**О. Ю. Павлова, А.Ф. Матушак, Л.С. Носова**

**Применение дополненной реальности
при подготовке будущих учителей иностранного языка**

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Учебно-методическое пособие

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В данном учебно-методическом пособии рассматривается феномен дополненной реальности, особенности его применения в иноязычной образовательной деятельности при подготовке будущих учителей иностранного языка. Приведены примеры возможного использования технологии дополненной реальности в образовательной среде, выделены достоинства и недостатки этой технологии. Материал пособия может быть использован для аудиторной и самостоятельной работы обучающихся по дисциплинам «Практика устной и письменной речи», «Практический курс английского языка», «Методика преподавания английского языка», «Методика обучения и воспитания (английский язык)», «Методика преподавания иностранных языков».

Рецензенты:
А. В. Зырянова, канд. филол. наук, доцент
Н. В. Маврина, канд. пед. наук, доцент

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## Пояснительная записка

Современная образовательная среда диктует новые условия подачи теоретических и практических знаний при обучении студентов в высших учебных заведениях. В данном учебно-методическом пособии рассматривается феномен дополненной реальности, особенности его применения в иноязычной образовательной деятельности при подготовке будущих учителей иностранного языка. Внедрение технологии дополненной реальности в процесс иноязычной подготовки студентов повышает мотивацию обучающихся при изучении иностранного языка и уровень усвоения информации, увеличивает эффективность процесса формирования иноязычной профессиональной компетенции студентов.

В пособии приведены примеры возможного использования технологии дополненной реальности в образовательной среде, выделены достоинства и недостатки этой технологии.

Использование дополненной реальности в обучении увеличивает привлекательность образовательного процесса для студентов, визуализирует подачу учебного материала, расширяет рамки традиционного учебника, усиливает мотивацию студентов к изучению профессионального иностранного языка и активизирует познавательную деятельность обучаемых.

# The Future of Education

By 2025, two billion of the global population is going to be made up by the youngest generation: Generation Alpha, also known as the iGeneration. Generation Alpha are children born between 2010 and 2025.

This is the first generation entirely born in the 21st century. These children are considered to be the most technological-infused demographic up to date.

Generation Alpha use technology, smartphones, tablets, and computers naturally. They haven't known life without the Internet or video games. Some of them live in smart homes and talk to a Smart Voice Assistant every morning before going to school. They know about SpaceX and they want to live on Mars one day. These children were born along with iPhones, iPads, and applications. They don't know or cannot even imagine how life was without them.

"By 2025, Generation Alpha will number 2 billion globally. It will be the wealthiest, most educated, and technologically literate in history." — Robert Hannah, Chief Operating Officer at Grant Thornton U.K.

Generation Alpha students are going to benefit from the emerging technology and innovations that are being incorporated into the classroom. Technologies such as Augmented Reality, Virtual Reality, Mixed Reality (AR/VR/MR), robotics, and Artificial Intelligence (AI) are already changing education. There is no doubt that Augmented Reality is here to stay and take over all the industries, including education and training.

Educational institutions that use the latest technology in the classroom as well as in field trips are going to create a completely different learning experience opportunity for the Alpha children. And with it, they are going to contribute to a better preparation for the leaders of the future.  Schools, educators, and educational institutions are going to find it challenging to cope with the demands of Generation Alpha children if they neglect to update themselves, their methodology, and curricula in order to adopt a new approach to education.

Alpha children are accustomed to acquiring knowledge by doing, screen-touching, and experiencing. Schools need to provide an adequate environment that

enhances this type of learning. This type of environment requires changes and a new approach to education at all levels. Schools and colleges should get ready by creating programmes of study that require deep learning. Schools need to start preparing programmes that are flexible enough to be adapted and modified quickly according to the young Alphas' inquisitive mind.

According to Jenny Coetzee, career educator and founding member of the ADvTECH Group's prestigious Crawford School La Lucia, "these children are the most connected, educated, and sophisticated generation ever, so when educating, a school should provide an environment that enhances learning for these digital integrators."

The right way to teach the young Alphas, thus, is by developing their critical thinking and problem-solving skills. It is going to be important for Generation Alpha children to be able to see problems from different perspectives in order to make the best possible decisions. This is going to constitute one of the pillars in their future shared with AI robots and Quantum computers. Teamwork will let them analyze possible alternative solutions according to different viewpoints, and then make decisions based on their own personal and individual critical thinking.

## Augmented Reality and Virtual Reality in Education

Augmented Reality (AR) and Virtual Reality (VR) are innovative technologies that have the potential to revolutionize the way we teach and learn. AR overlays digital information in the real world, enriching the user's perception and interaction with the real environment. On the other hand, VR immerses users in a fully virtual environment, offering the ability to interact with this artificial world in real-time. These technologies, often clubbed under the umbrella term of 'immersive technologies', have started to carve a significant niche within the education sector.

Education is no stranger to technology. Over the years, we've seen everything from blackboards to overhead projectors to smart screens transforming classrooms. Today, in the age of digital transformation, we're seeing an exciting

new wave of technological innovation in education. Virtual Reality and Augmented Reality are at the forefront of this revolution, offering immersive, engaging, and effective ways to teach and learn that significantly improve upon traditional methods.

*Understanding virtual reality in education*

Virtual Reality in education refers to the use of VR technology to create a simulated environment for teaching and learning. This immersive technology enables students to interact with the 3D world, hence providing a 'real' experience within a 'virtual' environment. Examples of VR in education include virtual field trips, immersive games for learning, and simulations for training in various subjects like medicine and engineering.

The utilization of VR in education comes with numerous benefits. It allows for experiential learning, where students can immerse themselves in any environment, historical era, or even within the human body, making the learning experience far more engaging and memorable. Furthermore, VR creates a safe environment for risk-free practical training, such as in medical or technical education.

Numerous case studies have shown the transformative impact of VR on education. For instance, Stanford University's Virtual Human Interaction Lab explores how VR can affect learning and empathy. Meanwhile, companies like Google have introduced VR in the form of Google Expeditions, allowing students to take virtual field trips to a myriad of locations worldwide, thereby extending their learning beyond classroom walls.

*Understanding augmented reality in education*

Augmented Reality (AR) is a technology that superimposes digital information like images, sounds, or text onto the real world, enhancing the user's perception and interaction with their environment. Examples of AR in education range from interactive textbooks that bring learning material to life, to AR apps that allow students to explore complex concepts like anatomy or molecular structures in 3D.

The application of AR in education offers several advantages. It provides an interactive learning experience, enhancing student engagement and motivation. Additionally, AR can make complex information more understandable and fosters collaborative learning as students can share their AR experiences with others.

Multiple case studies demonstrate AR's potential in education. For instance, the University of Helsinki has used AR to teach chemistry, allowing students to interact with virtual molecules in the real world. Similarly, apps like Aurasma are being used in classrooms to transform passive learning materials into active, interactive experiences.

*Comparing AR and VR in education*

AR and VR are both powerful tools that have significantly transformed education. While they share some common elements, such as providing immersive experiences, there are notable differences. AR enhances real-world environments by adding digital elements, thus keeping learners in their physical reality, while VR creates a completely new reality, immersing the learners in a different environment altogether.

Each technology comes with unique benefits and challenges. VR provides an entirely immersive experience, offering learners the ability to interact within simulated environments. This makes it particularly useful for teaching subjects where real-world experiences are challenging or impossible to create. On the other hand, AR doesn't require full immersion, allowing learners to stay connected to their physical surroundings. This offers a unique benefit for collaborative learning experiences.

Augmented Reality offers an array of advantages in the education sector that can revolutionize the way learning and teaching processes are conducted. Here are some notable benefits:

*Interactive learning.* AR encourages interactive learning by blending digital components into the physical world. This integration provides students with the ability to explore and interact with the subject matter, thus fostering an active learning environment. For instance, students can explore 3D models of biological

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systems, buildings, or historical artifacts in their classrooms, making the learning experience more engaging.

*Simplified complex concepts.* AR helps in breaking down complex subjects by offering visual and tangible representations. For instance, it can be used to illustrate complex scientific phenomena, like the solar system's functioning or a molecule's structure, through interactive 3D models. This approach aids in easier understanding and better retention of information.

*Enhancing creativity and imagination.* By adding digital information to the real world, AR can stimulate students' creativity and imagination. It allows learners to visualize abstract concepts, thus fostering a deeper understanding and inspiring innovative thinking.

*Collaborative learning.* AR fosters collaborative learning experiences as it can be easily integrated into group tasks. This is particularly beneficial in scenarios where team-based problem-solving and creativity are crucial. Multiple users can interact with the same AR content, promoting discussion, collaboration, and critical thinking.

*Accessibility and affordability.* AR can be easily accessed through smartphones and tablets, making it a cost-effective solution for educational institutions. This widespread accessibility can democratize access to high-quality educational materials, making learning more inclusive.

*Real-time feedback.* AR can provide immediate, real-time feedback, enabling students to understand their mistakes and learn from them immediately. This feature is particularly helpful in practical training, where instant feedback can drastically improve the learning curve.

*Increased motivation.* By making learning fun and exciting, AR can increase students' motivation and engagement. Gamified learning experiences using AR can create a more enjoyable environment, thereby promoting a positive attitude towards learning.

*Customizable learning experiences.* AR allows for personalized learning experiences tailored to each student's needs. Learning materials can be adapted

based on a student's progress, helping to cater to different learning styles and paces.

