

## Development of the *InteractionSuitcase* in virtual reality to support inter- and transcultural learning processes in English as Foreign Language education

### Inter- and transcultural encounters via Social VR

Rebecca Hein<sup>1,2,3</sup>, Jeanine Steinbock<sup>1,4</sup>, Maria Eisenmann<sup>1,4</sup>, Marc Erich Latoschik<sup>1,3</sup> und Carolin Wienrich<sup>1,2</sup>

**Abstract:** Immersion programs and the experiences they offer learners are irreplaceable. In times of Covid-19, social VR applications can offer enormous potential for the acquisition of inter- and transcultural competencies (ITC). Virtual objects (VO) could initiate communication and reflection processes between learners with different cultural backgrounds and therefore offer an exciting approach. Accordingly, we address the following research questions: (1) What is a sound way to collect objects for the *InteractionSuitcase* to promote ITC acquisition by means of Social VR? (2) For which aspects do students use the objects when developing an ITC learning scenario? (3) Which VO are considered particularly supportive to initiate and facilitate ITC learning? To answer these research questions, the virtual *InteractionSuitcase* will be designed and implemented. This paper presents the empirical preliminary work and interim results of the development and evaluation of the *InteractionSuitcase*, its usage, and the significance of this project for Human- Computer Interaction (HCI) and English as Foreign Language (EFL) research.

**Keywords:** virtual reality; Social VR; virtual objects; HCI; interdisciplinary; inter- and transcultural teaching and learning; foreign language education; EFL; racism; stereotypes.

## 1 Introduction

In an increasingly globalized, digital world, ITC is crucial to being an active part of modern society. EFL teaching can contribute to the development of these competencies by creating communication and exchange with other cultural societies. Especially in times of Covid-19, where immersion programs are barely feasible, social VR applications can offer enormous potential [HWL21]. EFL research has long been concerned with the question of how ITC learning processes can best be initiated and facilitated. Digitization is opening up new ways and opportunities that, through collaboration with the field of technology research, are revealing supportive and new approaches to EFL learning.

---

<sup>1</sup>{rebecca.hein, jeanine.steinbock, maria.eisenmann, carolin.wienrich, marc.latoschik}@uni-wuerzburg.de

<sup>2</sup> HTS Group, University of Würzburg

<sup>3</sup> HCI Group, University of Würzburg

<sup>4</sup> Lehrstuhl Fachdidaktik- Moderne Fremdsprachen, University of Würzburg

Immersive technologies, such as virtual reality (VR), offer many potentials for ITC acquisition in the EFL classroom [WDH20, HWL21]. These have already shown significant impact in the research field of HCI [Ra20]. Interdisciplinary linkages lead to innovative teaching-learning formats and are essential for successful digital transformation and participation [Wi20], so this work aims to transfer this to EFL teaching and learning by focusing on VO with significant meanings and tangible affordances. VO could initiate communication and reflection processes between learners with different cultural backgrounds. Learners could use these objects to negotiate and discuss cultural meanings and to reflect on specific thematic issues such as stereotypes. VO could help initiate and create authentic and lively communicative interactions. To achieve this goal, we developed a methodological approach that could contribute to an ITC communication process. Furthermore, we outlined a methodological approach that incorporates VO or the *InteractionSuitcase* into an English lesson for secondary school. Thus, the present work contributes to intensify the link between the potentials of immersive technologies and pedagogical principles focusing on competence- and action-oriented as well as situated learning, connectivity and co-construction [Wi20]. The learning setting shifts from being staged in the confines of the classroom to an authentic interaction and communication situation when learners engage with other learners and VO in social VR regardless of spatial and temporal distances.

## 2 The interplay between ICC and HCI

### 2.1 Inter- and transcultural language education

The acquisition of ITC is a central aim of modern English teaching [Be93, By97, De14, Vo14, Ei15]. The importance is emphasized in Germany's federal education policy as well as at the European level, where cultural education is seen as part of 'lifelong learning' and thus as the basis for active and successful participation in personal, professional and social environments. Within the context of English lessons, learners acquire knowledge, skills and attitudes towards their own culture and other cultures. For example, the development of critical cultural (self-) reflection or the initiation of a change of perspective are central steps [Be93]. Intercultural learning involves a binarity concept of '*self and other*' [Ei15, 281] and therefore tends to emphasize 'the experience of difference, multiperspectivity and the understanding of cultural '*otherness*' [Ei15, 281]. More recent developments in academic discourse, however, show an increased emphasis on transculturality and cultural hybridity [Vo14]. Bhabha developed the concept of 'hybridity' to draw attention to cultural intersections and to overcome binary ways of thinking in rigid cultural boundaries [Bh12, Ei15]. In a 'third space' values, views and norms meet without cultural fixation. Both concepts – inter- and transcultural learning – must be linked in the interest of language and cultural learning programs. Intercultural competence can be the basis for building up transcultural learning. For this reason, we

propose an integrative model that shows studies as well as ITC approaches as a learning continuum. It should be emphasized that although ITC acquisition processes can also take place at early ages, due to cognitive development, a deeper reflective understanding of cultural issues must be expected especially at more advanced ages [Ei15]. In the English classroom, ITC acquisition takes place in manifold ways. It can be reached by reading literature of the target culture or working with the textbook, cultural artefacts and exchange programs. Authentic cultural encounters and communication thus usually require a high effort. Not least for this reason, immersive technologies are becoming more important in modern EFL research.

