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From Speaking Skills to Virtual Mobilities: Challenges of VR Technologies in Communication from the European University of Technology

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***Abstract*— Within the vision of the European University of Technology (EUt+), a University Alliance of 8 European partners, augmenting a Mobility Friendly Plan through a virtual worlds approach, helps prepare students to overcome communication, language and cultural barriers. Such virtual environments can allow students to be immersed in the academic environments of the destination location, creating spaces for team building, collaboration, and creative activities. In the context of effective social interaction, communication and language learning become key pillars. Technological means that develop key competencies and abilities in such immersive environments, should be tackled. The current paper describes three uses cases of VR environments from the European University of Technology Alliance, implemented with the purpose of facilitating communication skills to overcome language and cultural barriers. The application of various technology levels, from prototype-based to customization of existing platforms is analyzed, under a TAM adoption assessment, to identify common challenges that may accompany the development of a shared VR campus, intended for effective communication, while providing the students a feeling of comfort, safety and confidence.**

Keywords*— *language confidence, communication skills, public speaking, language learning, Virtual Reality, immersive experiences; student mobilities

I. INTRODUCTION

Coherence is defined as one of the critical attributes of effective oral communication, defining the ability of the speaker to convey the same emotions through both words and tone of voice [1]. The potential to incorporate Virtual Reality (VR) technologies into language learning and teaching was reported widely but remains on the periphery due to their technical sophistication and functionality compared to other digital tools [2]. Developing a suitable VR platform remains expensive, especially in the context of higher education [3]. Yet, as easy-to-use and easy-to-adapt VR technologies make such immersive experiences feasible [4].

The purpose of the current work is to bring forward challenges of the adoption of VR technologies in communication scenarios, from use cases implemented across the EUt+ Alliance, at different Technology Readiness Levels. Design, interaction and assessment challenges are to be addressed in the development of a common VR space, as an immersive, multi-sensory, safe environment that is to overcome cultural barriers. Section II provides a description of the three prototypes and the communication use cases for which they were intended. Section III reports on the evaluation of the VR use cases using the Technology Acceptance Model (TAM). Section IV provides prosals for further extension of the study

II. VR USE CASES FOR COMMUNICATION ACTIVITIES

The case of a VR Prototype Fear of Public Speaking Through Eye Tracking Capabilities (VR-P1)

Technological solutions and virtual learning environments have been developed as training and therapeutic methods to help coping and overcoming glossophobia or the Fear of Public Speaking. A prototype that proposes a use case for a therapeutic training dedicated to overcoming glossophobia (FOPS) through an immersive VR environment, has been developed by simulating a scene where the user delivers a presentation in front of an udience (Figure 1). By analyzing the presenter's eye movements and real-time feedback from the audience, oratory skills may be improved, validating the applicability of such a use case for building self-confidence in speaking skills.

