Journal of Data Acquisition and Processing
ISSN: 1004-9037
https://sjcjycl.cn/
DOI: 10.5281/zenodo.777786

"ENGLISH LANGUAGE TEACHING DEVICE- BASED ON VIRTUAL REALITY TECHNOLOGY"

A.Kabilath Begum
Department of English, Rathinam College of Arts and Science (Autonomous) Coimbatore, Tamil Nadu, Email: kabilathbeguma@gmail.com

Maya P R
Department of English, Sri Sairam Engineering College (Autonomous), West Tambaram, Chennai, Tamil Nadu, Email: maya.eng@sairam.edu.in

A. Geetha
Department of English, Sri Sairam Engineering College (Autonomous), West Tambaram, Chennai, Tamil Nadu, Email: geetha.english@sairam.edu.in

Sakthi Prasath
School of Management, SRM Institute of Science and Technology, Kattankulathur, Chennai, Tamil Nadu, Email: sakthiprasath87@gmail.com

M. Muthumanikandan
Department of Humanities and Sciences, Rajalakshmi Engineering College (Autonomous), Thandalam, Chennai, Tamil Nadu, Email. muthuwinmail@gmail.com

M. I. Niyas Ahamed
Department of Biochemistry, Sacred Heart College (Autonomous), Tirupattur, Tamil Nadu.
Email: driniyasahamed@shctpt.edu
*Author for correspondence: **driniyasahamed@shctpt.edu**

Abstract
The purpose of this article is to give educators an accessible introduction to the use of augmented and virtual reality (AR/VR) in teaching a second language. We begin with a brief history of these technologies and a review of some of their affordances. After this, there are other activities described in detail, all of which can be used by English as a Second Language (ESL) instructors with access to cellphones or AR/VR equipment in their classrooms. Privacy considerations and classroom application are discussed as the article ends.

Keywords: virtual reality, augmented reality and English as a Second Language.

Introduction

Technology that enables augmented and virtual realities (AR and VR) is becoming more widespread. Digital games like Pokemon Go and travel applications like Lonely Planet Compass City Guides are two examples of augmented reality that most readers will be familiar with. Virtual reality (VR) is most often linked with gaming devices like the Playstation VR and HTC Vive, which display virtual settings that are both realistic and immersive. Both

technologies are advancing rapidly and getting more affordable, and it seems like every day a new product is introduced in one or the other category. In addition to being entertaining, they have serious educational applications that have been around for a long time (such as flight simulators for pilots and surgical training). Several studies have discovered their potential in language learning as well, such as the impact of augmented reality (AR) on boosting motivation among college students learning English, encouraging out-of-class Spanish language use and facilitating a more profound connection between elementary school students and classroom topics through virtual reality. However, its implementation in language courses has been scant thus far.

This article provides a practical overview of recent advancements in the field, discusses the affordances of the technology, and demonstrates how AR and VR can be used in the classroom to enhance instruction and extend students' learning beyond the traditional lecture hall. We will wrap off with some final thoughts on implementation challenges, socioeconomic factors, and issues of privacy and security [1-4].

A clarification of the technology

The terms augmented reality (AR), virtual reality (VR), and the combination of the two, known as mixed or extended reality (XR), describe a wide class of location, motion, and information technologies that allow for the addition of digital resources to the real world (in the case of AR) or the creation of entirely digital environments (in the case of VR), both of which allow users to interact with information and other users. Most VR experiences include immersing the viewer in a 3D virtual environment that fills their whole field of view through the use of a dedicated headset, whereas AR experiences typically involve apps on smartphones that display information about surrounding buildings or trigger location-sensitive media.

Virtual reality (VR) technology is not new, as it has been utilized for decades in the form of flight simulators. The difference now is that what was formerly costly, specialized, and stationary is now inexpensive, versatile, and easily transportable. As a result, its use has spread to a variety of fields, including hospitality training and the remote support of workers in high-risk areas like nuclear power plants and battlefields.

The usage of augmented reality (AR) apps that bring digital content into the real world is a rapidly growing area of interest in the AR community. Vuforia Chalk (https://chalk.vuforia.com/) allows technicians to remotely assist users by viewing a live-view of the user's environment and sketching on objects there (see Figure 1). For instance, with the Ikea Place app (https://www.ikea.com/gb/en/customer-service/ikea-apps/), customers may virtually place Ikea furniture in their own homes to get a feel for how it would appear before making a purchase [5-11].

