

Augmented Reality + Education = Great Synergy

WHITE PAPER



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INTRODUCTION

Education is one of the most important aspects of life. It is a way of learning about who you are, what you are capable of, and how to live with that knowledge. For many people, it also provides a way of their future success. As such, education should be taken as seriously as possible and given the most significant importance it deserves by society's members.

But there seems to be something wrong with today's schools. Nowadays, schools focus mainly on teaching kids how to excel in examinations rather than genuinely learning about life skills or self-reflection, emphasizing achieving good grades. This is something that has come to a level where it has become a major hidden problem. So, for example, if you are an average student, your school life might be a little better with good grades, but it doesn't mean that you will be motivated to study more or work harder.

For persons who are not interested in academics, their life would be even more problematic because they have to work very hard to get along with the school system and their other classmates. This could translate to less fun in pursuing learning in the long run, as students tend to not care much about their own development and also that of their peers. Also, to add to this, [Jensen](#) claimed students are more likely to become distracted when learning from a tape outside of a formal classroom setting, which results in a noticeable drop in learner engagement and when they are in the classroom.

Also, while we are in the era where technology has been ingrained into our lives, it seems as if schools are a bit slow. The only technology commonly used in schools is the computer and other teaching aids; this is despite the fact that there's plenty of helpful tools out there that could enhance education at school. Still, students are more on memorizing stuff for the exams than truly getting the most out of their learning experience.

This should change. Who doesn't want students to enjoy their learning experience truly? And who doesn't want teachers to inspire students to work more on their own development and take advantage of new technologies and tools?

The truth is, education is not perfect. But this doesn't mean that we should completely throw it away. On the contrary, it needs to be improved upon. The first step in improving education is acknowledging its flaws and trying our best to work on a solution for this problem. What if we could innovate our learning and teaching methods further to make learning more fun, be more meaningful, and truly make our minds understand the world?

You may hear or know of or even use interactive whiteboards, virtual reality, tablets, and other technological tools that have been successfully implemented in many classrooms.

This is my vision for a school of the future, and I'm sure I'm not the only one who envisions the same. One that focuses on student development and encourages their learning experiences to be more fun, more stimulating, and more meaningful. And it's not limited to only students; teachers can also be involved in making sure that everyone's contribution matters. This includes helping students work on problem-solving skills and providing new methods of teaching that can help enhance learning experiences for all involved.

This white paper, in particular, will be focusing on how augmented reality or AR can effectively be put in place to enhance student's learning experience and make the classroom environment more immersive, not just sitting in class or watching a video if learning online.

HOW DOES AUGMENTED REALITY TRANSFORM THE EDUCATION INDUSTRY?

Augmented reality is a technology that can be used to improve the learning process. But it looks like many education institutions still haven't adopted AR. Project Tomorrow reports that [less than 10% of schools](#) currently use augmented reality in the classroom, even though AR and other similar technologies are becoming increasingly popular.

This means that schools have yet to realize the potential of AR to improve student engagement. But don't let this stat alone give you the impression that AR will not be effective in schools. Here's [another statistic](#): the value of AR in education technology (EdTech) is predicted to surpass \$5.3 billion by 2023, with [2.4 billion](#) AR mobile users around the world. How valuable is AR?

AR definitely allows you to bring the classroom to life. It activates your creativity and imagination, making learning more fun and more manageable for students. Furthermore, AR helps both teachers and students engage in a more meaningful manner.

Here are some ways that AR can change how we learn and interact with digital content.

FOR STUDENTS

Students can benefit from augmented reality, providing engaging, interactive learning experiences for people of all skill levels and ages.

1. ELEVATE STUDENT ENGAGEMENT AND SPRUCE UP THEIR INTEREST

It's not unusual to see students who are quickly bored with their teachers' lectures, but it could actually change their experience once they try AR. Instead of just staring at the teacher or on their laptops for hours, they are now looking forward to what the teacher has to say; and most importantly, there is a whole new dimension added to the discussion.

One of the main benefits is that students could have a more immersive experience. For example, they can use AR to make it seem like they are in the classroom and interact with other students and teachers using this technology. But, of course, this could be done either in the classroom or at home, just by using a computer, tablet, or smartphone.

