

5TH ARTICLE

The Greenentre4deaf Project



VR Games as an Educational Tool



What is the VR Technology

Virtual Reality (VR) is a technology that uses computer-generated environments to create immersive three-dimensional (3D) experiences. Users can **actively engage with virtual worlds** using head-mounted displays and interactive controllers. Integrating **VR games into education offers a hands-on experience**. Rather than passively observing learning materials, reading a text, for example, or watching videos, through VR games, students can manipulate objects, explore simulated scenarios, and practice tasks that closely resemble real-world situations.

In educational contexts, VR has transitioned from being primarily a gaming or entertainment medium to a powerful pedagogical tool that supports experiential learning, personalised instruction, and deep cognitive engagement. This shift has been documented in research focusing on VR's potential to **transform traditional teaching methods by placing learners inside the content itself** rather than in front of it, fostering greater engagement and retention of knowledge.

This is one of the aims of the European Erasmus+ project **Greenentre4deaf**, to offer accessible training tools, such as VR game scenarios, to Deaf and Hard-of-Hearing (DHH) higher education learners. This will help them gain hands-on experience and develop the skills that will increase their employability in green professions.

Why use VR games in Education

In higher education, VR's value lies in its ability to **simulate complex and otherwise inaccessible learning environments**. Universities and colleges are increasingly experimenting with VR learning environments (VRLEs) across disciplines, from engineering to sciences and professional training, to complement or even replace conventional lectures. Immersive VR environments give **students opportunities for hands-on practice in controlled, safe settings** where mistakes become valuable learning experiences without real-world consequences. For example, working with renewable source technologies, sustainable farms or recycling factories can all be rehearsed virtually, helping students build both procedural **knowledge**



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and confidence before engaging in real-world practice. Empirical studies have found that such VR implementations in higher education can **improve student motivation, engagement, and participation**, as well as contribute positively to measurable learning outcomes when aligned with educational objectives.

A **VR game designed specifically around green professions** aligns well with the unique strengths of VR technology. Green professions often involve multifaceted systems, complex problem-solving, and field-based work in real environments that are costly, dangerous, or impractical to replicate on a large scale for all students. Through VR, learners can step into a virtual wind farm to assess turbine performance, participate in a simulated ecosystem to monitor biodiversity, or design sustainable infrastructure in a 3D landscape. These scenarios not only contextualise theoretical knowledge but also allow students to **experiment with environmental decision-making and practice professional skills** that are increasingly demanded in the evolving global labour market.

The pedagogical foundation of VR in education is grounded in experiential and constructivist learning theories, which emphasise learning by doing and knowledge construction through active engagement with the environment. In a VR game on green professions, students do not merely memorise facts; they perform real tasks, receive immediate feedback, and reflect on their decisions, thereby **reinforcing learning through direct experience**. **Gamification elements**, such as achieving goals, unlocking levels, and earning badges or feedback indicators, further **enhance motivation** and make the **learning process more meaningful and engaging**. Although gamification's impact varies by context and learning outcomes, its integration with VR has been shown to support intrinsic motivation and active participation when thoughtfully aligned with clear educational goals.

Supporting DHH Learners Through VR Games

For Deaf and Hard-of-Hearing (DHH) learners, VR offers distinctive advantages for professional training. Studies have shown that **DHHs have visual learning styles**. VR can be an efficient tool for DHH learners, as it relies on **visual stimuli and eliminates the need for auditory cues**. VR settings can be adapted successfully to their needs, **based on an inclusive and accessible procedure**. VR can be tailored with accessible text-based communication and affordable technology, **providing realistic professional experiences**. This integration can support DHH learners' comprehension of complex environmental systems, professional procedures, and domain-specific communication skills, making the experience more inclusive and equitable.



Developing Sustainability Practices through VR Tools

The use of VR in higher education also supports broader institutional and social goals. Systematic reviews of VR implementations highlight that, beyond engagement and motivation, **VR has the potential to foster digital competencies and contribute to Sustainable Development Goals (SDGs)** such as Quality Education, Affordable and Clean Energy, Decent Work and Economic Growth, and Climate Action. With a VR game focused on green professions, **students can engage with sustainability challenges** in a way that connects academic study to global environmental objectives and real-world professional contexts. Such alignment helps bridge the gap between theoretical learning and practical application while **empowering learners to contribute meaningfully to the green economy**.



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Conclusions

In conclusion, **VR games have emerged as promising tools for enhancing learning experiences in higher education**, offering immersive, interactive, and inclusive environments where complex content and professional practice can be learned experientially. One of the digital tools developed within the framework of the **Greenentre4deaf** project is a **VR game centred on green professions**. This holds particular promise, not only for **equipping students with relevant sustainability skills** but also for **engaging DHH learners through accessible design**. By integrating VR thoughtfully into curricula and aligning virtual scenarios with well-defined learning outcomes, higher education institutions can foster both academic achievement and broader professional readiness for emerging sectors of the global economy.



“VR is not an alternative to teaching, it’s a powerful educational tool that teachers can use to enhance their pedagogy”

- Brittany Allanach



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