In summary, AR in education can enhance the learning experience by making it more interactive, engaging, and meaningful. It holds the potential to transform traditional teaching methods and set the stage for a more immersive and effective educational framework.

Comparing their effectiveness in specific scenarios, both AR and VR provide unique learning opportunities. For instance, VR can provide immersive experiences of historical events or places, making history lessons more engaging. On the other hand, AR can superimpose complex scientific data onto the real world, aiding in the understanding of complex concepts.

These technologies have also gained significant traction among educators and learners due to their potential to create immersive learning experiences. For instance, VR is utilized in language learning, enabling students to practice language skills in virtual settings. AR, on the other hand, is used in science education to visualize and interact with 3D models of scientific concepts.

As AR and VR technologies continue to evolve, they will undoubtedly play an increasingly significant role in shaping the future of education. Not only will they make learning more engaging and fun, but they will also revolutionize the way we teach, making education more accessible, interactive, and effective.

*The takeaway*

AR and VR offer unparalleled opportunities to enrich educational experiences. These technologies have shown potential to enhance learner engagement, improve understanding, and create immersive environments that promote experiential learning.

As we continue to explore and understand the potential of these technologies, it's clear that the future of education will be more interactive, personalized, and engaging. While challenges remain, the prospects are exciting, and the potential impact of AR and VR on education is profound.

As we move towards a future where learning is no longer confined to a physical classroom or bound by geographical constraints, the marriage of education and immersive technologies like AR and VR becomes a promising avenue worth exploring and investing in.

### Implementing Augmented Reality and Virtual Reality in Teaching: Some Considerations

Before deciding to use VR or AR, there are a number of important considerations. As with any technical innovation there is likely to be an investment on the teacher's as well as the students' part. How much time is likely needed for learning the technology and assisting students? In addition, do students have access to capable devices? If not, could they share between them?

In addition to these considerations, AR and VR raise important questions about privacy and security. Along with many of the usual privacy and security issues online, VR presents a few new issues that should not be overlooked. While online harassment is a knownproblem in social spaces such as chat rooms or online games, VR poses new dangers.

Harassers can enter another person's personal space and depending on the VR environment make it difficult or even impossible for that person to retaliate by pushing the harasser away or escaping without quitting the space altogether. In creative spaces, harassers can also physically destroy creations and generally make use of the space impossible. As a result it is important to make sure that students use password-protected social spaces and that the teacher monitors the students' interactions to avoid this becoming an issue.

One of the first concerns before asking students to use their own smartphones for these activities is to remember that the socio-economic situations for each student are different.

Some students may not be able to afford a smartphone, or may have one with a cracked screen that can prevent them from using VR devices such as Google Cardboard. To mitigate this issue, it is recommended, specifically for VR, that

students have a non-VR alternative available to them. This can be accomplished by the teacher casting their own VR experience via projector or television.

Due to AR's ability to be used by any user with a modern smartphone, teachers should be aware of the possible permissions that an AR app is granted when being installed on student phones. AR Social apps may access and keep an updated history of the users frequented locations for ad purposes, while more nefarious apps may request access to thephone's microphone or camera, or scan a user's browser history or access other sensitive content. It is important to do a background check online for each new app students are asked to install.

Another consideration is who has access to the data that these apps produce. Students need to be made aware of who has access to their personal information or location data when using the apps so they can be fully aware when choosing to use them. It should also be made clear who has access to any chat logs, questions, feedback or test data, where this data is stored, and if possible, how to remove it.

A student should feel safe taking part in any discussion activity, expressing an opinion, or admitting that they do not understand something, without fear of this information being used against them in class by either their peers or teachers, or it being shared with others outside the class.

Instructors need to be aware of pricing too when creating VR or AR activities for classes. While some services may be free when first used, they may have limitations that can prevent their use in the classroom. VR social spaces may require a per-user subscription fee after the first month of use or may ask for a fee to allow a larger number of users into thesame space at the same time. These kinds of limitations may not become apparent or come into effect until students are already using them in the classroom, so it is necessary to make sure to know the parameters of the free-to-use model that the service is providing.

For AR, one needs to learn the usage limitations of free online services and whether or not they have educator licenses available. These limitations may be there to encourage creators to sign up for paying accounts and as such may not come into effect until a certain number of users have viewed an AR target, or a

number of free access days have passed. HP Reveal allows publishing the target online without payment but requests a monthly fee in exchange for additional content options and removing the need to subscribe to a creator's channel to activate the AR target. Services such as Blippar, Augment (https://www.augment.com/), and Layar all provide free educational licensing opportunities for teachers.

Finally, it is still early days for VR and AR with many companies trying to establish themselves as the best content creation service. While initially many of these companies may provide excellent free content, eventually their start-up investments may begin to evaporate and it can be expected that many of them will introduce more expensive price structures or reduce their free services. This is particularly a risk if a service offers a free education service and then finds education becoming a larger and larger part of their core user base. Despite these challenges, it is clear that many exciting developments are taking place in the AR and VR space. As educators, it is important to learn about these developments, their risks, and – most importantly – their potential benefits for learning. As a way of linking formal with informal learning spaces, there is a lot to be gained from teachers experimenting with the many possibilities of these new technologies.

**The Use of Augmented Reality in Foreign Language Education**

Providing an engaging learning experience is paramount for the success of any educational institution, and in particular, the success of the educator. Thanks to emerging technologies such as Augmented, Virtual and Mixed Reality (AR/VR/MR) the classroom today can incorporate AR and VR content that can make learning more efficient, faster, and much more fun. From mathematics to chemistry to biology with some creativity AR can be incorporated to practically any subject.

Some companies such as Indestry, an award-winning Augmented Reality experiences for entertainment, marketing, and education company, can certainly

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bring the dinosaur experience to the classroom in the same way it did for Jurassic Park at Universal Studios in Orlando, Florida.

In other words, this is one of the best ways an educator can use to engage and motivate students. By using tools and applications especially designed to create AR and VR content and activities even with little or no programming skills, creating an exciting world within the classroom becomes a piece of cake.

Augmented Reality technology expands the physical world; it adds layers of digital information onto what we can see with the naked eye. It augments our surrounding by adding sound, video, and graphics. On the other hand, Virtual Reality creates a completely different environment, an artificial world that replaces the real one and in which we can immerse ourselves like characters do as their avatars in Steven Spielberg's movie Ready Player One.

When the term Augmented Reality was coined back in 1990, some of the first commercial uses were, of course, in television and military. However, since then the AR technology has significantly evolved and today we see Augmented Reality applications in every industry with reported benefits from its users, including education.

Augmented Reality applications in education provide new ways of teaching and learning, bridging the gap between the virtual and real world. The benefits of AR in education are increasingly being recognized by researchers on the topic.

Researchers have reported the positive impact that Augmented Reality experiences have on learners as compared to non-AR ones:
- Increased content understanding
- Learning spatial structure and function
- Learning language associations
- Long-term memory retention
- Improved physical task performance
- Improved collaboration
- Increased student motivation

The researchers also reported just a few learning detriments from Augmented Reality, all of which can successfully be avoided:

- Attention tunneling
- Usability difficulties
- Ineffective classroom integration
- Learner differences

Augmented Reality tools let students not only engage with the technology but also it gives them the possibility to create their own content.

This is paramount in order to promote 21st-century skills such as creativity, problem-solving, critical thinking, analysis, coding, and iterative testing, the process of basing tests on insights gathered from previous tests in order to make changes gradually and which are evidence-based.

Augmented reality is considered one of the most modern information visualization technologies. Augmented reality technologies are used in the following areas: tourism; social interaction, such as entertainment and games; communication; purchase and sale areas; education. Nowadays, the advent of mobile devices and personal computers has enabled augmented reality concepts to be used in traditional educational environments such as schools and universities. AR is mainly consistent with constructivist and situated learning theory because it places the students within a real-world social and physical context while scaffolding, guiding, and facilitating metacognitive and participatory learning processes, namely, peer coaching, authentic inquiry, active observation, and reciprocal teaching.

AR promotes the effectiveness of learning because it relies heavily on visualization and realization of the concepts; thus, it increases students' engagement by giving them the room to explore either complex phenomena or abstract concepts .

AR educational use has been examined in which various researchers concluded that AR applications might improve learning effectiveness and motivation and promote the learning process. There are a large number of

augmented reality applications and tools that are designed for teaching and learning purposes.

However, there are some challenges in applying augmented reality applications and systems that are summarized into pedagogical, technological, and learning matters concerning the execution of augmented reality in education. There are grand challenges in AR applications that are manifested in interaction, tracking technologies, displaying, and furthering the depiction of AR. For instance, augmented reality applications might lead the learners to be cognitively overloaded with the huge amount of information they face, the complicated tasks they have to accomplish, and the various technological devices they have to use.

## Augmented Reality Tools for the Foreign English Classroom

Educators are constantly looking for resources and tools to get students engaged and excited about the content they are teaching, and an interesting option these days is augmented reality (AR) tools.

With a mobile device or tablet, teachers and students can use AR apps to access projection-based, location-based, or recognition-based experiences so that objects, artifacts, or media appear to be in the room. Students are then able to interact with that content by moving around, getting closer to it, and manipulating it to research and learn more about it.