According to [research](#) conducted among marketing students by Georgia Southern University and Bradley University, technology has resulted in an 87% increase in attendance and a 72% increase in participation in the class. This shows that most college students embrace technology and accept it into their everyday lives, which helps them with their learning in the long run.

Students can also use headsets and other devices if they can afford to. Either way, kids would be able to work on their learning in their own environment without having to go through all those hassles, such as traveling long distances or worrying about the quality of teaching.

2. EASY ACCESS TO LEARNING MATERIALS ANYTIME, ANYWHERE

In a world where we are constantly being bombarded by information, it only makes sense that we would want to easily access the information we need when and where we need it. Imagine having easy access to an augmented reality scene that allows you not only to read content in class but also to see what's happening in different parts of the world.

There are also augmented reality tools that allow you to compare different things side-by-side so that you can instantly understand how each one will affect your future. Again, this is useful for both students and teachers, as they'll gain a better idea of what they have to do and accomplish.

3. WORK DOESN'T FEEL LIKE WORK

Augmented reality technology can be used to make learning not only easier but also more enjoyable. For example, students could have their own personal augmented reality teacher with whom they can work at home or even in the classroom setting. This virtual teacher would have all the same materials and information available that a real-life educator would.

A significant advantage of AR in schools is that it can help make the process more interactive by letting students interact with one another as well as with whatever content or subject matter is on display. According to [this research](#), about 68% of learners say gamified courses are more motivating than traditional courses.

By providing an unforgettable learning experience, students won't feel that learning is tedious work filled with many hours of sitting in front of books or computers. Instead, it's like playing, making learning immersive, and it'll make learning fun.

4. PROVIDES A SAFER WAY TO LEARN

AR can actually help students have a more comfortable and safer learning experience. For example, it could be used to show basic information about how the fire works, just an example of dangerous or flammable material. With the help of AR, a student could have an immersive reality showing it in front of him or her.

With the current COVID-19 pandemic, students can't go out and about as freely as they used to be. Therefore, using AR to let students experience different environments and scenarios could help them learn or acquire new information faster than they usually do otherwise.

For example, a student could participate in a field trip to another city that could be available through an augmented reality app or something that lets them actually be there, not just go to it? This would make learning much more interesting for students, and they can enjoy their experience even if it is just a virtual one.

5. REDUCING HARDWARE AND EQUIPMENT COSTS

Augmented reality can reduce the hardware and equipment costs on the students' side, allowing them to use virtual environments instead of physical ones. It's also a solution that could be easily implemented as part of their learning journey; students can simply use either a computer or smartphone.

Buying new hardware and electronic devices for the sake of experiencing AR can be expensive. However, since most students nowadays have access to smartphones and an Internet connection, it makes sense that students would be able to experience AR much easier. For example, a classroom setup could be done using an AR setting, and students simply access it through an app or a web browser.

6. AIDING LEARNERS WITH DISABILITIES

Augmented reality is helpful for people with disabilities and those who cannot comprehend or interact with the traditional, classroom-based learning system. For example, there are children with autism or special needs who either don't have the ability or the skills to learn by traditional means, like people who have visual impairments or impairments in their motor skills.

With AR, it can help these students experience a no-barrier environment that allows them to experience new things and new learning materials that they wouldn't have gotten in an ordinary classroom setting. It's like they are being taught by a virtual teacher that has all the resources needed to provide them with an enjoyable learning experience.

7. STUDENTS AS INNOVATION DRIVERS

AR can spark creativity among students as they can use this technology to create new ways of learning or even improve the experience they get from studying. For example, students could create their own augmented reality-based content that teaches other people or other students, such as in a classroom setting.

They can also work on improving current content and come up with new ways to study using these tools. They could even consider brainstorming innovative AR ideas so that they can explore different ways to approach their projects and learning methods from one another.

8. ENHANCE COLLABORATION AMONG STUDENTS

The interactive nature of AR makes it an excellent opportunity for students to work together in a group. For example, they can be given different student accounts with varying levels of access and data that would allow them to view and work on the project together in the same space.

We all know how much it sometimes sucks to be stuck in the same room with multiple people who are already shy or may not have anything interesting to say. With AR, it wouldn't be such a problem because it would allow students to collaborate and communicate with each other in the virtual space given at their own pace without the risk of being sidelined.