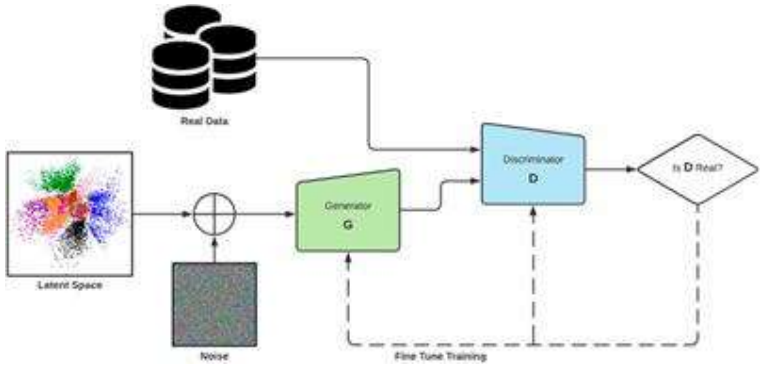

Figure 1. Generative Adversarial Networks–Enabled Human–Artificial Intelligence

Figure 2. Developing Augmented Reality Indoor Navigation Applications

Wearable augmented reality technologies are decreasing in price and expanding in availability. While high-end headsets like the Microsoft Hololens retail for around $3,000 USD as of early 2018, companies like Aryzon (https://www.aryzon.com/) and Myra (https://www.mirareality.com/) are focusing on creating smartphone-powered devices for less than $100USD. The widespread use of such gadgets will make it the norm to combine the actual world with the virtual one. Similarly, virtual reality (VR) headsets have shrunk in size and cost, with devices like the Oculus Go (https://www.oculus.com/go/) and Lenovo Mirage Solo (https://www3.lenovo.com/us/en/arvr/) replacing bulky, power-hungry PCs and smartphones. Google's efforts to make virtual reality more widely available with its inexpensive and universally-compatible VR viewer, Google Cardboard, deserve special recognition.

The huge decline in cost and rise in availability has made both VR and AR accessible to a far wider range of students. Augmented reality (AR) has been used in a variety of fields, including engineering, where it has been shown to improve students' spatial cognition through the manipulation of virtual objects in real-world locations. The use of AR in the classroom has also benefited the study of history by allowing students to virtually explore a historical setting (such a city) and examine artifacts, buildings, and landscapes from different eras. Thanks to the widespread availability of the inexpensive and lightweight Google Cardboard device, educators are now able to use 360-degree films from YouTube's official

360-degree video channel to take their students on virtual field trips to a variety of interesting and educational locations. Another rapidly expanding field of application is the classroom, where students can perform experiments that would be too risky or expensive to set up in real life. For instance, students can'mix' two substances and study the effect in risk-free virtual situations.

Students have utilized augmented reality (AR) in language classes to make virtual tours of their campuses or to play location-based games that require them to explore a town in search of plot clues. Despite these and other promising pilot programs, it's fair to conclude that augmented and virtual reality (AR/VR) technologies have not yet found widespread adoption in K-12 or higher education language classrooms. This article aims to show how augmented and virtual reality technology can be used in regular language classes without the need for technical expertise. Before giving some concrete suggestions for instructors to attempt, we will examine some of the possible pedagogical benefits of AR and VR in the classroom [12-15].

The benefits of VR and AR for language learning

Virtual reality's ability to keep students' attention is one of the many ways it excels in the classroom. For example, Gadelha (2018) argues that "by blocking out visual and auditory distractions in the classroom, VR has the potential to help students deeply connect with the material" (p.40). Students can focus on their research without being interrupted by views outside the classroom. Students gain from this level of immersion because they are better able to relate the material to their personal experiences. Students can benefit from virtual reality (VR) video content by better understanding how their coursework has real-world applications.

One of the most distinguishing characteristics of AR is that it incorporates a suite of mobile technologies, the affordances (possible advantages) of which have long been recognized as having applications in the realm of education. In their discussion of the benefits of mobile learning for language instruction, Reinders and Pegrum (2017) reference Klopfer et al. They talk about how mobility can foster learning that is not confined to a single location and can occur in both formal and informal contexts. Second, they discuss the widely acknowledged advantages of mobile technologies for facilitating social interactivity, allowing interaction and collaborative learning (for discussions within the realm of technology-enhanced language learning. Thirdly, they give context sensitivity (they adjust to their location, for example by displaying content in a different language), which may make it less difficult to create possibilities for contextual learning. Next, they facilitate communication and link students to instructional materials, peers, and experts, all of which have been found to facilitate learning through scaffolding and direct students toward meaningful experiences. Last but not least, they place a focus on uniqueness (devices and mobile environments can be tailored to an individual's needs, hobbies, etc.), which can aid in the development of individualized teaching and learning strategies.

