IMMERSIVE (NON-)DIGITAL LEARNING OF A CHILD WITH SPEECH, LANGUAGE, AND COMMUNICATION NEEDS

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Children with speech, language, and communication needs (SLCN) often face challenges that can make their learning and development more difficult [6]. Traditional teaching methods may not fully capture their attention or address their special education needs effectively [7]. While digital immersive technologies like Virtual Reality (VR) offer innovative solutions, they are not always accessible or appropriate due to cost [4], cognitive overload [1], or sensory sensitivities. Therefore, there is a pressing need to explore non-digital immersive learning approaches that effectively support children with SLCN, ensuring inclusivity and comprehensive engagement without reliance on advanced technology.

Immersion is a mental state where a person becomes deeply focused and engaged with something that captures their attention and interest [2]. It is frequently compared to the feeling of diving into the water and being surrounded entirely by an experience that stimulates the senses [5]. When immersed, people may lose track of time and become less aware of themselves as they fully connect with the experience.

Immersion can happen in different ways. For example, people can be passively immersed, like when enjoying a story or a movie or actively immersed, like when playing a challenging game or solving a problem. Researchers often define immersion in two ways. Technology-based immersion is when a system or device, like virtual reality, engages the senses and makes people feel present in another world [8]. In technology like VR or the augmented reality (AR), immersion often refers to how well the technology can make people feel they are part of a different environment. This might happen through realistic visuals, sound, and interaction or engaging stories and tasks that keep users focused and involved. The second one is psychological immersion. It is when a story, activity, or goal captivates someone's mind and emotions, drawing them into the experience [8].

There are several definitions of what constitutes immersive learning. Immersive learning is often associated with advanced technologies like VR

and AR. These tools create a sense of «presence», making children feel as if they are part of a different environment. However, some researchers argue that immersive learning is not just about the technology. It's about the experience it creates for them. Immersion happens when the combination of sensory input, emotions, and motivation fully engages children, whether technology-driven or not. To explain this, Dengel A. and Magdefrau J. divided immersive learning into two parts. The use side focuses on how children feel immersed in the process, such as feeling present in a virtual world or fully engaged in a task. The supply side is about the tools and materials, whether digital or non-digital, that create the immersive experience [3]. Researchers such as MystakidisS. and Lympouridis V. mention that immersive learning can be implemented using both digital and physical means, methods, and technologies [5]. Physical, analog immersive learning methods include simulations, role plays, and games [5]. In this way, the application of real-world activities helps children with SLCN gain experience and practice skills in a hands-on way. The focus is not just on broader vocabulary but on changing behavior and helping them actively engage. For instance, speech-language pathologists (SPLs)might organize role-playing games like a «pretend store» where a child practices asking for items, counting money, or responding to questions, helping them build communication skills in a real-world context. Board games or card games, such as «Guess Who?» or customized flashcards, can encourage children to describe objects, ask questions, and expand their vocabulary. Interactive storytelling allows children to act out parts of a story using toys or props, which helps them practice sentence structure and storytelling. Another example is escape room activities, where children solve simple puzzles or missions, such as following clues to «escape the pirate ship». These physical methods do not rely on advanced technology, yet they fully immerse the child in a learning experience where communication and skill-building happen naturally and effectively.

While digital immersive technologies, such as VR, AR, and mixed reality (MR), offer opportunities to simulate real-life scenarios or create engaging digital environments where children can practice their communication skills. These tools excite learning and provide a safe, controlled space for practicing speech and language. For example, VR allows a child to explore a virtual zoo using a headset. In this setting, they can learn animal names, ask questions, or describe what they see. AR apps overlay 3D images on the real world through tablets or phones. A child might use an AR app to view a 3D model of the mouth and tongue while practicing sounds, helping them understand how to pronounce specific speech sounds. MR takes this further by allowing digital elements to interact with the physical world. For instance, a digital character could «hide» behind furniture in a therapy room,

encouraging the child to use directional language such as «Look behind the chair!» These technologies make speech therapy sessions highly engaging and adaptable, particularly for children who may find traditional methods less effective or appealing.

In summary, immersive digital or non-digital learning is a powerful approach to teaching children with SLCN. Both methods have unique strengths and limitations. Digital immersive learning offers innovative and engaging tools but requires resources and instructional support that may not always be available. Non-digital (physical) immersive learning provides accessible and adaptable strategies but depends on the active involvement of SPLs and parents. A hybrid approach, combining digital and non-digital methods, can provide the most effective and inclusive support for children with SLCN. SLPs should work to ensure fair access to digital technology while continuing to create flexible, non-digital strategies that involve parents in the therapy process and help children reach their full potential in communication and learning.

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SIMLAB-SOFT – ІМЕРСИВНІ ТЕХНОЛОГІЇ ДЛЯ ВИКЛАДАННЯ КУРСІВ З БІОЛОГІЇ

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Імерсивні технології – це один із актуальних шляхів підвищення якості навчального процесу [1]. Однією з концепцій імерсивних технологій є віртуальна реальність (VR). Особливо актуальним цей підхід став з переходом освітнього процесу на онлайн систему навчання саме для викладання природничих наук. Виявлено багато переваг використання VR, наприклад: можливість візуалізувати складні процеси та явища, в тому числі і ті, що не доступні і за офлайн навчання; зменшення впливу сторонніх чинників; підвищення персоналізації в навчанні; спрощення процесу комунікації між студентами та викладачем тощо [2].

Крім того, лабораторні практикуми з біології останнім часом часто стикаються з етичними проблемами використання тваринного або людського біологічного матеріалу. Використання технологій VR, допоможе уникнути подібних питань, а також допоможе студентам краще зрозуміти та візуалізувати складну анатомію людини та тварин, процеси, що відбуваються на клітинному або молекулярному рівні. Можна застосовувати VR для імітації лабораторних робіт з фізіології тварин, що вирішить проблему етичності таких дослідів, а також дозволить отримати уявлення про складні хірургічні процедури та відпрацювати їх на віртуальних об'єктах [3]. Біологічні науки часто опираються на дослідження із застосуванням дорогого обладнання, яке вимагає великих фінансових затрат на обслуговування та придбання реактивів, наприклад: електронний мікроскоп, флуоресцентний мікроскоп, атомно-адсорбційний спектрофотометр, цитофлуориметр тощо. Використання віртуальної реальності дозволить кожному студенту відпрацювати методики на будь-якому обладнанні, а також