## 2.2 Human-Computer Interaction

Virtual reality (VR) and especially social VR applications can create such a 'third space' in which new ways of ITC learning can be facilitated in classrooms. The impact of immersive technologies is promising. First, many potentials arise by the possibility to slip into a virtual alter ego – an avatar. Research has shown that the virtual embodiment can influence the self-perception and behavior according to the perception and behavior users attributed to their virtual avatar (e.g., [Ra20]). Similarly, to self-representation, others can be virtually embodied and varied in their appearance and behavior as social partners. The social VR platform *ViLeArn* already demonstrated how participants interact live in hybrid avatar-agent teaching-learning scenarios [La19]. Embodied by virtual avatars, participants engage in social interaction during the teaching-learning process. Second and third, the design space.



Fig. 1: Depiction of *InteractionSuitcase* with sample interactions, objects and avatar representations.

of the situational context and VO in VR is almost limitless. In particular, their representation and affordances (e.g., inclusion of every day or significant objects) can make the VR experience even more tangible and vivid. Every object, property, and relationship between objects and between them and people is variable [WDH20]. VO can be integrated to guide and stimulate discussions (Figure 1). Intercultural competence is a multidimensional construct consisting of more than awareness (cognitive). Intercultural sensitivity (affective) and fluency (behavioral) are also important components and particularly interesting to explore psychologically [HWL21]. Based on the status quo that textbooks provide a first collection of objects is to be established. Social VR offers a 'third space' in which these objects can support ITC learning processes.

### 3 Research question and interdisciplinary design

Based on this theoretical foundation the research idea arose to create encounter situations between learners at schools in Germany and in the USA by means of social VR. By using VO, learners should reflect on their ideas of culture, stereotypes, prejudices or, due to current events not only in the USA, on various forms of racism and thus go through ITC acquisition processes. Based on this, the following research questions emerged: (1) What is a sound way to collect objects for the *InteractionSuitcase* to promote ITC acquisition by means of Social VR? (2) For which aspects do university students use the objects when developing an ITC learning scenario? (forthcoming). (3) Which VO are considered particularly supportive to initiate and facilitate ITC learning? (forthcoming).

**Collection process:** To answer these research questions, a content analysis was conducted to identify objects for the *InteractionSuitcase*. For the field of Teaching English as a second language or EFL research, the focus was on educational policy guidelines of the curricula, which are reflected in the textbooks and served as a basis for the collection of these objects.

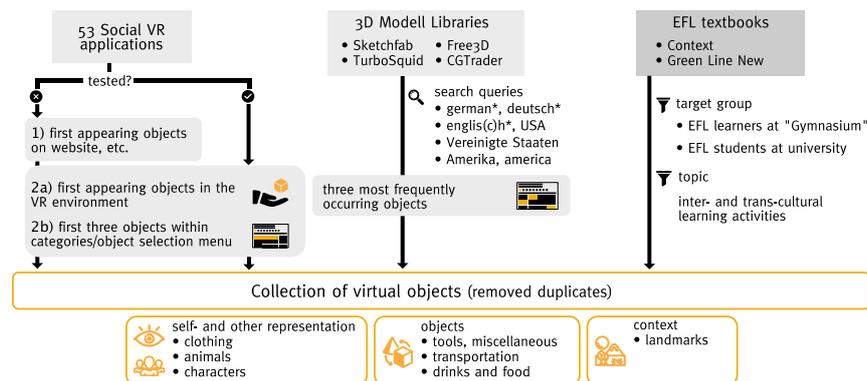


Fig. 2: Flow diagram for context analysis with scope EFL methodology/teaching and HCI.

If ITC acquisition takes place mostly on the basis of textbooks, learners are confronted with a series of cultural and even stereotypical images as most textbooks in EFL education still primarily focus on intercultural learning [De14]. By means of a qualitative content analysis, the two most common textbooks at the Gymnasium, 'Greenline Oberstufe' and 'Context', were examined. For a systematically sound and interdisciplinary approach, 53 existing social VR applications were screened and the results of searches in 3D model libraries were evaluated too. Both collections are examined and arranged.

**Collection results:** A total of 150 object representations were identified. The category self and other representation includes 47 objects. It includes objects such as a bear, Barack Obama, or a hijab. The objects category identified 84 objects, such as flags, which are the predominant image in EFL textbooks. The context category includes 19 objects such as

the Statue of Liberty. To use the identified VO as initiators for communication, we implemented the *InteractionSuitcase* in VR. Its prospective usage will be presented in the following.

