Literary Review sketch pad

Applications in Learning

Applications in Practice

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How is virtual reality being used in the medical field

Abstract

Keyword: [Medical education](https://search.proquest.com/pqrlscitech/indexinglinkhandler/sng/if/Medical+education/$N?accountid=4488); [Virtual reality](https://search.proquest.com/pqrlscitech/indexinglinkhandler/sng/if/Virtual+reality/$N?accountid=4488); Anatomy

Mainly education

Salsabeel et al. (2018) reasoned that medical students need to develop clinical skills before dealing with real people.  Students can develop skills without the risk of harming a patient by working with artificial models. However, the current models need to be updated due to the changing complexities of Medical knowledge and student demand for modern teaching methods.  Virtual reality is a model that can be used and has already been being used to enhance medical education.

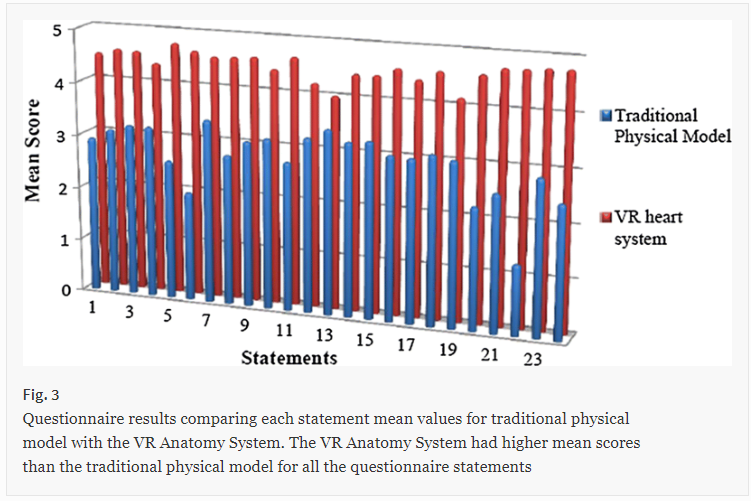
Salsabeel ect al. (2018) study allowed students to interact with a realistic looking three-dimensional model of a heart in virtual reality. Students are able to dissect and explore different parts of the heart and access description about those parts.  These student also used the traditional method for learning about the heart so they would be able to compare the experience.

Salsabeel ect al. (2018) explained that minimizing errors in medical learning is crucial for patient safety.  Virtual reality provides a way to measure learning outcomes to ensure students are ready to perform on real patients.

Salsabeel ect al. (2018) explained that their Virtual Reality system can be used all over the world because it’s user friendly, anatomy descriptions can be modified, and it can be accessed through the internet.

Salsabeel ect al. (2018) experimented by having students use their virtual reality system to identify structures of the heart, dissect the heart, see anatomical relations, and view information about each element of the heart.  After the student finished the run through, they were given a questionnaire to assess their experience. Twenty three of the questions asked the student to assess their experience with the physical model and twenty three other questions asked them to assess their experience with the virtual model.

Salsabeel ect al. (2018) concluded from their experiment that students felt like they learned more and preferred using the virtual reality model over the physical model.  This means that virtual reality is a efficient teaching tool



Zajtchuk and Satava (1997) claimed “Virtual reality is being used to enhance medicine in four main areas: education and training; medical disaster planning and casualty care; virtual prototyping; and rehabilitation and psychiatric therapy.”

“The value of these simulators is principally in teaching cognitive and manual skills. Due to their increasing complexity, simulators will eventually provide the same value in medical testing and certification as flight simulators do.”

Zajtchuk and Satava (1997) explained that real patient data can be stored in libraries and then rendered in three-dimensions for medical student studies.

Zajtchuk and Satava (1997) explained that virtual reality allows surgeons to train on difficult procedures by performing the procedure on an virtual organ that move, behave and feel like real organs.  They only say that they do not currently look like real organs. Also further testing is needed to determine if this method improves learning.

an exceptional program run by Helene Hoffman of the University of California at San Diego combines an established multimedia computer-based education program with virtual reality [3, 4]. This program helps students learn about anatomy, pathology, radiology, and case studies

medical curriculum can be available from any place, by anyone, at any time. The power of education is now convenient and at the disposal of the student, no longer limited by schedule, place, or time.

Another application of virtual reality is medical planning, such as that needed to deal with disasters and combat casualty care.  such as an earthquake zone or a battlefield

and creation of threatening environments, such as tall buildings or bridges, for psychiatric therapy

Jan-Maarten, Vorstenbosch, and Kooloos (2017)

For the study of human anatomy, this promises extraordinary versatility and flexibility in the presentation and exploration of anatomical objects, at a fraction of the cost of maintaining dissection facilities [2-4]. However, full VR is technologically challenging and has not yet been implemented. The ongoing development of virtual reality is reflected in the lack of consensus in the literature as to the effectiveness of digital 3D representations for human anatomy learning.

Older studies often report ambiguous or negative findings (e.g., [5, 6]). These studies however do not utilize the full potential of virtual reality, using 3D computer models in a "desktop VR" setting. In desktop VR, sources of spatial information such as physical size and tactile/force feedback are lost, and there is no direct interaction or sense of sharing space with virtual anatomical objects.

Other areas

we created a virtual anatomy learning environment to study the anatomy of the neck. both virtual anatomy groups would outperform the nonanatomical control condition.

we created a test that asks the participant to localize a cross section of the studied anatomy on a frontal view of that same anatomy. The student can do this by clicking one of a number of horizontal lines drawn over this frontal view.

being relevant for learning to apply anatomical knowledge in a clinical setting, for example, to interpret cross-sectional material resulting from radiological or histological imaging.

*1) The Stereoptic Condition* . Participants in this group studied a 3D reconstruction of anatomical objects of the deep neck wearing the Oculus

*(2) The Nonstereoptic Condition* . This condition was identical to the stereoptic condition, with the exception of the virtual objects being offered such that both eyes were presented with the exact same visual perspective.

*(3) The Control Condition* . Participants in this condition did wear the Oculus Rift headset for 150 seconds and only got to explore a virtual sea world instead of test-related human anatomy.

Ref

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