Students' engagement increases when they create experiences in AR to demonstrate their understanding of a particular concept or standard. When students use augmented reality during a lesson, they want to dive into the content and don't want to stop learning or exploring. They're more willing to use critical thinking, problem-solving, and communication skills to explore the lesson or activity. And using a variety of apps, students can create projects that correlate with curriculum standards and concepts to show what they know.

Augmented reality can be integrated into the classroom in all grades and across the curriculum — possibilities range from exploring space to learning about animals and continents to creating book reviews or historical settings. Some

students may not have many opportunities to visit historical landmarks, but they can do so virtually. AR also allows students to view models of things we can't see without a microscope and creates opportunity to see and interact with plants and animals, and sea creatures that live on the ocean floor. As educators, we can provide our students with opportunities and experiences they might not otherwise have that will be vital to their future.

*7 Fun Augmented Reality Tools*

1. *Merge Cube:* Students can use the cube with the Merge Explorer, Object Viewer, or Museum Viewer apps to explore the water cycle, view fossils, examine rocks and gemstones, experiment with simple machines, and more. The cube allows students to virtually hold artifacts and objects in their hands. With Merge Cube, teachers can create STEM lessons and activities or experience science or history, and students can also develop the content, make applications, and see their creative products come to life in AR. This is a great way to get students to see the results of what they create, a very first step to motivate future developers. It is also possible to use Google Sky Map to have a cool close up to stars and planets in this hand-held planetarium. There are more tools in the compiled list above, enough for every classroom and every teaching need. Now get your imagination ready, plan your next lesson, and have fun. Because teaching and learning can always be fun when adding some AR technology magic.

2. *CoSpaces Edu*: This tool allows students to not only explore AR but create their own experiences in any subject area. These experiences can be used with the Merge Cube or with a phone or tablet. Students can add audio, code characters and objects, and upload their own 360-degree photos or images into their project. They can also create infographics and tell stories through virtual exhibits and tours. With CoSpaces Edu, the teachers create a class and post assignments.

3. Assemblr: This tool empowers students to be creators of content as well as explorers. Students can dive into already created content, such as ocean animals,

planets, symmetry, fractions, or even how to do exercises correctly. (There is a free basic plan; premium plan pricing for schools starts at $1 per user per month.)

4. *Quiver Masks*: A fun resource that allows students to create character masks to put themselves in the shoes of a particular animal or person in a story. For example, 3- and 4-year-olds can retell and record the story of the Three Little Pigs while using masks they have made. (Pricing varies by product)

5. *Narrator AR*: An app that gives students a place to practice their handwriting; the app launches letters off the virtual page. This helps to reinforce correct letter and number formation for our youngest students in a fun and interactive way. (Pricing varies by product)

6. *Wonderscope*: iOS-only app that allows students to interact with stories like "Little Red the Inventor." (Each story costs $5)

7. *Augmented Classroom*: This tool from CleverBooks is browser based; it lets students learn about plants and animals and explore the world. Students can explore and interact with a variety of activities, learn about curriculum, and check their knowledge on topics including geography, weather, geometry, and space. Augmented Classroom also allows students to collaborate and create with other students around the world. (Pricing "starts from less than 1 euro per user per month")

AR can be a hook to get students excited about content, guiding them to ask more questions. Seeing and interacting with artifacts, animals, and more can boost students' excitement level and foster collaboration with their peers, making content more meaningful and memorable.

## 10 Activities Foreign Language Teachers Can Do
## with Augmented Reality

1. Create virtual tours.

One of the many advantages of AR is that it has the potential to take students on virtual yours without ever having to leave the classroom. For example, you could use an AR app to take your students on a virtual field trip to the Great Wall

of China, the Taj Mahal, or even the surface of Mars! You could also tour the inside of a human body, go back in time to ancient civilizations, or explore the inside of a volcano. The possibilities are endless!

2. Teach foreign languages.

AR can also be used to teach foreign languages in an immersive and exciting way. You can use AR to transport your students to a foreign country where they can practice their language skills in a real-world setting. Additionally, AR can be used to create virtual experiences that immerse students in the culture of a foreign country.

3. Bring historical figures to life.

Another amazing way to use AR is to bring historical figures to life. Using AR, you can have students meet and interact with figures like Julius Caesar, Abraham Lincoln, or even Marie Antoinette. This is a great way to bring history to life and help students better understand the people and events they are learning about.

4. Conduct virtual dissections.

Unlike traditional dissections, virtual dissections conducted through AR allow students to see inside the body without harming any animals. This is a great way for students to learn about human anatomy and physiology. Additionally, virtual dissections can be done over and over again until students fully understand the concepts.

5. Play educational games.

We all know that students love playing games, so why not use AR to have more fun and engaging learning? There are many educational AR games available that cover a wide range of topics, from Science and Math to History and Geography. These games are great for reviewing or introducing new concepts in a fun and interactive way. Additionally, many of these games can be played in groups, making them great for classroom activities.

6. Make math more fun.

Math can be a difficult subject for some students, but AR can make it more fun. Teachers can use AR to create interactive math games that make learning more engaging and exciting. Additionally, AR can be used to visualize mathematical concepts, which can help students better understand them.

7. Help students with special needs.

AR can also be used to help students with special needs learn in new ways. There are many apps and games that are specifically designed for children with Autism Spectrum Disorder, Down Syndrome, and other learning disabilities. These tools can help children with special needs develop new skills and reach their full potential.

8. Encourage physical activity.

With childhood obesity rates on the rise, it's more important than ever to encourage physical activity in schools. AR can be used to create active games and activities that get students up and moving. These games are not only great for getting kids active, but they're also great for promoting teamwork and cooperation.

9. Make connections across subjects.

One of the great things about AR is that it has the potential to connect different subjects together in interesting ways. For example, a lesson on fractions could incorporate an AR game that requires players to collect fractions of different objects in order to progress; or a lesson on photosynthesis could include an AR component that allows students to see how sunlight affects plant growth in real-time. This type of cross-curricular learning can help students make connections between subjects and see how they relate to one another.

10. Encourage students to be creative.

Lastly, AR is a great opportunity for students to be creative. There are many AR apps that allow users to create their own content, such as 3D models and digital paintings. This is a great way for students to express themselves and show off their creativity. Additionally, it can help students develop important 21st-century skills, such as problem-solving and critical thinking.

Compared to virtual reality, which creates a completely simulated environment, AR allows users to interact with the real world while also seeing digital content. This technology has a wide range of potential applications in education, from providing new ways to learn about the world around us to encouraging students to be more active and engaged in their learning. So if you're looking for ways to use AR in your classroom, be sure to check out some of the ideas on this list. Who knows, you might just find your new favourite teaching tool!

**Augmented Reality in the Foreign Language Classroom: Practical Ideas**

To give an idea of how an AR activity might work in the classroom, a sample activity is first provided with worked-out steps for implementation. This details some of the decisions to be made and procedures to be followed, including which tools and apps to use. This also allows us to introduce some of the technical terms readers may not be familiar with.

Following this, we offer short explanations for a number of further, practical activities; some supporting classroom-based study, others encouraging out-of-class learning. Each of these activities has been developed with high-school or university age students in mind and most are based on currently available, free and easy-to-use resources. A brief overview of the aims, class time necessary and the resources that will be needed is provided and then followed by a brief overview of how the activity can be implemented.

*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

A relatively easy and fun way to introduce students to the affordances of AR is by having them create and share tours of their school/institution. This could be a tour for parents, for visitors, or for new students. This type of activity was

successfully deployed by one of the authors of this paper at a university in Thailand, where students created a tour of academic services available to visiting professors (see above). Not only did the students enjoy the activity a lot, the resulting product (the tour) has been useful for the university in helping people new to the campus find their way.

*First things first.* The technology is not being used for its own sake, so the first step is to decide what the activity is trying to achieve. Is it to create opportunities for students to collaborate, discuss and negotiate? To learn to write instructional text types? Something else? Once the aim is chosen, it is time to make sure the technology and the activities created with them achieve it.

*The technology.* In essence, a tour activity involves the creation of information that visitors can see by looking at real-world objects through their cameras1. For example, they might point their camera at an office in a building and learn that this is where IT support is offered from 08:00-17:00 six days per week, along with links to contact details. The object that results in the display of information is called a 'target' or 'trigger'. So, in the previous example, the IT building is what 'triggers' information to be displayed. The information can be anything, from text (opening times), pictures (of the staff who work there), links (to IT help files), to videos and so on. The act of pointing a camera at a trigger is called 'scanning'.

Targets or triggers do not have to be physical objects, though. They could, for instance, be pictures of objects. As an example, students could take photos of key buildings and put them on a poster. Visitors can then scan the pictures (the triggers) to learn what the buildings are.

To develop such materials, use an AR creation tool, such as Wikitude (www.wikitude.com/) for location-based triggers, HPReveal (www.hpreveal.com/), Blippar (www.blippar.com/) or Layar (www.layar.com/) for image-based triggers. They all provide step-by-step tutorials on how to create content and share it with others online.

*Step-by-step.* Once the appropriate app has been chosen, it is time to prepare the class. Please remember that the procedures below are an example only. How the teacher introduces the activity will depend on the size of the class, how much pre-teaching students may need of new vocabulary, and so on – in other words, these are general guidelines only.

1. Divide the class into an even number of small groups. Each group creates either an academic themed (describing all academic services on campus) or a social themed tour (describing facilities such as canteens and sports).

2. Students brainstorm interesting and informative things to say about each of the locations.

3. Students then visit the locations and create their tour videos. They could also interview people at the locations to get more information to talk about.