#### 4 *InteractionSuitcase* Usage

**Classroom design:** The *InteractionSuitcase* can be a vital part of ITC learning scenarios. Although the predominant approach is using textbooks, VO seem very promising when it comes to the quality of learning outcome. This is not least due to the fact that VO can be used interactively, tangibly, individualized and multimodally [WDH20]. Following the paradigm of action orientation and task-based language learning, learners use these objects as a basis for communication with other learners in the VR environment. For example, learners can use (non-) stereotypical objects to negotiate the meaning of the concept of culture and autonomously identify common views with exchange partners.

**Seminar Task:** Within the context of a seminar design, planned for the winter term 21/22, university students will develop ITC learning settings using the *InteractionSuitcase*. By means of observations and interviews, the way in which the students work and plan with the *InteractionSuitcase* will be evaluated. Collaborative reflection will also take place as part of the planned seminar. Students will be asked about their choice of objects, which will provide further insight into the research question of which objects are perceived as supportive and in which phase of learning they are used.

**Behavioral measurement tool:** From a psychological point of view, it is not easy to make behavior quantitatively measurable. The *InteractionSuitcase* might provide a tool for this purpose. During exposure in VR, it is possible to log when, at what time, and by whom a particular object was picked up and utilized for an interaction. It is possible to recognize which object was applied for which interaction with whom. The participants use the objects intuitively. Hence, the *InteractionSuitcase* can be treated as an implicit, behavioral measuring instrument.

#### 5 Prospects

Based on previous findings, we assume that VO can initiate and facilitate ITC learning processes. This assumption will be empirically investigated in the next steps. For this purpose, context analyses were used to identify VO that can potentially be perceived as helpful for intercultural and transcultural teaching and learning. They will be evaluated for their implicit and explicit stereotypic and affective associative power with the help of an assignment task on time. In the scope of a seminar this *InteractionSuitcase* will be used, and exploratory research will be conducted to determine for which aspects of ITC acquisition VO are supportive. Furthermore, the question of the representation of the objects and the interaction techniques arises here. In the context of a usability study,

different manifestations of the *InteractionSuitcase* will be investigated. VO add an unprecedented learning experience to the EFL classroom. They make learning tangible and can be initiate communication in ITC education scenarios.

## Acknowledgements

This research has been funded by the Federal Ministry of Education and Research (BMBF): “Funding for teacher training with a focus on digitalization in teacher training” in the project CoTeach (project number 01JA2020).

## Bibliography

- [Be93] Bennett, Milton J: Intercultural sensitivity. Principles of training and development. Portland, OR: Portland State University, 25(21):185–206, 1993.
- [Bh12] Bhabha, Homi K: The location of culture. routledge, 2012.
- [By97] Byram, Michael: Teaching and Assessing Intercultural Communicative Competence. Clevedon: Multilingual Matters, 1997.
- [De14] Delanoy, Werner: Transkulturalität als begriffliche und konzeptuelle Herausforderung an die Fremdsprachendidaktik. Transkulturelles Lernen im Fremdsprachenunterricht. Theorie und Praxis, pp. 19–36, 2014.
- [Ei15] Eisenmann, Maria: Crossovers–Postcolonial Literature and Transcultural Learning. Learning with Literature in the EFL Classroom, pp. 217–236, 2015.
- [HWL21] Hein, Rebecca M; Wienrich, Carolin; Latoschik, Marc E: A systematic review of foreign language learning with immersive technologies (2001-2020). AIMS Electronics and Electrical Engineering, 5(2):117–145, 2021.
- [La19] Latoschik, Marc Erich; Kern, Florian; Stauffert, Jan-Philipp; Bartl, Andrea; Botsch, Mario; Lugin, Jean-Luc: Not alone here?! scalability and user experience of embodied ambient crowds in distributed social virtual reality. IEEE transactions on visualization and computer graphics, 25(5):2134–2144, 2019.
- [Ra20] Ratan, Rabindra; Beyea, David; Li, Benjamin J; Graciano, Luis: Avatar characteristics induce users’ behavioral conformity with small-to-medium effect sizes: A meta-analysis of the proteus effect. Media Psychology, 23(5):651–675, 2020.
- [Vo14] Volkmann, Laurenz: Die Abkehr vom Differenzdenken: Transkulturelles Lernen und global education. Transkulturelles Lernen im Fremdsprachenunterricht. Theorie und Praxis, pp. 37–51, 2014.
- [WDH20] Wienrich, Carolin; Döllinger, Nina Ines; Hein, Rebecca: Mind the Gap: A Framework (BehaveFIT) Guiding The Use of Immersive Technologies in Behavior Change Processes. arXiv preprint arXiv:2012.10912, 2020.
- [Wi20] Wienrich, Carolin; Eisenmann, Maria; Latoschik, Marc Erich; Grafe, Silke: CoTeach Connected Teacher Education. VRinSight Greenpaper, 124:53–55, 2020.