Fig. 1. Development of a VR prototype for practicing public speaking skills

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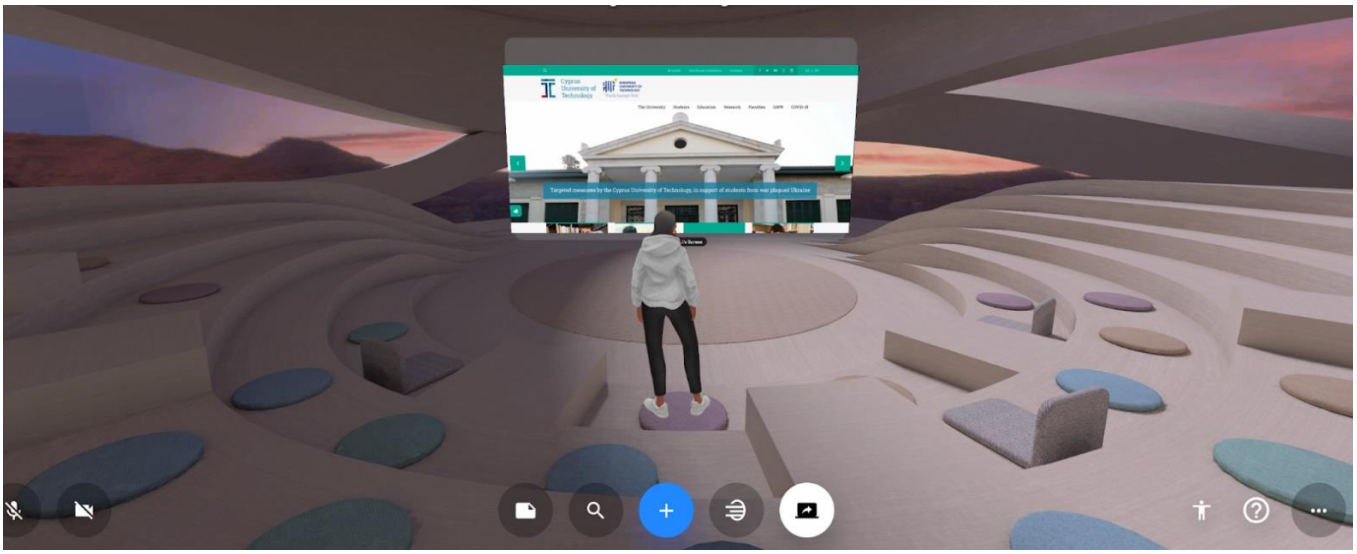

Fig. 2. Repurposing matured VR technology (Spatial Metaverse) for immersive collaboration in language learning and conversation

The case of VR for supporting mobility students: Spatial Metaverse as a Multilingual Communication Technology (VR-P2)

The idea to repurpose an already-existing VR tool, Spatial Metaverse, produced for an immersive collaboration experience for enterprise users, was incorporated in a language learning context (Figure 2). This work will report on a case study in repurposing Spatial.io, a Virtual Reality (VR) space, for preparing mobility students in their studies abroad by allowing them to experience a multilingual conversation with their mobility-peers prior to mobility. The Virtual Reality environment was prepared with an aim to support a safe environment for students to hone the skills required once they embark on their physical mobility. Spatial Metaverse provided a simulated context of the study abroad environment and the opportunity to familiarise themselves with their peers as well as exchange study abroad information prior to the mobility.

The case of VR for language learning in a purpose-built Mozilla Hubs space (VR-P3)

With its four separate rooms dedicated to four languages and cultures (French, German, Italian, Spanish), the #LanguagesPathways Hub is a multilingual resource aimed at language teachers interested in an alternative and immersive language learning environment for their students. The VR environment is designed to offer dedicated language tasks and games. Teachers will have the opportunity to take an introductory course to the environment and its possibilities for language learning, be a part of a community of practice and create their own language tasks as well as improve their digital skills and integrate them into the curriculum. Students will benefit from experiencing language learning in an immersive platform and be exposed to language learning innovations. Figure 3 shows the development of a dedicated low immersive environment for language learning using Mozilla Hubs.

