IMMERSIVE LEARNING IN EDUCATION: ADVANTAGES AND DISADVANTAGES

KASUMU, REBECCA OLUWAYIMIKA (PhD) &
UDUAK IDOGHOR (PhD, LLM, BL)
Department of Curriculum Studies/Educational Technology
Faculty of Education
University of Port Harcourt

ABSTRACT

Immersive learning is a teaching and learning approach that integrates technology with traditional methods of education, providing a more realistic and stimulating environment for growth. It focuses more on the experience of learning rather than if a student's answers are right or wrong. Immersive learning is hugely effective way for many learners to develop their knowledge and skills. It provides artificial, digitally created content and environments that accurately replicates real life scenarios so that new skills and techniques can be learned and perfected. In the future, immersion students will typically develop greater cognitive flexibility, demonstrating increased attention control, better memory, and superior problem-solving skills as well as an enhanced understanding of their primary language.

This study also indicates that work immersion enables students to acquire and develop the skills of teamwork, communication, attendance and punctuality, productivity and resilience, initiate and proactivity, judgment and decision making, dependability and reliability, attitude, and professionalism.

Keywords: Immersive learning; virtual reality; teaching; learning; technology.

1.0 INTRODUCTION

Immersive learning is a teaching and learning approach that integrates technology with traditional methods of education, providing a more realistic and stimulating environment for growth. It focuses more on the experience of learning rather than if a student's answer are right or wrong (Buljan, 2022). Immersive learning utilizes augmented, simulated, or purely artificial environments for learners to experience scenarios and simulations. There are many popular technologies for immersive learning experiences such as virtual reality, augmented reality and 360º video, to name a few (Barto, 2022).

An immersive classroom is a classroom that brings the real world into school through a fully immersive environment using wind, smoke, sound and visuals. This fantastic resource allows teachers to take their students beyond the classroom and the walls of the school into experiences that they may not otherwise ordinarily encounter. Education is the backbone of a thriving society. Civilizations have focused on the transfer of knowledge since the beginning of time. As educators are always looking for new ways to transfer knowledge more effectively, quickly, and easily, they have turned to virtual reality (Hassan, 2021). Life in the digital era offers an

opportunity to enable learning using technology. Virtual technology has the potential to transform how educational content gets delivered. It is already making great strides across the globe. There is a lot that a student can learn from the achievements made by virtual reality in the field of education:

1. **Virtual Tools for Real-World Learning:** The virtual tools that are available today allow for real-world learning. It means that students from across the globe can come together using VR to solve real-world issues. Many universities are collaborating in different countries to create a more inclusive environment. One of the ways virtual tools are being used is for offering language learning. Today, students can learn English virtually from just about any part of the world. It is possible to use virtual tools to create the perfect learning environment no matter where students might be. Since people are more likely to remember something, they experienced as opposed to reading, hearing, or seeing it, according to the cone of experience, virtual reality can help boost retention. It was found that students who utilized immersive virtual reality were able to accomplish tasks much faster as compared to students that relied on traditional computer programs (Andreas & Jutta, 2020).

2. **An Improved Online Classroom:** Diving deeper into the achievements made by virtual reality in education, another notable achievement that is observable is an improved online classroom. This has been mostly possible due to the use of an avatar. Social VR applications help tackle the monotony of online courses. They allow remote students to feel connected. Online coursework can rely on such applications to expand the curricula and boost engagement. It shows just how far virtual reality has come. The problem in the past has been that students fail to build memories during online classes. The classes might seem like nothing more than data being fed in the dullest way possible. However, virtual reality can provide students with plenty of opportunities to socialize using interesting avatars (John, 2014).

3. **Virtual Field Trips:** A great achievement made by virtual reality is that it allows for virtual field trips to be taken by classrooms. Some of the biggest universities are offering VR field trips to students for them to experience something new. The best thing about virtual field trips is that once they have been developed, they can be distributed on a massive scale. Discovery Education has offered millions of students the opportunity to take a virtual field trip aboard an airship (Volodmyr, Yurii & Artem, 2022).

4. **Art Education:** One of the biggest achievements made by virtual reality has been in art education. Today, museums across the globe have gone global. This provides art enthusiasts with the chance to visit virtual galleries and look at paintings virtually.

