

Fostering competencies of pre-service teachers for the planning, design and evaluation of teaching offers with Augmented and Virtual Reality

Kristina Bucher
Chair of School Pedagogy
University of Wuerzburg
kristina.bucher@uni-wuerzburg.de

I. ABSTRACT

Media formats linked to the concept of Extended Reality (XR) have started to find their way into many areas of professional and private life. Especially Augmented Reality (AR) - the projection of computer-generated content onto the users real world perception [8] and Virtual Reality (VR) - immersive, interactive, multi-sensory, viewer-centered, three-dimensional computer generated environments (cf. [3]) - offer a wide range of new possibilities compared to other media formats. While the use of AR and VR is already quite popular in the gaming and industrial sector, applications like *Google Expeditions* or *Anatomy4D* have also shown their great potential for scholastic learning. Studies point to potential advantages like enabling the visualization and manipulation of complex or inaccessible topics, or an enhanced possibility for exploration (cf. [1] [5]). To allow teachers to make use of these advantages, it is necessary to foster corresponding competencies for an appropriate use of such formats for teaching and learning (cf. [2]). For this purpose, a didactical concept was developed and implemented in the school-pedagogical training of pre-service teachers at the University of Wuerzburg, based on the research method of theory- and practice-oriented development and evaluation of concepts for media pedagogy (cf. [6]). This included the identification of suitable theoretical approaches, like the *Learning by Design-Approach* (cf. [4]) and *Action-oriented Teaching and Learning* (cf. [7]), and the derivation of didactical principles. The established concept is being evaluated with a mixed-methods approach; including questionnaires, focus-group interviews and participant observations.

ACKNOWLEDGMENT

The work presented in this abstract is part of the doctoral thesis *Fostering competencies of pre-service teachers for the planning, design and evaluation of teaching offers with Augmented and Virtual Reality*, supervised by Prof. Dr. Silke Grafe.

REFERENCES

- [1] J. Bacca, S. Baldiris, R. Fabregat, S. Graf, and Kinshuk. Augmented Reality Trends in Education: A Systematic Review of Research and Applications. *Journal of Educational Technology & Society*, 17(4):133–149, 2014.
- [2] K. Bucher and S. Grafe. Designing Augmented and Virtual Reality Application for Pre-Service Teachers. In *Proceedings of the 10th international conference on Virtual Worlds and Games for Serious applications (VS-Games)*, 2018.
- [3] R. Dörner, B. Jung, P. Grimm, W. Broll, and M. Göbel. Einleitung. In R. Drner, W. Broll, P. Grimm, and B. Jung, editors, *Virtual und Augmented Reality (AR/VR)*, pages 1–31. Springer Vieweg, 2013.
- [4] M. Koehler and P. Mishra. What happens when teachers design educational technology? the development of Technological Pedagogical Content Knowledge. *Journal of Educational Computing Research*, 32(2):131–152, 2005.
- [5] J. Martin-Gutierrez, C. E. Mora, B. Aorbe-Daz, and A. Gonzalez-Marrero. Virtual Technologies Trends in Education. *Eurasia Journal of Mathematics, Science and Technology Education*, 13(2):469–486, 2017.
- [6] G. Tulodziecki, S. Grafe, and B. Herzig. *Gestaltungsorientierte Bildungsforschung und Didaktik*. Klinkhardt, 2013.
- [7] G. Tulodziecki, B. Herzig, and S. Grafe. *Medienbildung in Schule und Unterricht*. UTB, 2010.
- [8] S. C.-Y. Yuen, G. Yaoyuneyong, and E. Johnson. Augmented Reality: An Overview and Five Directions for AR in Education. *Journal of Educational Technology Development and Exchange*, 4(1):119–149, 2011.