

# Significance and Impact of Artificial Intelligence and Immersive Technologies in the field of Education

R. Jayadurga, S. Rathika

Abstract: Teachers are active ingredients of educational system. Pandemic made us aware of online learning. Teachers improvising the learners to add values to educational behavior and attitude. Education never ages, the importance of its lifelong learning everywhere at every time. Artificial intelligence (AI) is a broad context, helps to develop educational strategies for present day scenario. It allows educators to benchmark and develop critical analysis to redesign educational policies for the implementation of innovative learning and teaching strategies in educational institutions. AI helps in educational transformation and accelerating basic educational skills by introducing software robots implemented in classrooms and other devices to make reminders for essential educational activities and assignments. In European countries they are utilizing teaching assistants as robots paired with Augmented Reality (AR) and Virtual Reality (VR) system and now they are providing MR (Mixed reality) altogether called Immersive Technologies promotes lifelong learning capabilities which makes learners engaged in creation, active learning collaboration, problem solving and makes learning as a real life experience in all educational perspectives.

Keywords: Artificial Intelligence, Technologies, Education, Augmented Reality (AR), Virtual Reality (VR),

## I. INTRODUCTION

Empirical research is based on observed and measured phenomena and derives knowledge from practical experience rather than theory or belief. Use of data to answer research questions, the present study in which the data are from observational research in which the data shows a clear understanding about AI and MR as a part of lifelong learning in education According (Mariana and Emilio, 2020,[7]) the use of immersive technologies that provide learners with an innovative and instructional framework, technological advancements have presented a challenge to educational ecosystems.

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The development of the present study's global research from past 4 decades shows that there is an indication of growing interest in using virtual reality in educational system now-adays. Similar to other experimental methods developed in recent decades to address the need of VR, the present study realizes VR is now more accessible to content creators and end users. In the digital era, MR is essential due to their strategic potential, now establishing trends with excellent influence on several research projects and ideas put out in the realm of education and its creative process Using digital visual components, sound, or other sensory cues, augmented reality (AR) creates an enhanced version of the real world that is transmitted through technology, specifically enriches the learning experience if provided in today's academic setting. Companies engaged in mobile computing and business applications have noticed a growing trend, as data collection and analysis become more common, one of the major purposes of augmented reality is to draw attention to specific aspects of the real world, to facilitate understanding of those approachable insight aspects, and generate innovation in realistic setting. There is no doubt that they assist businesses in making decisions and provide understanding of customer purchasing patterns in business. Likewise in education it creates learning and development through its remote expert assistance for students Immersed technologies, are typically not practical to immerse students in the real world and have them engage with it (Mehmet Kesim and Yasin Ozarslan, 2012, [8]). Despite the fact that the world is 3D (three dimensional), we choose to employ two dimensional media in education because it is more practical, comfortable, adaptable, portable, and affordable. It does not, however, supply dynamic material and is static. Alternatively 3D virtual environments created by computers can be used, although they require high performance computer graphics, which costs more than other learning equipments for students. Today's AI technology provides us with special affordances by fusing the real and virtual worlds. This is the new technique for controlling how we engage with the outside world. This technology enhances virtual information on top of the real environment we're witnessing, rather than replacing it. Interactivity and point of view are subject to implicit user control. It gives the students composite views with a collaborative vision of a real scene with artificially created virtual scenes about the relevant topics and make them enjoy the power of reality through these immersive technologies. This is an improvement for students by participating in a typical place, situation, product, or event in a partially unmediated manner. In such way we can provide the informational material through AR.

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#### II. SIGNIFICANCE OF AR IN EDUCATION

Technology related to augmented reality is nothing new. It has been applied to a variety of industries, including the military, medicine, engineering, robotics, tele-robotics, manufacturing, maintenance, and repair applications, consumer design, psychiatric treatments, etc., A person can engage with the real world in ways that have never been feasible before by employing virtual objects to display information that the user cannot directly detect with his or her own senses. With the help of interaction techniques supported by augmented reality, we can alter the location or other graphical elements of virtual objects. We have the capacity to handle both real-world and virtual items by using our fingers or hand movements on mobile devices like shake and tilt (Azuma.S et.al., (2001, [1]).