This also means kids from different parts of the world or different backgrounds can work together on projects through an AR environment, which is a great way to learn from each other and encourage teamwork and collaboration in a much engaging way than ever before.

FOR TEACHERS

For teachers, the benefits of AR are enormous as it can be used as a teaching tool and not as a distraction from learning.

1. PRESENTATION COMES TO LIFE

AR allows teachers to bring their presentations to life, allowing them to show images more lively and engaging. For example, the teacher can bring together a set of lenses that can be used to create a hybrid reality that is both virtual and real.

When a teacher is lecturing about history, for instance, she can use an AR to bring his or her presentation to life by making the images come alive using this technology. Even if she's not talking or explaining something in-depth, she can still show how it works by using AR to their students.

2. MORE COST-EFFECTIVE

Teachers don't have to buy or learn a piece of new equipment or hardware to use AR; they already find one that can be used with their existing devices.

Without a doubt, AR is also straightforward to install and set up. All a teacher needs is a surface or tablet that is equipped with this technology, and then the entire presentation can be brought to life by simply using these devices in conjunction with one another. But, of course, the AR developer needs to make sure that such a setting should be made user-friendly for both teachers and students alike before distributing or made it live.

Not to mention, it is much more cost-effective than regular technology, as it doesn't require a lot of money to set up, and it's already built into existing technology, which again, made by the AR developers beforehand.

3. MORE PERSONALIZED TEACHING

AR provides a way of teaching that is more personalized, enabling students to engage without distractions. This is beneficial for them because they will be able to focus and learn more deeply, which would give them the chance to understand concepts easier and appreciate what's being taught.

For instance, an AR desktop could show the teacher's presentation as it happens in real life, allowing students to view videos of lectures or recordings of what has happened in class that day without waiting for days. Alternatively, AR could also capture video of the teacher's presentation for later viewing by other students.

This means it requires fewer textbooks to deal with, as students can view and review their lessons and assignments after class without having to print them out or hand them out for everyone else to have.

4. SPARK MORE CREATIVITY IN TEACHING PLANS

Augmented reality can be used to make relevant curriculums and teaching materials more engaging for students, helping them learn faster and easier as well as making learning more efficient. For example, augmented reality can be used to make it easier for students to understand visual material, such as diagrams, charts, maps, and videos.

With more creative teaching plans, teachers can be more motivated to pursue new and innovative ways to make things fresh and exciting. Even if they can't come up with their own ideas, they can still get ideas from other teachers or simply experiment with AR themselves. For example, they could create a custom teaching plan for students that are different from those used for the previous class.

5. IMPROVE TEACHING SKILLS

Related to the previous point, AR can benefit teachers because it can provide them with a new and innovative way of teaching their students. With AR, teachers can introduce new ideas or make their lectures more interesting through the use of engaging virtual animations. They could also use AR to inspire new lessons that students would be interested in or begin to learn more about a topic on their own time by using this technology.

This will allow teachers to improve their teaching skills in a much more meaningful way than before and give them renewed motivation in teaching others. This is because they are constantly learning and trying new things that would benefit them in the future. For instance,

It's not hard for teachers to explore a new educational approach or try out something new when it comes to augmented reality; all they need is an idea that could come from anywhere and implement it right away.

HOW CAN AUGMENTED REALITY TRANSFORM THE LEARNING EXPERIENCE?

There are many ways augmented reality can transform the learning experience, going beyond the classroom walls with mobile devices, such as tablets and smartphones.

