

Virutal Reality as an Educational and Training Tool in Medicine

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Abstract

Use of computers is tremendously increasing in medical education. Learning Process is moving from textbook to electronic mode, a interactive way in real sense to fulfill the educational needs of the graduate and post graduate learners. In virtual reality learners can learn according to their own time and also contents are reusable. It is not limited to any geographical area and time slots. It is a valuable learning tool for medical students, can be used appropriately when and where required. This article reveals the role of virtual reality for learning and training in medical field.

Keywords:- Electronic learning, Virtual reality

Introduction:-

E-Learning is a self initiative activity, teachers are facilitators. In Virtual learning is objectives are set, initiated and maintained by the learner, learning materials and methods are chosen by them, they take total responsibility of their own learning and control over the monitoring of progress of learning. The learner determines what is important for him to how to continue his learning activities. Accordingly, a successful learner-centered E learning model provides a perfect blend of independence and support [1].

Use of computers is tremendously increasing in medical education. Learning Process is moving from textbook to electronic mode, a interactive way in real sense to fulfill the educational needs of the graduate and post graduate learners. In virtual reality learners can learn according to their own time and also contents are reusable. It is not limited to any geographical area and time slots. It is a valuable

learning tool for medical students, can be used appropriately when and where required. This article reveals the role of virtual reality for learning and training in medical field.

Medical graduates of the twenty-first century are expected to 'hit the ground running' [2], requiring not only a traditional clinical education but also one that is up-to-date with the latest technologies according to the situations in working area. There has never been a greater need for educators, students and clinicians to continuously update their skills, to remain abreast of the changing healthcare environment and to remain 'digitally literate' The adoption of digital tools can, in fact, free up time allowing medical educators to learn concepts and to reflect on practices [3],

Apart from traditional clinical education medical students and teachers needs to be update their knowledge according to the day to day changing health scenario with limited time availability. This is the demand of time that medical students and educators should continuously update themselves with the latest technology according to the situations in working area. The use of technology actually free up time for medical educators and learners, allowing them to learn ideas and reflect on practices. Trainers are spending their valuable time for conducive virtual training, should be rewarded and acknowledged for their endeavors [4].

Now a days, besides traditional teaching, educational institutes are using different medias like computers and internet for enhanced perception of learners. The instruction most commonly takes place in an online environment. Virtual reality is the technology of simulation of the peripheral world through a computer as well as communication through a receiver [5].

Virtual reality includes uses perception of sense organs like vision, sound, touch and power transmitter as outer tools and input tools like mouse, chaser, gloves, etc., a virtual environment's graphical manufacturing system and an information carrier. In a virtual environment, all the features of activity such as time , severity of the disease and way of feedback can be adopted depending on the type of treatment and one's own ability [6, 7]. Additionally, one can observe their motor results and changes can be done if necessary. Virtual reality is a novel training and learning method for healthcare professionals.

This technique can be used extensively from inventing new life-saving methods to training the of the budding medical graduates, post graduates and other learners. It can greatly applied as a learning and teaching media, from classrooms to clinics and operation theatres. Virtual Reality is not only useful for healthcare professionals for learning as well as for training but also aids healing of the sufferers. It can be used safely for

- To train Medical graduates, post graduates and interns
- To treat variety of Patients.
- For Medical marketing

- To create disease awareness among society

Training of medical students:- Virtual Reality has a capacity to magnify the areas inside the body and make it visualize more clearly, which are not observable otherwise. Medical students learn human anatomy on cadavers in dissection Halls. It is difficult to get cadavers, many legal procedures are to be followed to get cadavers, and it does not react like a live human body. In Virtual reality however, health professionals

In Virtual reality however, health learners can observe the minute detail of all the organs of the body in reconstruction & can develop other training scenarios which are same as common surgical procedures.[8] As well as simply providing content, the presented knowledge can be updated and thus hopefully made easier to assimilate by the use of multimedia. Examples of beneficial multimedia might include a many video clips that shows a child with strider, a “flash” animation that shows a details of cellular activities, or a chest x ray. Through virtual reality abnormalities of X rays or sonographies or CT scans is highlighted visualized easily by just a click of button and quick message is conveyed to the learners by trainers. During Virtual learning students can easily ask any doubts without any hesitation as on one is there in front line. [9]

