EXAMINING THE PERCEPTIONS AMONG UNDERGRADUATE NURSING STUDENTS USING VIRTUAL REALITY IN A COMMUNITY COURSE: A MIXED-METHODS EXPLANATORY STUDY

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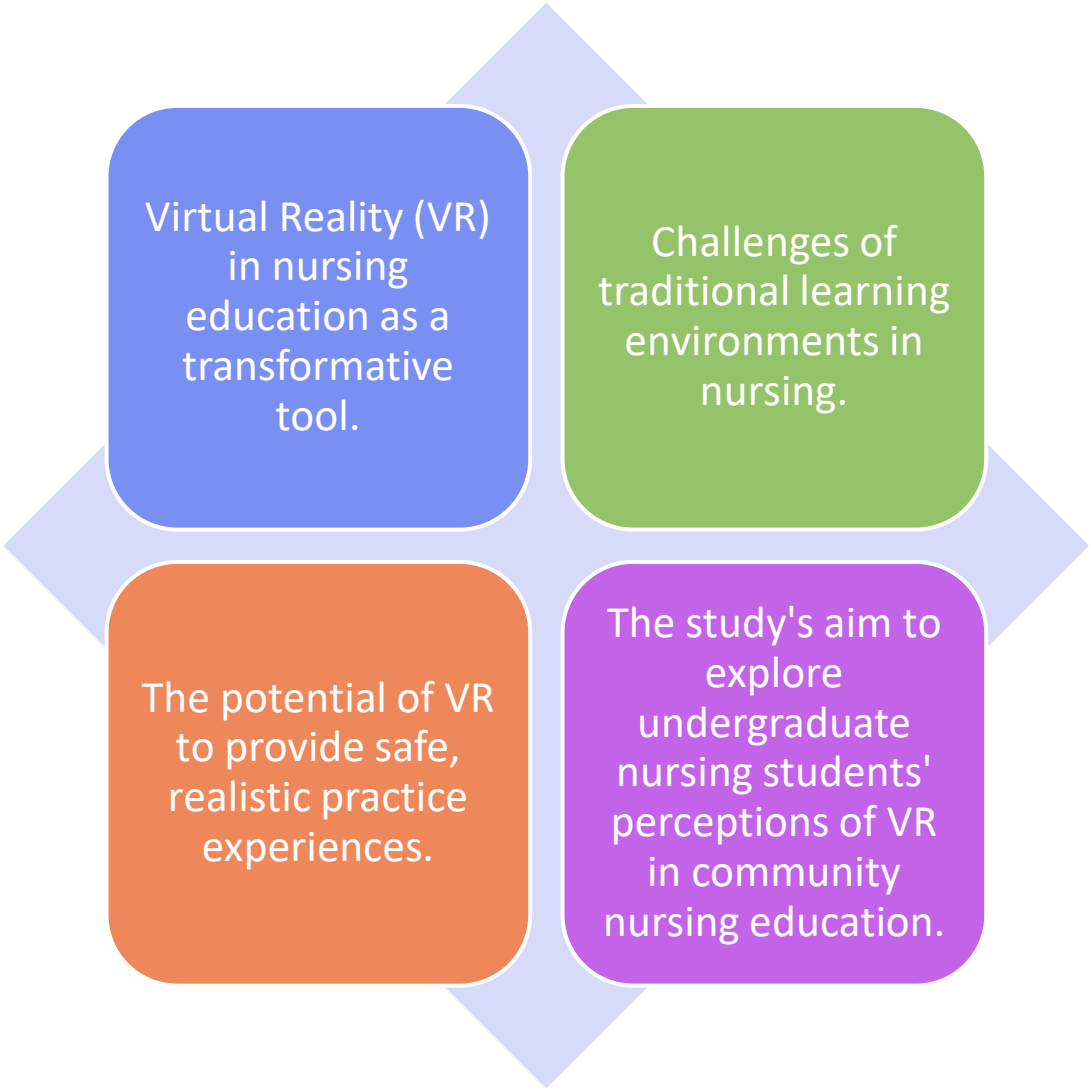
BACKGROUND AND PURPOSE

