

# Tec dentistry: Learning with a simulator and mixed reality goggles



Students from the bachelor's degree program in **Dental Surgery** at the **School of Medicine and Health Sciences** can now practice **endodontics** in a **simulator**, while also receiving step-by-step **technological support virtually and in real-time**.

Through **mixed reality** and **Hololens technology**, [Tec de Monterrey](#) students are able to perform this procedure without needing a professor to be present.

*"It's a unique **educational innovation** project, that's never been done before, at least not in Latin America,"* said **Dr. José Carlos Presa**, Director of the Regional Department of Dentistry at the Tec.

*"It's very important to us that students use the latest **technology** in our areas of education, and it also increases the value of that project,"* he added.



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## Self-managed learning

Prior to using this technology, sixth semester students prepare their **preclinical work scenario** on a **dental simulator** as follows:

Wearing the **mixed reality goggles**, they perform a root canal procedure following the instructions given by their **virtual professor**, as well as any additional information required at each stage of the procedure.

*“They have to carry out a root canal procedure, which is considered a **high-precision dental treatment** that consists of removing the neurovascular bundle from the dental organ, performing a thorough cleaning and shaping of the root canal system, and concluding with the permanent sealing of the root canal.*

*“This procedure occurs frequently during dental visits and is intended to **promote the permanence of the teeth** inside the patient’s oral cavity,” the professor explained.*

One of the challenges faced by the students is time, as they have a total of two hours to complete the **self-managed process**, which has more than **16 steps**.

*“This gives us an idea of how students have to perform these processes on their **patients**, including all of the clinical scenarios they will encounter.*

*“Self-managed training is expected to be extended to other areas of **health sciences**,” he added.*



Although the project is currently in the exploratory stage, students will have access to this **technology** at any time.

All they have to do is reserve a slot in the **dental simulator lab** at the Tec's School of Medicine and Health Sciences and begin their **self-managed** practice.

***“This gives us an idea of how students have to perform these processes on their patients, including all of the clinical scenarios they will encounter.” - Dr. José Carlos Presa.***

### **Mixed reality and its contribution to education**

**Ana Gabriela Rodríguez**, leader of **educational innovation** at the Vice Rector's Office for Academic Affairs and Educational Innovation, spoke about the benefits that this technology brings to Tec students.

*“We're exploring how useful it is in practice. **Immersive mixed-reality learning** helps us to analyze environments, see abstract concepts, practice, and even perform evaluations.*

*“In this experience, we're looking at **how to be more efficient**, more scalable, and how to get the most out of extended reality, that's why innovation is important,” she said.*



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**Mauricio Martinez**, leader of Creative Design and Development at the Tec's Vice Rector's Office for Academic Affairs and Educational Innovation, talked to CONECTA about the importance of immersion for students.

*"We have found several ways that this **technology** benefits students. Primarily, immersion provides a hands-on and in-depth experience that allows them to have more tools and retain information better.*

*"If we tell students to perform a movement related to a procedure, they **develop that skill** through repetition. Many of the resources are self-managed and can generate knowledge through practice at any time," he concluded.*

It is important to mention that **Dr. Karen Reyes and Dr. Regina García** participated in this **educational innovation**, accompanied by pedagogical architect **Olaf Román**.

This group, along with instructional designers, graphic design, and production, created this procedural experience in **mixed reality**.

### **Hololens mixed reality technology**

**Hololens** is a technology developed by **Microsoft** that consists of a **mixed-reality** device which allows you to interact with the virtual world in a more natural and immersive way.

The device is a pair of glasses that allows the user to see **three-dimensional holograms** superimposed on the real world, providing a unique augmented reality experience.

**Mixed reality** is a technology that combines virtual and real elements to create a new environment in which the user can interact.

This technology is an **evolution** of **augmented reality**, which enables virtual objects to be superimposed on the real world through a mobile device or camera.

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