

**Yemina Iman (PhD) Faculty of Health & Environmental Sciences**

---

Chiropractic students often encounter challenges when transitioning from classroom-based learning—typically involving peer practice and mannequins during the first three years—to clinical settings with real patients in the final two years. These challenges stem from limited case diversity, restricted patient availability, and ethical considerations. Additionally, some students may experience anxiety or a lack of confidence during initial patient interactions due to insufficient preparation.

To address these issues, I developed an Extended Reality (XR)-based virtual learning platform in collaboration with the New Zealand College of Chiropractic. This platform features AI-driven virtual patients powered by Natural Language Processing (NLP), enabling students to safely and repeatedly practice patient history-taking and communication in a judgment-free, immersive environment.

In this presentation, I will briefly showcase the technologies developed as part of the XR system and explain how they support student learning through the frameworks of 4E cognition and entangled cognition—approaches that suggest learners become behaviourally inseparable with the digital environment (Aguayo et al., 2023). I will also present how the Clinical Reasoning Assessment Rubric (CRAR) (Kim et al., 2021) and the NASA-TLX workload assessment (Vučković et al., 2024) can be applied in future phases of the study to evaluate students' communication skills, confidence, and perceived task load. The session will demonstrate both assessment tools and explore how entangled cognition within XR environments can enhance student learning and clinical decision-making in chiropractic education.

#### **Keywords**

Chiropractic Education, Entangled Cognition, Extended Reality, Virtual Patient Simulation, Clinical Reasoning

#### **References**

- Aguayo, C., Videla-Reyes, R., & Veloz, T. (2023). Entangled cognition in immersive learning experience. *Adaptive Behavior*, 31(5), 497–515. <https://doi.org/10.1177/10597123231183996>
- Lee, J., Park, C. G., Kim, S. H., & Bae, J. (2021). Psychometric properties of a clinical reasoning assessment rubric for nursing education. *BMC nursing*, 20(1), 177. <https://doi.org/10.1186/s12912-021-00695-z>
- Vidal-Balea, A., Fraga-Lamas, P., & Fernández-Caramés, T. M. (2024). *Advancing NASA-TLX: Automatic user interaction analysis for workload evaluation in XR scenarios*. arXiv. <https://doi.org/10.48550/arXiv.2411.00510>