



Improving Autism Education: An Innovative Immersion AR/VR Pedagogical Method Using Experiential Learning

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ABSTRACT :

The prevalence of Autism Spectrum Disorder is increasing, which poses difficulties for the educational system in providing enough support for autistic pupils. Around 75 million people worldwide, or 1% of the total population, suffer from autism spectrum disorder. Approximately 1 child in every 100 has autism. Current research suggests that a child's risk of developing autism is influenced by both environmental and genetic variables. Even if there is a growing body of knowledge in certain areas, the profession of teaching autistic individuals still requires ongoing growth. This study looks at how creative pedagogical approaches might be used to help people with ASD overcome obstacles in the classroom. Interactive activities that captivate students in real-world situations are given priority in experiential learning to comprehend it more fully or more fully and support the development of new skills. This study investigates the effects of the autism learning hub's deployment on pedagogical practices, student engagement, and academic outcomes for students with ASD using a combination of qualitative and quantitative approaches. The results demonstrate the important role that the autism learning hub plays in encouraging social engagement, inclusion, and improved learning outcomes for people with autism in educational settings. This study adds to the growing body of research on inclusive education and provides insight into practical approaches for assisting kids with ASD in regular classroom settings.

Keywords: Autism Spectrum Disorder, immersive learning, effective learning, inclusive environment, Education, pedagogical approach, experiential learning.

1.0 INTRODUCTION:

A severe neurological condition known as autism spectrum disorder (ASD) causes a person to struggle with social interaction. People with ASD frequently have particular learning demands that necessitate specialist assistance and modifications in educational environments. Currently, it is critical to ensure that all individuals, including those with autism spectrum disorder (ASD), have a sense of belonging and are able to actively engage in the educational process [1]. The creation of inclusive learning settings that meet the different needs of all students, including those with ASD, has come under growing focus as awareness of ASD has grown in recent years. Experiential learning is one such cutting-edge strategy that shows promise in fostering an inclusive learning environment for students with ASD. This project aims to investigate the possibilities of hands-on learning as a cutting-edge pedagogical strategy for teaching ASD, with an emphasis on building an inclusive classroom atmosphere [2].

We seek to understand how experiential learning can meet the distinct learning profiles and preferences of people with ASD while fostering a sense of inclusion and welcome in the educational system by carefully analyzing the body of existing literature, case studies, and practical findings. This research will look at the fundamental theories and real-world applications of experiential learning as well as strategies for building inclusive learning environments that meet the sensory, communicative, and social-emotional needs of students with ASD. In keeping with this goal, the idea of an autistic learning hub has surfaced as a motivating way to provide particular support and resources for people with ASD inside the school system [3] [11]. A centralized platform that provides a variety of resources, materials, and programs especially created to treat autism is known as an autism learning hub.

Natural language processing (NLP) voice recognition technologies, augmented reality/virtual reality (AR/VR) simulations, and interactive educational games are just a few of the components that are typically found in an autistic learning hub. These characteristics are intended to support the development of skills in areas including academic performance, sociability, and communication, as well as to actively engage learners with ASD in engaging and interactive learning experiences [4]. The goal of the autistic learning center is to establish a welcoming and encouraging learning environment where people with ASD can flourish intellectually and socially by utilizing cutting-edge technologies and evidence-based methods. Additionally, the establishment of an autistic learning hub may enhance teachers' capacity to meet the many requirements of children with ASD and promote their engagement and success in conventional classroom settings [5][6]. In order to support inclusive learning environments in the educational system, this work examines the effects of establishing an autism learning center as part of an innovative pedagogical method. We assess how well

autistic learning centers serve the educational needs of people with ASD by carefully reviewing the body of research, case studies, and empirical studies. We also look into the possible advantages and difficulties of incorporating autism learning centers into educational practices and policy [8][10].

The overall goal of this research is to further our understanding of how technology-based interventions, such as autistic learning hubs, can significantly increase the success, equality, and inclusivity of people with ASD in educational settings [7][9]. Through elucidating the subject content and theoretical underpinnings of the autism learning hub concept, our aim is to educate researchers, educators, and policymakers on the significance of implementing inclusive methods that cater to the varied needs of students with ASD [12].

Studies reveal that parents express concerns regarding inclusive education and stress the significance of establishing nurturing settings that address the unique learning needs of children with autism [14]. For these adolescents, adjusting to new school environments can be very difficult since they may experience anxiety, social pressures, and a lack of resources for help. It is essential to comprehend how autistic children participate in many settings, such as the home, school, and community, in order to create inclusive strategies that work [19].

The establishment of a friendly atmosphere for students with autism is greatly influenced by parents, educators, and students themselves. Research emphasizes how crucial it is to take into account the opinions of stakeholders on inclusion, views toward autism, social communication, and interactions in the school setting when addressing behavioral issues with students [13]. In addition, teachers must possess the skills, attitudes, and understanding required to effectively support autistic students in regular classrooms. To support evidence-based practices for kids with autism, it is crucial to allocate resources, match performance objectives with student needs, and offer professional development [15].