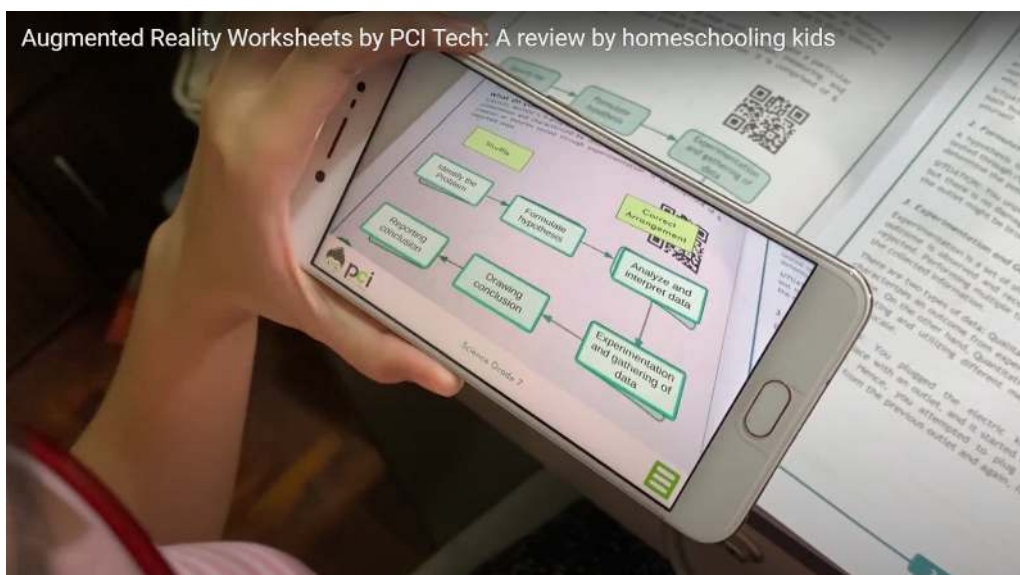
AR-ENABLED WORKSHEETS AND HOMEWORK

This is a revolutionary new way to do worksheets and homework. It's not just about finding the answers; it's about understanding them. With AR-enabled worksheets and homework, students can see how math problems are solved and get interactive exercises to help them understand and learn the lesson better.

At the same time, students can get a better understanding of the concepts being taught in class through AR-enabled worksheets and homework. So it is not just about working out math problems or reading a textbook, but understanding what they are learning as well.

This approach gives students an incentive to use their creativity in understanding how things are done rather than just following instructions by rote.

This video by [Sisters Act - Kids Can Tell](#) shows how AR-enabled worksheets work. The worksheets were made by PCI Tech, a Filipino technology company.



AR-ENABLED BOOKS

An AR-enabled book enables the reader to interact with the book much more meaningfully than before. Students can use these books to do more than just read them; they can explore and interact with the characters inside the book, thus making reading an interactive experience.

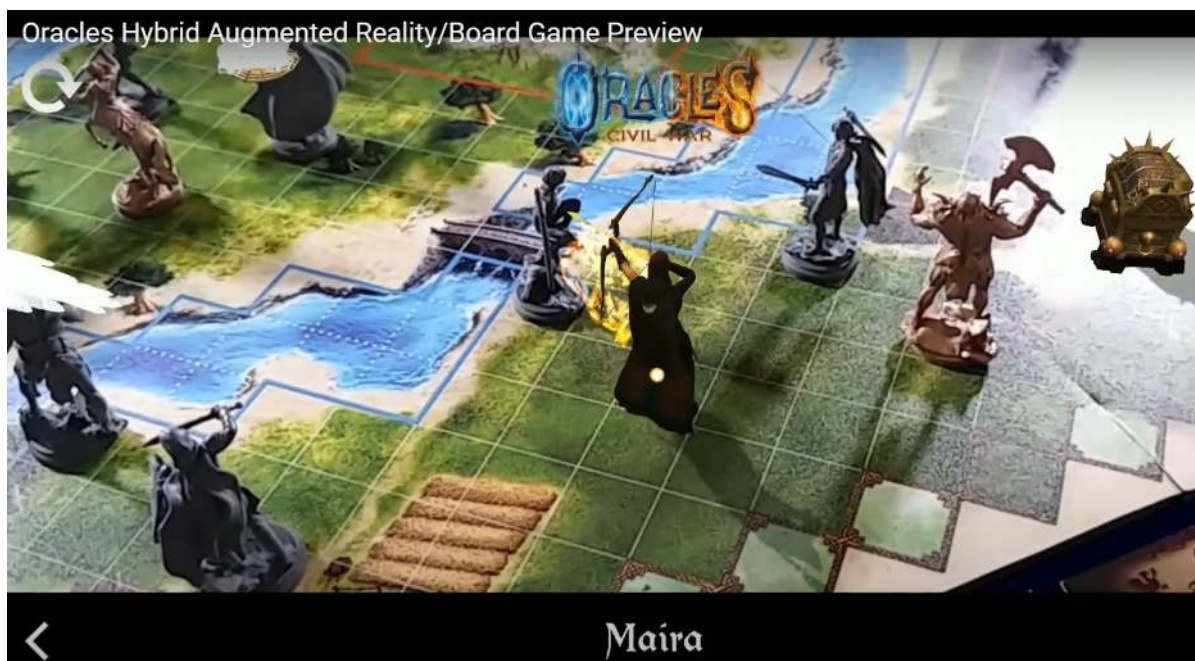
The students can be able to personalize the reading experience based on their preferences. [Julie Smith: The Techie Teacher](#) has demonstrated the AR-enabled book in action.



