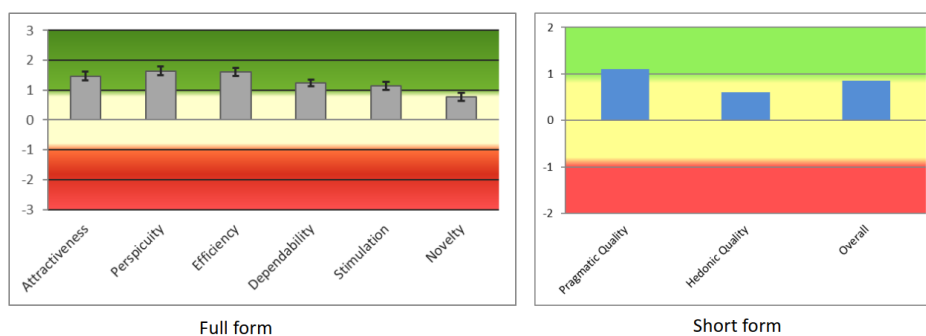


Figure 8. User experience evaluations using UEQ

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Figure 9. VR sickness evaluation setup and study

SSQ evaluation

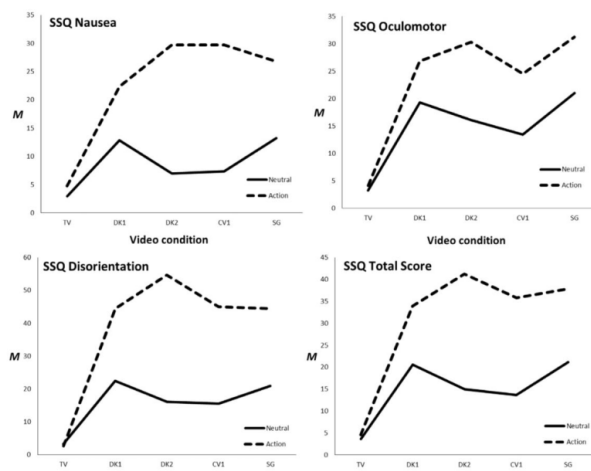


Figure 10. VR sickness scores and graphs for SSQ

- Highest reported sickness on SSQ-D and SSQ Total Score scale
- Distinct difference in experiencing low and high action content

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5. 4th Teacher training – designing User Interfaces with Adobe Xd – from idea to online interactive mock-up

The teacher training on user interface design using Adobe XD tool took place on June 17th 2021. The training was done at the UAMD premises as well as over the Zoom platform, with the possibility to show the lectures, speakers, videos, etc. to remote participants.

The participants were the teaching staff and students from the following institutions:

- European University of Tirana (UET)
- Aleksander Moisiu University (UAMD)
- Epoka University (EPOKA)

The structure of the training was a hands-on workshop starting with Adobe Xd basics such as home screen, workspace, basic tools, artboards, etc. This was followed by an introduction to workflow procedure such as design, prototyping and sharing, later followed by hands on examples on how to use home screen, workspace, basic tools, and artboards. After the break a session on designing interface took place (guided design), followed by prototyping and homework.

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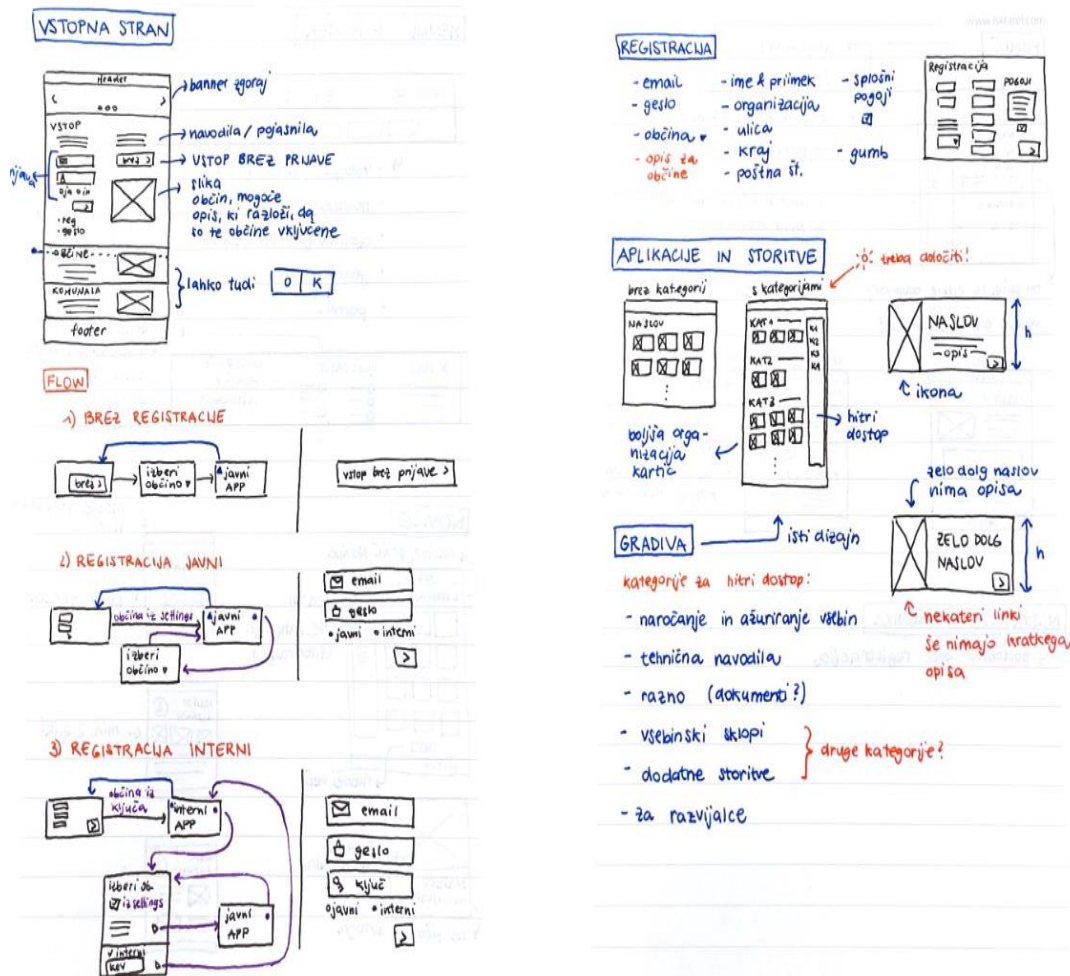


