

# Augmented Reality as a Tool for Language Learning

**Erin Frazier**

**Steven Asquith**

**Daniel Worden**

## **ABSTRACT**

*Augmented reality (AR) may enhance a learner's experience through the implementation of kinesthetic learning (Radu and MacIntyre, 2012), raising awareness of group dynamics (Wu et al., 2013; Xu et al., 2008), and potentially changes the way learners perceive the world with which they interact (Gonzalez-Lloret & Ortega, 2014). This technology has not yet been fully explored within language learning or teaching, and at times, it is difficult to determine which activities are well suited to an educational environment. For this reason, an exploratory research project was conducted on a series of different AR activities. The researchers explore three questions while initializing AR in the classroom: 1) What are the benefits of using AR technology within a classroom? 2) In comparing, low, medium, and high technologies, which yields higher levels of performance among students? and 3) In comparing, low, medium, and high technologies, what are students' perceptions of the materials? The data suggests that learners found considerable value in AR, but also highlighted a few challenges in its application. This paper will introduce several of the AR activities utilized during the study and examine the successes and challenges in exploiting this technology to its full pedagogical potential.*

Keywords: Augmented Reality, Language Learning, Material Building

## **INTRODUCTION**

Newer technologies are a source of interest, yet they are challenging to implement in the language classroom. There is a demand to employ these technologies for learning, however, if they are applied into a language learning environment before being properly examined, than technologies will only become entertainment with no pedagogical underpinnings (Gonzalez-Lloret & Ortega, 2014) This project explores the task-based materials designed to use augmented reality (AR) as an enhancement to the Freshman English curriculum.

## **AUGMENTED REALITY**

AR, like virtual reality (VR), has been on a circular trend of popularity for many years as technological advances are made. A surge in interest in AR emerged with the release of the mobile game *Pokemon Go* (Hawkinson, 2018). Following this rise a myriad of applications for AR were developed, spanning numerous disciplines from engineering, design, and entertainment to being implemented in educational environments. As Sheehy et. al. (2014) defines AR is an overlay of digital information or data, including text or images, applied to the physical world, this new way of delivering information has the potential to change how learning is achieved in the classroom, especially in language learning. AR may enhance a learner's experience through the implementation of kinesthetic learning (Radu and MacIntyre, 2012), raise awareness of group dynamics (Wu et al., 2013; Xu et al., 2008), and potentially changes the way learners perceive the world with which they interact (Gonzalez-Lloret & Ortega, 2014). These key factors were the primary reasons the researchers wished to employ AR in a language learning environment. The researchers explore three questions while initializing AR in the classroom: 1) What are the benefits of using AR technology within a classroom? 2) In comparing, low, medium, and high technologies, which yields higher levels of performance among students? and 3) In comparing, low, medium, and high technologies, what are students'

perceptions of the materials?

### **Task-Based Activities**

Task-based language learning was the basis for the construction and implementation of the AR materials. The definition of a task identifies two focal points, real-world or target tasks, which are non-linguistic tasks learners could use to function beyond the walls of the classroom, and pedagogical tasks, that are conducted within the classroom with a particular linguistic goal in mind (Long, 1985; Ellis, 2003; Willis and Willis, 2001; Nunan, 2013). Nunan further highlights that a task is a stand-alone structured activity in which learners are focused on “comprehending, manipulating, producing, or interacting in the target language” to communicate meaning rather than grammatical forms (Nunan, 2013, p4).

New technologies, like AR, opens the door to classroom activities that were previously not accessible. Combining the well researched pedagogy of task-based language teaching (TBLT) with the newer technologies has the potential to “minimize students’ fear of failure, embarrassment, or losing face; they can raise students’ motivation to take risks and be creative while using language to make meaning” (Gonzalez-Lloret & Ortega, 2014, p4).

This is especially valuable within second language teaching as learners often may experience some anxiety when functioning in a second language. Hence there is a need to develop AR with TBLT since it would be mutually beneficial for the two disciplines to align as how to utilize and integrate newer technologies in a classroom in an authentic matter is vastly under-researched.

