



Using augmented reality for collaborative multimodal storytelling

Steven Asquith¹ and Erin Frazier²

Abstract. New technologies often influence the ways in which one shares linguistic experiences. One such technology, Augmented Reality (AR), may initiate concepts used in language learning through digital storytelling. This paper describes an exploratory research project based on Choose Your Own Adventure (CYOA) AR digital storytelling which investigated how Collaborative Learning (CL) and AR can be used to enhance language learning. Different AR activities were evaluated, culminating in an AR digital storytelling project. Analyses of qualitative data collected after each activity provided insights into important considerations when utilizing AR in the classroom. The findings suggest that learners found considerable value in AR, but also highlighted challenges in its application. CL was key to the success of this project.

Keywords: augmented reality, collaborative learning, multimodal storytelling.

1. Introduction and context

AR can improve students' analytical thinking and creativity by applying the technologies affordances, while collaborating to design and play interactive activities. This paper describes a CYOA digital storytelling project. It builds on knowledge of AR technology developed in class-based projects such as AR vocabulary games, AR travel fair poster presentations, and AR scavenger hunts. The study was conducted with Japanese freshmen English majors as part of a process-oriented curriculum based on the multiliteracies approach (New London Group, 1996) with the goal of developing a sophisticated communicative competence. Interaction and peer-to-peer collaboration are key elements of curriculum based

1. Rikkyo University, Tokyo, Japan; stevenasquith@rikkyo.ac.jp; <https://orcid.org/0000-0002-9154-9247>

2. Reitaku University, Kashiwa City, Japan; efrazier.research@gmail.com; <https://orcid.org/0000-0001-6789-1117>

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group work and this project intended to cultivate students' creative multimodal capacities.

2. Theoretical grounding

CL was used to both analyze and create new media forms based on the CYOA format. Implicit in the notion of collaboration is the idea of reciprocity and helping other group members to achieve a stated goal, or solve a problem, through cooperation rather than competition (Laal & Laal, 2012). As such, important life skills such as emotional intelligence, conflict resolution, teamwork, and leadership, as well as locating, presenting, and synthesizing information become part of the learning process. Also, such CL allows students to participate according to their relative attributes in an equitable division of labor. This characteristic of CL allowed students to successfully complete the CYOA project which required diverse skills and knowledge.

AR immerses language learners in experiences by merging real world with virtual objects and images (Yang & Liao, 2014). Statti and Torres (2018) suggest positive learning outcomes for those who take part in AR experiential learning. As AR adds a digital layer to reality it provides an immersive experience which augments learning. This merit compliments the CYOA storytelling format which places the reader in the first person as an active agent making decisions in the narrative process. By utilizing AR these decisions can be augmented into the real world and students can create media which immerses the 'reader' into the narrative experience. AR has been shown to have positive effects in a range of educational contexts, including discovery-based learning, objects modeling, AR books, skills training, AR gaming (Yuen, Yaoyuneyong, & Johnson, 2011), social constructivism, and individualized fostering of knowledge (Zhang, Wang, & Wu, 2020).

Creatively designing CYOA stories, therefore, seems to take advantage of CL and AR's specific affordances. By requiring students to use AR as a consumer of a narrative, and to be active and creative designers, we required students to use higher-order thinking skills in their second languages.

3. Project description

The goal of this project was to have students think critically about the advantages of different textual types – written and visual, video, and AR – for storytelling,

thus improving their understanding of multimodal forms of expression. To achieve this, students collaborated to create effective AR narratives. The project was implemented in three stages: (1) written, (2) video, and (3) AR. Students created written CYOA stories and played YouTube-based CYOA videos before working on the AR group project. This allowed students to compare the media types and scaffold their knowledge as they progressed.

Participants were first year English majors in a Japanese university (n=63) and the project was conducted in their second language, English. Evaluation was primarily based on students' creation of the CYOA digital artifacts, while playing the other students' stories was a secondary goal. After the project was completed, participants wrote a reflection considering the benefits and limitations of each modality and what they learned from the process.

Students designed an AR CYOA story in groups of four using their second languages. This was a complex task requiring learners to create stories in multiple textual dimensions. Students considered the basic story narrative, choices and structure, how to tell it effectively in short video sections, and how to embed the story into the physical world so that the player's physical location became part of the narrative. After each video, players made a decision which would direct them to the next location. Once found, this location revealed an AR video layer showing the next part of the story. Based on this structure, students collaboratively designed their narratives. Once completed, these were shared with the rest of the class to play the original AR CYOA stories.

4. Outcomes

The resulting CYOA stories included a detective murder mystery which directed the player to the scene of the crime in the physical world to look for clues, as well as a horror story which used enclosed physical spaces such as elevators to build tension. This illustrates that students thought carefully about designing the stories based on the strengths of AR and the use of both physical and digital environments. Another production consisted of an interactive, retro video game in which players had to find and defeat a monster that made effective use of sound effects. This highlighted the students' consideration of AR modalities including genre and the first person camera viewpoint to immerse players within the narratives. Part of the appeal of AR and this project was the novelty, and students engaged with the challenge of creating content in an innovative medium. Overall, the CL aspect of this project worked especially well, as students had to

function effectively as teams based on their individual strengths to complete the task in their second languages.

Students stated that AR was the most interesting way to tell a CYOA story. They especially liked the aspect of moving through the physical environment and collaborating with classmates to find targets and make in-game choices. They also felt that collaboration during the design and playing of the AR stories was enjoyable and beneficial to their English skills. The main constraints were frustrations with the AR relating to errors and not being able to go back and rewind video clips. The following quotes summarize the class's general opinions on the CYOA AR project.

“We can enjoy like a real adventure and feel reality. Otherwise, it's little bit hard to make because sometimes AR has a system error. But AR activity is so fresh and I could enjoy it because it is my first time to make own AR videos”.

“I actually tried AR, and it was so fun. Because it is like a real game and I can enter the game world, so it is exciting”.

5. Limitations and future directions

Improvements to this project would relate to enhancing the students' awareness of the outcomes, specifically relating to CL life skills and metacognitive awareness. For instance, this might involve awareness-raising through pre- and post-task check sheets showing the CL skills (i.e. leadership, negotiation, and emotional intelligence, etc). As a language learning tool, this might be conducted in groups with students brainstorming language and phrases useful for each skill type. Also, a post-task guided group, and whole class discussion targeting effective multimodal communication skills would provide an excellent addition to this project. Because the task was relatively complex requiring different soft skills, communication skills, and technical skills, outcomes should be explicitly stated so that students become metacognitively aware of the project's value.

6. Conclusion

This qualitative investigation detailed a CYOA digital storytelling project using AR and CL with second language learners. This approach provided a powerful

means for students to effectively learn soft skills in combination with multimodal and digital literacies. Although the technology is not perfect, students still found considerable value in creatively and collaboratively applying its affordances. If easy-to-use, reliable, and affordable AR apps become more readily available, such CL AR projects would be worthwhile additions to many pedagogical contexts.

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