TIKRIT UNIVERSITY'S MEASUREMENT OF THE NEED FOR A VIRTUAL LABORATORY AS A TEACHING AND LEARNING TOOL FOR COLLEGE STUDENTS OF MEDICINE, DENTISTRY, AND SCIENCES

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ABSTRACT:

Virtual reality has evolved over time to become a crucial component of education. Therefore, it is essential to comprehend this technology's benefits and strengths and how it was developed and measured. In this situation, virtual laboratories have replaced traditional laboratory settings in the educational sector. Therefore, this work focuses on virtual laboratories, especially the remote use of VL, to improve practical elements of efficient teaching. The main goal of this study is to use qualitative analysis to investigate instructional methods and student experiences in the virtual laboratory. Surprisingly, little study has examined the linkage between virtual laboratory student data and learning analytics. Consequently, this study aims to close this gap by undertaking a qualitative analysis, especially.

Keywords: (Virtual laboratories, Remote laboratories, Learning analytics, learner analytics, Distance education).

1. INTRODUCTION

Unlimited time, immediate feedback, repeated testing, experimentation, and student security are all benefits of the virtual lab (Achuthan, K., 2020). Students develop strong problem-solving abilities as a result of their encounters with virtual and simulated experiments as they become ready for physical education. To educate students and professionals on the essential skills in this context, the virtual laboratory is frequently viewed as a feasible alternative to the traditional laboratory and has a good impact on students' learning (Stegman, M. A. 2021). Virtual laboratories are cutting-edge technology that offers a dynamic, all-

encompassing, and safe means to promote awareness and education while amplifying the drawbacks of experiential learning (Irwanto, I, 2022).
The idea of remote access to simulations and virtual talent processes is central to the virtual lab. Digital beacons can be produced by virtual laboratories to track student progress and pinpoint effective teaching methods. Students' abilities to solve problems, think critically, explore, and learn more have improved as a result of their involvement with the virtual lab (Shen, C. W., 2022). In order to make use of this knowledge, the discipline of "educational analytics" is a method to shed light on learning by examining diverse student-generated data (Singh, V. K., 2021).

Therefore, the most common purpose of virtual laboratories is to give people access to a 3D or 4D environment where they may encounter actual or hypothetical data and interact with it in real-time. In other words, it enables problem-solving similar to that found in a physical lab by giving consumers the opportunity to experience a genuine lab setting in a virtual one. Technologies based on virtual reality have a lot to offer in terms of learning and labs. VL, however, is still a young technology with only a few uses in education. 2020 (Firdiarahma F) On the flip side, there is a wealth of information on the practical component that discusses the use of physical or chemical substances that are harmful to students during practical experiments.

Additionally, some pupils have a serious phobia of going to surgery. medical college operations, among others (L. P. R. A. Utami, 2021; R. Taranilla, 2020). Much research in the same area (R. Taranilla, 2020; Lege, 2020; Sweileh, 2020) concentrates primarily on design, ignoring user experience, user requirements, and scenario analysis for learners utilizing virtual laboratories. This research investigates Tikrit University's demand for a virtual laboratory in the educational process. help get over a student's fear of certain elements that could be present in typical labs, such as gaseous materials, chemicals, or the blood used in surgery.

2. LITERATURE REVIEW

A few academic studies on VL are being carried out. Earlier this year, Jensen and Konradsen (2018) (Jensen, L., 2018) published a thorough study on the usage of VL. Along with different learning outcomes, they evaluated the user experience in

VL. They provided students with 21 writing samples that varied in quality and a collection of analyses that aided in understanding and learning. This article demonstrates that HMDs have limits in their capabilities for analytical work and operations when compared to less effective technology. The reality of VL usage, however, is hard to determine due to the low quality of the included research (Jensen, L., 2018).

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According to research done in Nigeria, some kids are analyzing volumetric data and providing answers. The outcomes showed a clear distinction between participants in the physical and virtual chemical tests. Students who worked in a simulated chemistry lab outperformed those who worked in a real chemistry lab. This demonstrates how excellent and effective the 3D interaction is and how well it performs its primary function. The lack of resources is resolved with the virtual chemical lab. In order to increase student knowledge and achievement, it is, therefore, more beneficial for them to practice in a virtual chemistry lab (F. Aliyu, 2019).