AR BOARD GAMES

Playing the game while experiencing AR will help students learn a lot more about the game than when they play it without AR. This is because the AR-enabled board game enables them to experience the game in a whole new way while not distracting them from the actual playing.

While this one's a hybrid AR, the Oracles Hybrid AR board game shows how it can make a board game more engaging.



AR FLASHCARDS

Learning through flashcards doesn't have to be boring anymore. With the use of AR, students can apply visuals to the flashcards and get a more active understanding of what they are learning. In this way, they can make use of their creativity and do more than just follow instructions by rote.

These Dinosaur 4D+ flashcards use augmented reality technology that brings ancient creatures on the cards come to life!



ANATOMY

Are you learning anatomy as part of your course? The AR element makes it easier for you to retain the information being presented by the professor and get a better understanding of the anatomy in your own way, rather than just following the instructions.

See the video below on how it works:



DIGITAL PUZZLES

Think jigsaw puzzles. What if you could play them with digital technology and experience AR on the box?

Augmented reality can be used to present digital puzzles with many visual elements, similar to what it did for physical jigsaw puzzles. This approach gives users a more user-friendly way to try and solve their puzzles even though they cannot physically drag pieces from one location to another.

This Smartivity jigsaw puzzle would surely make you want to play more!



SCAVENGER HUNTS

You may have heard or even played Pokemon Go before. It is a game that involves AR and lets you catch virtual monsters in real-world locations with just the touch of a button. What if you can use this concept for something else?

For instance, instead of catching Pokemon's characters, you can search for clues related to your lesson or topic and get points depending on what you do. The more clues you find, the more points you get! It's fun and educational all at the same time.

Scavenger App nails this big time (video by [TeachLearnDesign](#)).



AR FIELD TRIP/VIRTUAL EXPEDITIONS

The current situation doesn't permit going out and about often because, you know, the pandemic is still ongoing. So, the idea of going out on a field trip is perhaps not as fun.

But with different augmented reality technologies, there's no more need to stop everything and go out searching for faraway places. With AR field trips/virtual expeditions, students can take trips to locations all over the world, then share their experiences with other students or classmates.

Meghan from [Vestal's 21st Century Classroom](#) explained how this could be possible :)



AR MANUALS

Do you need guidance on using particular stuff or need to learn more about the components of it? AR manuals can help you by providing more information and step-by-step instructions on how to use something. This can help learners with both basic and complex tasks.

[MobiDev](#) explains how AR can be implemented on manuals and user guides.



HOW TO EFFECTIVELY DEPLOY AUGMENTED REALITY IN THE EDUCATION SECTOR

There are many different ways to effectively deploy AR in the education sector in an effective manner.

USE WEBAR PLATFORMS

There are many web-based AR platforms that educators can use to deploy augmented reality in teaching and learning more effectively. WebAR is also the easiest way for anyone to get started with AR.

For instance, [Wikitude](#) provides a platform that allows creating AR experiences without needing to know any development skills in the process. Similarly, [Aryel.io](#) lets anyone create AR experiences without requiring a development background.

But if you are not into the dev chops,

HIRE DEVELOPERS TO DEVELOP AR

If you or your organization have deep pockets, then this option is for you. Simply hire developers who can create the AR experiences that you want. In addition, they will take care of the entire process, from development to deployment to maintenance.

DEVELOP A USER-FRIENDLY MOBILE APP

Just like the AR, if you don't have the expertise to build a mobile app from scratch, you can get someone who does - or hire a mobile development company with the skills and experience.

This approach makes it possible for your app to be more accessible and accessible to people, considering that nearly everyone has a smartphone these days. It also means you can have access to a larger pool of potential teachers and students who will use an AR app, making it easier and more accessible.