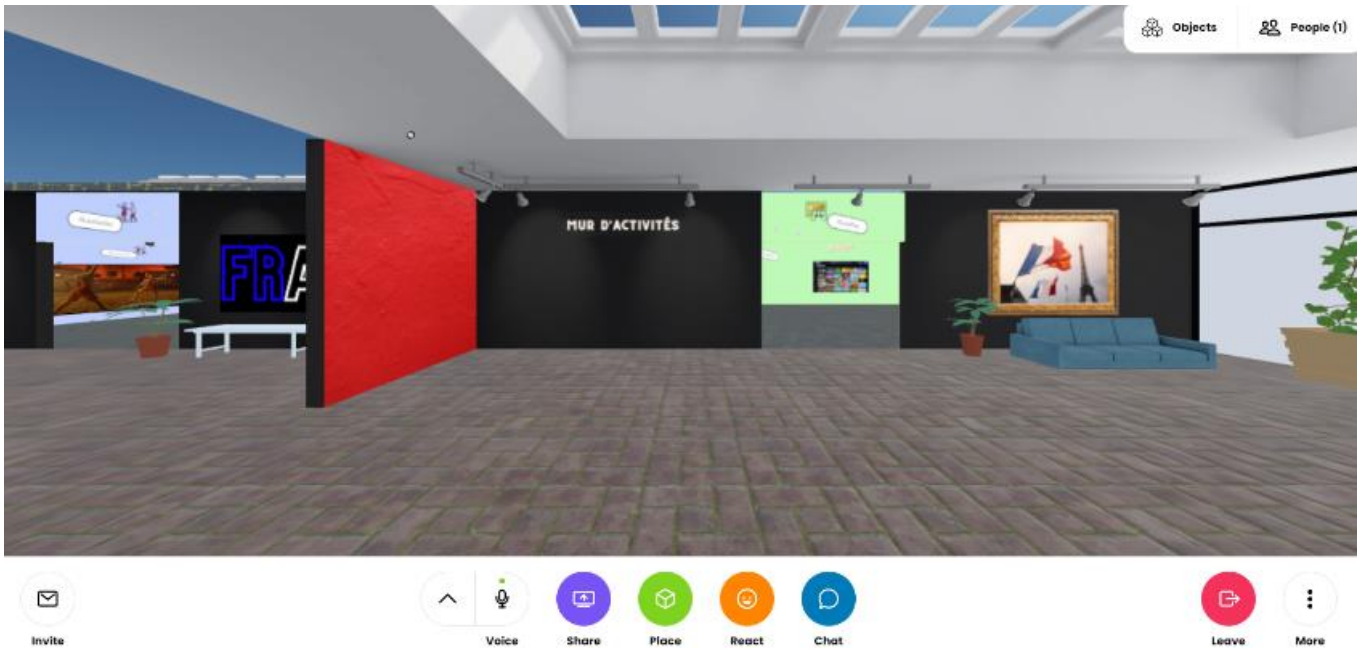

Fig. 3. Development of a dedicated low immersive environment for language learning using Mozilla Hubs

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III. Evaluation through a TAM assessment

User attitudes towards adopting these proposed VR environments for improving communication skills were assessed through a TAM quantitative study that collected data from a sample of 74 participants through a survey (51% female, 49% male), by referring to standardized measures of Perceived Ease of Use (PeOU) and Perceived Usefulness (PU). TAM has been widely applied to understand and predict user acceptance and usage of new emergent technologies, including VR [6]. Perceived Usefulness (PU) - the degree to which a user perceives that a particular technology will enhance their productivity, efficiency or effectiveness and Perceived Ease of Use (PeoU) - the degree to which a user perceives that a particular technology is easy to use and learn are the two key factors that influence the user's behavioral intention to use technology and have been assessed through the current study [5]. The target population of the study to which the three use cases were presented, consisted of 4th year students , enrolled in the Faculty of Electronics, Telecommunications and Information Technology, chosen as a representative group for the population that uses VR technology to enhance human communication and interaction. The study was conducted on a voluntary basis, where the high participation rate of 82% of the total of 90 students indicated a high level of interest in all three the use cases, and the technology itself. Results were collected for each prototype in the study.

Three AM statements analyzed the PeOU factor (PeOU-Q1 – PeOU-O3). Resulting distributions are presented in Figure 4 – Figure 6.

An average percentage of 51.76% of the students assessed the prototypes as being accessible (“Agree”), while 24% responded highly positive (“Strongly Agree”). An average percentage of 51.76% of the students assessed the prototypes as being accessible (“Agree”), while 24% responded highly positive (“Strongly Agree”).

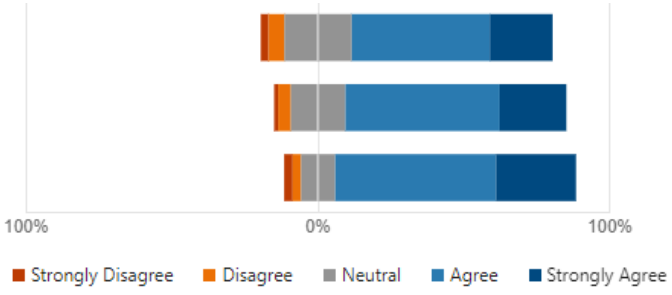

Fig. 4. I would find the VR-P easy to use (PeOU – Q1)

The high percentage (58.46 % on average) of participants who responded positively to the statement "Learning how to use the VR-P would be easy for me" indicates that the participants found the VR-P technology user-friendly and easy to learn. The fact that 19.7 % of participants selected "Strongly Agree" further emphasizes their confidence in their ability to learn how to interact within these environments.