AR and VR go beyond today's most popular smartphone technologies by allowing users to incorporate their physical selves into the virtual-real world interaction. Augmented and virtual reality (AR/VR) encourage "embodied" and "extended" cognition, which emphasize the mind's inseparable link to its surroundings and "cognitive activity as

grounded in bodily states and activities". What these different theories of mind have in common is their emphasis on the importance of the external world to our mental processes and, by extension, our education. In addition to spontaneous movements, data suggests that intentional gestures and the manipulation of objects (e.g., on a screen or in a VR environment) can have an impact on learning. Very little study and application to the English language classroom exist outside of some experimental studies, who looked at the usage of portable vibrating bracelets to teach English intonation.

In addition, augmented reality can inspire students to actively engage in (co-)constructing their learning environment, whether through the sharing of images, the asking of questions about a specific area, or any other means. Technology's present-tense benefits mean it can facilitate "just-in-time" education. With augmented reality, educators may do things like have more open classrooms, help students from afar, and create projects that combine official and informal settings for learning. Recent research shows that students benefit from having a physical component to their education and are less likely to get bored when they are not confined to a single area.

The majority of published studies on the application of AR and VR in language instruction are preliminary explorations of the potential and reception of these technologies among teachers and students. Holden & Sykes (2011) detail the creation and rollout of Mentira, a Spanish-language place-based game in which players must explore their immediate (Spanish-speaking) environment in search of information, hints, and puzzle solutions. The authors discovered that using Mentira's game-like environment to facilitate authentic engagement outside of class increased student motivation and showed great promise for future deployment. They do note, however, that new tools and artifacts aren't enough when it comes to designing unique and engaging learning opportunities.

According to Reinders & Wattana (2014), students at a university in Thailand created an augmented reality campus tour for prospective students. The authors suggest that, particularly in a foreign language environment, the high student engagement and involvement caused by the activity's real-world outcome and the physical nature of the exercise compensated some of the additional time required to educate students how to use the technology.

We include a variety of activities that make use of the aforementioned affordances for language learning in order to encourage language teachers to engage in their own exploratory practice and research. We've included several activities that make use of AR and VR in and out of the classroom that require nothing in the way of technical know-how.

Examples that can be used in the language classroom

Firstly, a sample activity is presented with worked-out stages for implementation in order to give an idea of how an AR or VR exercise may work in the classroom. This lays out some of the choices that must be made and the steps that must be taken, such as which resources and applications to employ. This also gives us a chance to explain some of the jargon that some readers might be unfamiliar with. After this, we provide brief descriptions of a variety of additional, hands-on activities, some of which complement in-class study while others inspire independent study. Each of these exercises was designed with older pupils in mind, and it makes use of readily accessible, no-cost, and simple-to-implement

materials. The activity's goals, required amount of class time, and required materials are outlined, and then implementation details are provided.

Creating a Campus Tour

Aims: *Using English for Specific Purposes and practicing descriptive language*

Class time needed: ***60-80 min***

Resources: *Wikitude, HP Reveal, Layar* or *Blippar,* smart devices with cameras

Having students make and share tours of their school or institution is a simple and entertaining approach to introduce them to the affordances of AR. Tour participants could be parents, guests, or even brand-new students. One of the authors of this research used a similar practice at a university in Thailand, where students made a tour of the university's academic services for visiting academics. Not only did the students have fun with it, but the final product (the tour) has proven helpful to the institution in assisting visitors who are unfamiliar with the layout of the campus.

First things first

Obviously, the goal of the activity must be established before any technological means can be put to use. Is it to give kids a chance to talk to one another and work out compromises? So that you can get better at writing academic papers? Another thing? Once a goal has been established, it is time to ensure that the technology and the resulting actions will bring about that goal [16-19].