4. While at the locations, students create triggers with their AR creation tools to display the video content. Some location-based AR services only provide services in certain countries or areas, so in this case create image-based triggers using of any flat object there, such as a sign or map (see Figure 3).

5. Show students how to create an account on one of the AR creation tools and how to upload their target images and attach their tour videos to the targets.

6. Students create a video that introduces the tour locations and where to find the targets that will start the tour videos.

7. Ask the groups to create a quiz with one question about each of the locations that can be answered by watching the tour videos.

8. For the final part of the activity, ask the groups to find another group with a different theme and take their tour, answering the quiz questions as they go.

### 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

Students can also use the campus tour procedure above to create activities focused on giving and receiving directions. Rather than creating videos related to the locations themselves, students can create videos explaining how to go from one place to another. Groups of students work their way to a common point, possibly in the form of a competition with the first team to arrive winning. Teachers can create the directions themselves or students can work together as a class to create a set of directions that another class would use.

### *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

Online maps such as Google Maps (www.google.com/maps) provide opportunities to create community content layers that appear on top of their regular maps and are shareable withother people. These layers provide additional information to, for example, special locations, user reviews, images and even directions to follow. For projects, students can design their own layers individually or as a class. At the end of the academic year, first year students can create map overlays that provide information to next year's students. These overlays can include tips on the best places to go, such as the best coffee shops in town or places to study quietly on campus, and the fastest ways to get there, along with images and information about each location.

A similar activity would involve prefacing this activity with field trips where students have to go and collect information about a particular building, person or topic. This could include going to a local museum, finding historical buildings around town, or locating (and perhaps interviewing) a particular person.

More directly related to what is covered in class, students can be asked to tag examples of certain vocabulary items located nearby, or even examples of the use of a particular grammatical feature (e.g. tagging locations with reviews to practice giving opinions). Students putting target language into use in authentic contexts

such as their own local areas has been suggested to have significant learning benefits (Kukulska-Hulme & Bull, 2009). Teachers can also create this information themselves, and provide pictures, links, tips and even specific vocabulary items for students to study (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 useful activity that can be enhanced with AR. While traditional languagefocused treasure hunts often incorporate written clues hidden at each location, AR-enhanced treasure hunts can take advantage of the ability to also embed audio and video into the environment. This can provide the addition of speaking and listening practice to an activity that is traditionally focused on reading and writing.

In this activity, two teams are paired and given different instructions which they need to share to retrieve information from around the town (this could be limited to just one campus, for example) in order to find a hidden treasure. In order to get to the treasure, students leave notes for the other team by tagging items with a recorded video that explains where to find the next video.

A treasure hunt can also involve location sharing. Google Maps now features the ability to let users track friends and choose whom to share their own location with2. A variation of the treasure hunt is for one group of students to head out and for another to stay in class, tracking the first group's location (see Figure 4), and perhaps sending out instructions with tasks for the group to complete over Skype (https://www.skype.com/) or Google Hangouts

### *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

It is a common occurrence that some students finish an activity early while others are struggling to keep up. One way of dealing with this is to provide learners with the option of accessing additional information, based on their needs and/or preferences. AR services can make it easy for teachers to provide further explanations or additional exercises. By scanning the activity in the textbook, learners can access further resources online via links and videos embedded into the text itself. These resources could enable students for whom the content may be too easy to access additional tasks or more challenging questions (see Figure 5), while simultaneously assisting struggling students with translations of key vocabulary, a summary of a reading text, charts or diagrams to help explain difficult concepts.

To achieve this, physically scan the desired page from the textbook (using a scanner or photocopier), convert it to a digital image and upload it to an AR service such as HP Reveal or Layar. Once uploaded, use the website tools to place the additional information on top of the page so that students can access it when they point their AR app cameras at the textbook activities.

### *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

Information gap activities (where learners are missing information they need to complete a task and need to talk to their team members to discover it) are a popular classroom activity.

With AR, teachers have the opportunity to enhance these activities by exposing students to a wider variety of media to discuss. AR apps such as HP Reveal and Layar can provide teachers with the tools they need to quickly embed content such as videos, text, audio, websites and more into any image. After finding a few images related to the topic of the information gap activity, teachers can upload them to an AR creation tool and embed the desired content into each

one. Once the images have been printed out on paper, they can be distributed to students who can then use their cameras to access the content and start explaining it to their group.

Some examples of information gap activities include:

· 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.

· Grammar: Each AR target displays a set of key information related to a narrative, such as the tense, perspective, events etc. that students have to put together to understand the full context of the story.

· Pragmatics: when given a particular text type, such as a request or an apology, students collect the key components needed to word the letter correctly, by finding and sharing such information as the intended audience, the severity of the issue, the topic at hand and the level of politeness needed.

· Communication: each student can see some information about an object, such as a related image, a video, an audio recording or a 3D model. By sharing what they can see, they try and identify, for example, the purpose of the object they are looking at, or some information about it, such as who it belongs to, or what should be done with it.

### *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 For teachers with access to a high-end VR headset, asynchronous film creation programs such as Mindshow (www.mindshow.com/) can be useful in helping students express creativity in their language production in new and exciting ways. Students can create environments and then film themselves in it one after the other, layering each student's movement and dialogue onto the scene until a fully filmed, multi-actor scene is

created. Students can custom-design scenarios that are enhanced by 3D virtual realia and props and create engaging videos to demonstrate language usage scenarios to their classmates. Airports, hotels, presentations, news reports, job interview scenarios and more can all be made and shown in class

### *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

One common challenge faced by teachers is knowing how much of the class content is being understood. One method of monitoring student performance is backchanneling, where teachers request responses and feedback from students at key points during the lesson to gauge comprehension. AR opens up the ability to quickly distribute access to online questionnaires and feedback opportunities without having to add QR codes or web links to printed handouts. Digital image copies of handouts can be uploaded to any AR service andhave links to online forms embedded in them. Teachers can take entire units worth of material and embed backchanneling opportunities into the worksheets without needing to reprint the material with weblinks. Students simply use an AR app to point their phone cameras at the handout and access the backchanneling material.

Some of the many backchanneling opportunities that online questionnaires enable include presenting students with a few sentences after teaching them a new grammar point or vocabulary item and asking them to indicate which ones are correct or incorrect. For reading activities, comprehension questions can be administered or students can select from a list of keywords after skimming a short article. For writing, students can choose which thesis statement is most appropriate for a topic or place a number of essay paragraphs in order (see Reinders, 2014 for more on backchanneling).

To create these backchanneling opportunities in the classroom, scan or take a photo of the activities and use them as AR targets to take students to online forms

where they can answer questions and provide responses. In Layar, HP Reveal or any online AR service that ermits creating URL links from AR targets, simply create a link to a Google Form (http://docs.google.com/forms/) and change the settings as desired.

Students can also provide anonymous feedback on specific activities without teachers needing to create multiple forms. Google Forms supports pre-filling sections of the form automatically based on the URL used to access the form, allowing for teachers to auto-fill the name of the activity whenever a student scans an activity with Layar or HP Reveal.

To do this in Google Forms, after creating questions for students to answer, create a question with a short answer field such as "Which activity do you wish to talk about?" Then go to the "More" icon (three vertical dots) in the top right and select "Get pre-filled link."

Answer the above question in the form with the name of the activity that is going to be augmented and then click "Submit." Now there will be a link that can be pasted into an online AR service, using the activity sheet/textbook page itself as a target and any time a student points their smartphone at that target, they will be automatically sent to that Google Form with the activity title pre-filled.

### 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

Many textbooks are not particularly topical and the subjects can sometimes be discussed in very generic, impersonal terms. As a form of pre-reading or familiarizing students with a topic before classroom discussion, use 360-degree videos in Google Cardboard or other VR systems to fully immerse students in the subject at hand, using current resources. Check sites such as YouTube for "360-degree (topic)" and look for content that would be suitable for students. For

example, on the topic of 'separation' there are some truly touching videos of the plight of refugees (see Figure 7) that are likely to spark a reaction from students.

Once students have watched these videos, ask them to write and discuss a few questions:

· 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.

## Augmented Reality-Based Foreign Language Learning: Importance and State of the Art

Augmented reality is increasingly used in the educational domain. However, little is known concerning the actual importance of AR for learning English skills. Augmented reality (AR) reflects a physical real-world environment that has been augmented or enhanced by adding virtual computer-generated information to it. AR is a new technological system that entails adding virtual objects to the real world in real time throughout the user's experience. AR contains an integration of computer-generated data, namely, graphics, audio, and video with the real world. It supports and reinforces reality by presenting information that is neither recognized by individuals' imagination nor identified by their cognitive process in normal circumstances. Recently, the popularity of augmented reality has experienced a rapid increase, particularly for academic purposes. The reason behind its popularity lies in providing a mediated conception of the factual world by combining it with computer-generated content. Augmented reality has various uses in different fields, such as psychological treatment, manufacturing, medicine, robotic, military, robotic, customer design, telerobotic, and maintenance and repair applications.

Even though augmented reality is still in the early phases concerning the educational domain, a variety of researchers indicate that augmented reality enriches the school curriculum. For example, augmented reality might promote students' motivation towards learning English, particularly reading skills, and augmented reality offers the capabilities of greatly promoting the educational

system. Augmented reality is considered an effective tool that facilitates the process of learning English and improves students' motivation.