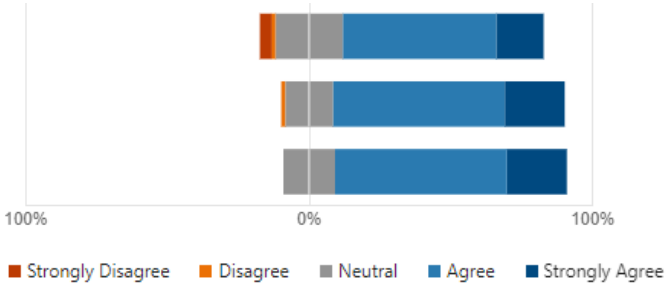

Fig. 5. Learning how to use the VR-P would be easy for me (PeOU – Q2)

The high percentages of participants who selected “Agree” (55.76%, on average) and "Strongly Agree" (13.13% on average) suggest that students of the surveyed population have a high level of confidence in their ability to become proficient in using the three prototypes.

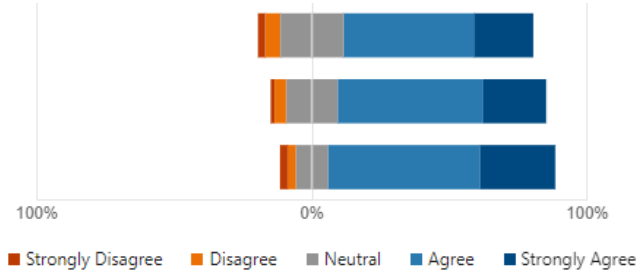

Fig. 6. Becoming skillful at using the VR-P would be easy for me (PeOU – Q3)

Five questions assessed the PU factor, and resulting distributions are presented in Figure 7 – Figure 11. Similarly, with the PeOU factor, the results of the PU survey statements indicated that the students held favorable attitudes towards the suitability of VR technology for the intended use cases.

In response to PU-Q1 statement, on average, 39.86% of the participants agreed that using such prototypes would raise their mood, which indicates that they viewed the technology as having a positive impact on their emotional well-being. This result may be important because a positive emotional state can improve learning outcomes and engagement.

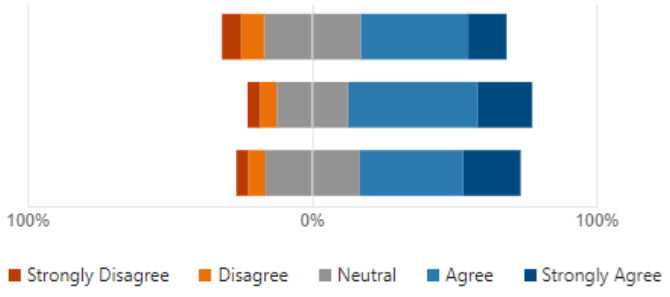

Fig. 7. Such a VR-P would raise my mood (PU-Q1)

Similarly, in response to the PU-Q2 statement, 48.2% of the participants agreed that these prototypes would improve engagement and motivate them in related activities to communication, suggesting that these prototypes could be an effective way to increase student engagement and motivation in communication-related activities, which could lead to better learning outcomes for communication skills.

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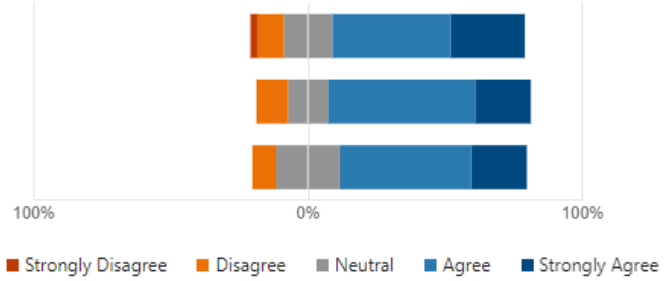

Fig. 8. Such a VR prototype would improve engagement and motivate me in related activities to communication (PU-Q2)

In response to the PU-Q3 statement, 50.1% of the participants agreed that these learning prototypes would enhance their learning performance in communication activities. This result suggests that the students identify the VR technology as a tool that could improve their ability to learn and perform well in their studies, with important implications for their academic performance and future careers.