VIRTUAL REALITY AND ITS APPLICATIONS IN UNDERGRADUATE NURSING EDUCATION



LITERATURE REVIEW

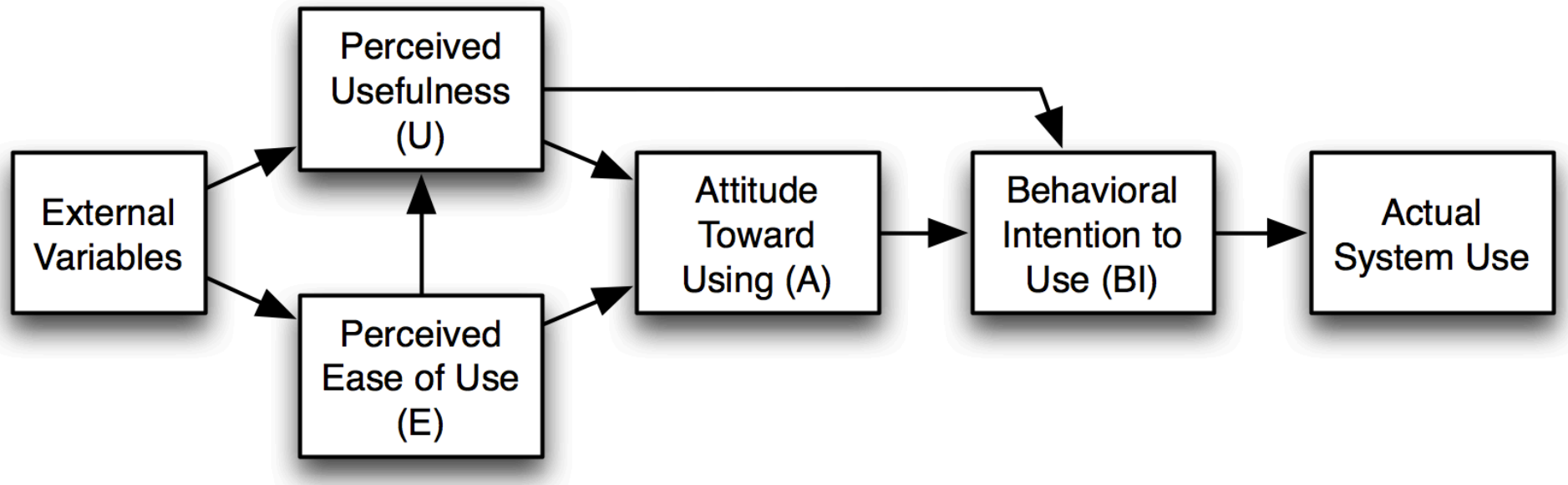
Evolution of technology in nursing education: From traditional methods to innovative VR applications (Aebersold & Tschannen, 2013).

Benefits of VR: Enhanced learning experiences, improved clinical skills, and psychological safety (Dustman et al., 2021; Fealy et al., 2019).

Research gap: Limited understanding of VR's integration into community nursing education (Shorey & Ng, 2021).

AIM AND RESEARCH QUESTIONS

- Aim: To study the student experiences of home safety environment assessment in a VR simulated environment.
- R1: What are the perceived usefulness and ease of use levels following the VR simulation experience?
- R2: What are the levels of overall system usability following the VR simulation experience?
- R3: Does perceived usefulness and ease of use predict overall usability and behavioral intent to use while controlling for previous VR experience?
- R4: What are the participants' experiences with VR home visit simulations?



THEORETICAL FRAMEWORK

THE STUDY WAS GUIDED BY THE TECHNOLOGY ACCEPTANCE MODEL (TAM)

METHODS

RESEARCH DESIGN AND TECHNOLOGY

METHODS AND RESEARCH DESIGN

- Mixed-methods explanatory study design.
- Participants: Nursing students enrolled in a community health course.
- Instruments: Technology Acceptance Model (TAM), System Usability Scale (SUS), and semi-structured interviews.
- Data analysis tools: SPSS and MAXQDA.

PROCEDURES

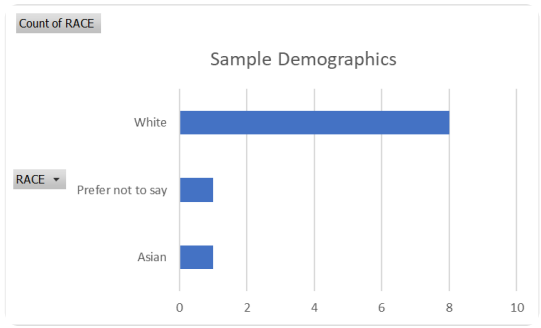
- Students were recruited through convivence sampling from the community course
- Students went to the research lab on a non-clinical day
- Students were presented with a VizHome scenario at random after consenting
- VR simulation required students to examine the homes and find areas of challenge
- Students debriefed and if accepted were asked a serious of three interview questions about their experience in focus group format.