### **METHOD**

The project used action research to evaluate the materials which were created to implement AR

in the classroom. As Burns (2010, p2) highlights “the action part of action research is to intervene in a deliberate way in the problematic situation in order to bring about changes and, even better, improvements in practice.” This was very valuable insight as the researchers could self-analyze the materials being created as they proceeded based on feedback from the students via surveys and the instructors personal observations.

In the development of the material two key factors were taken into consideration. The first was to align the materials with the established curriculum for the Freshman English course with is based on multiliteracies. Hence, the materials focused on two key aspects of literacy: linguistic diversity and multimodal forms of linguistic expression and representation (Cope, & Kalantzis, 2015). The second factor focused on cognitive problem-solving utilizing Bloom’s digital taxonomy (Anderson & Krathwohl, 2001), where each activity builds in levels of complexity as learners used the technology to complete each task. The tasks aided learners in moving fluidly through the six aspects of the framework: remembering, understanding, applying, analyzing, evaluating, and creating. This will be discussed further in the description of the AR activities below.

### **Participants**

The group of participants that took part in this study was made up of three Freshman English classes (n=58) based on a multiliteracies process curriculum. Learners were a mix of females and males between 18-19 years old. The classes selected were lower to intermediate (A1-B1 \*B2) with their language proficiency. All participants had access to a shared HP Reveal account to lessen technical issues and to ensure the materials learners produced were secure in a private institutional account.

## **AR ACTIVITIES**

Five different activities were constructed to focus on different linguistic skills and to use different levels of cognitive processes for bloom's taxonomy. The following section will explain the tasks in detail.

### ***Welcome to the SALC: AR tour***

The first activity that was introduced utilizing AR was the *Welcome to the SALC: AR tour*. Tours have become a common way to implement AR within a language context (Bonner & Frazier, 2018; Hawkinson, 2018). Students were divided into pairs and given clues for different areas of the Self-Assessed Learning Center (SALC). Once the clue was deciphered learners would go to that area of the SALC finding target to scan to receive a task to complete. Students seemed to find the addition of the game and competition motivating in learning about the different areas of the SALC. There was a visible change in their attitude. A few of the groups literally ran out of the classroom to get to the next area and do the task. The activity was designed to incorporate all four language skills and encouraged collaboration in the pairs for understanding. This was a good introduction to the research and technology for the students accessing remembering, recalling important information for long term use of the SALC, and understanding, making sense on how to learn using the SALC, of Bloom's digital taxonomy (Anderson & Krathwohl, 2001).

### ***Minimal Pairs***

Students struggled with both listening and speaking when it comes to the R/L or B/V sounds in English. These are sounds that Japanese learners of English commonly have problems in terms of output and input (Lee, 2018; Lambacher, 1999). So an AR card game was created. The game was very simple. Written on one side of the card was a coordinating minimal pair set

(e.g. Light/right or vile/bile). The other side of the card had a unique image that was the trigger for a video that would repeatedly play allowing the student to hear a single word multiple times. One person would have the device (iPad) to play the AR card and the other three students in the group would guess which sound it was by choosing a card with a single letter on it (V, B, L, R). Then the device would be passed to the next person. The game continued until the students went through all the cards. This activity used the applying stage in Bloom's taxonomy as learners used technology to gain knowledge in a new way.

### ***Vocabulary Task***

This was the first activity that led students in the creation of their own AR materials. This task allowed learners to break down the use of the technology based on the last three stages of Bloom's digital taxonomy: analyzing, evaluation, and creation. Learners were given vocabulary words to research that were relevant to the unit being taught. They then produced their own definition for the word and explained its part of speech. Learners shared their definition with each other. After that they were asked to draw a visual representation of their designated word. Once the image was completed, the learners recorded a video saying the word, part of speech, definition, and repeating the word at the end of the video, which was used to create an overlay using HP Reveal.