## Theories and Approaches behind Augmented Reality
## in Foreign Language Education

Among various language acquisition and learning theories, constructivism, sociocultural theory (SCT), and connectivism are believed to guide the use of AR, on the ground that some of their features are associated with AR. On the other hand, Communicative Language Teaching (CLT) and Task-based Language Teaching (TBLT) are the approaches on which AR may be predicated.

In the view of constructivist theorists, learners construct their knowledge by combining newly acquired knowledge with previous ones. The core of this theory is the active engagement of learners. Discovery-based, situation-based, and problem-based learning theories are derived from the view of constructivist theory. AR-supported learning is a contemporary theory and it is also based on constructivism, in as much as it helps learners to gain knowledge in a contextualized environment, and with the help of AR-based language materials, the learners can acquire, internalize, construct knowledge and use it in their productive tasks through using their critical thinking and kinesthetic abilities.

In the process of language learning, cultural and social factors have also a considerable magnitude. Based on this significance, sociocultural theorists claim that meaningful learning requires not only the innate capacity to learn but also social interaction with cultural elements. One of the core issues of SCT is the role of the Zone of Proximal Development (ZPD). The fundamental relationship between SCT and AR lies here, relatively with scaffolding. With the help of AR technology, language learners have a chance to work collaboratively in a contextualized environment. Collaboration in such an environment leads to social interactions and scaffolding between language learners.

Apart from these traditional theories, connectivism, which is relativelya new contemporary theory, is about constructing a connection between the technology-

enhanced learning environment with learning opportunities for learners while prompting interaction and collaboration. By the agency of AR-based technology, which is context-based, learners can have a chance to bridge their learning skills with the real contextualized environment enhanced by different modalities. HELLO designed by Liu (2009) might be considered as an example of a connectivist approach to language learning by virtue of AR, since it enables learners to enhance their speaking and listening skills in AR-based contextualized environment.

Even if language acquisition and learning approaches depend on the above mentioned theories, it might be fruitful to briefly mention CLT and TBLT in terms of AR. CLT puts interaction at the center of the language learning process. Any kind of interaction (i.e with the teacher, with peers, with authentic texts, etc.) combined with the use of language outside leads to better learning. Supporting this, AR technology allows for this mentioned process, enables learners to engage and interact with technology inside and outside the classroom, anytime andanywhere.

On the other hand, TBLT mainly concentrates on the use of authentic language and meaningful tasks in the process of language learning. Through the medium of AR, learners can have a chance to take place in meaningful tasks combined with real and virtual worlds, and they can perform their language skills within these tasks to learn more effectively.

AR helps 21st-century skills development. Most textbooks include end-of-the-unit projects such as posters, booklets, brochures, and digital newspaper designs. These projects can be completed using AR. In this way, students use the 4C's (Critical thinking, Collaboration, Creativity, and Communication) while searching for an appropriate AR platform, choosing suitable multimedia, collaborating and communicating with peers, and all in all, bringing about technologically supported, innovative, and quality products. Throughout the process, teachers should encourage and guide students as they explore. Eventually, teachers will be amazed at what students come up with.

# Teaching Foreign Language Skills Using Augmented Reality

The recent changes in education due to the previous COVID-19 pandemic increased the need to implement technology utilization in English language teaching. In addition to the tragic human loss and suffering, we have witnessed a time full of transformation of education via the integration of technologies and digital tools. For instance, technologies such as video calls, messages, and websites have been integrated into online classes. Although augmented reality (AR) technology is still an emerging technology and has not been explored fully, empirical evidence has shown that AR is an effective tool for teaching in online contexts and distance learning.

As English has become an international language and a lingua franca, the teaching of English language skills is vital in this era of convergence. Within the teaching of English, there are four language skill that include reading, writing, listening, and speaking. The teaching of these skills ensure that students are competent communicators. However, the teaching of English using traditional or conventional methods is found to be uninteresting, dull, and ineffective as the new generation of learners are often more technological savvy compared to previous generations. Hence, teachers' instruction needs fresh and innovative use of technology integration for increasing student engagement. Various technologies have been inculcated for improving the teaching and learning of English language skills, with AR being one of them.

## *Implementing Augmented Reality (AR) for Improving EFL Students' English Listening Skills*

Listening for EFL students is linked to speaking and pronunciation. If a student can pronounce something correctly and speaks in a natural and everyday way, they will understand it when they hear it.Teaching EFL listening is rewarding because students can often make good progress if appropriately guided. Listening skill is critical that teachers have to practice every day. Teachers have the knowledge and technique to teach listening to the learners successfully. There are

three steps in teaching communicative listening as follows: Pre-Listening, While-Listening, and Post-Listening.

*Pre-listening step to prepare students for what they will hear or view*. The teacher should assess the student's background knowledge of the topic and the linguistic content of the text necessary to understand the listening passage or activate whatever knowledge the students have. There is also the need to clarify features of any cultural information, which is essential for the students to understand the passage without isolating it from its very context, which also gives them hints as to what type of text they will be listening to, the role they will play, and the purpose (s) for which they will be attending. This activity allows them to work collaboratively, do background reading, or even do class discussion activities.

Sample pre-listening activities:

1. Looking at pictures, maps, diagrams, or graphs

2. Reviewing vocabulary or grammatical structures

3. Reading something relevant

4. Constructing semantic webs (a graphic arrangement of concepts or words showing how they are related)

5. Predicting the content of the listening text

6. Going over the directions or instructions for the activity

7. Doing guided practice

8. Matching while-listening activities to the instructional goal, the listening purpose, and students' proficiency level.

*While-listening step*. This directly relates to the text as students do the task during or immediately after the listening. The teacher needs to ensure that the students are well instructed and understand every step they must follow to complete the task of listening. If students are to complete a written task during orimmediately after the listening time, it is of great help for them to let them read through the script or text first. By doing so, students will have the foreknowledge as to what they will listen to and somehow get ideas for completing the task. In this

phase, the primary goal is comprehension and not production. Letting them write while listening might distract them from achieving the primary goal. Asking questions that help students focus more on the details of the text is also crucial to their comprehension. Before the listening activity starts, allow students to review questions they must answer after listening. Listening to the answers will help the students figure out the crucial parts of the message of the listening material or text. Conducting predicting activities also helps the students bring their comprehension skills to a higher level. Do these indicating activities before the actual listening so the students will be reminded about what they will hear to see if it makes sense in the context of their prior knowledge and what they already know of the topic and events of the passage? Whenever possible, unleash necessary feedback to encourage the students and understand how they can examine how or why their responses need modifications.

Sample while-listening activities

1. Listening to visuals

2. Filling in graphs and charts

3. Following a route on a map

4. Checking off items in a list

5. Listening for the gist

6. Ching for specific clues to the meaning

7. Completing cloze (fill-in) exercises

8. Distinguishing between formal and informal registers

*Post-listening step*. Follow-ups play a vital role in this process stage. Follow up the while-listening part, which aims to use the knowledge acquired from listening to develop other skills like speaking. In real-life scenarios listening and speaking go together. They are integrated, so the teacher should teach these two skills interactively. The students may know how to listen to and speak the language, but it is a tendency that they may still need to be able to do communication using the language simply because these skills are not presented and used in a very integrated way. Using real-life scenarios as authentic materials

could naturally lead to acquiring these two skills in an integrated manner. Integrating skills exposes English language students to the original language and challenges them to interact naturally using the language (Tavil, 2010). By doing so, learning English becomes a natural means of interaction and sharing among people. Furthermore, it helps the teacher be creative by putting color in their lesson using various activities because the range of tasks is more comprehensive. "Real success in English teaching and learning is when the learners can communicate in English inside and outside the classroom" (Davies and Pearse, 2000: 99).

Sample post-listening activities

1. Think, Pair, Share Activity

2. Inside-Outside Circle Activity

3. Role-play Activity

4. Survey activity

5. Information-Gap

Listening is a receptive skill in that the listener receives a message from a speaker, but it should not mean the listener is passive during a listening task. The listening process is very active as the listener needs to use background knowledge to understand the speaker's intended message; the listeners should deal with various tasks while listening to activate their schemata.

The follow-up of these stages can easily be the production stage, which inevitably means integrating skills. Hence, teaching these skills will negatively influence communication in the classroom; therefore, the teachers should create real-life situations by combining listening and speaking skills and implementing Think Pair, Share Activities, Inside-Outside Circle Activities, Role-play Activities, Survey activities, Information-Gap, and Four Corners.

### *Teaching Vocabulary to English-Language Learners with Augmented Reality*

Curiosity is the crucial element in our DNA which drives us to explore and learn. From ancient times until now, we, as human beings have always wanted to try things for ourselves, to explore and experience. I believe that learners should

be given the opportunity to explore the things they are learning. In-class environments are not always able to provide these opportunities but language teachers can overcome this obstacle by bringing traditional course books to life and employing Augmented Reality technology which is relatively easy.

The children of today are bombarded with technological tools from the day they are born and there are even some studies which have discovered that the brain structure of today's children is not the same was that of previous generations. Smartphones, tablets, and video games are physically changing the brains of adolescents. Our students have changed radically and today's students are no longer the people our educational system was designed to teach.

Students spend their entire lives with mobile phones, computers, video games, music players and video cams. How can we as teachers engage our students if we are not on the same wavelength? The gap between teachers' technological skills and knowledge and that of students' is widening. Thus, teaching increasingly demands technologically-competent and efficient teachers who can capture the attention of digital natives and in order to be able to do this, teachers need to be one step ah….no! Two steps ahead of their students if that is at all possible.