Collaborating with other organizations or individuals is another necessary aspect of inclusive education for kids with autism [18]. Instructors must become more knowledgeable about inclusive education, acquire the skills necessary to meet a range of students' learning requirements, collaborate closely with parents, and have faith in the benefits of inclusive practices for the growth of their students. Social workers can also be very helpful in assisting autistic students in overcoming obstacles in the classroom and promoting social integration.

Some advantages of autism inclusivity include:

- Improved social integration and acceptance.
- Increased awareness and understanding of neurodiversity.
- Reducing negative stereotypes and discrimination associated with autism.
- Enhanced academic and personal development for individuals with autism.

2.0 LITERATURE SURVEY

The study covered the information and guidelines about educational films for students with autism, collecting data that is necessary to determine the kind of videos that should be viewed by the students. Subsequently, research is conducted to determine what kinds of games students should play in order to acquire basic language skills and acquire new languages. Now, compiling databases on autistic language is the primary endeavor in order to create a model for a speech recognition system.

In addition to maintaining statistics about the autistic data based on age group, the disabilities are measured on various scales and depending on the mental health of the pupils. The socioeconomic determinants of health are also examined in relation to poverty and unemployment, among other factors [16]. Instead of teaching them, a variety of approaches are used to treat autism, but each approach has drawbacks and ramifications. Predictors are variables that are used to forecast treatment outcomes based on variables like age and gender [17]. The model included with the NLP-based speech recognition system is derived from data related to autism. The model needs to receive training and face a variety of technological hurdles as part of the operation [18].

Because autistic persons differ somewhat from regular people, it is important to consider the human-machine interaction between the computer and autistic people. Therefore, it is imperative that we design the interfaces so that user engagement is seamless. It is important to include design factors such as context, sensory stimuli, and customization options [20]. When creating instructional videos, the modeling should match the appropriate video content. The majority of the films have to be interactive, as this will aid children in honing their social interaction abilities through the use of eye contact and comprehension of social cues [21]. The development of diverse teaching approaches and the implementation of a learning platform comprising multimedia resources and evaluation software are crucial.

It is important to use a variety of teaching techniques, such as feedback mechanisms and student participation [6]. The e-learning environment solves a number of issues that the traditional systems had. As the less comprehending student can now review the videos and pick up the concepts. Students can now choose from a variety of options that provide customization and flexibility [22]. There are several ways to comprehend the difficulties experienced by autistic individuals and find solutions for them using qualitative techniques like interviews and observations. The relationship between climate profiles and company culture gives us an autism evidence-based practice. It investigates the ways in which schools and culture affect the faithfulness to evidence-based approaches. The viewpoint of educators on their responsibilities and difficulties in meeting the needs of students with ASD. By means of interviews.

The four main tactics are training in social skills, environmental changes, mindfulness-based interventions, and cognitive behavioral interventions. Parents have a significant influence on the study of autism through surveys and interviews. They have an influence on their child's education as well.

Effective identification is hampered by a number of issues, such as inadequate training and complicated diagnostic criteria. Provide further suggestions for potential remedies, such as enhancing school psychologists' training and utilizing evaluation instruments that are culturally aware. Adolescents with ASD's engagement in social activities is also impacted by environmental circumstances. In order to improve social inclusion and involvement, it can be helpful to understand these aspects while creating interventions and support systems. The degree of ASD symptoms, the existence of additional psychological illnesses, and the degree of intellectual functioning all have a substantial impact on how severe it is.

3.0 METHODOLOGY

Two very helpful tools for teaching and amusing autistic youngsters are augmented reality (AR) and virtual reality (VR). We can utilize augmented reality to give them helpful graphics and indications when they're performing tasks like interacting with others or learning new skills. Through virtual reality, people can practice managing loud environments or calming down in stressful situations, among other scenarios, in a safe setting. It's similar to playing a game, however instead of imparting meaningless knowledge to kids, it teaches them important things like how to make friends, manage their emotions, and even be safe in public. By using these resources, we can make learning easier and more enjoyable for kids with autism. Learners with autism can gain from engaging, interactive, and customized curricula.

1. **Social Skills Training:** - Create virtual reality models of social interactions such as greetings, conversations, and get-togethers. Use augmented reality (AR) to overlay visual cues and prompts during social interactions to help children quickly grasp social norms and cues. To make teaching social skills more enjoyable and motivating, apply gamification techniques.
2. **Sensory Integration:** - Model social interactions in virtual reality, such as greetings, talks, and get-togethers. To help kids quickly pick up on social signs and norms, use augmented reality (AR) to overlay visual clues and prompts during social interactions. Use gamification strategies to increase the fun and motivation of social skills instruction.
3. **Communication Skills Development:** - Utilize augmented reality (AR) apps to enhance communication during conversations by incorporating visual aids such as image cards, text overlays, and symbols. Provide virtual reality scenarios that let children practice speaking and listening in real-world contexts, including placing an order at a restaurant or requesting help.
4. **Life Skills Training:** - Provide classes in virtual and augmented reality that teach fundamental living skills, such as money management, personal hygiene, and food preparation.
5. **Emotional Regulation and Coping Strategies:** - Provide children the opportunity to engage in mindfulness exercises, deep breathing, or visualization exercises by modeling stressful situations or triggers in virtual reality environments. Through the use of augmented reality (AR) apps, which provide visual clues and reminders of coping methods in real-world contexts, you may help youngsters learn how to self-regulate their emotions in difficult situations.
6. **Academic Learning Support:** - Make instructional AR and VR games and activities that are specific to children's learning methods and interests.