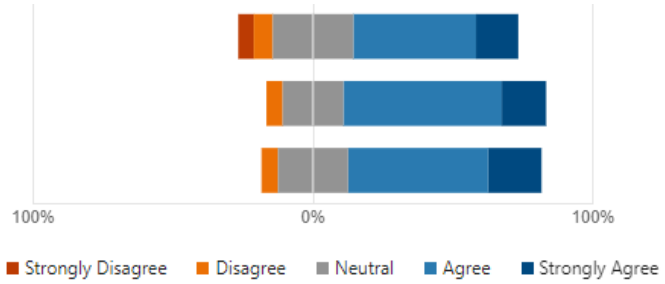

Fig. 9. The VR-P would enhance my learning performance in the field (PU-Q3)

In response to the PU-Q4 statement, 43.16% of the participants agreed that using these prototypes communication activities should become more accessible, making learning more accessible and convenient, which becomes another factor improving their engagement and overall learning outcomes.

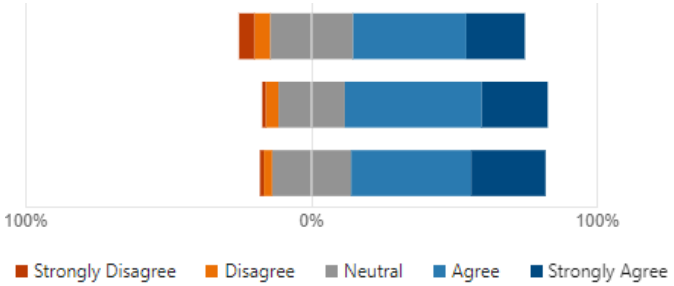

Fig. 10. The VR-P would make studying in the field easier (PU-Q4)

Finally, in response to PU-Q5 statement, 43.3% of the participants agreed that such VR prototypes contribute to a better student/student interaction and student/lecturer interaction, outcomes that could improve communication and collaboration between students and their lecturers, enhancing the overall learning experience.

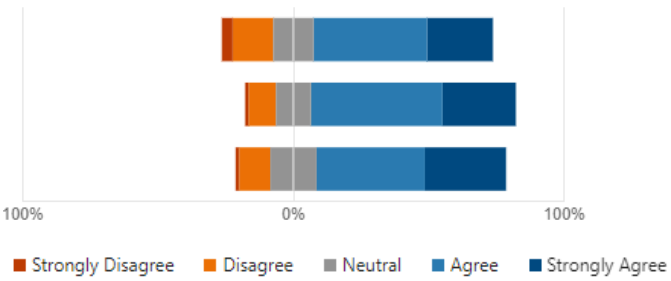

Fig. 11. The VR-P would improve student/student interaction and student/lecturer interaction (PU-Q5)

IV. Conclusions

The Perceived Ease of Use (PeOU) and Perceived Usefulness (PU) constructs were applied to validate user acceptance of three VR prototypes developed within the EUt+ Alliance as use cases for enhancing communication skills in multicultural and multilingual environments. The study aimed to examine the impact of PeOU and PU on user behavioral intention with respect to using such prototypes in educational environments. The positive evaluation rate of 70% on average (cumulating "Agree" and "Strongly Agree" options) indicated that PeOU and PU had a significant positive effect on users' intention to adopt VR technologies in communication scenarios. Furthermore, the results provided evidence of the role of PeOU and PU in user acceptance and adoption for further communication skills training. The study's future direction involves evaluating the AT and BI factors of the TAM model and verifying the viability of these prototypes as modules within a shared VR campus that meets the necessary requirements.

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