In the millennial age, media technologies such as pictures, videos, conferencing, animation-creation, computer games, chat rooms and social networking sites ranging from Penpals to Facebook have affected the way we learn and teach languages. With such tools, learners now have endless opportunities to learn languages and these technologies have made language learning and teaching more enjoyable and productive.

These new technologies have also paved the way for a change in course delivery and new approaches in course delivery have emerged with technological advancements.

Learning English vocabulary through augmented reality (AR) can improve students' vocabulary mastery. It makes young learners more engaged and excited to learn English vocabulary. Augmented Reality learning activities combined with the Task-based learning approach encourage students to participate in activities

and improve student motivation in language learning. Thus, higher stimulation increases language achievement. Teachers lack practical training in AR content creation and implementation from a technological and pedagogical perspective, but their attitudes towards AR integration as transformative technology are very positive, particularly regarding student attention, collaboration and shared enjoyment.

With its feature of visualizing the content in a context-rich environment, AR provides students with meaningful associations between the content and the real environment" that eventually eases the process of vocabulary learning. Augmented Reality simulations might provide language learners with motivating experiences and unexpected delight. Media components such as audio, video, animation and interactivity facilitate language learning by reducing anxiety.

Vocabulary teaching is very suitable for AR technology. We can transform a traditional course book unit related to animals into an Augmented Reality enhanced coursebook. Learners are able to bring these animals into life by employing various AR application such as HPReveal, Augment, BlippAR, ZAPWorks, UniteAR, Holo and LayAR.

It is even possible to add a related video on a specific area of the course book, thus supporting self-paced learning. When teachers try this technology in their own classes, they observe that students are really amazed and attracted by it, since they don't feel like they are covering a lesson, but feel like they are at home and playing games. Moreover, this time, they have a chance to explore the target information in a more detailed way and in their own field of vision.

Furthermore, this is something students haven't experienced before and they perceive their teachers as someone ahead of them. This leads to greater attention in the class. AR is an attention-raising tool for learners. Surprisingly, AR is also reported to raise the attention of students who are even struggling with attention deficit hyperactive disorder.

The possibilities are endless with this technology. Lesson plans can easily be developed around AR. For instance, when an animated animal is on the screen,

students can be asked to give a name to it, pet it and tell a story about a day in its life or students might talk as if they were these animals. Movements of animals can be told with references to tenses.

In conclusion, it is incredibly easy to create AR experiences for your students regardless of what their levels are. There are dozens of ready-to-go applications in the Google Play Store or Apple App Store along with hundreds of tutorial videos that show how to implement AR in classes step by step.

## Advantages and Disadvantages of Using Augmented Reality in the Foreign Language Classroom

The number of AR users is predicted to reach 4.3 billion in 2025, meaning that virtual and augmented reality in higher education have a bright future. With AR, educational institutions can improve distance, classroom, and practical learning and make it more exciting and engaging.

The integration of Augmented Reality (AR) into educational settings brings a host of advantages that can transform traditional teaching methods. However, alongside these benefits, there are also potential drawbacks that educators must consider. This balanced examination will delve into the pros and cons of using A.R in the classroom.

### Advantages of AR in Education

*Enhanced Engagement and Motivation.* One of the most significant advantages of A.R is its ability to engage students. A.R transforms the learning experience from passive absorption of information to active exploration and interaction. This heightened engagement can lead to increased motivation and interest in the subject matter. For instance, when students can visualize complex scientific processes in three dimensions, they are more likely to be captivated by the lesson and retain the information.

*Interactive Learning Environments.* AR creates an interactive learning environment that encourages students to become active participants in their education. Through AR, learners can manipulate virtual objects and experiment

with different scenarios, which can lead to a deeper understanding of the concepts being taught. This interactivity is particularly beneficial for kinesthetic learners who learn best through hands-on experiences.

*Accommodating Diverse Learning Styles.* AR can cater to various learning styles, including visual, auditory, and kinesthetic. It can provide visual representations for abstract concepts, which is helpful for visual learners, and can include audio elements for auditory learners. The hands-on nature of A.R is ideal for kinesthetic learners who benefit from a tactile learning experience.

*Safe and Controlled Learning Simulations.* AR allows educators to create simulations of real-world scenarios that would be impossible, dangerous, or impractical to experience in real life. For example, students can conduct virtual chemistry experiments that mimic the reactions of real substances without the risk of handling hazardous materials.

*Immediate Feedback and Assessment.* AR applications can provide immediate feedback to students, allowing them to understand their mistakes and learn from them in real-time. This immediate assessment can help students to quickly correct misconceptions and reinforce learning.

### Disadvantages of AR in Education

*Cost of Implementation.* One of the primary disadvantages of AR is the cost associated with its implementation. Schools may need to invest in AR-compatible devices, software, and training for educators, which can be a significant financial burden, particularly for underfunded educational institutions.

*Technological Challenges.* The reliance on technology means that AR is subject to the same issues that can affect any digital tool, such as software glitches, hardware malfunctions, and connectivity problems. These technological challenges can disrupt the learning process and lead to frustration among both students and teachers.

*Equity and Accessibility.* There is a risk that the use of AR could exacerbate the digital divide. Students who do not have access to AR technology outside of

school may find it difficult to complete homework assignments or further explore AR content, leading to an inequitable learning experience.

*Potential Overstimulation.* While the interactive nature of AR can be engaging, there is also the potential for overstimulation. Some students may find the multisensory experience overwhelming, which can detract from the learning objectives and lead to cognitive overload.

*Teacher Training and Curriculum Development.* The effective use of AR requires teachers to be adequately trained, not only in the technical aspects of the technology but also in integrating it into the curriculum. Developing AR-enhanced lessons that align with educational standards and learning outcomes requires time and effort, which can be a significant investment for educators.

*Distraction from Traditional Learning Methods.* There is a concern that the novelty of AR could distract from traditional learning methods and foundational knowledge acquisition. Educators must strike a balance between utilizing new technologies and ensuring that students still engage with and benefit from more conventional educational approaches.

*High Costs of AR Devices.* The manufacturing of AR devices involves the incorporation of advanced technologies, which naturally escalates their market prices. High costs can potentially hinder widespread adoption, as not everyone can afford these premium devices. This could potentially create a divide between individuals and organizations that can leverage AR's benefits and those who cannot. As we move forward, it is vital to work towards making these technologies more affordable to promote inclusivity and widespread use.

*Limited Battery Life.* AR applications are known to consume a significant amount of power, which puts a strain on the battery life of devices. Users may find themselves constantly charging their devices, which can interrupt the user experience and limit the usability of AR in scenarios where prolonged use is necessary. Developing power-efficient algorithms and hardware components could be key to overcoming this limitation.

*Over-reliance on Network Connectivity.* AR experiences often require stable and high-speed internet connections to function seamlessly. This reliance can prove to be a significant barrier, especially in regions with limited or inconsistent network connectivity. Furthermore, heavy network traffic can lead to lagging and buffering, undermining the immersive experience AR aims to offer. To mitigate this, advancements in offline AR capabilities and enhancing network infrastructures globally would be essential steps.

*Bugs and Glitches.* Like any software, AR applications are prone to bugs and glitches that can interrupt the user experience. These technical issues can range from minor annoyances to significant problems that prevent the software from functioning correctly. A commitment to robust testing and ongoing software maintenance is critical to minimizing these issues and providing a smooth user experience.

*Limited Content Available.* The AR landscape is still relatively young, and as a result, the availability of quality content is limited. Developing AR content can be resource-intensive and requires specialized skills, which further limits the pace at which new content can be created. Collaborations between content creators, developers, and industry experts can potentially accelerate the development of a rich and varied content ecosystem.

*Potential Incompatibility with Existing Systems.* AR applications may face compatibility issues with existing systems and platforms, making integration a complex process. Users might find it challenging to incorporate AR into their existing workflows due to these compatibility issues. Hence, developing standards and protocols to facilitate easy integration should be a priority for the industry.

*Complexity in User Interfaces.* AR introduces a new dimension of interaction, which can sometimes lead to complex and non-intuitive user interfaces. Users might find it challenging to navigate these interfaces, leading to frustration and a steep learning curve. The development of user-centric design philosophies, focusing on simplicity and intuitive navigation, can significantly enhance the user experience.

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*Potential for Information Overload.* AR has the ability to overlay vast amounts of information onto the real world, which, if not managed properly, can result in information overload for the user. This can be overwhelming and detract from the primary objectives of using the AR application. Designers and developers need to focus on presenting information in a manner that is easy to digest, possibly incorporating features that allow users to control the amount and type of information displayed.

By acknowledging and addressing these technical limitations, stakeholders can work towards fostering a mature and robust AR ecosystem that promises not only immersive experiences but also usability, accessibility, and value for a wider audience.

In conclusion, while AR offers a range of exciting possibilities for enhancing education, it is not without its challenges. The key to successfully implementing AR in the classroom lies in understanding and addressing these potential drawbacks while leveraging the technology's strengths to create a dynamic and inclusive learning environment. As with any educational tool, the value of AR depends on its thoughtful and strategic application in pursuit of clear learning objectives.