5. **Tutoring:** Finally, virtual reality is also connecting tutors with students in ways never imagined before. Tutors can hold virtual classrooms and bring students together. They can draw on a virtual blackboard and more. Virtual tutoring allows students to get the help they need to excel in subjects that they might be struggling with without hassle. It shows just how far online education has come (Ly, Saade, & Morin, 2017).

2.0 AIM AND OBJECTIVES

This study examines immersive learning in education: advantages and disadvantages. Specifically, the study intends to:

1. Describe the tools for immersive learning
2. Explain the advantages and disadvantages of immersive learning
3. Discuss how to begin implementing immersive learning
4. Evaluate the challenges faced by virtual reality education
5. Examine how immersion improves learning experience
6. Identify reasons why immersive technology is a valuable investment in education and workforce training

3.0 DISCUSSION

Immersive learning is a teaching and learning approach that integrates technology with traditional methods of education, providing a more realistic and stimulating environment for growth. It focuses more on the experience of learning rather than if a student's answers are right or wrong. It incorporates digital media, simulations, and other interactive tools to create "immersive" experiences for learners. This type of education can be used in both online and offline classes through simulations, role-playing, or other activities that allow students to experience firsthand what they are learning about. They might also participate in discussions with classmates around the world (John, 2008).

Below are the different types of immersive learning examples:

- Augmented Reality
- Virtual Reality
- Mixed Reality
- 360 Film

Any immersive learning experience aims to engage learners so that they learn best. Immersive learning puts the student in an environment where they are surrounded by the material they are learning. Immersive learning is different from traditional learning methods in a few ways:

1. **It is more engaging and can hold student's attention for longer:** Immersive learning gets and keeps students' attention for longer, as it is more engaging. Traditional learning methods can be boring, but immersive learning makes students feel like they are right in the middle of the action. It engages the learner's senses, increasing their comprehension of the material. Immersive learning and Virtual Reality can also be combined to make lessons more interesting (Elliot, & Joey, 2017).
2. **It provides a more realistic experience:** The second distinction from traditional learning is that it provides a more realistic experience, helping students better understand the material. With immersive learning, students are in simulated real-world environments where they must interact with other people and objects as they would in everyday life. This type of learning can be especially beneficial for subjects like History, Geography, and Science, which often require hands-on exploration.
3. **It allows for hands-on learning:** One of the advantages of immersive learning is that it allows for hands-on learning. This type of learning takes place in an environment where students are actively engaged in their learning process. In a traditional classroom setting, students are usually passive recipients of information. However, with

www.ijrehc.com   Page 104

immersive learning, students have the opportunity to explore, experiment, and discover new things (Annisa & Mohd, 2022).

3.1 Tools for Immersive Learning

- **Virtual Reality -** Virtual Reality consists of an artificial environment (created by software engineers) that allows the user to be fully immersed in an experience that is altered from the real world. Genuinely immersive, this option allows the user to pick up and move objects, turn on or take apart a device, walk around a room, and interact with virtual characters (Herrington, Reeves & Oliver, 2007).
- **Augmented Reality -** Augmented Reality places virtual objects in real-world space. Using individual headsets or AR-capable mobile devices, images appear in front of the user. This technology can be used to allow the user to explore an object and all its parts or apply virtual labels to a piece of equipment to help them learn how to use each part of the device. Think of AR as adding layers on top of the real world through the lens of your phone, tablet, or headset.
- **Video Learning -** Video Learning captures scenarios and training environments with 360º video to lead the learner through a process or location that can otherwise be difficult, expensive, or dangerous to visit. The employees can view the 360º video by dragging with their mouse or finger on desktop or mobile devices while also providing immersive experience using any VR headset (Isabel, Johannes, Alexander & Amir, 2020).