Figure 11. Paper prototyping example

- A – main menu
- B – design tab
- C – prototype tab
- D – share tab
- E – coediting settings
- F – preview on mobile
- G – preview in popup window

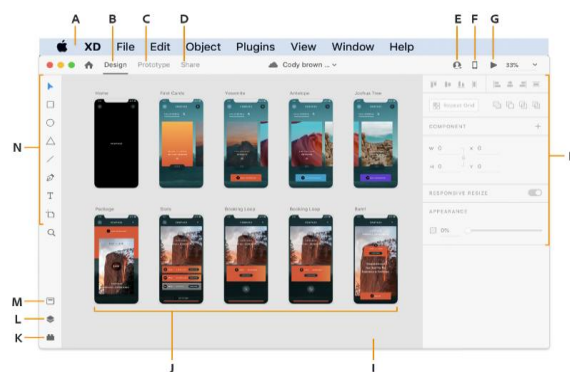


Figure 12. Adobe XD project workspace

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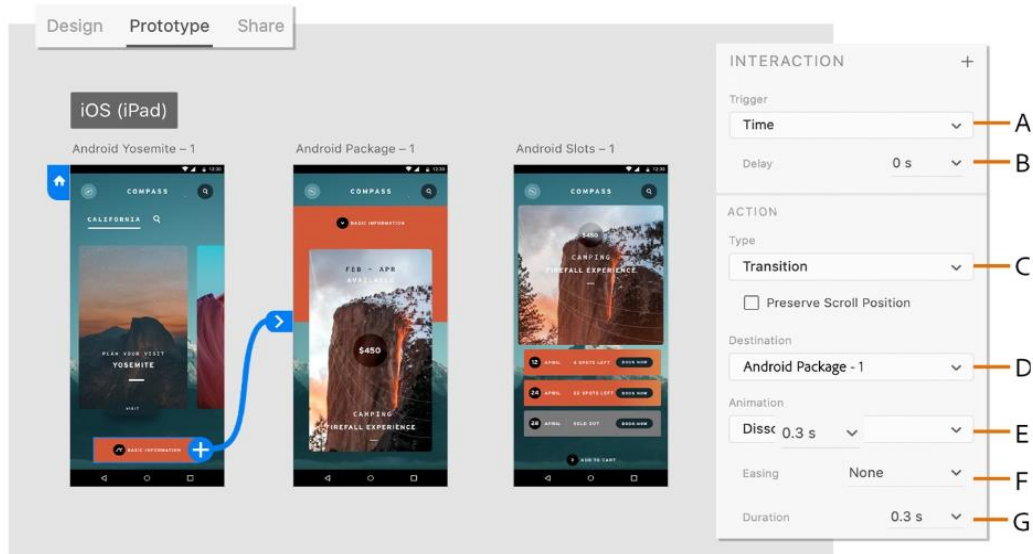


Figure 13. Adding interactions in Adobe XD

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6. 5th hands-on training on Ux and VR sickness evaluation methodologies

The hands-on workshop on VR sickness and user experience evaluations was done by the University of Ljubljana team and took place in Durres on July 1st. The training was done at the UAMD premises as well as over the Zoom platform, with the possibility to show the lectures, speakers, videos, etc.