Innovation of the idea of “Virtual Patient” has created a great interest in health professionals. Through virtual patients one can teach the art of history taking, diagnosis and handling the patient just by conversation.. Students use Virtual reality for learning history taking method by using already prepared bank of questions and also learns the way of patient examination. Listening of normal and abnormal heart sound, lungs sounds and intestinal sounds virtually is of great benefit to the learners. Many These psychomotor skills can also be learnt well in clinics and with the simulator. However, a created clinical scenes helps the learner to know the ways of diagnosis, investigation and treatment with the help of resources. Good models allow a number of choices, more than one of which may be correct, at each “node”. An appropriate choice allows the learner to move to the next node and thus proceed with the case. [10]

Virtual learning delivers surgical training also. A video of a real surgical procedure is made from many angles which is then combined with models of the anatomy being operated to provide interactive training experience. [11]

Treatment:-

Patient Education:-

Virtual reality can make the internal organs observable for doctors as well as for patients also, visualization of the organs helps to pin point the abnormality, area involved, severity of the disease and its mechanism of treatment. Patients can see the surgery plan well in advance with the help of Virtual

Reality and this helps to remove fear of surgical procedure from their minds. This will make patients more cooperative during the procedures and it ends with the satisfaction of both doctor as well as patients.

Surgery by Robots:-

A surgical procedure done by robotic device is a newer invention. A surgeon is in charge of robotic arm. As a result there are less chances of complications during surgery. The procedure is completed faster. The robotic surgery is precise, with smaller incisions, minimum blood loss and quicker recovery time.[12]

Pain Management & Physical Therapy:-

Virtual way can be used successfully in relieving the sensation of pain and provides physical treatment too. It can help in healing the psychological issues also. A study showed that full Virtual Reality immersion for those patients who are going for physical therapy after a skin graft can be distracted and subsequently intensity of pain levels can be reduced. Virtual Reality for physiotherapy has also been shown to be useful in reducing recovery time of patients. Virtual environment helps the patient to perform regular exercises with more fun and create an enthusiastic work culture, raise the spirits and make the patient more focused. [13]

Virtual Reality learning model is especially attractive to medical educators as it promises to overcome the ills of teacher-dominated teaching methods by allowing learners the option of selecting learning materials in their own time and in their own preferred way. Learners can access the content from any place, any time and can repeat the sessions as and when required. They can also make use of a range of learning activities that best suit their needs and preference. They are also able to monitor their progress and determine the success of their learning endeavors. [14]

Virtual learning method attracts the students more as in this way of teaching teacher domination is very less as compared to classroom and clinics teachings. They can learn in their preferred time by their own way at their own place and can repeat or leave the class as per their own choice. They can easily monitor their own learning process and make use of a range of learning activities. This may hold them responsible for their own study.

Disadvantages:-

This is expensive technology due to high costly monitors, program softwares, implementation procedures, and learners. Sometimes it becomes time consuming procedure. It needs the person expert in technology also.[15]

Advantages:-

Increase in accuracy of procedure and reduction in errors. It creates positive psychological, improves teamwork and helps to build up self confidence in learners and trainers. Minimizes the duration of surgery than actual surgery. Easy training tool, clear visualization of the area. Helps in clear visualization

of locations of anatomy. Helps to comprehend the external and internal relationship between the organs. Increases the skills of surgeons better for safety of students, physicians and patients. Decrease in cost with increased accuracy. Helps in overall improvement of the skill, work and environment of the learners and trainers both.[16]

Conclusion:-

The use of virtual learning, as an alternative way, has played a significant role in improving the competency of different health professionals, teachers, paramedical staff also. Therefore, along with traditional way it can be used as a complementary learning and teaching tool. It has tremendous scope in the field of laparoscopic surgery to achieve precisions in surgical procedures which taught using virtual mode. Specific and general affecting factors for its adoption should be revealed. Some more studies must be done on the training of medical students using virtual way to determine the type and extent of its impact on the performance and competency of the learners. Virtual reality is very useful in training and enhancing psychomotor skills such as laparoscopic surgical procedures, suturing, pelvis examination. Further more studies should be done to decide the impact and significance of this learning media and satisfaction of the trainers and students. Considering the needs of learners, designing virtual reality tools can be a true solution for its effective use for learning and training medical students.

Many uses of Virtual Reality enlisted are still in its budding stage. In the coming years, this teaching and learning method may be used extensively to improve the precision & effectiveness of procedures, and improve the capabilities of the human being, both as the care-provider. There is tremendous strength for Virtual Reality in the field healthcare system, it only demands the integrated efforts of engineers as well as health professionals for creating and applying the technology for the welfare of the society.

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