3.2 Advantages of Immersive Learning

1. **Makes learning fun:** Gone are the days were going to school was considered boring. With the introduction of technology like 3d printing, interactive displays, gamification, and more, lessons have become engaging again. Learners come to school expecting to experience something new and determined to learn how to perform these activities themselves. Adding a virtual reality experience to their lessons will come with the "wow factor" that keeps learners smiling in class. Lessons supplemented with virtual reality will enable learners to experience new things while learning in class (Hamide & Jeongmin, 2020)

2. **Immersive learning experience:** Most or lessons are textbook-based and although this has been the go-to means of education for years, it can still be improved upon. The introduction of images helped learners better-associated information they read in a textbook to specific images. Videos also helped learners better understand lessons that seemed theoretical from their perspective. In some cases, a flat 2d picture does not seem enough, which is why we take learners outside on field trips to experience some of these things themselves. With virtual reality, learners will be able to immerse themselves in the lesson to get first-hand experience of the subject matter (Norton, Ian, Crosthwaite, Nicoleta Balliu, David, Andrew, Geoff, & John, 2007).

3. **Safe experiments and exploration:** Some experiments are dangerous and therefore not done in a classroom. Using virtual reality, these experiments which would normally be dangerous in a classroom can be conducted in a virtual reality environment for learners to experience firsthand. Already, practitioners are using

virtual reality to help people fight phobias. Be it fear of heights or any or even fear of VR goggles, virtual reality is helping people overcome their fears. Normally, taking a patient with fear of heights to the top of a building to fight their fear would be dangerous. In chemistry, physics, engineering, or biology, these experiments can easily be conducted without fear of harm to any learners involved

4. **Inspires creativity & imagination:** Leveraging virtual reality in education also inspires learner creativity. Learners will be immersed in the subject matter which sparks their imagination. Instead of an image in a book, learners get to experience things for themselves and develop interest, based on actual interaction. Technology is something modern learners are used to in their everyday lives.

5. **Learn by playing:** younger learners have very short attention spans. Getting them to sit in one place for a class or two seems like an impossible task. Most learners are used to playing video games. Using virtual reality technology feels like playing video games, encouraging them to want more, and indirectly learning in the process (Robert, Siegle, Roscoe & Schroeder, 2021).

6. **Explain difficult concept:** As teachers, we all have topics that are quite difficult to explain and by extension for learners to understand. Using virtual reality, teaching difficult topics can be supplemented with virtual reality to enable learners better grab and understand these concepts.

7. **Higher Retention Rate -** Using immersive technologies can create exciting activities that can keep employees engaged. Engaged employees have a higher retention rate, which results in a better return on investment from your training program. Learners received feedback from bumping into physical obstacles in the classroom, and had the opportunity to try again while taking into consideration what they learned from the previous experience (Beck, 2017)

8. **Enriched Data Determines ROI -** By investing in new immersive technology, you open your training program to new metrics and measurement capabilities. With a robust program, you can measure the employee's training in real-time with eye tracking, head and body movements, reaction time, and more.

9. **Safe Learning Area -** With immersive learning, you can give your employees a safe learning environment where they can practice safety protocols, observe hazardous situations, or develop interpersonal skills without risking their safety or the company's reputation.

10. **Better learner data:** Technology-based immersive learning tools offer the added advantage of providing instant analytics reports to learning and development staff. Immersive learning technologies can collect usage statistics (ie. frequency of training, duration, completion), performance data (tasks performed or questions answered correctly), and engagement levels (measured in terms of eye tracking, head movement, clicks, and other learner interactions). This unprecedented level of real-time data provides insights on individual progress and aggregate performance to support both individual development and the continuous improvement of immersive learning programs (Adnan, 2020)

11. **A safe learning environment:** Immersive learning makes it easier to practice skills that, in the real world, carry a high degree of risk whether to people or costly equipment.

12. **Economies of scale:** Although the cost of acquiring the technology needed to implement virtual immersive learning may be high, using it to train large numbers

of people over multiple training cycles can be very cost-effective in the long run (Makransky & Gustav, 2021).

