

# Using Virtual Reality to Treat Cognitive & Communication Impairments in Adults

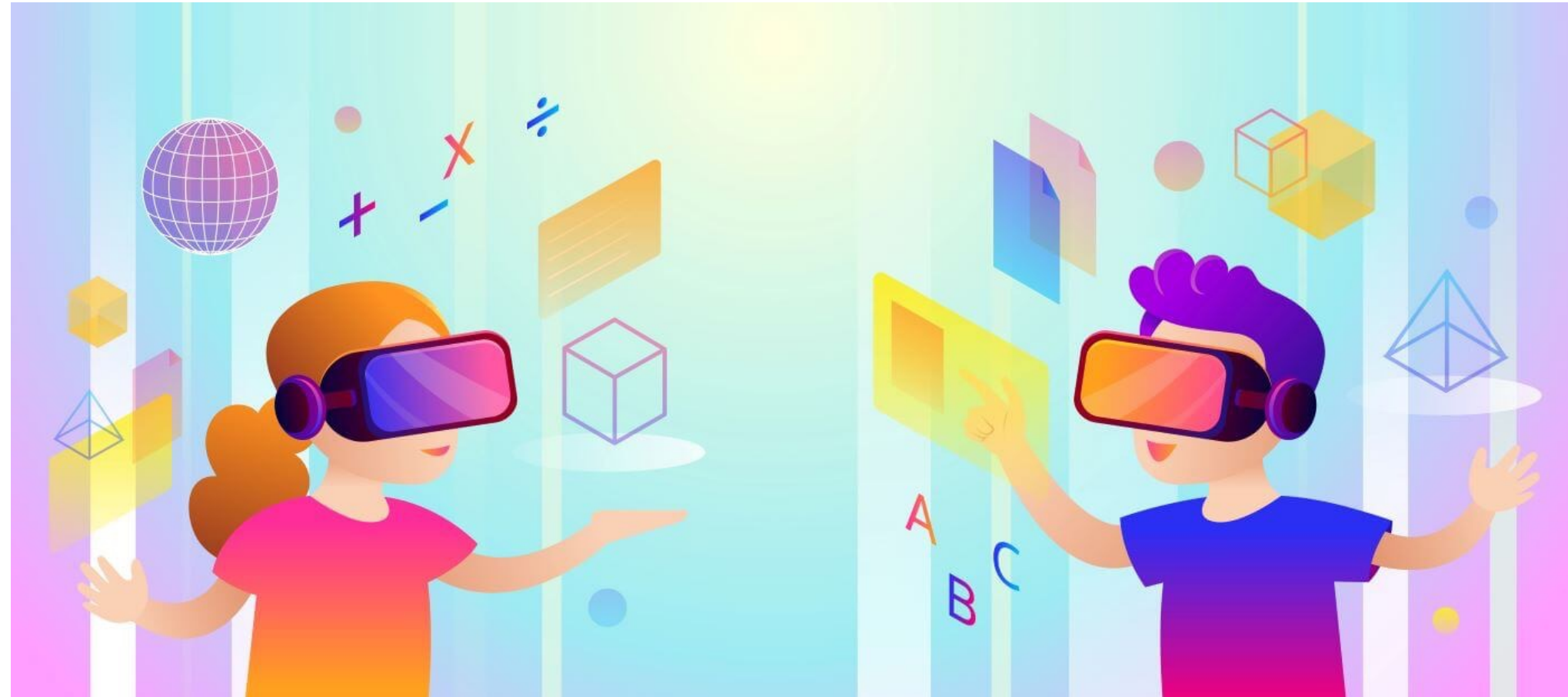
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## Abstract

Cognitive and communicative deficits are experienced by individuals with dementia, stroke, traumatic brain injury, and developmental disabilities. Skilled speech therapy services are required for these individuals' experiencing impairments in communication, memory, problem-solving, and processing. Treatment targets may vary including communication, attention, focus, orientation, word retrieval, and executive functioning. Treatment tasks must be personalized and purposeful to provide the most functional therapy possible. Virtual reality (VR) has been proposed as a means to provide these services for individuals to promote independence in their environment, and in turn, more functional success in real life. **VR is the “use of interactive simulations created with computer hardware and software to present users with opportunities to engage in environment that appear and feel similar to real-world objects and events.”** This session will provide an overview of VR and its effects on cognitive and communicative impairments in adults.