The technology

A tour activity consists mostly of producing data that tourists can observe by pointing their cameras at real-world objects1. They may, for instance, point their camera at a specific office in a building to find out that onsite IT assistance is available from 08:00-17:00, six days a week, and get relevant contact information. A 'target' or 'trigger' is the thing that causes the information to be shown. So, in that scenario, the IT building acts as the "trigger" that causes certain data to be shown. The data may take any form: text (hours of operation), images (staff members), links (technical support documents), movies, and so forth. Scanning is when a camera is pointed at a trigger.

However, targets and triggers need not be tangible items. Images of things, for instance, are one possibility. Students might, for instance, create a poster featuring photographs they've taken of notable local landmarks. Visitors can then learn about the structures by scanning the images (the triggers). Use an augmented reality (AR) production tool like Wikitude (www.wikitude.com/) for location-based triggers or HPReveal (www.hpreveal.com/), Blippar (www.blippar.com/), or Layar (www.layar.com/) for image-based triggers to create such content. Each one explains in detail how to make content and publish it on the web.

Step-by-step

After settling on the right software, it's time to get the students ready. The steps outlined here should be used as a model only. The specifics of the activity's introduction will vary from instructor to teacher based on factors such as class size, the importance of new terminology, and so on.

Separate the students into pairs or groups of threes. Each team designs a tour with either an academic focus (highlighting the many resources available to students in the classroom) or a social focus (highlighting the many opportunities for recreation on campus).
The students come up with intriguing and educational things to say about each place.
Next, they go on location visits and film their own guided tours. They could also conduct interviews with locals to gather extra material for their reports.
Students use their augmented reality creation tools at the sites to set off video triggers. If you want to use a location-based AR service, but it's only available in a specific country or region, you can make image-based triggers by using any flat item in that region, such a sign or a map (see Figure 3).
Teach your class how to sign up for one of the augmented reality creation programs, upload an image of a target, and link a video of a tour to it.
In order to kick off their tours, students must first film an introductory video that details the tour stops and where to find the targets.
Instruct the teams to make a quiz in which viewers must watch the tour videos in order to answer a single question about each destination.
Finally, have each group identify another group that has a different theme and join them on their tour, answering the quiz questions along the way.

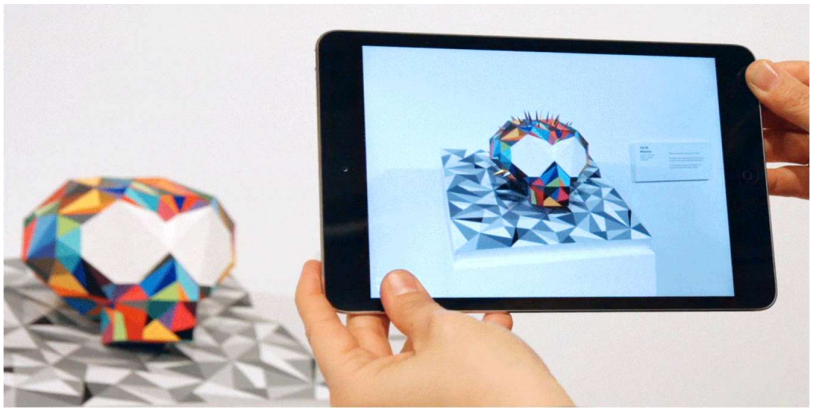

Figure 3: HP Reveal – Augmented Reality in your Pockets

Giving and following directions

Aims: *Practicing vocabulary such as location prepositions, and giving and receiving instructions.*

Class time needed: ***45-60 min***

Resources: *Wikitude, HP Reveal, Layar or Blippar, smart devices with cameras*

Using the same steps as the campus tour, students can practice both giving and receiving instructions. Students can make videos showing how to get from one spot to another instead of making videos about the locations themselves. Students cooperate in teams to reach a similar goal; the victorious team can be the one that gets there first. Instructions can be written by the teacher, or the class can collaborate to write them for another group.

More realistic presentation practice through 360-degree videos and VR Aims: *Practicing shadowing and improving presentation skill confidence* Class time needed: *20-30 min*

Resources: *Dedicated VR headset such as HTC Vive, mobile VR headset such as Oculus GO or Google Cardboard with VR capable smartphone, YouTube, headphones users* can have a far more immersive experience than while watching a standard video with the use of Virtual Reality cameras (which snap images or record video in all directions simultaneously) and headgear. The virtual reality (VR) capabilities of online resources like YouTube's 360-degree video library can be used in a variety of educational contexts, from preparing students for field trips to allowing them to engage in virtual field trips and other immersive learning experiences.