3.3 Disadvantages of Immersive Learning

1. **Devalues human connection:** At the present stage of virtual reality technology, users are mostly connected to the software which can be a huge challenge in a classroom environment. This will potentially change as the technology continues to grow but learner interactions will be devalued if learners are mostly connected to the virtual environment (Hafner, 2020).
2. **No flexibility:** Since the software is pre-programmed, questions and answers are only limited to whatever questions or answers are already programmed in the system. Learners who have problems understanding what they see will be unable to ask and get answers to these questions in the virtual world.
3. **Addiction:** Like with most forms of technology, a major concern usually has to do with addiction. Learners can easily become addicted to the use of this technology especially if their interest in the virtual world surpasses their interest in the real world.
4. **Expensive:** The current VR technology is still growing and as more and more competitors enter the market, the technology itself will become less expensive. As it stands at present, only rich schools will be able to afford to integrate the technology into their curriculum (Francesco, Bigliardi, Angelo, Serena, & Alberto, 2019).
5. **Eye health:** Some users of virtual reality goggles have reported some form of effect on their eyes after prolonged usage. This of course has not been proven yet but if the effects of looking at your computer screen for a prolonged period apply in this scenario, it would be advisable to avoid prolonged usage of VR goggles. This issue is still quite debated but the most important is that learners should not use VR goggles for a prolonged period at a time
6. **Costs -** The start-up cost for immersive reality can be higher than alternative modalities. Between the hardware, designing, programming, etc., it may be daunting to your leadership team.
7. **Early Adaptation -** While this is exciting to imagine, it also means that you may have to refresh your program to stay current.
8. **Health and Safety -** Not everyone is able to participate in virtual reality programs. Some people will get headaches, nausea, eye strain, or even worse symptoms (Damas, 2022)

3.4 How to begin implementing immersive learning

Many of the benefits of immersive learning can be achieved without that level of investment, which is good news for organizations with budget constraints. Below are several less costly techniques that have long been a mainstay of soft skills and technical training (Hamilton, McKechnie, Edgerton & Wilson, 2020).

- Simulations that include branching determined by the actions and decisions of learners
- On-the-job training with the opportunity for hands-on practice

- Role playing with a coach or mentor who offers actionable feedback
- Job shadowing while observing real-world interactions with clients

3.5 Challenges faced by Virtual Reality Education

According to Loureiro & Buttencourt (2011), although virtual reality in education has brought with it many achievements, certain challenges need to be addressed such as:

1. **Developing More Content:** One of the biggest challenges faced by virtual reality in education is the lack of content. The fact is that developing more content can be very expensive, and not every educational institute has the means to hire. Since pre-undergraduate education does not have huge funds, it can be difficult to get start-ups involved. This is why it is important to get investors and businesses involved to fund the development of more content.
2. **Availability of VR Headsets:** Although many students can afford to purchase a VR headset, there are still some students that do not have the money to buy a VR headset. This prevents them from taking advantage of VR-based learning. The challenge that needs to be handled is providing VR headsets to every student.
3. **Cyber-Sickness:** Cyber-sickness is a real thing that many people do not even consider. It is similar to motion sickness and can prevent students from learning. The good news is that cyber-sickness is diminishing as technology improves. However, to ensure that students acclimate to the sensation, more investment is needed. Educators have to work together with companies to create the perfect VR classroom. There is no denying that virtual reality can play a big role in the future of education. From offering virtual-reality tools to virtual tutoring, it offers amazing potential. However, certain challenges need to be addressed, such as the need for more content, cost and availability of VR headsets, and cyber-sickness (Loureiro & Bettencourt, 2011).

3.6 How can immersion improve the learning experience?

Immersive technology can realistically simulate real-life situations, which mentally and emotionally engages the learner. As a result, completion rates and meaningful engagement with learning materials increases. In addition, the technology enables on-demand repetition, where immersive scenarios can be repeated as many times as a learner needs to fully absorb the learning material.

Immersive learning can also help learners improve their decision-making in real-world situations. Students can see the results of their actions in virtual reality immediately with real-time feedback, allowing the learner to easily recognize areas for improvement and consequences of a decision made (John & Michael, 2020).

Reasons why immersive technology is a valuable investment in education and workforce training.

- **Promotes learning through experience (experiential learning):** With immersive technology, students can learn more quickly by being an active participant in the learning experience. They learn by 'doing' and interacting in a way that simulates real life experiences, leading to long-term knowledge retention. Immersive technologies

create an environment where students can interact with objects, both virtually and physically. Hands-on experience helps to build soft skills and operational knowledge. Any scenario can be repeated as many times as a student requires in order to master the skill or learning objective - this eliminates the fear of making a mistake and creates a safe learning experience. Learners get an opportunity to apply theory in practice. Their actions receive immediate feedback and have certain outcomes that allow students to check whether they made the right decision (Thompson, 2021).

