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Zirkel, Michelle; Summer, Theresa

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Empowering English Language Teachers to Use Immersive Virtual Reality for Global Citizenship Education

Michelle Zirkel, University of Bamberg, Germany
Theresa Summer, University of Bamberg, Germany

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Abstract
The threat of climate change to our planet has made addressing environmental issues a global educational priority, encompassing various subjects and school levels in numerous countries, including Germany. As a result, English teachers are required to promote English language skills and global citizenship education (GCE) in their classrooms. Several studies have illustrated that immersive virtual reality (iVR) learning environments can promote language learning and pro-environmental behaviour. Thus, there is a strong case for using iVR in the context of GCE and English language education. However, iVR technology is not yet widely used in Germany, and therefore, teachers lack the necessary skills to use it efficiently. Consequently, as part of the DiSo-SGW project, we aim to develop, test, and implement research-based teacher training modules, focusing on empowering English language teachers to use iVR for GCE. This paper provides an overview of the DiSo-SGW project, outlining how we aim to innovate teacher education through research-based teacher training programs focusing on integrating iVR and global learning in English teacher education.

Keywords: Immersive Virtual Reality, Digital Literacy, Digital Sovereignty, Global Citizenship Education, Sustainable Development Goals, English Language Education, Teacher Education

worldCALL
WorldCALL Conference 2023 in Chiang Mai, Thailand

Introduction

Climate change poses a significant threat to our planet which is why tackling environmental issues has become a global educational goal across various subjects and school levels in numerous countries (e.g., the United Nations 2015 Sustainable Development Goals (SDGs)). In Germany, global citizenship education (GCE) is a central learning objective that spans all subjects (Nationale Plattform BNE 2017). Hence, teachers of English must find a way to integrate environmental issues into language-related tasks. Various studies have demonstrated that immersive virtual reality (iVR) holds significant potential for language learning (Dhimolea et al. 2022) and pro-environmental behaviour (Ahn et al. 2015; Bailey et al. 2015; Fonseca and Kraus 2016; Scurati et al. 2021). However, teachers in Germany lack experience with iVR due to the currently limited availability of this technology. Furthermore, the COVID-19 pandemic has emphasised the importance of teachers and learners being proficient in using digital tools, particularly those which have great potential for enhancing learning experiences, such as iVR. Addressing this issue is one of the key goals of the DiSo-SGW project, which aims to develop, evaluate, and disseminate evidence-based teacher training modules which aim to foster English teachers' digital literacy in using iVR for language learning and GCE (UNESCO 2014). This paper seeks to provide an overview of the DiSo-SGW project, followed by a definition of important terminology specific to this project, a detailed project description, and an outlook on future steps.

1. Competence Network on Digital Learning: The Project Diso-SGW

The project presented here is part of a large competence network in Germany called *lernen:digital*. It draws on the expertise of around 200 research projects and aims to develop evidence-based materials and concepts for school development in the digital age. One main objective is to facilitate the exchange between academia and practice for the digital transformation of schools. The long-term goal is to develop research-based teacher training modules that will be made available as open educational resources across Germany. The competence network *lernen:digital* consists of four competence centres: 1) STEM (i.e. Science, Technology, Engineering, and Mathematics), 2) Languages, Social Sciences, and Economics, 3) Music, Physical Education, Art, and 4) School Development. In addition, a transfer office of the competence network acts as an interface. Supported by the European Union (NextGenerationEU) and funded by the German Federal Ministry of Education and Research, the project will run for 31 months from June 2023 to December 2025.

The second competence centre (Languages, Social Sciences, and Economics) comprises six projects. One of these is DiSo-SGW, which stands for *Digitale Souveränität als Ziel wegweisender Lehrer:innenbildung für Sprachen, Gesellschafts- und Wirtschaftswissenschaften in der digitalen Welt* ("Digital sovereignty as a goal of pioneering teacher training for languages, social and economic sciences in the digital world"). It is an interdisciplinary project that focuses on the main school subjects of the respective competence centre. The project consortium DiSo-SGW, which was submitted by Jörn Brüggemann and Theresa Summer in early 2023, is funded with 6.2 million Euros. It involves research institutes and 13 universities, working together on an evidence-based development, evaluation, and implementation of teacher training modules. Guided by the principles of general and subject-specific digital sovereignty or literacy (see Sect. 3), these training modules aim to support teachers in developing their digital competence.

