

**PGDip: E-Skills Development with Immersive Technology**

**VRA 701 Assignment Part A & Part B**

**Survey Report: *Healthcare department***

**By**

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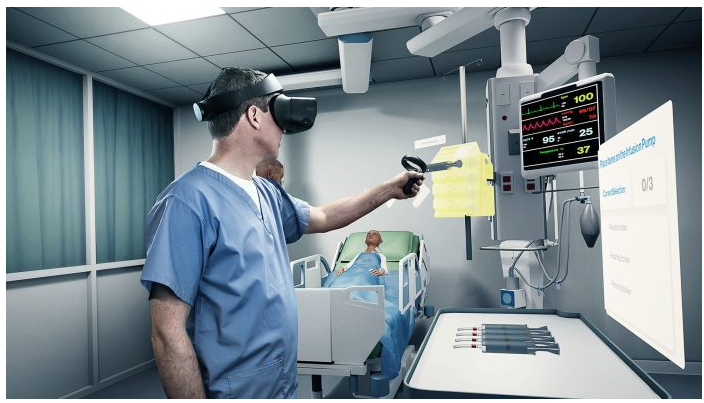
# Summary

We all rely on the healthcare system, but in this day of innovation and new technology, healthcare doesn't have to fall behind. In this survey, I looked for the use of immersive technology in the healthcare system. Immersive technology is employed in a variety of areas of life. The research that has been done or the actions being taken to ensure that the healthcare system does not lag behind in this new technology This report is important because it demonstrates how far the healthcare sector has come, the various interventions that have been made, the gaps that still need to be filled, and the areas on which future researchers should concentrate. Also, the opinions of people regarding the use of immersive technology and how they believe it will change their way of life.

**1.0 Background/ Introduction**

One of the most intricate systems in the world, the healthcare system requires to be more cautious while implementing new innovations. The use of immersive technology in healthcare is currently being tested more frequently, despite the fact that it is not yet more widely used. Most of these trials are being conducted through the educational system, where they are contrasting the benefits of using traditional methods and those of using immersive technology to enhance learning. That's not all; there have been some surgical trials in which the surgeons participating in the application depict the type of procedure that must be performed and in-game methods may learn how to do it prior to performing on real patients, as well as some have been tried again for therapies of a certain psychiatric condition, as well as blocking the pain.

Since education is one of the fields that has been studied and more research has been done on it, I'm going to use it primarily in this survey. As most schools emphasize theory learning and students don't get enough time in skills labs and some materials, like mannequins, can't respond, it doesn't expose students to real-life situations, and sometimes we find low and high-functioning patient simulators but all students can’t have access to them as they are few. Practice without theory is blind, theory without practice is sterile” (Karl Marx, 1975, p. 182). Immersive technology is being employed as a solution to this problem. Some academic institutions have started using this system to train both nurses and doctors, giving them time to get accustomed to the medical setting and preparing them for when they begin their practice.

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**Image 1: healthcare provider using immersive skills for self-directed learning**

# 2.0 Review of Related Articles

A desktop program for 3D virtual laboratories was created by Nicola et al. (2022) in order to help medical students who were unable to attend physical labs and classes owing to COVID-19. Where each phase is reliant on the one preceding it, the waterfall project management methodology was applied. The app was created using the Unity editor, the Unity Asset Store, and the C# programming language for implementation and functionality. Application that was supplied was useful. According to Yu Mei Chang (2021), using virtual applications helps students feel less stressed because they can learn on their own and don't need lectures. It also saves money because there aren't any real chemicals being used that could get messed with.

Academic writing on the topic of nursing education is growing. A virtual reality program called Nursing XR was created to help nursing students improve their communication, risk-taking, holistic evaluation, and professional decision-making skills. Gilardi and co. (2022) The company implemented the software using the SCRUM agile development process, which involved cooperation between faculty experts, students, and developers. The program was created using the Unity engine for Meta Quest 2 devices and the XR interaction toolkit, and it was intended to be played while seated. The design and development method used by Giraldi et al.(2021) has shown to be a successful one, mostly because it is based on participatory design. Through peer discussion among students in the same physical room while immersed in the VR application, Nursing XR not only gave students the chance to engage in decision-making, risk assessment, and wound management, but also elicited collaboration and discussion on patient prioritization, treatments, and a holistic assessment of the patient environment. Due of their isolation, the participants were able to fully immerse themselves and act as they pleased.

Nursing students connected to the virtual world can use what they have learnt in their professional practice through serious games in 3D virtual reality. In order to discuss the design and heuristic evaluation of a serious game 3D immersive VR for the development of communication competence, Hara et al. (2021) created a 3D game named comunica-Enf. The game was created using the Unity 2019.3.6 games engine® (Unity Technologies), Visual Studio® (Microsoft Corporation) was used for the game's coding, and Blender (Blender Foundation) was used for the 3D modeling of characters and objects. The players' speeches were recorded and stored in an Artificial Inteligence database. This app has given nursing students a secure and enjoyable setting to practice communication skills.