- **Awakens curiosity with immersive environments:** Immersive technology can be much more exciting for learners compared to traditional learning, as it engages more of the senses and can make you feel like you're in a completely different situation to reality. Immersive learning tools can recreate any kind of environment or situation, which opens up a world of opportunity. It can promote curiosity and sparks interest in students' way beyond regular 2D videos. The captivating virtual scenarios encourage learners to open their minds and explore the impossible. Naturally, it is more interesting than traditional school assignments such as writing a research paper (Laurence, 2021).

- **Improves learning analytics:** Immersive learning gives teachers and trainers a level of performance and usage data like never before, where they can get data driven insights from the learners through real-time and post-performance feedback, which helps to measure learning and identify areas for improvement. Using immersive technology to train students and employees enables more detailed and accurate learning analytics. With XR (extended reality) technology, you can analyze data on a student's performance like never before, and based on this information, teachers and trainers can update learning experiences and guide students further as they progress along their learning journey. Data such as the duration of use, number of repetitions, completion rates, eye contact, body language and number of correct answers or interactions all help teachers to get more detailed insights into the progress a student is making. The learner themself is able to track their own progress too and together the student and instructor can use immersive learning to enhance the learning experience, and ultimately accelerate the transfer of knowledge and behavioral change (Ellysse, 20210

- **Transforms workforce training:** Immersive learning will start to replace some expensive in-person training, as it can be deployed at scale and more cost effectively. Not only are there cost and accessibility benefits, but as we've already discussed, employee performance can also be accurately tracked, and easily identify areas that require additional training. Immersive learning facilitates the upskilling of employees through realistic practice and accurate feedback on performance. Companies can use immersive training to effectively onboard new hires, safely train staff in otherwise high-risk situations, and improve employees' soft skills to help achieve individual and organizational goals. Crucially, immersive learning can be easily deployed at scale to deliver the same high-quality training to employees located all around the world (Lorne, 2021).

- **Keeps learners attentive and focused:** XR captures the full, undivided attention of a learner by immersing them in realistic situations and removing them from distractions. Immersive learning helps learners focus on their learning experience and learn more efficiently. The traditional learning environment is full of distractions. Teachers have to overcome numerous obstacles to win students' attention and help them learn, and we all know people who press 'play' on an e-learning video then scroll through social media while it plays in the background (Micah, 2021).

- **Increases participation:** Immersive learning increases engagement levels of learners compared to traditional learning material. The lack of possible distractions, particularly with VR, combined with immersive gamification, make this an attractive alternative to future learning strategies. Immersive learning encourages students to be active and engaged in the learning material. With immersive learning, the student is frequently required to interact in the virtual environment or complete a task in VR for the learning to continue. Immersive learning gives students a platform for collaboration, where they can meet in VR and feel a heightened sense of presence and connection than over Zoom, for example. Learners can explore virtual environments together, practice joint problem-solving as a team, provide feedback for presentations or group projects, and discuss their performance in the virtual exercises. Role-play games and remote collaboration in VR allow everyone to share their knowledge and learn from each other's experiences, resulting in more active participation (Stephen, 2020).

4.0 CONCLUSION

While immersive learning is still new, there is evidence that it can be very effective way to learn. So far, it is more engaging, provides a realistic experience, and allows for hands-on learning. Immersive learning environments are learning situations that are constructed using a variety of techniques and software tools, including game-based learning, simulation-based learning and virtual 3D worlds. Immersive learning is a learning method which students being immersed into a virtual dialogue; the feeling of presence is used as an evidence of getting immersed. Immersive learning allows learners to control the outcomes by connecting them with real experiences but in a safer environment.

REFERENCES

Adnan, A.H.M., (2020). From interactive teaching to immersive learning. Https//www.iopscience.iop.org>…

Andreas, D., & Jutta, M., (2020). Immersive learning predicted: presence, prior knowledge and school performance influence learning outcomes in immersive educational virtual environments. Conference: 6th international conference of the immersive learning research network 2020.