By improving a student's perspective of and interaction with the real environment sessions, augmented reality can be used for education with amusement and edutainment. Like a genuine object, the student can move around the 3D virtual image and observe it from any angle. Students are able to do tasks in the actual world thanks to the information that the virtual items give. Interactive Surface is one of the crucial ways to enhance learning is through metaphor. Innovative computer interfaces can be created to improve in-person and remote cooperation by fusing the virtual and physical worlds. As many academic and literature books are in the form of audio books, which can be implemented with the AR technology in future, may take the students to civilizations and space virtually and make them learn about our kings & queens, about wars, live experiments, evolution of human kind, etc.,

According to (Gattiker et al., 2013, [2]) describes about fascinating use of this technology is in textbooks that incorporate with AR. These books are printed regularly, but when a webcam is pointed at them, designed interactions and visualizations appear. This is accomplished by utilizing a website, installing particular software on a computer, or using particular mobile applications. By utilizing augmented reality textbooks will be transformed into interactive sources of information found on hardcopy pages. In this approach, even students from village or people without previous computer expertise can benefited from sophisticated immersive experiences. Different teaching strategies and appropriate teaching methods to assist students of different levels because of the constraints of traditional computer-assisted emanating on teaching approaches, AR aided teaching elevates the prerequisites for computer-assisted teaching and hopes that it has a better more intellectual assistant.

## III. VIRTUAL REALITY IN EDUCATION

Computer-assisted training is not always easy to follow, though. It is difficult to deal with students with differing levels and abilities and make aware of how to use different teaching strategies and appropriate teaching methods to assist students of different levels, because, of the constraints of traditional computer-assisted emanating on teaching approaches and answers. This elevates the prerequisites for computer-assisted teaching and hopes that it has a better presentation form and a more intellectual assistant (Steven M. LaValle, 2019,[10]).

A user can engage with a 3D model or virtual world by using VR. the environment could be realistic in the sense that it is familiar to us on a macroscopic level, realistic in the

sense that it represents the physical world as it is now recognized by science but is not typically observable, or it may be used to envision a completely fictional universe. As a consequence, VR has been used in a broad range of educational environments, including the management, engineering, sciences, psychology, archeology, history and architecture (Liangfu Jiang, 2021, [6]).

#### IV. IMPORTANCE OF MR IN EDUCATION

Mixed reality (MR) a hybrid technology of both AR and VR plays a great role in a mysterious realm. The fusion of real and virtual worlds gives users individual control options over their surroundings. This is what makes mixed reality unique. (Viraktamath S.V, et.al., 2021,[13]) explore the field of mixed reality in a unique and planned way to create intelligent mixed reality classrooms. Their aim is to show how mixed reality devices can act as real-time analytical tools for teachers in the classroom, improving student learning. The first part introduces the emergence of mixed reality using several defined theories that are widely accepted and give insight into the approach of many Two different hypotheses researchers. were experimented using the same mixed reality tool called 'Lumilo', which supports AIED (Artificial Intelligence in Eduucation) and ITS (Intelligent Transport System), in an attempt to create a mixed reality classroom. This is followed by hypothetical results aimed at using one of them in a classroom environment where both teachers and students will benefit most. This type of environment has led to better teaching methods compared to existing mixed reality classroom approaches.

## V. CHALLENGES AND OPPORTUNITIES OF MR IN **EDUCATIONAL SYSTEM**

The availability of capable hardware, mixed reality has earned a lot of research attention in recent years. People can now immerse themselves in virtual worlds or explore metadata using augmented reality applications on their smart phones. Schools, universities, and other educational institutions begun to provide tablets capable of displaying mixed reality content to students and pupils However, compelling MR applications that promote enhanced knowledge transfer lag behind (Knierim, et. Al., (2018), [5]). While the availability of MR hardware opens up new possibilities, it also presents new challenges for content creators and educators. We discuss these challenges and opportunities, as well as future research directions. We see mixed reality as an opportunity to provide everyone with supportive and personalized learning experiences.

