Language learning through conversation envisioning in virtual reality: a sociocultural approach

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Abstract. This study proposes a virtual reality platform for language learners to practice a Target Language (TL) and develop cross-cultural competencies through interaction with peers or an AI-agent (limited scope), followed by a scheme for engaging learners to envision their conversations by disclosing their thoughts, reasoning, feelings, and expectations. This platform, Virtual Reality Conversation Envisioning (VRCE), enables the learners to fully share a contextual, immersive environment, simulated in Virtual Reality (VR), to have free conversations by performing role-plays on proposed topics. VRCE is designed to provide first person views during conversation and third person views during envisioning so that learners can take the role of participants and meta-participants at each phase. Learners envision the conversation individually at certain points during the role-play review. Their envisioning is then shared with their conversational partner to detect the misunderstandings, observe the situation from each other's perspective, and to learn about sociocultural cues that led to the different viewpoints. Participants' envisioning revealed interesting differences in their understanding of a shared situation. Findings showed that VRCE is an effective medium to raise learner collaboration and develop cross-cultural competencies.

Keywords: conversation envisioning, cross-cultural competencies, virtual reality, collaborative learning.

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1.   Introduction

There has been increasing interest in the use of virtual worlds and simulated games for promoting language learning, raising cultural awareness, and developing communicative competencies (Deutschmann & Panichi, 2013; Peterson, 2011). Such platforms often focus on teaching discrete cultural points to the learners (Cheng, Yang, & Andersen, 2017), promote grammar and vocabulary acquisition (Johnson & Valente, 2009), and support real-time communication to fulfill a quest (Thorne, 2008). However, there is a paucity of research on making a platform that focuses on free-form conversation, the meta-analysis of the interactions, and knowledge transfer to develop a set of culture general skills. In today's culturally diverse world, the use of a foreign language has become the main means of communication among people of various backgrounds. However, when using a foreign language to interact with peers from different cultural backgrounds, building common ground on-the-fly becomes a challenge. It is known that learners bring their background culture to the conversation even when using a foreign language (Lado, 1964). This transfer effect can lead to interesting cross-cultural communications as well as peculiar misunderstandings that can be investigated to develop sociocultural competencies.

This paper proposes a platform to support real-time conversation between learners or with an AI agent (with limited scope) in VR and to envision the conversation by including learners and teachers as meta-participants for making a detailed contrastive analysis of the interactions. We conducted an experiment to see if the framework is effective in developing learners' cross-cultural competencies and smoothening conversations. We analyzed the learners' interactions and envisioning during the experiment from a sociocultural perspective.

2.   VRCE

VRCE has two modes, role-play and envisioning. It offers access to engage in social interaction with peers, native speakers of English, and an AI-agent (role-play), and endows learners with deft tools to reflect on their interactions and further perform a contrastive analysis of their reflections (envisioning). A series of negotiation scenarios such as bargaining, job offer, etc. were designed as a basis for learners' interaction. An AI agent is built to interact with learners by showing appropriate verbal and non-verbal reactions to the learner input on the given scenarios. The agent's reaction is taken from real-world scenarios and is augmented by the sociocultural notes, cues on the reasoning behind the agents'

behavior, and hints for expected reactions, provided by meta-participants' analysis. During the interaction with the agent, learners could benefit from the envisioning notes that clarified why the conversation led to a particular direction. This part demonstrates how envisioning can help understanding the conversation better and what it takes to envision a conversation as a meta-participant.

Voice chat was used to support real-time communication and a motion capture system was used to track the participants' gestures and project them into their avatars to allow for natural communication. The platform is designed to support recording, rewinding and replaying learner collaborations and enables the learners to review, revise, or analyze their interactions. Learners can move back and forth through the branches of the conversation to revise their decisions or interaction (first person view) or later review their conversation as meta-analyzers to interpret their actions, provide notes on instances of cultural implications, and envision the conversation (third person view). In envisioning mode, VRCE allows the teachers, conversation analysts, or other learners (observers) to add indicators on different points of the conversation to prompt for participants' envisioning. The system requests explanation using the rubric shown in Figure 1.

Figure 1.   VRCE for role-play and envisioning: (a,b) role-play in first person view, (c) role-play review in third person view and envisioning rubric, (d) envisioning provided by the participant

During envisioning, teachers can join the shared space to elicit learner's explanation and to provide them with necessary scaffold. After envisioning, the system allows for replaying the conversation augmented by the envisioning notes. This would serve as an example scenario with sociocultural cues to the other learners so that they can replay this scenario while benefiting from the cultural points provided by their peers earlier.