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**Table 1: *summary of the articles used.***

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| --- | --- | --- | --- | --- | --- |
| **Reference** | **Research Focus** | **Methods Used** | **The technology used (AR/VR/MR)** | **Findings/**  **Conclusion** | **Future work** |
| Nicola (2022) | a summary of the students' experiences creating a challenging 3D application for medical students. | Waterfall approach | VR | A step- or task-based methodology was effective in terms of producing a usable application. | By automatically recognizing user activity using the software provider Unity Analytics, they want to test the application with medical students using novel test methodologies. |
| Giraldi (2022) | enabling simulated practice and fostering the development of students' risk analysis and decision-making abilities. | SCRUM agile process | VR | Communication skills development was achieved. | Think about future studies that may be done on the actual learning environments where VR applications are applied. |
| Hara (2021) | To outline the creation of a serious 3D immersive VR game and its heuristic assessment for the improvement of communication skills. | Heuristic evaluation | VR and AI | it offered a secure and comfortable environment for the development of communication skills. Its appearance and usage have been checked and validated. | Further research is required based on the use of Comunica-Enf to measure emotions and approach the learned knowledge. |

# 3.0 Conclusion and Potential Future Recommendations

According to the feedback of those who have used it, immersive technology is currently playing a significant role in the healthcare system. However, there are still issues with its application, it is expensive to purchase the materials needed to use it, and as always, the health department needs more attention because some innovations may not be put into practice or tested on patients due to ethical reasons. As of now, this technology is still mostly focused on educating and training healthcare professionals. As they advance, however, part of this technology may be employed in treatment choices, as it has been tested for a few mental health disorders as well as for reducing pain during surgery. I believe that as Africans, we are restricted to using this immersive technology because there haven't been enough studies examining how immersive technology affects African healthcare students.

**References**

Gilardi, M., Honnan, S., Sheerman, L., Cund, A., & Rae, S. (Accepted/In press). Nursing XR – A VR application to teach decision-making to student nurses. Paper presented at European Conference on Game-Based Learning

2022, Lisbon, Portugal.

Hara, C. Y. N., Goes, F. D. S. N., Camargo, R. A. A., Fonseca, L. M. M., & Aredes, N. D. A. (2021). Design and evaluation of a 3D serious game for communication learning in nursing education. Nurse education today, 100, 104846.

Nicola, S., & Stoicu-Tivadar, L. (2022). Sharing the IT Educational Experience of Developing 3D Applications for Medical Students’ Training. Informatics and Technology in Clinical Care and Public Health, 289, 204.

**Part B: App Review**

Anatomy AR is an augmented reality application depicting the human body and its components. It portray articular, cardiovascular, digestive, endocrine, genital, integumentary, lymphatic, muscular, nervous, bone, respiratory, sensory and urinary system on a real scale with indications and notes for the study and learning of university students. It is centred on the teachings of Medicine

This is an android app that can be downloaded from Google Play, but only devices running Android 4.4 and higher may use it.

This app provides complete translation into English, Spanish, Simplified Chinese, Russian, and Korean .It is accessible to people who speak a variety of languages, and it also offers information on every system in the human body.

Since they are the ones who deal with the human body, medical university students are the app's primary target audience. But, aside from that, it can also be used by a variety of students pursuing careers in the medical industry, including nurses, physiotherapists, and others who want to gain a thorough understanding of the human body. Also, this tool can help lecturers if they need to clarify or refresh their memory on a certain subject.

Because it depicts the human body and provides descriptions of various body parts, this app is categorized as a medical app. However, it primarily targets students who are studying human anatomy. So, it serves as a broad medical education app.

This app uses Augmented Reality (AR Core) technology in which user can place the model on a surface in the real world for an immersive experience. It also use Augmented Reality (Image Tracking) in which the user can see the model on a target image for an immersive experience this requires printing the image.

This software only supports augmented reality; it does not support any other technology. It doesn't enable mixed reality or virtual reality, which would allow us to fully immerse ourselves.

Offers a thorough human model and a compelling augmented reality experience. Study anatomy in a didactic method without spending a lot of money. See realistic 3D models of each of the human body's systems in high quality. With a comprehensive knowledge base of anatomical definitions and terminology based on the official Anatomical Terminology, you can complement your study plan. Imagine each part of the human body using augmented reality, and become familiar with its size, purpose, and make-up.

There is only one comprehensive model (Male) in the software, and scanning to find the scale to see your model of your anatomy takes a long time. It has a drawback in that you can't locate a scale for your model when the location is too dark, as in load shedding situations and when there aren't enough lights. When you need assistance with a particular operation, there are no help features available, and since the app is only displayed in a single color, there is no way to modify the color of the display. There isn't a Quiz option in this software where you can test your knowledge.

Yes, I would suggest this app to students who want to have a guide on how to study human anatomy, including the structures and their descriptions. This is because the app has a zooming feature that allows you to see the full organs and all of the descriptions you need to know for various body parts.

Since the XR app is still relatively new and unpopular, specific devices must be used in order to access it. They are not well-known, which limits their productivity and prevents them from enhancing their application. If they were well-known, more people would be able to use it, which would increase revenue and maybe lead to improvements.

When there is not enough financing for the project, it is difficult for an app developer to create what he has visualized and what he believes to be his greatest work because some models are not readily available and must be purchased. In our digital age, data privacy and cyber security is a highly challenging and serious issue.