While MR has the potential to improve learning experiences, it can also overwhelm the learner with too much information at once. Repetitive or obtrusive representations may overwhelm or irritate the user. As a result, the development cycle of learning applications should include an awareness of visual overloads as well as intelligent information placement. The first completely self-contained wearable MR devices became affordable for researchers and end-users as hardware progressed quickly. Most devices are still in their infancy.

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This includes a short battery life, a small field of view, and an uneasy feeling after wearing it for several hours. These challenges will most likely be solved in the coming years due to rapid technological advances. Although speech allows for hands-free interaction, it is unlikely to be suitable for classroom use due to background noise and social acceptance (Santos, etal., 2014, [12]). Because they cause fatigue when used repeatedly, mid-air hand gestures are unsuitable as an input modality. The question of how to design an expressive interaction concept for MR learning experiences remains an open research question and sure this present study will be a lead to make remedies for the above mentioned challenges.

## Impact of AI in Present day Educational setting

Researchers argues that nowadays, young people typically use their smart phones or tablets. This gives students the chance utilizes AI applications to study for ten to fifteen minutes in their free time. Using gesture recognition technology, AI aids in understanding the students' views or comfort during lectures. As AI develops, it can now read a student's facial expressions or hand movements to determine whether they're finding the lecture difficult to understand (Sayed Fayaz Ahmad et al, 2021, [9]). If so, the machine can adjust the course so that the student can easily follow along. Machines driven by AI are competent of tailoring the academic curriculum. Through the use of AI tools, worldwide classrooms can accommodate students who have auditory or visual impairments.

Students who are ill and aren't able to attend class can also benefited from this. The teacher evaluates the students in the conventional instructional system which is based on their assessment tasks, which takes a lot of time. When AI intervenes in this situation, it assists in providing recommendations on how to close learning gaps. Students who speak different languages or have hearing or visual impairments can access a wide range of information thanks to AI. The AI-based system allows the translator delivers subtitles in real-time application mode. Students can read and hear in their native language, for instances, with the assistance of Machine Translation. There did exist some systems in use where multiple-choice tests were evaluated by computers like Olympiads, and now breakthroughs are being made such that written responses like paragraphs and assertions can also be graded by computers. As a result, an educator's job is made smoother, there is no time wasted, and can be used to engage more on the progress and assessment of each individual student.

#### VI. SIGNIFICANCE OF AI

Students can be categorized into groups by AI that are most suited for specific activities. Software using artificial intelligence that can better identify information right away. These information are added to a central database, and the database's prior essays can be used to compare future articles. A computer-based technique called AI in education offers personalized, dynamic, and perceptive teaching (Jagadeesh Kengam, 2020,[4]). The Domain Knowledge model, which gives the system the ability to finish tasks that encourage students to judge and contribute to the solution, is one of the major components of the AIED system.

Finally, the Interface component offers the channel via which the learner and the system communicate. The Model of Pedagogy component depicts the teaching capability of the system. Voice recognition is extremely effective in education

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as this represents a ground-breaking use of AI. This includes the Apple's Siri, Google Assistant, Microsoft's Cortana, and Amazon's Alexa. Without the assistance of their teacher, these voice assistants allow students to communicate directly with the educational materials that are available on the internet and in the installed devices. Use of this Technology expected to accumulate expeditious generation. As artificial intelligence rapidly he grow one no wonder we are as long as more and more facet of our daily lives teaching system tries to commemorate-up with importunity acquire more talent to keep AI booming the engine will startle. But additional than just education development through STEM (science, mechanical, management and engineering). However the field is being metamorphose by AI cores. Intelligent systems are rapidly changing in education establishments from primary to higher education, use of this technology expected to accumulate expeditious generation and instruction establishments as a whole cognoscente efficiently and chalk up student's learning goals.

AI can bring about altogether advanced change education. Robots can ameliorate essentials to enrich and bring about digital content in the classroom digital instruction has already startled. An investment beckons and amplify Interest in AI for future educational institution, increase of international student market, democratization higher education and booming finances pressures which are associated with canonizing the numbers of students, who wish to go on to higher education as the main reason for burdensome higher via AI education.