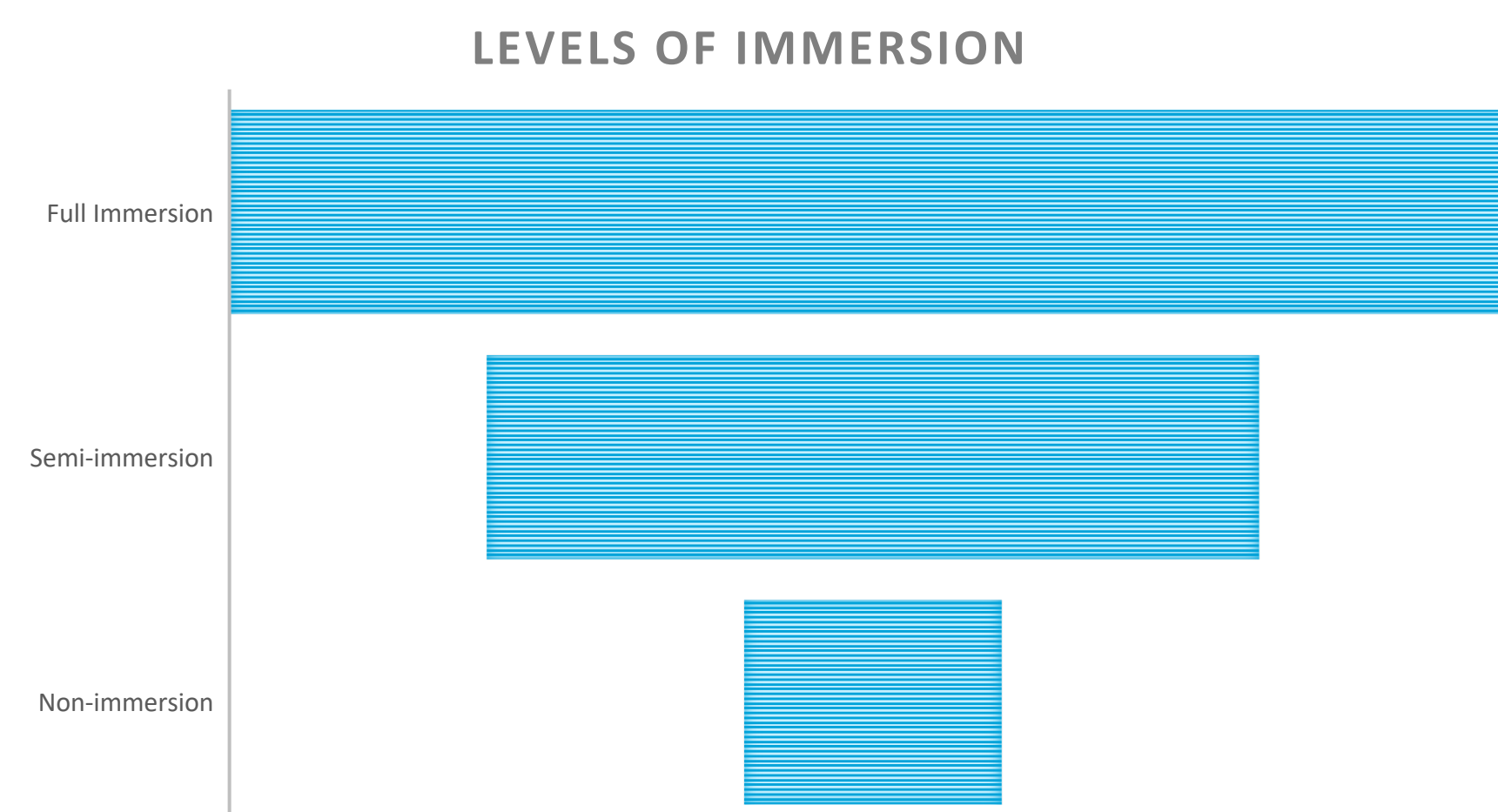


## Introduction

Speech-language pathologists (SLPs) are often involved in the rehabilitation of individuals with cognitive and communicative impairments to assist in regaining skills, developing strategies, overcoming barriers, and increasing the ease of participation in everyday life. Hospitals, care facilities, nursing homes, or private practice clinics are typical settings for SLPs to deliver treatment. In these settings, SLPs often use role-playing as a means to facilitate real-world situations and real-life practice during sessions. Although deemed helpful to use role-play in sessions to facilitate these events, it is typically difficult to simulate exact environments and other factors that may occur. A new way has been proposed to solve this common issue with the introduction of virtual reality (VR). Research shows that VR allows for the simulation of controlled environments where situations can be altered as necessary to suit each individual and their needs. VR has made an appearance in speech therapy, as well as physical (PT) and occupational therapy (OT) and continues to prove its usefulness for SLPs.