In order to help public and high school students strengthen their skills, a chemistry VL distance learning course called VL2E2C was created. It offers in-depth instruction in the theory and practice of chemistry. Students with impairments can readily conduct clinical trials in this method's optional laboratory by cutting back on routine or experimental use. In addition to assigning an intelligent user-controlled robot to execute activities that may be completed autonomously, there are three other ways to run the software (Shaista, R., 2021).

Results can also be viewed in real-time by users. This approach demonstrates how cutting-edge VL technology may support conventional chemistry instruction by producing successful outcomes for online learning (Shaista, R., 2021).

Research on the absence of communication between teachers and distance learners in higher education was done in 2021. To finish the laboratory assignments, students need to possess both fundamental and advanced knowledge. As seen in COVID-19, individuals from all around the world stayed in faraway locations and carried out duties online, including remote testing. In order to improve communication, the method of communication modification was applied, and the experimental machine was used to contrast the traditional laboratory with the selected platform. Many users finished their activities quickly and received scores that were more than 200% higher when the platform was combined with systematic learning (Achuthan, 2021).

A study on the efficiency of online education in virtual labs was also released, accounting for the 2020 pandemic. This study sought to determine the value of virtual reality learning environments. The purpose of this project is to investigate how virtual laboratories might enhance students' ability to learn in a Chennai school. The purpose of this study is to ascertain if virtual laboratories assist students in enhancing their individual learning. The research was conducted through observation and conversations with subject-matter experts. According to the poll results, a majority of students are aware of and pleased with the virtual lab. The study recommends that schools employ virtual laboratories to promote students' creative thinking. (2021, F N Kumala).

3. METHODOLOGY

This work was applied to different colleges at Tikrit University, including (20) respondents as shown in Figure 1.