But what if your organization prefers web-based AR instead of having a mobile app? Then,

DEVELOP A USER-FRIENDLY WAY TO ACCESS WEBAR

Related to the first point, make sure that your users know where to access the link to experience WebAR on their browsers. Utilize the web-based AR platform by creating a website that is viewable on the browser.

This approach makes it easier for teachers to experience an AR lesson on their classroom's computer instead of dealing with several apps that they might not find very user-friendly.

DISCUSS HOW TO GET STARTED WITH USING AR

Especially if your organization wants to delve into AR for the first time, you must discuss the practical steps to get started with AR.

This involves determining how your organization plans to use AR in the classroom, which tools and platforms will be used, which topics will be covered, and so on. This also applies if it would be done outside of the classroom setting. Define the Purpose of a Given AR Experience

Another important thing to consider is the purpose of an AR experience.

What will it be used for? Why does it need to exist? What are its goals? How can it help with student or teacher objectives? The more clear you are about it, the better.

EXPLAIN THE BENEFITS OF AR FOR TEACHERS AND STUDENTS

The benefits of utilizing AR are enormous. But make sure that you can clearly communicate this to your stakeholders (in this case, students and teachers) before getting them involved.

You should also make sure to give specific examples. For instance, if you are using AR for a classroom lesson on an exciting topic, make sure that you explain why it is essential to the students and make sure they can relate to it.

CONCLUSION

Augmented reality is a relatively new technology that can be used to educate people. It has been utilized as a teaching tool for many reasons, such as adding visual aids to lessons and making it easier for learners to understand complex concepts.

Considering that nearly everyone these days has a smartphone, an AR app is one way of implementing AR into an organization's learning environment. But before getting started on creating an AR app, you need to answer important questions such as who will be using it, what it will be used for, and why your organization wants to create an AR app in the first place.

It's also important to consider the practical steps on how to get started with using AR. This involves determining how your organization plans to use AR in the classroom, which tools and platforms will be used, which topics will be covered, and so on. Determine which type of platform can help your organization achieve its objectives. But before that, it is crucial to discuss the practical steps on how to get started using AR from the very beginning.

REFERENCES

ABI Research. (2019, April 17). *Augmented and Virtual Reality Tools Empower Education and Drive AR/VR Market Value to US\$700 Million by 2023*. ABI Research. Retrieved June 18, 2021, from <https://www.abiresearch.com/press/augmented-and-virtual-reality-tools-empower-education-and-drive-arvr-market-value-us700-million-2023/>

Chapman, J. R., & Rich, P. J. (2018, September 20). Does educational gamification improve students' motivation? If so, which game elements work best? *Journal of Education for Business*, *93*(7), 315 - 322. Taylor and Francis+NEJM. <https://doi.org/10.1080/08832323.2018.1490687>

Eastman, J. K., Iyer, R., & Eastman, K. L. (2009, July 1). Interactive Technology In The Classroom: An Exploratory Look At Its Use And Effectiveness. *Issues in Education Research (CIER)*, *2*(3), 31 - 38. <https://doi.org/10.19030/cier.v2i3.1084>

Jensen, S. A. (2011, October 6). In-Class Versus Online Video Lectures: Similar Learning Outcomes, but a Preference for In-Class. *Teaching of Psychology*, *38*(4), 298 - 302. SAGE Journals. <https://doi.org/10.1177%2F0098628311421336>

Lu, A., Wong, C. S. K., Cheung, R. Y. H., & Im, T. S. W. (2021, April 12). Supporting Flipped and Gamified Learning With Augmented Reality in Higher Education. *Frontiers in Education*, *6*, 110. <https://doi.org/10.3389/feduc.2021.623745>

Maryville University. (2021, March 12). *Augmented Reality in Education: Interactive Classrooms*. Maryville Online. Retrieved June 18, 2021, from <https://online.maryville.edu/blog/augmented-reality-in-education/>

Sinha, S. (2021, January 2). *Augmented Reality In Education: A Staggering Insight Into The Future*. eLearning Industry. Retrieved June 18, 2021, from <https://elearningindustry.com/augmented-reality-in-education-staggering-insight-into-future>



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