## Example

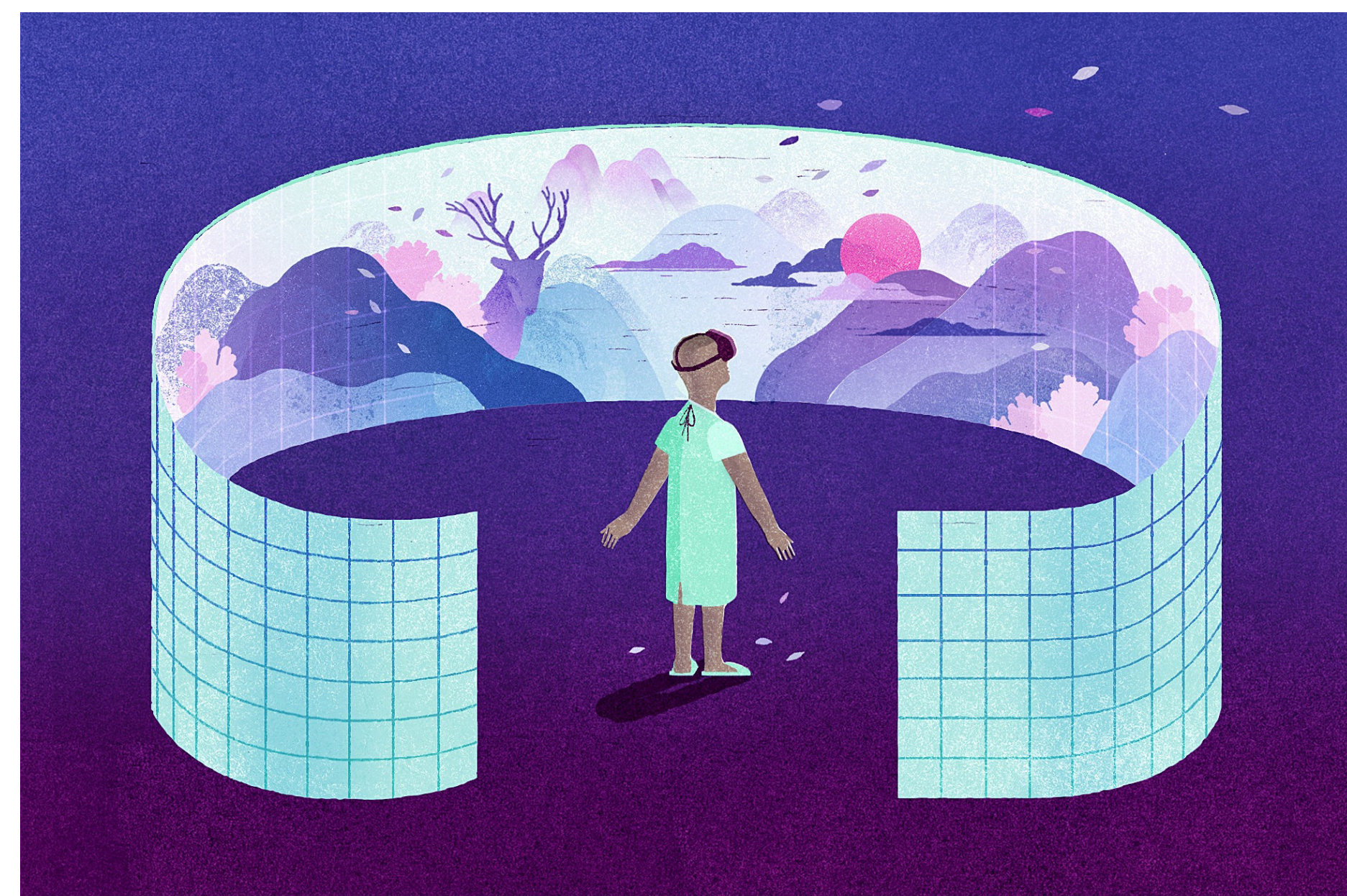
VR offers varying levels of immersion as shown below.



- Allows for flexibility and specificity for each client
  - Allows SLPs to make VR suitable for a variety of clients
  - Allows for treatment of diverse needs and abilities
- Non-immersive simulation** allows users to explore environments on a screen.
- Immersive simulation** allows users to experience full immersion as if physically present in the environment.
- Participants use head-mounted displays to experience full immersion.
  - Users pick up, hold, and drop objects.

**Example:** A speech therapy session taking place in a simulated VR kitchen where users complete a variety of tasks that are representative of tasks of daily living while engaging in conversation. Tasks can be altered to include moving plates from one space to another, stirring a pot on the stove, measuring ingredients, etc. Cognitive tasks are included throughout the activity and can be altered to change the complexity of the task making it appropriate for a wider range of clients with varying cognitive needs.

The physical aspects included in this activity would open the possibility of treatment with an interdisciplinary team including OT and PT.



## Benefits / Limitations

In a mixed-method study from 2021 (Vaezipour et. al.), SLPs perceived VR to be more appropriate for specific groups of clients. A quote from a participant in this study: “I can see it helping those people who are progressing well... their physical mobility is quite good but need a lot of repetition and practice with the communication and cognition tasks.” Other studies were consistent in finding VR to be more **beneficial for clients with cognitive-communication disorders who typically score well on assessments, but poorly with day-to-day tasks.**

**Limitations** to consider from this research include an individual's **physical and motor skills, balance, level of awareness, cognitive impairment level, and other medical diagnoses.** Other limitations to VR therapy include the possibility of motion sickness, headaches, and a certain level of animation of the people in the simulation, lack of being able to engage with all items of the simulation and being unable to see your own hands or body.

## Discussion

Most SLPs and patients expressed a **strong sense of satisfaction** regarding their experience in the simulation. The **sense of reality** in the completion of the activities **without becoming a danger** to themselves or others is crucial. In consensus throughout the research, many individuals **expressed motivation** with the simulation containing **functional, realistic tasks to complete**, with SLPs agreeing.

## Conclusion

Virtual reality technology offers a modernized opportunity to experience realistic environments that incorporate the complexity of real-life situations. VR technology could provide opportunities for clinicians to bridge the gap between a clinical setting and real-world experiences.

## References

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