3. Experimental analysis

3.1. Participants

The participants in this study were 34 upper-intermediate learners of English from different cultural backgrounds. Participants were carefully grouped into pairs with different cultural backgrounds (e.g. Japanese versus French).

3.2. Procedure

The participants were placed in different rooms and did not meet each other before the experiment. They received a role-play scenario with secret conditions specified for each role. The conditions were set to encourage each participant to negotiate for achieving the desired outcome. Participants were asked to perform a role-play in first person view using VR. Motion capture was used to transfer their gestures into their avatars. The teacher observed the interaction in third person view and assigned indicators at various intervals to prompt for learners' explanation in the envisioning phase. After the role-play, each participant reviewed the interaction individually (third person view) and envisioned the conversation particularly for teacher-specified points. Next, learners were informed that their partner went through the same envisioning process, and their explanations will be exchanged to see if they had different interpretations. Finally, the two participants were asked to meet each other, have a short discussion and fill out a questionnaire.

4. Results

Learners' feedback after they exchanged their envisioning was reflected on a five point Likert scale questionnaire (Figure 2). Results show that envisioning in VRCE helped the learners to detect and resolve misunderstandings by comparing viewpoints and learning about the cultural differences.

Figure 2. Participants' feedback on a five point Likert scale questionnaire for exchanged envisioning
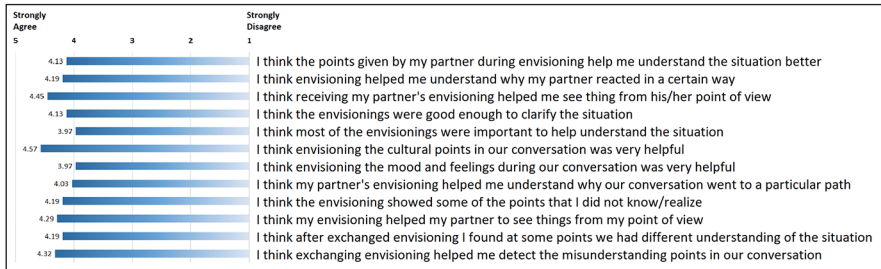
This result is supported by the collected data from the interactions and envisioning. Figure 3 shows an excerpt of the learners' interaction and their individual envisionings. As can be seen, what counted as an annoying direct question in one's culture and an instance of galling one's pride, was no more than a simple question out of curiosity that can be asked directly in another culture. By comparing the envisioning, both participants realized that they had different understandings of the same situation. Another interesting point in this excerpt is the negotiation of meaning when one participant misuses the word "disposable", which is noted by the peer.

Figure 3. A sample excerpt of role-play and envisioning

5. Discussion and conclusion

Results suggest that the majority of participants highlighted the effectiveness of VRCE in facilitating cross-cultural interactions. Participants noted that contrastive analysis of their envisioning significantly assisted them in interpreting their interaction accurately, which in turn may lead to smoother future communication with their partner. Learners also pointed that reviewing the interaction in the

third person view facilitated meta-analysis of the conversation and raised meta-linguistic awareness. One main complaint about this system was the lack of facial expressions in VR, which can be addressed by using a web-based 3D version in future.

Further analysis of participants' interactions in VRCE showed rich use of the TL both during role-play and envisioning. VRCE can be an effective medium to improve learner competencies by inducing activities that elicit TL dialogues. These activities involve collaboration, assistance, and co-construction such as negotiation of meaning, asking for clarification, resolving misunderstandings, and receiving support from more proficient peers, that are conducive to the operation of zones of proximal development (Vygotsky, 1978). It can be inferred from the observations that with frequent instances of collaborative learning (e.g. explaining specific cultural points) using the TL during role-play, envisioning and discussion, this framework can promote TL learning. Data showed that learners' interactions involved a high degree of learner input, as they actively engaged in the interpretations of the TL use and sociocultural points which promoted critical thinking. Finally, the game-like nature of the scenario raised learner motivation and the use of our fully immersive environment allowed the participants to get into their roles and benefit from situated and experiential learning (Kolb, 2014). In this view, VRCE is anticipated to promote fluency and smoother cross-cultural interaction in the long-term.

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