Ph.D. in Information Technology
Thesis Defense

September 9th, 2025
at 14:00 pm
"Emilio Gatti" Conference Room – building 20

Paolo BOFFI – XXXVII Cycle

Educational Technologies in the Immersive Age: The Role of Immersion and Control Factors in VR Learning

Supervisor: Prof. Pierluca Lanzi

Abstract:

The past decade has seen remarkable advancements in Virtual Reality (VR) technology, driven by the increased number of affordable devices and enhanced processing power. This technological progress has allowed more realistic and interactive virtual worlds. VR offers a unique opportunity to immerse learners in dynamic, multisensory environments, promoting experiential and interactive learning. By offering highly engaging and interactive educational experiences, VR can improve motivation and knowledge retention, facilitating the understanding of complex topics. However, the effectiveness of VR in education is still under debate, and the impact of immersion levels on learning outcomes is not yet fully understood.

This dissertation investigates the relationship between immersion levels and learning outcomes in educational VR. Specifically, it explores how varying levels of immersion influence learning outcomes across various educational contexts, aiming to propose a structured taxonomy of VR-based learning. This dissertation is based on the Cognitive Affective Model of Immersive Learning (CAMIL) framework, which identifies immersion and agency as two fundamental factors influencing learning in digital environments.

The research begins with a comprehensive review of existing literature on VR-based learning, and the categorization of VR systems based on immersion level. Building on these foundations, a series of case study are presented, each designed ot assess the effectiveness of varying level of immersion in enhancing learning outcomes and designing proper interaction strategies for learning tasks. These case studies span diverse subjects, including STEM, cultural heritage, environmental awareness, and interaction design. The findings contribute to a deeper understanding of the impact of immersion on learning outcomes, and the benefits VR brings to the educational field.

PhD Committee

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