2. Terminology: Digital Sovereignty, Literacies, and Competence

The term *digital sovereignty* used in the German project title (and translated verbatim here) refers to "the sum of all abilities and possibilities of individuals and institutions to fulfil their role(s) in the digital world independently, self-determined and securely in the digital world" (Goldacker 2017:3 own transl.). For individuals, digital sovereignty encompasses three aspects: 1) use (using digital technology and data securely and efficiently to achieve specific goals), 2) data (making informed decisions about personal data and the right to access information from digital sources), and 3) societal impact (understanding and participating in shaping the impact of digitalisation on society), (Goldacker 2017:7 own transl.). Digital sovereignty thus refers to an individual's ability to have control over their digital presence including their ability to make informed decisions about personal data, the use of digital resources and the assessment of their credibility. The term *digital sovereignty*, which extends to an individual's participation in society and is therefore more general, is not widely used in English academic literature. Instead, researchers and practitioners refer to digital competence or digital literacies. Pegrum et al. (2022:3) define the term *digital literacies* as follows: "the individual and social skills needed to effectively manage meaning in an era of digitally networked, often blended, communication." In their framework Digital Literacies 3.0, they group digital literacies into four domains: communicating, informing, collaborating, and (re)designing (Pegrum et al. 2022:10). This is similar to the outline of digital competence in the *European Framework for the Digital Competence of Educators* (DigCompEdu), which categorises learners' digital competences as follows: information and media literacy, communication, content creation, responsible use, and problem solving (European Commission et al. 2017). For the development of educators' digital competence, six areas are listed, including 22 fundamental competences. A summary of the six areas is given below:

1: Concerns educators' broader professional development including their use of digital technologies for professional interactions and individual development, and organizational benefits.
2: Focuses on competences for effectively and responsibly using, creating, and sharing digital learning resources.
3: Dedicates to managing and coordinating the use of digital technologies in teaching and learning.
4: Addresses the use of digital strategies to enhance assessment.
5: Emphasizes the potential of digital technologies for learner-centered teaching and learning strategies.
6: Specifies pedagogic competences needed to enhance learners' digital competence. (Based on European Commission et al. 2017:9)

These areas of digital competence play a role in our project, which will be described in the following section.

3. The Project DiSo-SGW in Bamberg: IVR and GCE in English Language Education

Our project is part of the foreign language education consortium in which we are collaborating with the Universities of Bremen (Andreas Grünewald and Leona Droste) and Würzburg (Maria Eisenmann and Jeanine Steinbock). While the research team in Bremen focuses on the use of artificial intelligence in French language education, the team in Würzburg investigates iVR with a focus on inter- and transcultural learning in English classrooms.

In our project, we aim to develop, test, and implement research-based teacher training programs empowering teachers in utilizing iVR to enhance their students' English language skills and GCE. Environmental issues were chosen as a thematic focus due to three reasons: the recognition of climate change as a major threat, the integration of environmental issues and in curricula on a national and global level, and the significant engagement of young people, as seen in movements like Fridays for Future, highlighting the urgency of addressing these topics in all classrooms. Consequently, a key aim is for teachers to link the teaching of English and language-related tasks with global issues (e.g., environmental issues, sustainability, and social justice).

Through her model of education for sustainable development in English language education, Surkamp (2022:36) demonstrates that learners can enhance their receptive, lexical, and critical thinking skills by engaging with sustainability topics presented in diverse media and texts, which provide multiple perspectives. This engagement with diverse media and texts can equip learners with the necessary skills and knowledge to analyse and critically reflect on global issues and discourses, and raise awareness about the power of language and other media with regard to shaping discourses (Surkamp 2022:36). In addition, learners can practice their productive skills by actively participating in global discourses on environmental issues using English as a lingua franca, negotiating sustainability issues in interactions with others, and communicating effectively to contribute to changes in various societal, political, economic, and ecological domains on a local, regional, and global level (Surkamp 2022:36). By engaging with different texts and media, learners should learn about the interrelated nature of global issues and thus learn to perceive themselves as global citizens and recognise their responsibility to the global community beyond the borders of their nation states. Hence, in line with UNESCO's framework of GCE, learners should develop the necessary cognitive, socio-emotional, and behavioural competencies "to become proactive contributors to a more just, peaceful, tolerant, inclusive, secure and sustainable world" (UNESCO 2014:15).