Give children with autism a more engaging and approachable way to learn by using immersive narrative and interactive simulations.

Community Integration and Safety Skills: - Create augmented reality (AR) apps that help children safely navigate unfamiliar environments by superimposing safety information and navigational cues on natural environments.

- Use VR simulations to instruct children in safe and entertaining ways about emergency procedures, road safety, and stranger awareness. Ultimately, using AR and VR technologies to teach autistic children can be a safe, engaging, and helpful way to support their development in many areas, including social skills, academic learning, emotional regulation, sensory integration, communication, life skills, and community integration.

Fig 1 Jigsaw puzzles games

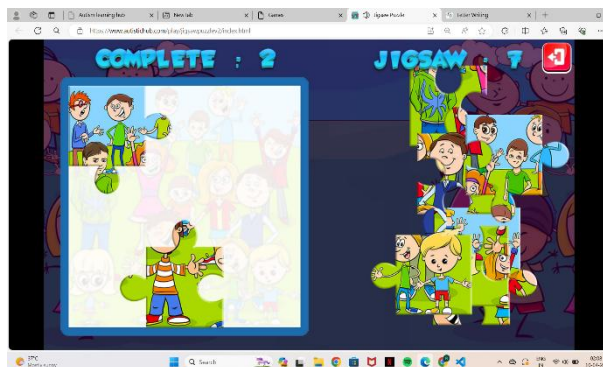


Fig 2 Number Writing game



Fig1 and Fig 2 are the examples of the immersive learning games based on AR and VR technology included in order to make the learning process easier for autistic children. The games include different activities for the kids, with an interactive environment.

Fig 3 User experiencing VR based learning



Fig 3 shows the image of the autistic kid using the simple cardboard VR device helping them to be the part of the more interactive entertainment. Such devices are used for making the learning environment more interesting place to learn and have fun.

Fig 4 Use Case diagram

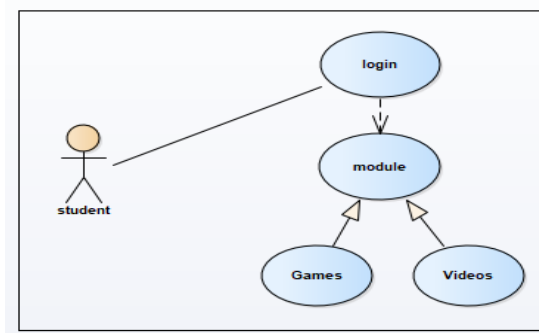


Fig. 4 shows the use case diagram for the learning website designed for the autistic kids. The diagram shows the flow of the process right from the user login, then selection of the module and further choosing the game or storytelling.

Fig 5 VR based learning videos

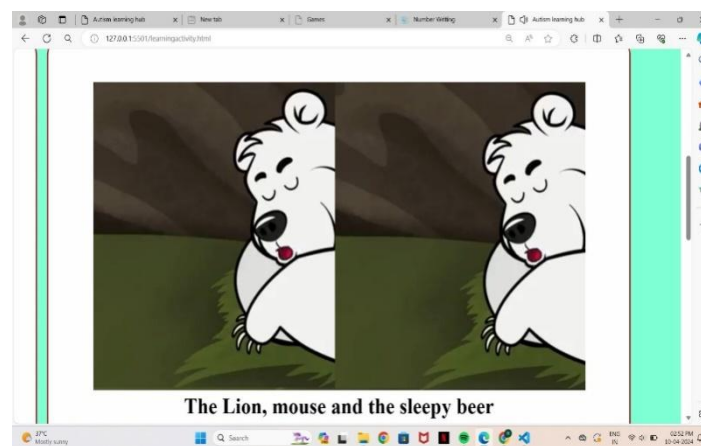


Fig 5 shows the image from the VR based learning video. It depicts how the videos are processed in this environment.

4.0 CONCLUSION

The goal of this research is to help provide an ecology for learning for individuals with ASD. It is a big stride in the direction of helping autistic kids in the classroom. Our platform provides a singular opportunity for social development, academic advancement, educational games that are enjoyable, and empowerment. The platform helps autistic students feel included and at home by acknowledging their varied needs, which is crucial for their general wellbeing. This platform helps students enhance their social skills, independence, and confidence in addition to their academic performance. This educational website offers games and immersive learning experiences that enhance student interaction by using genuine user trials.

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