

VR Ultrasound



The aim of this project was to develop and validate a tool that could teach medical students basic point-of-care ultrasound, in a cost-efficient manner.

A VR learning tool teaching ultrasound theory, knobology, and allowing for simulated hands-on procedural training, was developed by VitaSim in close cooperation with the University of Southern Denmark (SDU) and Odense University Hospital (OUH).

The efficacy of the tool was compared to traditional e-learning in a double-blinded, randomized controlled trial (RCT). 20 medical students participated in a voluntary, short ultrasound course and received 60 minutes of education through either VR (intervention) or e-learning (control), followed by 15 minutes of non-supervised hands-on training (both).

Primary outcome was an OSAUS¹ based score obtained in an OSCE² setting. Secondary outcomes were attainment of individual groups of learning goals and subjective measures from a questionnaire.

Conclusion: A clear trend of VR outperforming e-learning was observed (figure 1).

Two-sample t-test with unequal variances for total score

Groups	n	Score (mean)	95% conf. Interval	
VR	11	164.82	153.55	176.09
E-learning	9	148.00	133.77	162.23
Combined	20	157.25	148.29	166.20
Difference		16.82	-0.057	33.69
t = 2.1083		H _a : Difference > 0	pr(T > t) = 0.0253	

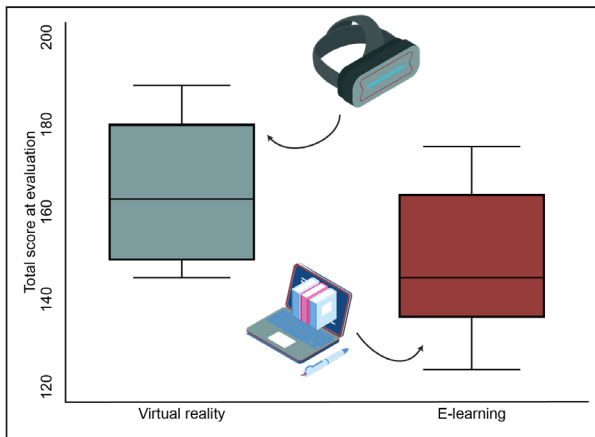


Figure 1: Comparison of VR with e-learning for teaching ultrasound.

The total score represents the achievement of all learning goals and was the primary outcome of this study.

A one-sided t-test showed a significant difference ($p < 0.05$), confirming our alternative hypothesis that the VR would score higher than e-learning.

“How would you describe your experience of preparing for hands-on training using Virtual Reality?”

“Good, it gave a good sense of what moving the probe around did, and which image you can expect to get.”

“It was a good tool for learning. You feel very immersed in the examination and lose track of time and place.”

A questionnaire involving scale-based (LIKERT) and short text answers was given to all students to evaluate perceived learning, self-efficacy, presence, usability and technological quality.

¹ Objective Structured Assessment of Ultrasound Skills

² Objective Structured Clinical Examination