360-degree films and inexpensive VR glasses like Google Cardboard make it easier to hone presentation abilities. Students have traditionally prepared for public speaking by practicing in front of a mirror or by finding a quiet place to recite their speeches while visualizing an audience. However, using 360-degree films and VR, students can use the plethora of internet presentation videos to practice in front of simulated audiences.

Distribute 360-degree presentation videos (either those discovered online or those created by the teacher) to students and have them watch them using headphones, mobile VR headsets, and their own cellphones.

Tell the pupils to pay close attention to the person talking, both to the words and to the gestures. Students should try to mimic the speaker's movements and vocal inflections during the second viewing.

On the third viewing, have the students shadow while facing the audience and trying to make eye contact with as many people as they can.

After students have seen the video several times while trying to recall as much of their own speeches as possible in preparation for their own presentations, have them watch the movie once again, but this time with the audio muted, and ask them to deliver their speeches to their virtual audience.

Creating community content maps for the local area

Aims: *Writing and reading reviews using target language in authentic contexts*

Class time needed: *45-60 min*

Resources: *Google Maps, any smart device or PC*

Websites like Google Maps (www.google.com/maps) allow users to add custom layers of content to their maps, which may then be shared with the wider community. These "layers" add context to preexisting data, such as recommendations from other users, photographs, and even step-by-step guidance. Students can create their own layers for their projects either independently or collectively. First-year students have the option, at the end of the school year, to design map overlays for use by second-year students. The best coffee shops in town or quiet study spots on campus may be highlighted on these overlays, along with directions, photos, and other useful information.

Preceding this activity with field trips when students have to go gather knowledge about a certain building, person, or topic is another example of a comparable activity. Some examples of such activities are visiting museums, seeking out landmarks of historical significance, and tracking down individuals to interview.

Students can also be requested to identify sites with examples of a grammatical feature (e.g., labeling locations with reviews to practice giving opinions) or vocabulary items directly connected to what is studied in class. It has been argued that students will gain greatly

from learning a language by using it in real-world settings, such as their own communities (Kukulska-Hulme & Bull, 2009). Teachers can also provide this content on their own, supplying students with images, links, tips, and even targeted vocabulary items (Bo-Kristensen et al., 2009).

Location-based puzzle treasure hunts

Aims: *Understanding context clues, practicing listening comprehension and procedural language*

Class time needed: *45-60 min*

Resources: *HP Reveal, Google Maps, any smart device or PC*

Treasure hunts are a fun and productive pastime that can be improved using augmented reality. Treasure hunts that use augmented reality can take advantage of the ability to embed audio and video into the environment, in addition to the written clues used in classic language-focused treasure hunts. This is a great way to include oral communication skills into a lesson plan that has typically centered on the written word.

This game has two teams working together to uncover a hidden treasure by following separate sets of instructions given to them and then discussing what they've learned with one another. The kids on each team must work together to locate the prize by leaving clues for the other team in the form of recorded videos attached to various objects.

Sharing one's location is another option for completing a treasure hunt. Users may now keep tabs on pals and select specific people to share their whereabouts with in Google Maps2. An alternative approach to the treasure hunt involves sending half the class on an excursion while the other half stays in the classroom to monitor their whereabouts using a tool like Skype (https://www.skype.com/) or Google Hangouts (https://hangouts.google.com/) and provide clues and tasks.

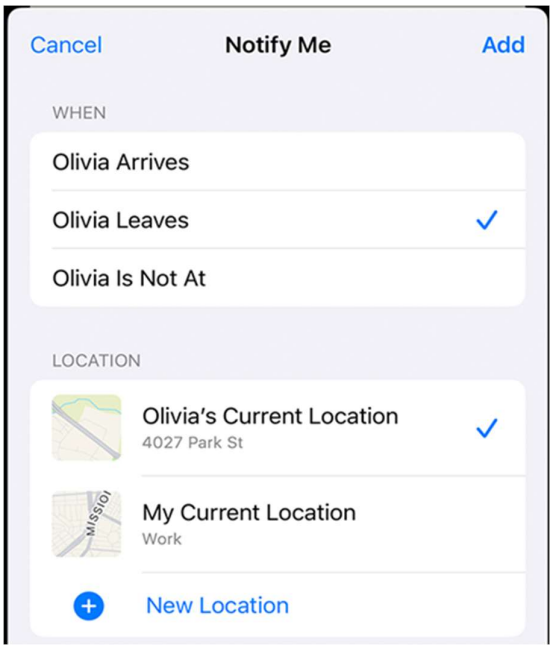

Figure 4. Users can limit who they share their location with and for how long

Providing instant-access supplementary materials for readings

Aims: *Providing faster students with additional activities and slower students with additional assistance without physically modifying materials*
Class time needed: *10-20 min*
Resources: *HP Reveal or Layar, a scanner, smart devices with cameras*