Groups of four students were given a set of all the images to play a vocabulary game with. The game was played in two rounds. In the first round, learners had to identify the target vocabulary word from the image. Learners turn the cards over one by one and the first one to shout out the correct vocabulary word got to keep the card. If there is disagreement as to which word the image is, learners watch the augmentation. The person with the most cards at the end of the game wins this round. The second round is similar, but instead of only saying the word they

must include the definition. As they have already seen the images and know the word, this is an added challenge. The augmentations are watched again to check the correct definitions. Again, the winner is the person with the most cards at the end of the game.

### ***Poster Adaptation***

Students were asked to give a five to seven minute presentation to promote tourism in a country that is not a popular travel destination for Japanese tourists. In groups of three students created a poster with a seven days itinerary. After that students augmented their poster with a video question for a stamp rally. Presentations were done with another FE class and listeners could take notes during the presentation. Following the presentation, the listener would watch the AR question (the question was related to information that the presenters told listeners during the presentation). The effectively gamified the activity and gave listeners a great purpose to be attentive.

### ***Choose Your Own Adventure***

The last and most involved activity was a multimodal genre analysis. The purpose of these activities was to answer question two, analyzing technology-based learners achievements, and three, looking at learners perceptions of the materials. These activities also move to the most critical stages in Bloom's taxonomy of evaluation, to judge and step guidelines to the medium, and creating, to use the technology in an innovative way. The genre chosen for the activity was 'choose your own adventure'(CYOA) as the creative branching of the plots within the genre opened up creative licenses in the utilization of language for the learners.

The first activity based on low technology, general access materials, was a text/paper-based activity. Students were taught the basic of the CYOA genre. After which learners were given a

teacher example using Google Slides (Bump in the Night). They played through the story a few times to increase their understanding of the genre. Learners used this experience as a model to make their own paper based CYOA as a group. The group first thought of the exposition and conflict of the story. After which pairs created two different paths in the story for the rise to action. Finally, individuals would write four unique conclusions of the story addressing the climax, falling action, and resolution (see figure 1).

Figure 1: Model of paper based CYOA

Step 1: Exposition/ Conflict	Step 2: Rising action	Step 3: Climax /Falling Action/ Resolution
------------------------------	-----------------------	--

Group (Ss: 1,2,3,4) write the first page together.	Pair Ss:1&2 work on option A	Solo 1 ending option A (- or+)
		Solo 2 ending option A (- or+)
	Pair Ss:3&4 work on option B	Solo 3 ending option B (- or+)
		Solo 4 ending option B (- or+)

After students were introduced and had a basic understanding of the genre, they then had an activity based on medium technology. Medium technology was defined by technology that acts as a direct tool for substitute with no functional change or with functional improvement (e.g. YouTube, Google Docs). Partner watched ‘*A Date with Markiplier*’ three times and drew out the route in the CYOA story the Youtube videos presented. The learners were then asked to compare the strengths and weaknesses of both the Text based CYOA (Bump in the Night/ group CYOA) and video CYOA. This led students through the evaluation stage in Bloom’s taxonomy.

Finally, learners started the creating stage of Bloom’s taxonomy utilizing high technology or for this project AR. High technology was defined as technology that allows for significant task



redesign and allows creation of new tasks previously inconceivable. Learners were asked to create a campus wide CYOA incorporating everything they had learned about the genre. They reflected on the previous two activities, reviewing the structure of a story and analyzing the benefits of video. They then had to apply the strengths of AR including: kinesthetic learning as learners changed locations based on the decision the group made while playing the CYOA, the importance of group dynamics while making decisions in the CYOA, and changed the way learners interact with the technology regarding language usage. This assisted the learners in the construction of their CYOA which required learners to make seven videos and AR targets.