The digital tool in focus of our project is immersive virtual reality, a term subject to diverse definitions by researchers, as noted by Motejlek and Alpay (2021:3). We draw on Mikropoulos and Natsis' (2011) definition, according to which virtual reality refers to "a mosaic of technologies that support the creation of synthetic, highly interactive three dimensional (3D) spatial environments that represent real or non-real situations." These 3D environments are accessible through various devices, including desktop computers, head-mounted displays (HMD), or cave automatic virtual environments (Buttussi and Chittaro 2018). Researchers usually distinguish between virtual reality environments accessed by computer desktops, also called low-immersion virtual reality (LiVR) (Kaplan-Rakowski and Gruber 2019) or desktop virtual reality (dVR) (Wu, Yu, and Gu 2020), and those accessed by head-mounted displays (called either immersive virtual reality (iVR) or high-immersion virtual reality (HiVR) (Kaplan-Rakowski and Gruber 2019). The degree of immersion acts as an objective criterion for assessing the lifelikeness of an experience within a system and its effectiveness in isolating the user from the external surroundings (Cummings and Bailenson 2016). In our project, we focus on immersive virtual reality (iVR), i.e. virtual reality accessed through HMDs, as this type of technology provides an entirely different learning experience than a 2D desktop, and studies have shown that iVR can be beneficial for language learning (e.g., Dhimolea et al. 2022) and pro-environmental behaviour (Ahn et al. 2015; Bailey et al. 2015; Fonseca and Kraus 2016; Scurati et al. 2021). With regard to hardware, Pico 4 and Meta Quest 3 headsets will be used for the teacher training modules. This decision was informed by their cost-effectiveness and current prevalent usage in German schools that possess virtual reality headsets. Regarding the software, the selection process relies on

available options in the Meta and Pico app stores, and on a framework for the evaluation, and creation of iVR learning environments that will be published soon.

As a methodological framework, we employ a design-based research approach (based on McKenney and Reeves 2019) for the development of the teacher training modules including five stages:

1) An analysis of the state of the art
2) The design of the teacher training modules
3) The evaluation of the teacher training modules through questionnaires and interviews
4) A further adjustment and refinement of the teacher training modules based on their evaluation
5) The implementation and dissemination of the teacher training modules

At present, our project is situated within its initial stage, involving an analysis of the existing demand for teacher training modules concerning iVR and GCE. This phase encompasses selecting existing iVR applications suitable for language learning and GCE, coupled with an examination of essential characteristics of effective teacher training modules. Currently, there are few teacher training courses available on iVR in foreign language education in Germany, hence we aim to fill this gap. When designing the teacher training modules, we will focus on four of the above-mentioned areas of digital competence (European Commission et al. 2017:9). As the DigCompEdu illustrates, digital competence includes competences for effectively and responsibly using, creating, and sharing digital learning resources (area 2), which means that teacher training modules should not only enable teachers to use existing iVR applications for language learning and GCE (e.g. *Immerse*, *ImmerseMe*, *Be Earth*, *Ecospheres*) but also teach educators how to create their own iVR learning environments. Given the constraints faced by language teachers in dedicating time to learn complex tools such as Unity or Unreal Engine for iVR environment design, we will focus on instructing them in the use of user-friendly authoring software, including Mozilla Hubs, Spatial, and AR2VR. This strategic approach to empowerment enables educators to develop their iVR learning environments and guide their learners in creating personalized iVR environments aligned with individual interests (areas 5 and 6). Moreover, the teacher training modules will encompass guidance on the utilization, administration, and coordination of iVR headsets for instructional purposes (area 3). Additionally, a critical examination of the messages conveyed through the iVR learning apps and environments and the personal data that the headsets and apps require will be integrated into the modules, aligning with the objective of cultivating teachers' digital sovereignty, as defined by Goldacker (2017).

4. Conclusion and Future Outlook

In her keynote on "Why Theory Matters: Conceptualizing CALL" at the WorldCALL conference (2023), Hampel referred to ten "What If?" questions (Hampel 2019:101–9; in response to Larsen-Freeman and Cameron 2008:9–11) directing the listeners' attention to the following currently highly relevant question: "What if learning a language is not only about learning conventions but also about innovation and creation?" (2019: 105). In the context of our project, this question is of central importance as we aim to explore the potential of iVR for teacher education in the context of GCE. The project's next steps involve publishing a framework for evaluating and creating iVR learning environments for GCE. This framework will serve as a guideline for teachers, policymakers and software developers, and it will provide a starting point for the development of the teacher training modules. Following this,

we will design, pilot, evaluate, and adjust teacher training modules. Finally, we aim to disseminate these modules as open educational resources.

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Contact emails: michelle.zirkel@uni-bamberg.de
theresa.summer@uni-bamberg.de