Some students may complete a task ahead of schedule while others are still working to catch up. Students can be helped in this regard if they are given the opportunity to seek out supplementary materials that cater to their own interests and needs. With the help of AR services, educators may quickly and easily give students more information or assign more practice problems. Students can learn more about a topic by scanning the corresponding section of a textbook, which will take them to online resources including links and videos. By providing translations of key vocabulary, summaries of reading texts, charts, and diagrams to help explain difficult concepts, these resources could help students who are having difficulty with the material access additional tasks or more challenging questions (see Figure 5).

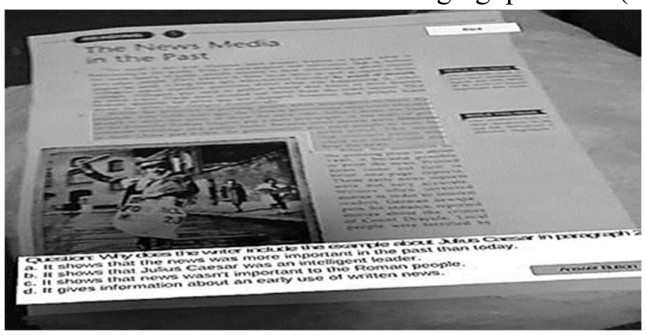

Figure 5. Inserted questions at the end of a piece of writing, with the relevant passage underlined

Scan or photocopy the appropriate page from the textbook, then upload the resulting digital image to an augmented reality service like HP Reveal or Layar. After the content has been uploaded, it may be positioned at the top of the page using the site's capabilities so that students can see it when they use their AR app cameras to see the textbook exercises.

Automatically assigning roles in information gap activities

Aims: *Using targeted language in a communicative environment with a focus on all members speaking equally*
Class time needed: *15-30 min*
Resources: *Layar or HP Reveal, smart devices with cameras*

Popular classroom exercises include "information gap activities," in which students are missing information necessary to perform a task and must consult with their teammates to learn it. Teachers can improve these experiences with AR by giving students access to a broader range of media to analyze and discuss during the activities. The use of augmented reality (AR) programs like HP Reveal and Layar can provide educators with the means to instantly incorporate media like videos, text, audio, websites, and more into any image. Teachers can use an augmented reality creation tool to upload photographs they've found that are relevant to the topic of the information gap activity and then integrate the appropriate content into those images. Students can view the content using their cameras after receiving the printed photographs; they can then begin discussing the material to their peers.

The following are some information-deficit examples:Vocabulary: Presented with a paragraph of text missing key vocabulary, students have to collect sets of nouns, action verbs and adjectives from the AR targets and work together to place them correctly into the text.
Students are presented with a series of grammar-related augmented reality (AR) targets, each of which shows a piece of crucial information related to a narrative (such as tense, viewpoint, events, etc.).
Pragmatics: when given a certain text type, such a request or an apology, students gather the essential components needed to word the letter appropriately by discovering and discussing factors like the intended audience, the gravity of the situation, the topic at hand, and the appropriate level of politeness.
Sharing: each student has access to some data about an object, like a picture, video, audio recording, or 3D model. By discussing what they have observed, they want to learn more about the thing they are looking at, such as its function, its owner, and its recommended next steps.

Virtual reality video creation

Aims: *Providing students with new environments to express their creativity in language production focused role-playing activities*
Class time needed: *60-90 min*
Resources: *High-end VR Headset such as Oculus Rift and VR capable PC, projector, free copy of Mindshow*

Teachers that have access to a high-end VR headset can help their pupils express their creativity in language production through the use of asynchronous film creation applications like Mindshow (www.mindshow.com/). Students can set up scenes and take turns filming themselves within it, adding their own movements and lines of dialogue until a fully realized, multi-actor scene is achieved. In order to better illustrate language usage scenarios to their peers, students can create captivating videos using custom-designed scenarios bolstered by 3D virtual realia and objects. Figure 6 illustrates the versatility of these models, which may be used to simulate airports, hotels, presentations, news stories, and even job interviews.