## Health and Safety Concerns of Using Augmented Reality
## in the Foreign Language Classroom

The rapid integration of Augmented Reality (AR) into various aspects of our lives, while promising a revolutionary shift in the way we interact with technology and the world around us, also necessitates a careful consideration of its implications on health and safety. From physical discomforts to mental health challenges, the spectrum of concerns is broad and deserves a thoughtful analysis. Let's explore these concerns in detail:

1. Physical Health

AR interfaces, while being interactive and engaging, pose certain risks to physical health, which are mainly characterized by eye strain and a heightened potential for accidents.

*Eye Strain and Discomfort.* Extended use of AR devices can cause considerable strain to the users' eyes. The phenomenon often termed as "computer vision syndrome" encompasses eye strain, dryness, and discomfort, potentially leading to long-term vision problems. Users are often so engrossed that they overlook the need for regular breaks, which can exacerbate the strain. It is thus essential for AR applications to incorporate features that encourage users to take necessary breaks and possibly even include settings that adjust the brightness and contrast to reduce eye strain.

*Potential for Accidents (Distractions while Walking or Driving).* AR can potentially create immersive experiences that distract users from their immediate surroundings. This has serious implications, particularly when users are engaged with AR applications while walking or driving. The distractions can lead to accidents, sometimes with severe consequences. Policymakers and developers need to work hand in hand to create guidelines and safety features that minimize distractions and promote safe use of AR technology in various settings.

2. Mental Health

The effects of AR are not limited to physical health; they extend profoundly into the realm of mental health. This new age technology can potentially foster conditions that precipitate mental health challenges including increased isolation, dependency, and a blurred distinction between reality and virtuality.

*Increased Isolation.* While AR offers interactive and engaging experiences, there is a growing concern that it might lead to increased isolation. As users get more absorbed into the virtual worlds, the time spent on real-life social interactions diminishes. This isolation can potentially lead to a range of mental health issues including depression and anxiety. Communities and individuals need to be cognizant of this risk and work towards fostering a balanced approach to

technology use, where real-life interactions are not completely overshadowed by virtual engagements.

*Dependency and Addiction* Like many technological advancements, AR carries the risk of fostering dependency and addiction. Users might find themselves spending an increasing amount of time engaged with AR applications, sometimes at the expense of other important aspects of life such as work, education, and personal relationships. It is critical to develop mechanisms within AR applications that encourage responsible use, including features that alert users about excessive use and promote regular breaks.

*Blurring of the Lines between Reality and Virtuality* A unique challenge posed by AR is the blurring of lines between the real world and virtual environments. As AR integrates virtual elements seamlessly into the real world, it might become increasingly difficult for users, especially young children, to differentiate between what is real and what is virtual. This blurred distinction can have significant implications for users' perceptions of the world and their ability to engage meaningfully with reality. Educational programs and awareness campaigns can play a vital role in helping users navigate this complex landscape, fostering a healthy and grounded approach to AR use.

In conclusion, as we embrace the plethora of opportunities offered by AR, it is incumbent upon us to navigate its growth with a vigilant eye on the potential health and safety concerns. By fostering a culture of awareness, education, and responsible use, we can work towards ensuring that the advancement of AR occurs hand in hand with the well-being of its users, paving the way for a harmonious integration of technology into our lives.

## Privacy and Security Issues of Using Augmented Reality
## in the Foreign Language Classroom

As Augmented Reality (AR) technologies continue to become an integral part of our daily lives, the concerns surrounding privacy and security are escalating at a similar pace. The seamless integration of virtual data with the real world, while

offering an enriched user experience, also opens up avenues for potential misuse and exploitation of data. Understanding these concerns deeply and working towards mitigating them is critical in establishing a safe and responsible AR ecosystem. Here, we delve into the nuances of the privacy and security issues associated with AR technologies:

1. Data Privacy

Data privacy remains at the forefront of concerns as AR technologies continue to evolve. The issues surrounding the collection of sensitive data and the potential for data breaches are becoming increasingly pronounced.

*Collection of Sensitive Data.* AR applications often require access to a significant amount of personal data to function optimally. This may include geolocation data, facial recognition, and sometimes even access to personal files and media. The collection of such sensitive data creates a situation where users might be unwittingly exposing their personal information, making it imperative for developers and providers to establish clear boundaries and consent mechanisms. Additionally, stringent regulations governing data collection and storage are necessary to prevent misuse and to uphold user privacy.

*Potential for Data Breaches.* The data collected by AR applications are usually stored in centralized databases, which are potentially susceptible to data breaches. A breach can lead to the leakage of personal and sensitive data, which can have far-reaching consequences, including identity theft and financial fraud. Companies developing AR technologies must invest heavily in securing these databases, implementing advanced encryption techniques, and adopting a proactive approach to identifying and mitigating potential security vulnerabilities.

2. Security Risks

Alongside data privacy, the burgeoning AR sector faces substantial security risks, notably an increased vulnerability to hacking and misuse of personal information.

*Increased Vulnerability to Hacking.* As AR systems become more complex, they also become attractive targets for hackers. These cybercriminals can exploit

vulnerabilities in the software to gain unauthorized access to user data or even to manipulate AR experiences in malicious ways. For example, hackers might manipulate AR content to spread misinformation or propaganda. The security of AR applications, thus, should be a priority, with continuous efforts directed towards identifying potential vulnerabilities and patching them promptly to prevent exploitation.

*Misuse of Personal Information.* The information collected by AR applications can sometimes be used in ways that violate user privacy and trust. For instance, companies might sell user data to third parties for advertising or analytics without the explicit consent of the users. This not only breaches trust but also puts users at risk of targeted phishing attacks and other forms of exploitation. To prevent such misuse, regulatory frameworks must be developed that impose strict penalties on entities that misuse personal information, encouraging a culture of respect for user privacy and ethical data handling.

In conclusion, the path to a secure and private AR environment is laden with challenges that demand a concerted effort from developers, regulators, and the community. Creating awareness about potential privacy and security issues, and fostering a collaborative approach towards mitigating these concerns, will be essential in shaping an AR ecosystem that not only enriches user experience but also upholds the highest standards of safety, privacy, and security. Through responsible development and use, we can harness the full potential of AR technologies without compromising the well-being and privacy of the users.

## Societal Impact of Augmented Reality

As Augmented Reality (AR) weaves itself more intricately into the fabric of our society, it begins to mold and shape various aspects of our lives, sometimes in ways that may not be immediately apparent. Its implications stretch far beyond individual users, influencing societal structures and dynamics on a broader scale. In this section, we take a closer look at the potential societal impacts of AR,

encompassing aspects such as social isolation, environmental concerns, and economic implications:

1. Social Isolation

The proliferation of AR can potentially foster environments where social isolation becomes more prevalent. This is characterized by reduced face-to-face interactions and its consequential impact on children's development:

*Reduced Face-to-Face Interactions.* As individuals immerse themselves more in the virtual augmentation of reality, there is a conceivable reduction in face-to-face interactions. This can potentially undermine the depth and quality of personal relationships, as virtual interactions may not fully replicate the nuances of physical interactions. Furthermore, this trend can lead to communities where individuals are more isolated, potentially fostering feelings of loneliness and detachment. It is, therefore, crucial to encourage a balanced approach to AR use, where virtual interactions complement, rather than replace, physical interactions.

*Impact on Children's Development.* Children growing up in an environment saturated with AR technologies may face unique developmental challenges. The potential for reduced physical activity, hindered development of social skills, and an over-reliance on virtual environments are significant concerns. Additionally, prolonged exposure to AR can potentially impact children's ability to distinguish between the virtual and real worlds, with consequences for their cognitive and psychological development. As such, it becomes essential to establish guidelines and educational programs that foster healthy interaction with AR technologies, safeguarding the holistic development of children.

2. Environmental Concerns

The exponential growth in the adoption of AR technologies raises critical environmental concerns, particularly in terms of electronic waste and energy consumption:

*E-Waste.* The manufacturing and disposal of AR devices contribute to the ever-growing problem of electronic waste (e-waste). As users continually upgrade to newer devices, older models often find their way to landfills, contributing to

environmental degradation. Strategies for recycling and upcycling components, as well as designing devices with longer lifespans, need to be prioritized to curb the proliferation of e-waste and its associated environmental impacts.

*Energy Consumption.* AR applications, particularly those that involve complex computations and graphics, are energy-intensive. This surge in energy consumption not only strains existing power infrastructures but also contributes to increased greenhouse gas emissions, particularly if the energy is derived from fossil fuels. Developing energy-efficient AR technologies and encouraging the use of renewable energy sources can potentially mitigate these environmental concerns, fostering a more sustainable path of development for the AR industry.

3. Economic Implications

The evolution of AR technologies has considerable economic implications, notably in terms of job displacement and economic inequality:

*Job Displacement.* As AR technologies automate various tasks and functions, there is a growing concern over job displacement in several sectors. While AR can create new opportunities, it can also render certain jobs obsolete, leading to economic displacement and requiring workforce retraining. Policymakers and industry leaders need to work collaboratively to anticipate these shifts and develop strategies to ensure a smooth transition for affected workers, potentially through reskilling initiatives and educational programs.

*Economic Inequality.* The rapid advancement of AR technologies can potentially exacerbate existing economic inequalities. Those with access to AR technologies might have a distinct advantage in terms of education, job opportunities, and overall quality of life, creating a divide between the "digital haves" and "have-nots". To prevent the widening of this gap, it is essential to promote inclusive access to AR technologies, possibly through governmental initiatives and community programs that aim to bridge the digital divide.