Annisa, U., & Mohd, Z., (2020). Exploring immersive learning technology as a learning tool in experiential learning for architecture design education. Open house international journal vol. ahead-of-print. No., ahead of print.

Beck, D., (2017). Immersive learning. Https//www.link.springer.com>b…

Buljan, M., (2022). Transforming education with immersive learning techniques. Https//www.elearningindustry.com>tra…

Damas, S.H., (2022). Immersive journalism: advantages and disadvantages. Journal of education and research. 9(2), 43-54.

www.ijrehc.com
Page 110

Elliot, H., & Joey, J.L., (2017). Virtual reality in education: a tool for learning in the experiential age. International journal of innovation in education. 4(2),17-25.

Ellysse, D., (2021). The promise of immersive learning: Augmented and virtual reality's potential in education. Https//www.itif.org….

Francesco, G., Bigliardi, B., Angelo, D., Serena, F., & Alberto, P., (2019). Pros and Cons of Augmented reality in education. Proceedings of EDULEARN19 Conference. Palma, Mallorca, Spain.

Hafner, P., (2020). Categorization of the benefits and limitations of immersive environments for educational conference: The 19th international conference of modelling and applied simulation.

Hamide, K.A., Jeongmin, L., (2020). Immersive learning technologies in English Teaching: A systematic review. Educational technology international. 21(20, 155-191.

Hamilton, D., McKechnie, J., Edgerton, E., & Wilson, C., (2020). Immersive virtual reality as a pedagogical tool in education: a systematic literature review of quantitative learning outcomes and experimental design. Journal of computers in education. 8(2), 1-32.

Herrington, J., Reeves, T.C., & Oliver, R., (2007). Immersive learning technologies: Realism and online authentic learning. Journal of computing in higher education. 19(1), 80-89.

Isabel, L., Johannes, K., Alexander, K., & Amir, D., (2020). Immersive learning in real virtual reality. Https//www.ipirke.com>2020/03…

John, C., (2008). Millee: Mobile and immersive learning for literacy in emerging economies. Https//www.academia.edu…

John, M.B., Michael, W., (2020). Bringing life to learning: immersive experiential learning simulations for online and blended courses. Journal of asynchronous learning networks. 16(5), 61-71.

John, M.C., (2014). Immersive learning. Https//www. Researchgate.net.>2…

Laurence, C., (2021). Immersive learning: what is it and why does it give an advantage to your workforce? Https//www.insights.virti.com>i…

Lorne, F., (2021). The benefits of Augmented reality for employee training. Https//www.forbes.ccom.s….

Loureiro, A., & Bettencourt, T., (2011). The extended classroom: meeting students' needs using a virtual environment. Procedia social and behavioral sciences. 15(2), 2667-2672.

Ly, S.I.S., Saade, R., & Morin, D., (2017). Immersive learning; using wen-based learning tools in a PhD course to enhance the learning experience. Journal of information technology education research. 16(3), 227-246.

Makransky, G., & Gustav, B.P., (2021). The cognitive affective model of immersive learning: A theoretical research-based model of learning in immersive virtual reality. Educational psychology review. Https//www.stanfordv.com>mak…

Micah, C., (2021). How immersive technology champions the four C's of learning. Https//www.edtechmagazine.co…

Norton, C., Ian, C., Crosthwaite, C., Nicoleta Balliu, M.T., David, S., Andrew, H., Geoff, B., & John, K., (2007). Immersive learning technology. Proceeding of the 2007 AaeE Conference, Melbourne.

Robert, F., Siegle, R.D., Roscoe, N.L., & Schroeder, S.D.C., (2021). Immersive learning environment at scale. Https//www.journal.sagepub.co…

Stephen, Y., (2020). How immersive learning technology is transforming work force training and driving social impact. Https//www.iobs4thefuture.med….

Thompson, S., (2021). Immersive learning: why it is effective. Https//www.virtualspeech.com…

Volodmyr, O.L., Yurri, O.Z., & Artem, E.A., (2022). Immersive learning technology for ensuring quality education: Ukrainian university case. 9th workshop on cloud technology in education, December 17, 2021.