#### VII. OTHER PRACTICAL IMPLICATIONS

AI is impacting many fields, and education is one of them. It is a modern teaching method, or teaching and education method, that can address and solve many problems related to learning. The implementation and adoption of AI is inevitable in the education sector. AI technology is not limited to smart learning, tutoring systems, and social robots. There are many other smart technologies such as virtual facilitators. online learning environments, management systems, learning analytics, etc. that are also making expressive benefaction in this area. This study provides a strong case for the adoption and use of AEOIs (Automatic Exchange of Information) in educational settings. It also provides guidance to education policy makers on the importance and role of AEI in education and the number of issues AEI (Artificial Emotional Intelligence) can address. It also provides educational institutions, teachers, and students with knowledge about how, where, and when to use AIA (Artificial Intelligence and Applications). Each stakeholder can use the research differently, depending on their needs and requirements. Also, educate educators about how AI is changing the world of education and how it can help with dangerous tasks

#### VIII. FUTURE OF AI IN INDIAN EDUCATION

AI has the potential to change the way we live and work, because of its high potential its adoption is treated as the fourth industrial revolution.



## Significance and Impact of Artificial Intelligence and Immersive Technologies in the field of Education

As with any major advance technology brings many opportunities and challenges, on the one hand some Applications are being developed or are being developed that may improve quality of life. Important. The annual economic growth expected to double over 12 years, study says by 2035, on the other hand, there is also the risk of unemployment. A report from CMIE (Centre for Monitoring Indian Economy) estimates that India's unemployment rate was 6.50% in September 2022, In urban India it was 7.70% while in rural India it was only 6.00%. According to them at least 44.85 million unemployed Indians all over India due to scarcity of skills and technologies (Sunil Kumar Srivastava, 2018, [11]),

Luckily India has a unique opportunity to apply technology to solve some of its biggest problems Lack of medical facilities, poor quality of education, etc. cannot meet them. The aim is to ensure good health care or quality education using conventional methods, for example, the number of doctors required to provide quality medical care is very large, accomplished in a few years. AI technology offers an alternative way to achieve the same thing. This report reviewed both the international and national landscape of adoption of artificial products intelligence technology. Technology has the potential to boost economic growth, but significantly, it can adversely affect employment opportunities. Issues faced by each country maximize opportunities while addressing the problem of unemployment (Hughes, et.al., 2005, [3]). Report we explored from previous studies shows developments in several other countries to identify the steps they are taking. Based on this, implication from studies proposed a way forward for India, including infrastructure development, policy and regulation, research and development, human resource development. All Stakeholders should come together and discuss these issues to make India a techno-power nation.

## IX. FINDINGS OF THE STUDY

The article highlights the use of empirical research and observational data to understand the impact of AI and mixed reality (MR) in lifelong learning in education. It emphasizes the growing interest in virtual reality (VR) and augmented reality (AR) in educational systems. The significance of AR in education is discussed, including its ability to enhance the learning experience, draw attention to specific aspects of the real world, and provide remote expert assistance. The importance of VR in education is also mentioned, highlighting its applications in various fields and its ability to create immersive learning experiences.

The article further explores the significance of MR, which combines AR and VR, in creating intelligent mixed reality classrooms and improving student learning. It acknowledges the challenges and opportunities presented by MR in the educational system, such as the availability of hardware and the need for content creators and educators to adapt to new technologies.

The impact of AI in the present-day educational setting is discussed, focusing on its ability to personalize learning experiences, assist students with disabilities, and provide real-time analytical tools for teachers. The significance of AI in categorizing students, identifying information, and enhancing teaching methods is highlighted.

The practical implications of AI in education are mentioned, including the use of AI technology in smart

learning, tutoring systems, social robots, virtual facilitators, online learning environments, and learning management systems. The study also mentions the future of AI in Indian education, highlighting the potential for AI to address challenges and improve the quality of education in India, while also acknowledging the risk of unemployment due to technological advancements.

Overall, the study provides an overview of the role of empirical research, AR, VR, MR, and AI in education, setting the stage for further exploration of their applications and impacts.