## **Discussion**

The utilization of AR for language learning activities yield some insight into perceptions learners have on the implementation of newer technologies in the classroom. Learners highlighted several benefits of using AR within a classroom. Out of the language skills of reading, writing, listening, and speaking, learners felt that AR was beneficial to their listening skills, which may be a reflection on the tasks done within this project relying primarily on video augmentations. Though with any technology there is a slight learning curve, learners looked passed that and the most common commented topic was a sense of joy and pride for being able to use and create augmented materials themselves:

*Learner 1: "AR sometimes 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."*

*Learner 2: "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."*

Adding to that, learners enjoyed the activity more when it required more interaction between people and groups. They found *Welcome to the SALC: AR tour*, the poster adaptation, and the

CYOA activities more engaging than the other activities. Finally, students expressed a deeper understanding of a genre (CYOA) as they had to think of the task through a multi-faceted approach which included linguist discourse analysis, kinesthetic learning aspects, and multimodal material production.

### **Conclusion**

There is room for newer technologies within the language learning environment. AR applications are becoming more accessible to teachers and are simple to use as a tool to enhance language learners' experiences. However, the technology will need to be carefully scaffolded to ensure the use of AR aligns with curriculums and provides benefits to learners. It is clear that learners found the tasks with AR engaging, while also aided in critical thinking development through the manipulation of multimodal tasks. There is a need for more research on AR classroom tasks as this project was limited by a small number of participants in a language focused university. There is a space for AR in the language classroom, though to see further development with newer technologies, like AR, more widespread implementation needs to be applied to a variety of educational environments.

## Citations

- Anderson, L. W., & Krathwohl, D. (2001). *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Blooms Taxonomy of Educational Objectives*. New York: Longman.
- Bonner, E., & Frazier, E. (2018). Creating an Augmented Reality App for an Enhanced Self-Access Tour. RELAY Journal, Jan. Retrieved March 20, 2018, from [https://kuis.kandagaigo.ac.jp/relayjournal/issues/jan18/bonner\\_frazier/](https://kuis.kandagaigo.ac.jp/relayjournal/issues/jan18/bonner_frazier/).
- Cope, B., & Kalantzis, M. (2015). The Things You Do to Know: An Introduction to the Pedagogy of Multiliteracies. In Cope, B., & Kalantzis, M (Ed.) *A pedagogy of multiliteracies: learning by design*. (pp.1-36) Houndmills, Basingstoke, Hampshire: Palgrave Macmillan. doi:10.1057/9781137539724
- González-Lloret, M., & Ortega, L. (2014). Towards technology-mediated TBLT: An introduction. In M. González-Lloret & L. Ortega (Eds.), *Technology-mediated TBLT: Researching technology and tasks* (pp. 1-22). Amsterdam, The Netherlands: John Benjamins Publishing Company.
- Hawkinson, E. (2018) Augmented Tourism: Definitions and Design Principles. *Invention Journal of Research Technology in Engineering & Management*, 2(9), 33-39. doi: 2455-3689
- Lambacher, S. (1999). A CALL Tool for Improving Second Language Acquisition of English Consonants by Japanese Learners, *Computer Assisted Language Learning*, 12(2), pp. 137-156.
- Lee, J. K. Y. (2018). Volleyball or Bareebooru? Common Problems of English Pronunciation for Japanese Learners. *Gifu daigaku Kyoikusuishin. Gakusei shien kiko nenpo*, (4).
- Radu, I., & Macintyre, B. (2012). Using children's developmental psychology to guide augmented-reality design and usability. *2012 IEEE International Symposium on Mixed and Augmented Reality (ISMAR)*, 227-236. doi:10.1109.2012.6402561

- Sheehy, K., Clough, G., & Ferguson, R. (2014). *Augmented education: bringing real and virtual learning together*. New York, NY: Palgrave macmillan.
- Wu, H., Lee, S. W., Chang, H., & Liang, J. (2013). Current status, opportunities and challenges of augmented reality in education. *Computers & Education*, 62, 41-49.  
doi:10.1016.2012.10.024
- Xu, Y., Bolter, J., Macintyre, B., Gandy, M., Deen, S., Schrank, B., Gorbsky, M., White, T., Barba, E., Radu, I. (2008). BragFish: exploring physical and social interaction in colocated handheld augmented reality games. *Proceedings of the 2008 International Conference in Advances on Computer Entertainment Technology - ACE 08*, 3-5. Dec., Yokohama, Japan.  
doi:10.1145/1501750.1501816