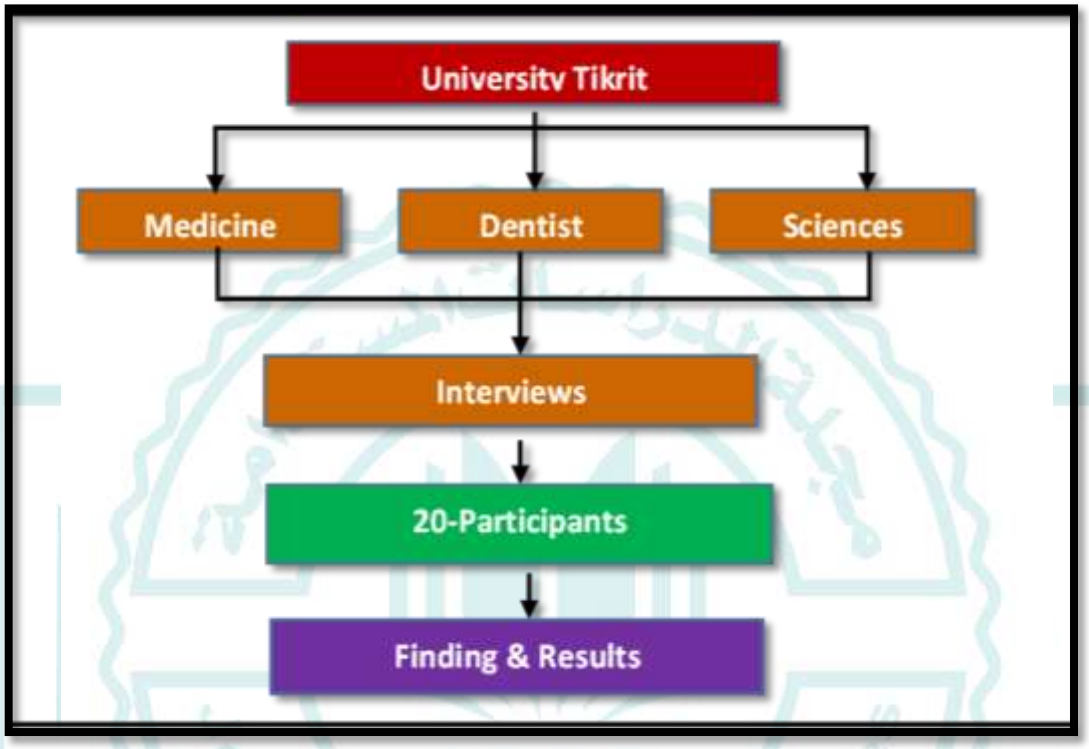

Figure 1: Research Method Approach

4. DATA ANALYSIS AND RESULTS

Participants in this study comprised 12 undergraduate students, 1 Master's student, 2 Ph.D. students, and 5 lecturers, all associated with Tikrit University. An announcement regarding the virtual lab was posted in the colleges of the university, and interviews were conducted face-to-face with the participants to gather information.

Table 1 presents the demographic information of each participant, including their occupation, gender, age, nationality, interview method, specialty, and classroom subject.

Table 1: Participants Information

Respondents	Occupation	Gender	Age	Nationality	Interview	Specialty	Classroom Subject
P1	Bachelor Student	M	22	IRAQI	Face to Face	Medicine	Anatomy
P2	Bachelor Student	F	23	IRAQI	Face to Face	Medicine	Embryology
P3	Ph.D. Student	F	30	IRAQI	Face to Face	Dentist	Embryology and Oral Tissues
P4	Ph.D. Student	M	34	IRAQI	Face to Face	Dentist	Dental Anatomy and Morphology
P5	Prof	M	48	IRAQI	Face to Face	Dentist	Pharmacology
P6	Ass. Prof.	M	36	IRAQI	Face to Face	Medicine	Embryology
P7	Lecturer	F	34	IRAQI	Face to Face	Biology	DNA
P8	Prof	M	53	IRAQI	Face to Face	Chemistry	Physical Chemistry
P9	Prof	F	43	IRAQI	Face to Face	Physical	Physiology
P10	Bachelor Student	F	22	IRAQI	Face to Face	Medicine	heart
P11	Bachelor Student	F	22	IRAQI	Face to Face	Biology	Embryology
P12	Bachelor Student	M	23	IRAQI	Face to Face	Medicine	Cerebral analysis
P13	Bachelor Student	F	20	IRAQI	Face to Face	Mathematics	statistics
P14	Master student	M	25	IRAQI	Face to Face	Chemistry	Analytical Chemistry
P15	Bachelor Student	M	22	IRAQI	Face to Face	Medicine	Surgeries
P16	Bachelor Student	F	22	IRAQI	Face to Face	Dentist	Anatomy
P17	Bachelor Student	M	24	IRAQI	Face to Face r	Biology	Blood Analyses

P18	Bachelor Student	M	21	IRAQI	Face to Face	Physical	Physiology
P19	Bachelor Student	M	22	IRAQI	Face to Face	Chemistry	Physical Chemistry
P20	Bachelor Student	F	23	IRAQI	Face to Face	Biology	Bacteria

The interviews were conducted to investigate the need for a virtual lab at Tikrit University to complement the traditional lab setup. Each interview lasted between 30 minutes to an hour and was structured around six specific questions. These interviews elicited valuable insights into the participants' perspectives on various aspects, such as the effectiveness of traditional labs, factors influencing the practical side (e.g., blood phobia and operations), and the potential of the virtual lab in comparison to the traditional classroom.

Overall, this research study aims to provide a comprehensive understanding of the participants' views and experiences with virtual labs and their potential role in supporting and enhancing the existing traditional lab practices at Tikrit University.

5. CONCLUSION AND RECOMMENDATIONS

According to the results of this study, which attempts to explore the effects of 4D virtual laboratories combined with reality on university students' learning processes, simulation-based virtual lab equipment is a more effective learning strategy than conventional approaches. Additionally, after building a virtual lab with an easy-to-use, customizable graphical user interface, students become more interested in and motivated to do experiments, whereas regular learning has little impact on their learning. Their training is challenging as a result. It should go without saying that virtual lab technologies are more engaging and enjoyable than those used in clinical laboratories. As a result, the utilization of virtual laboratories nowadays enables students to engage in the learning process, enhance their learning by repeating experiments, and do so while studying at their own pace their heart.

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