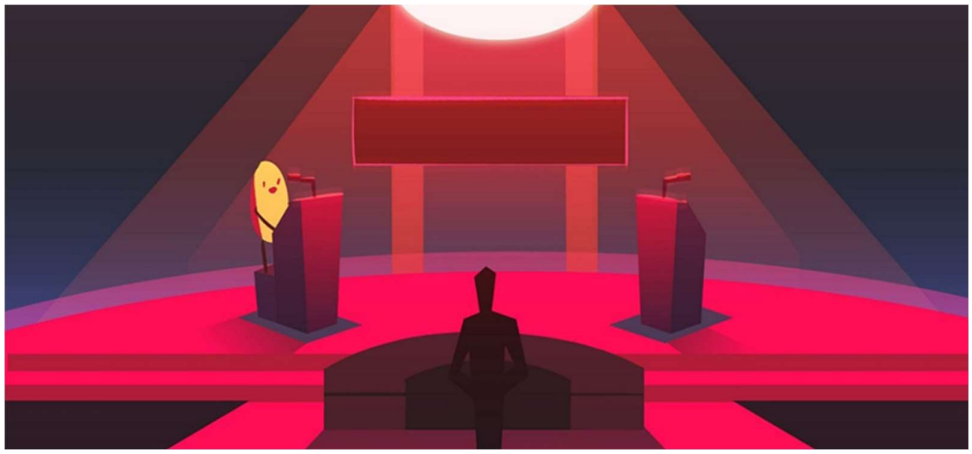

Figure 6. A Mind show news program scenario

Backchanneling with the teacher during classwork or homework
Aims: *Providing ways for teachers to measure understanding and gather feedback*
Class time needed: *5-15 min*
Resources: *Layar*, *HP Reveal, Google Forms, smart devices with cameras*

Knowing how much of what they are teaching is actually sinking in is a common struggle for educators. Backchanneling is a technique for keeping tabs on how well a class is doing since it allows teachers to get instant feedback from students at crucial junctures in the course. With AR, it's no longer necessary to add QR codes or web connections to printed handouts in order to provide quick access to online questionnaires and feedback options. Uploading digital picture copies of handouts to any AR service allows for the addition of links to online forms. Without having to duplicate the materials with weblinks, educators can take full units' worth of content and integrate backchanneling opportunities into the worksheets. Students can easily access the backchanneling content by pointing their phone cameras at the handout while using an augmented reality software.

Among the various backchanneling possibilities made possible by online quizzes is the presentation of sample sentences to students after teaching a new grammatical point or vocabulary item, with the request that they select the proper or erroneous phrase. You can use comprehension questions or a list of keywords for students to choose from after they've skimmed an article for reading activities. For additional information on backchanneling, see Reinders (2014). In terms of writing, students can select a suitable thesis statement or arrange several essay paragraphs.

Use the scanned or photographed activities as augmented reality targets to direct students to online forms where they can respond to questions and provide feedback, so creating backchanneling opportunities in the classroom. Link to a Google Form (http://docs.google.com/forms/) and modify its settings in Layar, HP Reveal, or any other web-based augmented reality service that supports doing so from AR targets.

The necessity for various forms to collect student input on separate activities is eliminated. Whenever a student scans an activity using Layar or HP Reveal, the teacher can have Google Forms automatically fill in the name of the activity depending on the URL used to access the form.

After generating questions for the students to respond to, create a question with a short answer box, like "Which activity do you wish to talk about?" in Google Forms. After that, click the "More" icon (three vertical dots) in the top right and choose "Get pre-filled link." To begin, please identify the augmented activity by completing the form's first question and clicking "Submit." Now, the activity sheet or textbook page itself can serve as a target for an online augmented reality service, and when a student points their smartphone camera in that direction, they will be taken to a Google Form with the title of the activity already filled in.