In summary, as we navigate the complexities of a society increasingly influenced by AR technologies, it becomes imperative to consider the broader societal impacts. Through conscious development and responsible usage, we can

potentially steer the trajectory of AR technologies towards fostering a society that is not only technologically advanced but also inclusive, sustainable, and harmonious. By addressing these societal concerns proactively, we stand a better chance of integrating AR technologies in a manner that enhances, rather than undermines, the collective well-being of society.

## Educational Setbacks of Augmented Reality

While Augmented Reality (AR) has opened doors to innovative learning experiences, offering immersive, interactive, and engaging educational content, it is not devoid of setbacks. As we steadily integrate this technology into our educational systems, it becomes paramount to scrutinize the potential impediments and accessibility issues it might foster. This section meticulously explores these setbacks, evaluating how they might influence learning outcomes and access to quality education.

1. Learning Impediments

The integration of AR in educational settings, although promising, presents a series of challenges that could potentially hinder the learning process. Here, we explore some of the critical impediments:

*Distractions in Learning Environments.* The immersive nature of AR can sometimes prove to be a double-edged sword. While it has the potential to create engaging learning experiences, it can also introduce distractions in learning environments. The plethora of information and interactive elements can divert students' focus, making it challenging to concentrate on the core learning objectives. Students might find themselves engrossed in the augmented elements rather than assimilating the educational content at hand. Therefore, educators and content creators need to design AR experiences judiciously, ensuring that the technology serves as a tool for enhancing learning, rather than a source of distraction.

*Potential for Shallow Learning Experiences.* A significant concern with AR-based learning is the potential for fostering shallow learning experiences. The

emphasis might shift from deep understanding and critical thinking to mere interaction with augmented elements. There is a risk that students might prioritize the visual and interactive aspects over the substantive content, possibly fostering a superficial understanding of complex topics. To mitigate this, it is essential to blend traditional teaching methodologies with AR, promoting a balanced approach that encourages deep learning and critical thinking, while leveraging the interactive capabilities of AR.

2. Accessibility Issues

The rapid development and implementation of AR in education unearth serious accessibility issues, which can potentially exacerbate existing disparities in educational outcomes:

*Limited Access to AR Technology in Underserved Communities.* The deployment of AR technology is often concentrated in well-funded educational institutions, leaving underserved communities lagging. These communities might lack the necessary infrastructure, including access to AR devices and high-speed internet connectivity, to benefit from AR-enhanced learning experiences. This disparity can result in unequal learning opportunities, putting students in underserved communities at a significant disadvantage. It becomes critical to develop strategies that facilitate the broader dissemination of AR technologies, ensuring that all communities, regardless of their socioeconomic status, have equal opportunities to benefit from this technological advancement.

*Widening of the Digital Divide.* The introduction of AR in educational settings has the potential to widen the existing digital divide. Students who have ready access to AR technologies might have a substantial advantage over those who do not, creating a rift in educational outcomes. This divide is not only confined to access but also extends to the skills required to navigate and utilize these technologies effectively. To prevent a widening digital divide, educational policies should focus on promoting inclusivity, possibly through governmental initiatives that aim to bridge the gap, ensuring that all students have the necessary resources and skills to leverage the benefits of AR technologies.

As we strive to integrate AR technologies into educational settings, it becomes essential to navigate the potential setbacks prudently. By addressing learning impediments and accessibility issues proactively, we can forge a path that leverages the strengths of AR to enhance educational outcomes while minimizing its drawbacks. This proactive approach fosters an inclusive educational landscape where AR technologies serve as tools to facilitate comprehensive and equitable learning experiences, paving the way for a brighter and more inclusive future for all students.

As we stand on the threshold of an era prominently marked by the integration of Augmented Reality (AR) into various sectors of our lives, it becomes critically imperative to balance the scales of rapid advancement with potential pitfalls. Throughout this discourse, we have navigated the complex tapestry of potential disadvantages that accompany the burgeoning use of AR technologies. It is a journey that took us through the technical limitations, health and safety concerns, privacy and security issues, societal impacts, and educational setbacks that are intertwined with the propagation of AR technologies.

In conclusion, the onus falls upon us — the developers, policymakers, and users — to foster a symbiotic relationship with AR technologies, where innovation thrives alongside safety, privacy, and inclusivity. Through a collaborative and concerted effort, we can pave the way for an AR-integrated future that harmonizes with the collective aspirations of society, weaving a tapestry that is not only technologically advanced but also grounded in ethical and responsible practices. Let us venture forth with vigilance and foresight, shaping a future where AR technologies serve as a beacon of progress, illuminating our paths while safeguarding the cherished values of humanity.

**The Influence of Augmented Reality on Our Brain**

AR is already with us for a while now. However, there is not much research about the benefits of it from the psychological side of consumers. We found a

number of interesting articles about the influence of AR on the brain and decided to share the information with you. What does AR do to our brain?

*High cognitive activity.* In special research, 50 participants have worked on different assignments with and without AR versions. During this experiment different factors were measured. For example, long-term memory encoding, engagement, attention, approach and emotional intensity. The results show that almost all of the parameters were higher with people who used AR. Especially within engagement and attention.

*High level of memory encoding.* The same study shows a 70% higher memory encoding level with AR usage. Encoding allows to convert a perceived item of use into a construct that can be stored within the brain. We can recall this later from our long-term memory. For marketers, this has great meaning. Imagine yourself looking at a number of television commercials. The next day you will probably recall a few to zero. The ones you do remember most likely have something special, like AR. It's something that you haven't experienced before.

*Lower approach / withdrawal levels.*According to the same study, the levels of approach and withdrawal while using AR were lower than without it. Lower levels of approach and withdrawal can be connected to the emotional experience of participants.  AR provokes a 'surprise' response in the brain.

*Future predictions.* The capacity of AR to deliver surprising and emotionally experiences is likely to stay in the future. The software that is used to create AR experiences continually improves. This makes it possible for developers and creators to build more vivacious and compelling AR experiences. There is also a big chance that AR will be used for more purposes in our daily lives.

*Neuroscience and the future of AR.* As with most mediums, the newness associated with AR will decrease a little over time. With this in mind, the earlier mentioned withdrawal effect will most likely diminish as we see AR segway into an everyday utility. At this point, story and content become a much more integral part of delivering AR experiences of the future. The ability to tell engaging and

captivating stories will be more important as people's brains come to expect everyday surfaces, products, and packaging to be augmented.

These findings have huge impact on brands and their long-term commercial strategies. As Neuro-Insight's research certainly suggests, AR experiences are more engaging and memorable than non-AR experiences. This presents a huge opportunity for brands to lead the way in leveraging the technology. They don't just stop at a brand level. The impact is much more far-reaching. For example, live shopping from home in a Kiwi store during a pandemic. This 3D online store provides all the service and excitement from a regular real store, but online. Now is the time to start thinking about your long-term AR strategy.

## A Safe Future of Augmented Reality

Looking ahead, the potential of AR is immense. Its applications will continue to improve various aspects of our lives, offering enhanced, interactive, and personalized experiences. However, as we embrace the conveniences and innovations of AR, prioritizing safety, privacy, and ethics is non-negotiable. A future where AR is both transformative and safe is achievable, but it requires a concerted effort from all stakeholders.

Development and regulatory practices need to be agile, adapting to the evolving landscape of AR technology. Innovators and developers have a pivotal role in integrating safety and ethical considerations into the design and deployment of AR applications. Every innovation should be assessed not just for its functional capabilities, but also for its impacts on privacy, safety, and societal norms.

Users, too, have a significant role to play. Awareness, education, and responsible usage are essential. As we step into augmented spaces, being aware of privacy, safety, and ethical considerations is vital. The interplay between technology and human behavior will shape the experience of AR – making informed and ethical choices ensures that this emerging technology enhances rather than compromises our quality of life.

It is important not only for the teachers to be ready, knowledgeable and have a positive mindset towards the implementation of technology in the classroom but also the fact schools need to be well-equipped with the devices needed for the implementation of technology in the classroom before we can implement in in real classroom situation. It is important to consider all these aspects such as teacher's readiness, perception and acceptance of using Augmented Reality in the teaching of English reading skills and school's infrastructure and internet access before implementing it for real in the classroom. When implementing a new policy or technology into the classroom, the one conducting the lesson is the teachers. It is very important that we put teachers first before implementing Augmented Reality in classroom to find out whether they will agree or not agree with the implementation. If teachers are not happy with the implementation, it will never be successful, because in the end, teachers are the one who will conduct a lesson.

In conclusion, as we embrace the augmented future, staying informed and vigilant of the potential risks and navigating them ensures that we harness the benefits of AR without compromise. The AR's evolution is ongoing, and in this narrative, safety, privacy, and ethical considerations are not just integral – they are foundational. In the balance of innovation and safety lies the promise of an augmented reality that transforms, empowers, and uplifts in a manner that is secure, ethical, and respectful of the human experience.

*Учебное издание*

**Павлова** Ольга Юрьевна
**Матушак** Алла Фёдоровна
**Носова** Людмила Сергеевна

**ПРИМЕНЕНИЕ ДОПОЛНЕННОЙ РЕАЛЬНОСТИ
ПРИ ПОДГОТОВКЕ БУДУЩИХ УЧИТЕЛЕЙ ИНОСТРАННОГО ЯЗЫКА**
*УЧЕБНО-МЕТОДИЧЕСКОЕ ПОСОБИЕ*

На английском языке