Learning in the Metaverse

Hanna Jobst [1]

[1] *Friedrich Alexander University Erlangen-Nürnberg, Findelgasse 7/9, 90402 Nürnberg, Germany*

5. Discussion

The purpose of this study was to gain a better understanding of the implications for the implementation of Metaverse solutions. Our findings, discovered through the analysis of existing literature, use cases and expert interviews, highlight the benefits of the immersive learning environment but also reveal possible risks, and gaps in research.

One of the advantages is the possibility of individualisation and tailoring of content to create a user specific learning experience supporting special needs and abilities of users. Furthermore, the immersive and gamified experience provides an enhanced learning process for the students and supports the overall knowledge transfer, not only by increasing the engagement of students, but also by supporting their motivation. Communication and collaboration are well supported by Metaverse solutions and can support more traditional didactic formats. Metaverse solutions in higher education hold big potentials and should be used as a complementary and supportive resource to reinforce other in person formats.

Risks and challenges discovered in the research concern the nature of change management as for an example to remove technical barriers for users and content creators, offer support and training for the new application and ensure motivation amongst teaching personal to drive the change towards this new 3D learning approach. Another obstacle is the allocation of the resource of equipment as well as human resource for content creation. Data and privacy concerns are also some of the more negative voices towards the Metaverse. Additionally, the psychological impact of the immersive environment and the associated ethical responsibility are not to be underestimated, especially considering that students want to keep physical real-world components in their university life.

A research gap exits for the actual impact of immersion on students. Framework, rules, and guidelines for Metaverse solutions in the context of higher education need to be developed and the impact of AI both from a developers and users needs to be studied further.

6. Conclusion

In conclusion, the integration of Metaverse solutions into higher education, particularly in thematically fitting subjects of Information Systems, holds great potential for transforming the student's learning experience. The gradual implementation, starting with a supportive role, allows for a smoother transition and addresses potential challenges. The identified implications suggest that focusing on collaborative

learning, problem-based learning, and community-based learning can effectively harness the immersive benefits of Metaverse solutions while emphasizing communication and collaboration. By strategically incorporating these use cases, educational institutions can capitalize on the unique features of the metaverse to enhance student engagement and foster a dynamic and interactive learning environment. As technology continues to advance, a thoughtful and phased approach to the integration of Metaverse solutions can pave the way for a future where innovative learning methodologies coexist harmoniously with traditional educational practices.

7. Limitations

There are at least four potential limitations concerning the results of this study. A first limitation concerns a threat to validity of the literature review is that the named SLR was rather used an orientation for the conducted literature review, not as a factual instruction. Within the group the literature review was conducted individually, and results were reported to one another. We tried to structure the review as much as possible but did not entirely follow the proven method. This leads to a very high researcher bias and leads to not replicable results, which devalue its results.

Another limitation is the sample size of 22 interviewees which restricts the reliability of the collected data from the expert interviews. The landscape of higher education was tried to be presented by (8) students, (8) lecturers, and (6) practitioners. However, the limited number of participants may be not enough to capture the broad diversity of opinions within higher education. Future research should target a larger sample size to ensure representativeness of its results.

A third potential limitation regards the underlying study design of the structured expert interviews. The possibility of a biased interpretation is not to be dismissed. Interviewees responses may be influenced by the asked question and therefore limits deeper exploration of unexpected insights. This limitation could be resolved by choosing a semi-structured interview approach for further studies.

A fourth limitation is located within the specified scope of the research. The knowledge gain is applicable for the Information Systems bachelor's degree. When applying the generated insights to other contexts the specific context of this study must be considered. Future research could explore the capability of Metaverse solutions in a more diverse, broader setting to create a general overview of those application in higher education.

8. Future Research

In terms of future research, it would be useful to extend the current findings by examining the three topics discovered as research gaps.

A first possible study could analyse in detail what risks and effects the 3D

environment and immersive characteristic of Metaverse solutions have on students.

Second the development of a recognized synopsis of frameworks, rules and guidelines is to be studied.

Third the impact of AI on the development of Metaverse solutions as well as the impact and labelling of artificial avatars within it.

By analysing the named subjects future research contributes to a responsible evolution of solutions within the Metaverse.

9. Own Contributions

I took an active role in every stage and aspect of our research throughout the project as well as ensuring regular meetings and exchanges within the group. In detail, my individual contributions for this project are the responsibility for the literature review. I theorized the structured literature analysis (by Kitchenham and Charters). The decision and execution method were discussed within the group. Furthermore, I searched for relevant literature and use cases I obtained the contact details of instructors listed in the IS Bachelor Modulhandbook and distributed questionnaire requests to them. In addition, I talked to lecturers in my personal environment and did the questionnaires with them. The evaluation of the answers of the lecturers was another task I have taken on (see Lecturer-Result.docx). I worked on the combination of all results (see files Result1.pdf, Reuslts2.pdf, Results3.pdf) as well as the limitations and reflection of this research.

10. Reflections

Upon revisiting the experiences documented in this project the open approach we applied during the study leads to not replicable results and restricts the validity of the findings. For future research I would focus on choosing a clear in theoretical founded methodology and applying it.

On the other hand, the conducted reliability examinations were a good and helpful tool to use within the project.

In retrospect, I realize that the challenges encountered during this endeavour served as valuable learning opportunities, pushing me to reassess my approach to problem-solving, group work and scientific research.