Orienting students to a reading topic through 360-degree videos

Aims: *Familiarising students with a topic and providing them with vocabulary in context*

Class time needed: *20-30 min*

Resources: *Cheap VR headsets such as Google Cardboard, student smartphones*

Textbooks often fail to address current events and may present their subjects in overly broad, impersonal ways. Use 360-degree films in Google Cardboard or other VR devices to fully immerse students in the subject at hand as a type of pre-reading or familiarization before classroom discussion. Google "360-degree (topic)" to find student-friendly content on sites like YouTube. In the case of the theme of "separation," for instance, there are some really moving movies depicting the situation of refugees (see Figure 7) that are likely to elicit a response from

students.Once students have watched these videos, ask them to write and discuss a few questions (Teeter, 2018):

What aspects of the video affected you the most?

What can be done to solve this problem/improve this situation?

Share your ideas with a partner.

Figure 7. 360° video: See how UK aid is helping Syrian refugees in Azraq.

Considerations for using VR and AR in the classroom

Several factors should be considered before settling on virtual or augmented reality. Teachers and students alike will need to put in effort to fully realize the potential of this technological advancement. How much time would you estimate being needed to understand the technology and help students? Are there adequate technological resources available to students? If not, may they divide it up among themselves?

Important problems about privacy and security are also raised by AR and VR technologies, which should not be ignored. In addition to the common online privacy and security concerns, virtual reality raises several novel ones. Virtual reality (VR) introduces new risks to the already-serious issue of online harassment in social places like chat rooms and online games. If a harasser enters a victim's virtual space, the victim may find it difficult or impossible to defend themselves by pushing the harasser away or leaving the area. Harassers in artistic settings can also cause actual damage to works created there, effectively rendering the area unusable. Therefore, it is essential that students use secure, password-protected social networks and that teachers keep a close eye on student activity in order to prevent this from becoming a problem.

Remembering that each student's socioeconomic status is unique should be a primary consideration before requiring them to utilize their own smartphones for these activities. Some students may not have access to virtual reality (VR) devices like Google Cardboard because they lack a smartphone or because their phone has a broken screen. In the case of virtual reality (VR), it is advised that students also have access to traditional learning methods. A simple way for a teacher to do this is to share their own virtual reality (VR) experience using a projector or television.

Due to the accessibility of augmented reality, educators should be aware of the potential permissions that an augmented reality app is allowed while being loaded on student phones. More malicious apps may ask to use the phone's microphone or camera, scan the user's browser history or access other sensitive content, and augmented reality social apps may access and

preserve an updated history of the user's frequented areas for advertising purposes. Before having pupils download an app, it's crucial to look into its history online.

One last thing to think about is who can see the information these apps generate. In order for students to make informed decisions about which apps to use, they must be told which third parties have access to their data. It's also important to specify who can view chat logs, queries, feedback, and test data, where that information is stored, and how to delete it.

Every student has the right to participate in class discussions, voice their opinions, and ask questions without worrying that their answers will be used against them or that their answers will be shared with others outside of class.

When designing Virtual Reality (VR) or Augmented Reality (AR) exercises for students, teachers should also consider cost. Some services are initially free, but they may contain paid upgrades or restrictions that make them inappropriate for use in a classroom setting. After the trial period, virtual reality (VR) social spaces may charge users a monthly subscription fee or a price to enter the place with a bigger group of people. It is important to understand the bounds of the service's free-to-use approach, as restrictions of this sort may not become evident or take effect until students begin utilizing the tool in class.

Finding out if free internet services have usage caps and whether or not they offer educational licenses is essential for augmented reality. These restrictions might be put in place to entice authors to sign up for paid accounts, and they could be delayed until a predetermined number of users have viewed an augmented reality target or a predetermined number of free access days have elapsed. HP Reveal enables for free online publication of the target but charges a monthly fee for access to premium content and to disable the need to subscribe to a creator's channel in order to activate an augmented reality (AR) target. Blippar, Augment (https://www.augment.com/), and Layar are just a few of the services that offer free educational license to educators.

Finally, virtual reality and augmented reality are still in their infancy, with several companies competing to become the industry's premier content development service. Despite the fact that many of these companies may initially deliver fantastic free material, it is projected that many of them will soon adopt more expensive price structures or restrict their free services as their start-up capital begin to dwindle. An organization runs this risk in particular if its free educational service attracts a substantial portion of its user base because of its focus on teaching and learning.

Despite these obstacles, it's evident that lots of interesting things are happening in the augmented reality and virtual reality sectors. Educators should familiarize themselves with these innovations, the hazards they pose, and, most significantly, the benefits they may have for student learning. Teachers can learn a lot by exploring the various opportunities presented by these new technologies, especially as a means of bridging the gap between formal and casual learning environments [20-23].

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