#### X. DISCUSSION

The significance and impact of artificial intelligence (AI) and immersive technologies in the field of education are undeniable. These technologies have revolutionized the way we learn and teach, providing unique opportunities for personalized, interactive, and engaging educational experiences. AI and immersive technologies, such as augmented reality (AR), virtual reality (VR), and mixed reality (MR), have proven to be powerful tools for enhancing student learning, improving teaching methods, and addressing various challenges in education.

AR, with its ability to overlay virtual information on the real world, enriches the learning experience by providing interactive and context-specific content. It allows students to explore and manipulate virtual objects, enhancing their understanding and retention of complex concepts. AR textbooks and immersive experiences take learning beyond the limitations of traditional methods, enabling students to engage with subjects in a more dynamic and immersive way.

VR, on the other hand, creates simulated environments that transport students to different times, places, or scenarios. It enables experiential learning and offers opportunities for students to interact with 3D models and simulations. VR has been successfully applied in various fields, from sciences and engineering to history and psychology, providing realistic and immersive experiences that enhance understanding and retention of information.

MR, as a hybrid of AR and VR, combines the real and virtual worlds, offering users individual control over their surroundings. This unique characteristic of MR opens up possibilities for creating intelligent mixed reality classrooms, where teachers can use real-time analytics and personalized approaches to improve student learning outcomes. MR also allows for collaboration and interaction between students in both physical and virtual spaces, fostering engagement and creativity.

The impact of AI in education is equally significant. AI-powered tools and applications provide personalized learning experiences, adapt the curriculum to individual student needs, and offer real-time feedback and assessment. AI can analyze vast amounts of data and generate insights to improve teaching methods, identify learning gaps, and assist in decision-making processes. It also enables inclusive education by providing accessibility features for students with disabilities and language barriers.

Despite the numerous benefits and opportunities presented by AI and immersive technologies in education, there are challenges to overcome.

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The availability of capable hardware, visual overloads, and the design of intuitive interaction concepts are among the challenges that need to be addressed. However, as technology advances, these challenges are likely to be resolved, leading to even more innovative and effective educational experiences.

These technologies enhance learning experiences, foster engagement and creativity, provide personalized and adaptive learning, and empower both teachers and students with powerful tools and resources. As these technologies continue to evolve, it is crucial for educational institutions, policymakers, and stakeholders to embrace and effectively integrate AI and immersive technologies into the education system to prepare students for the demands of the future. By harnessing the potential of AI and immersive technologies, we can create a more inclusive, dynamic, and effective educational environment that empowers learners and prepares them for success in the digital age.

#### XI. CONCLUSION

As mentioned above, this study builds on a theoretical outlook of the importance and significance of AI and other immersive technologies in education. There are many other AI systems that play an important role in education including grading, evaluation, trial and error, etc. Future work may be done to cover other aspects. Future studies could quantitatively test the role to make the study more general and can be conducted on all AI applications in teaching and learning to further explore this area. MR along with AI has the power to change the way we use computers. It makes the impossible possible and their potential in education is just beginning. AR interface offers seamless interaction between the real world and the virtual world. With the help of an AR system, the learner interacts with her 3D information, Objects and events in a natural way for student's development.

Based on AR it supports seamless interaction between real and virtual environments in education to use concrete interface metaphors for object manipulation ability to smoothly transition between reality and VR coordinating a team of experts to find potential augmented reality solutions in educational problems is critical to achieve realistic solutions, we need to design and coordinate interdisciplinary research projects to improve them content and environment. Educators should work with researchers to develop AR interfaces. When well thought out, Mixed Reality (MR) allows us to create compelling learning environments and explain even complex scenarios and make them more realistic for students. We can anticipate that MR environments will be available to a broader audience like academician and educators in the near future. In the study, we focused on pedagogical and technological challenges, as well as the numerous options for personalized, improved, and ubiquitous learning. We anticipate the availability of MR systems in the educational system in the future for a variety of use cases, personalized and engaging learning materials are available (Liangfu Jiang, 2021, [6]). MR breaks down emotional barriers and allows students to experience life from a new perspective with immersive technology to create environments for learners to collaborate, giving them access to previously unattainable experiences.

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## Significance and Impact of Artificial Intelligence and Immersive Technologies in the field of Education

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