

# Virtual and Mixed Reality Technologies for Medical Training

PhD Candidate:

*Edoardo Battezzor*

## 1. Introduction

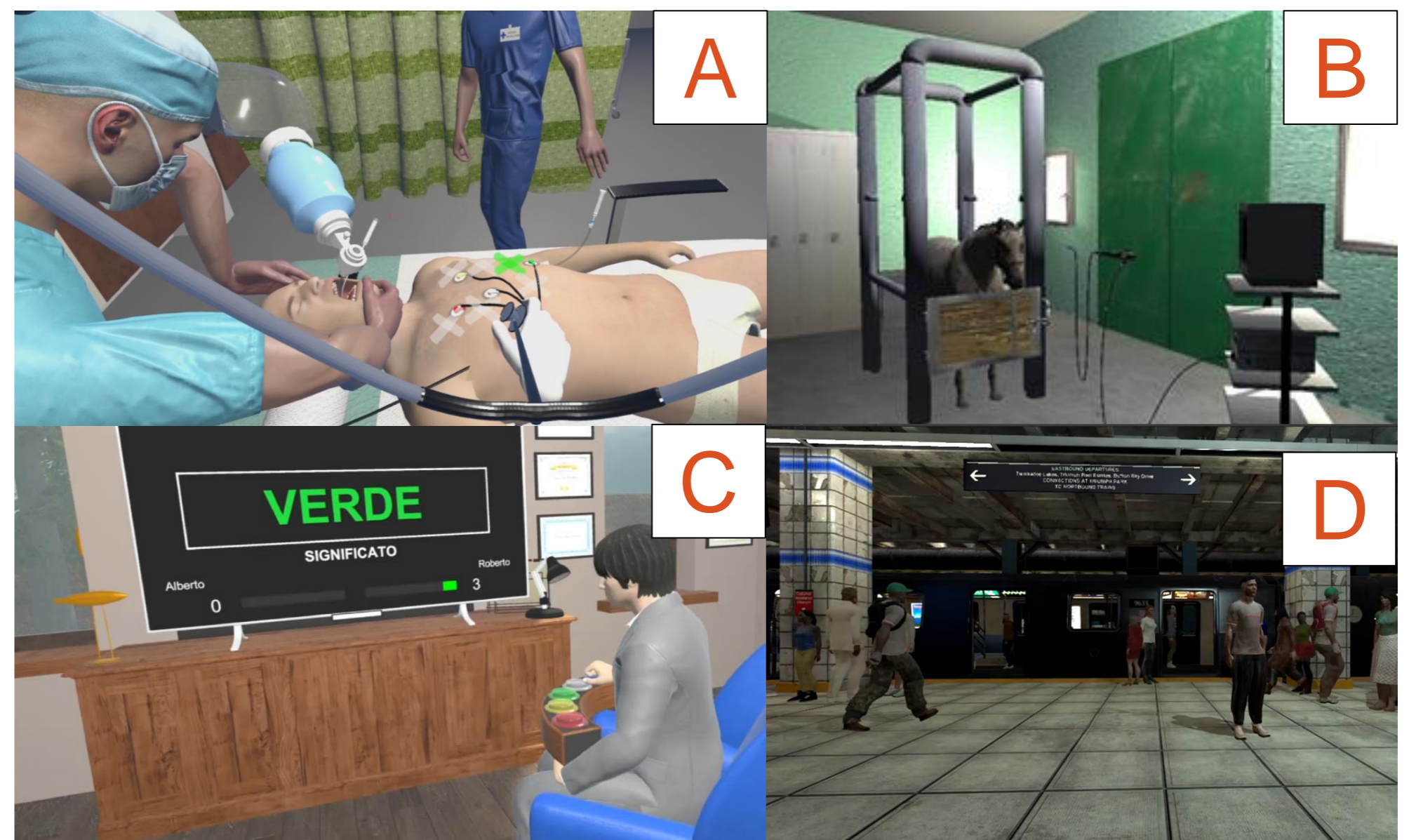
Medical education is a field that encompasses many skills, including knowledge acquisition, operation of medical equipment, and development of communication skills. Virtual Reality (VR) and Augmented Reality (AR) can offer a valuable contribution in medical training, as they provide a safe and flexible environment for trainees to practice these skills. These systems do not require the physical presence of an instructor and they are able to support institutions and learners with automatic assessments. Furthermore, they can foster self-learning and be easily adjusted, in terms of difficulty, to suit the learning pace for students at different levels.

## 2. Objectives

The objective of the PhD work is to identify and develop novel solutions for medical education leveraging state-of-the-art VR and AR technologies. These contributions should expand the current knowledge on the topic and effectively support institutions and learners.

## 3. Methods

Research and experiments were conducted in the fields of VR and AR training [1, 2] to understand the current state of the art better. Moreover, a specific review of the state of the art of the use of Virtual Patients in the medical field was conducted [3]. These analyses highlighted the importance of effective design for learning, intuitive interfaces (including usage of natural language processing) to facilitate users, and a general lack of immersive simulations in the medical field.



## 4. Projects

Several immersive simulations were developed, guided by the aforementioned discoveries, and in collaboration with domain experts:

- **VR Training for Difficult Airways** (Fig A).
- **VR Training for Equine Endoscopy** (Fig B).
- **VR Implementation(s) of the Stroop Test** (Fig C).
- **VR Exposure Therapy for Social Anxiety Disorder** (Fig D).

## 5. Conclusions

Experiments on the simulations mentioned above are still ongoing, but preliminary results and evaluation of domain experts are promising.

## 6. References

1. Assessing the Usability of Different Virtual Reality Systems for Firefighter Training / Corelli F.; Battezzor E.; Strada F.; Bottino A.; Cimellaro, G.P. - HUCAPP 2020, Valletta, Malta on 27/02/2020).
2. Assessing Visual Cues for Improving Awareness in Collaborative Augmented Reality / Strada F.; Battezzor E.; Ameglio E.; Turello S.; Bottino A. - XR Salento 2022, Lecce, Italy, 6/7/2022.
3. Training Medical Communication Skills with Virtual Patients: Literature Review and Directions for Future Research / Battezzor E.; Bottino A.; Lamberti, F. INTETAIN 2020, on 11/12/2020