The participants were the teaching staff and students from the following institutions:

- European University of Tirana (UET)
- Aleksander Moisiu University (UAMD)
- Epoka University (EPOKA)
- POLIS University

There were 14 participants from the above institutions attending the training and workshop, out of those 7 were online and 7 on-premise.

The structure of the training was a hands-on workshop from the domain of user experience evaluation and VR sickness evaluation. The lecture and workshop included the evaluation procedures, questionnaires, methodologies, and analysis of results, all in the form of study examples, trends, and challenges in this domain.

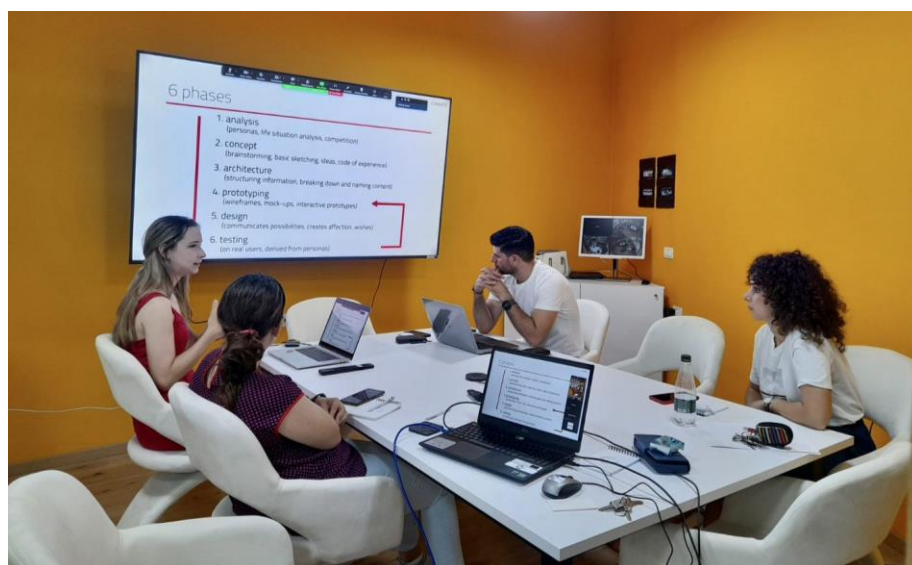


Figure 14. Workshop on evaluation of Ux

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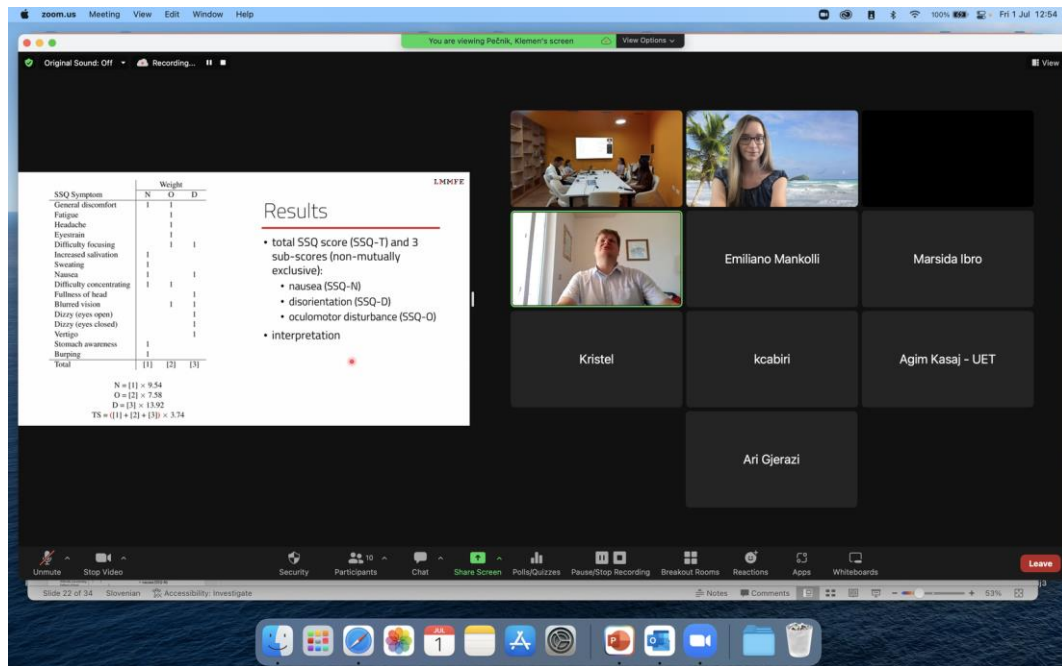


Figure 15. Remote participants of the Ux evaluation workshop

7. Conclusion

This document is presenting the reports on trainings that have taken place in the scope of WP2.6 in the domain of user experience, related to VR content. The goal of the document is to provide guidelines for creation of educational VR content in the scope of the Erasmus+ Vtech project. Other trainings, not related to the user experience were done in the scope of WP2.1.

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