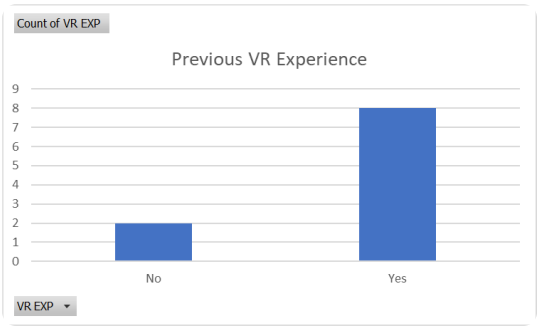
DATA ANALYSIS

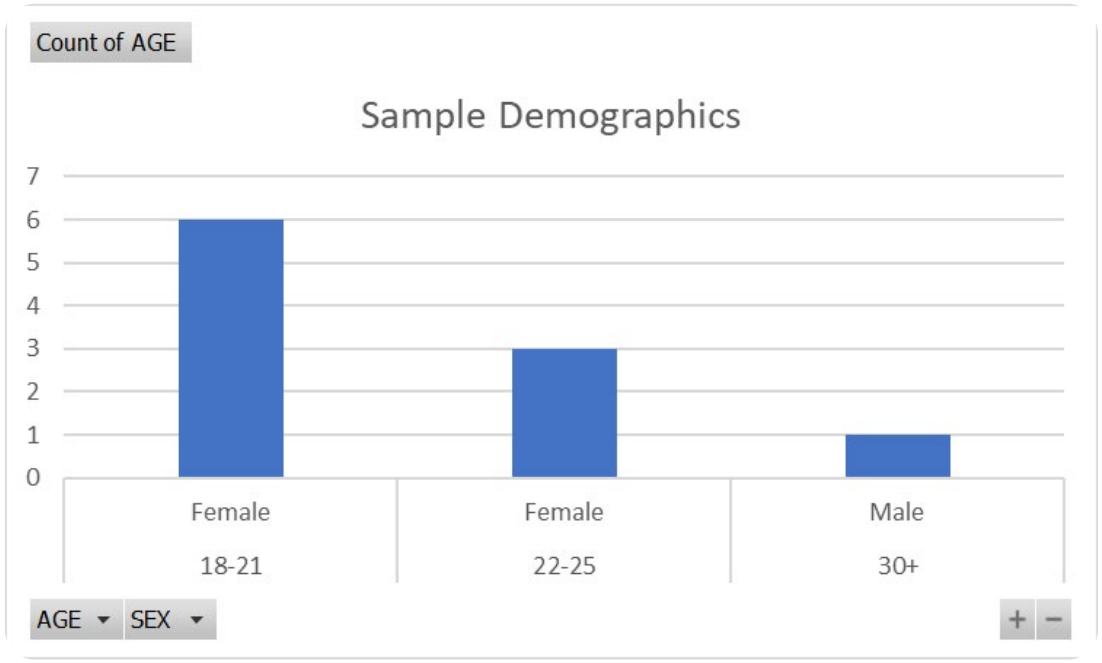
- Descriptive statistics for demographic information (frequency)
- Descriptives for perceived ease of use (EU), perceived usefulness (PU), and behavioral intent to use
- Hierarchical regression analysis to predict EU and PU's role in predicting behavioral intent to use, while controlling for previous VR experience.
- Qualitative descriptive analysis

RESULTS

AND IMPLICATIONS FOR SIMULATIONISTS AND NURSE EDUCATORS

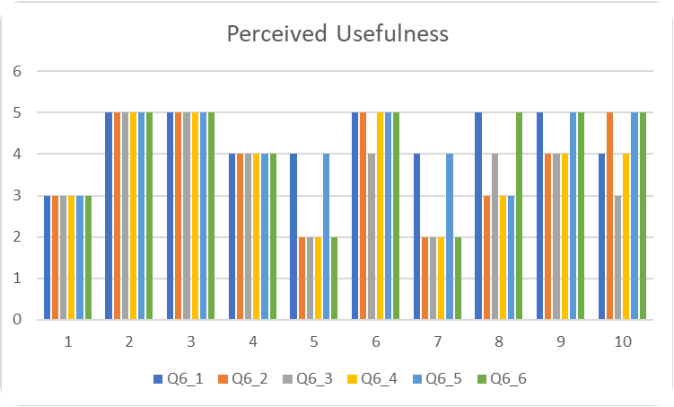


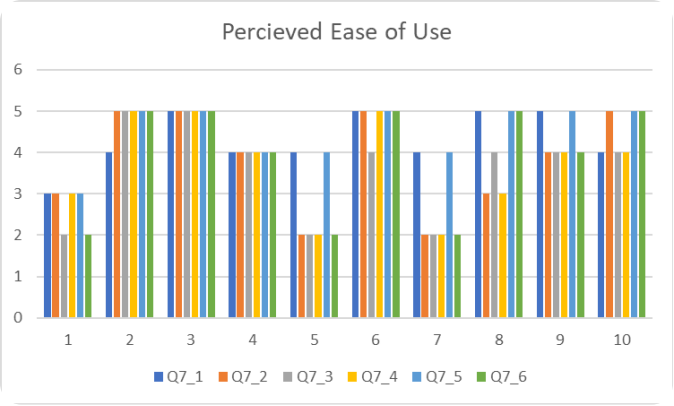




QUANTITATIVE RESULTS

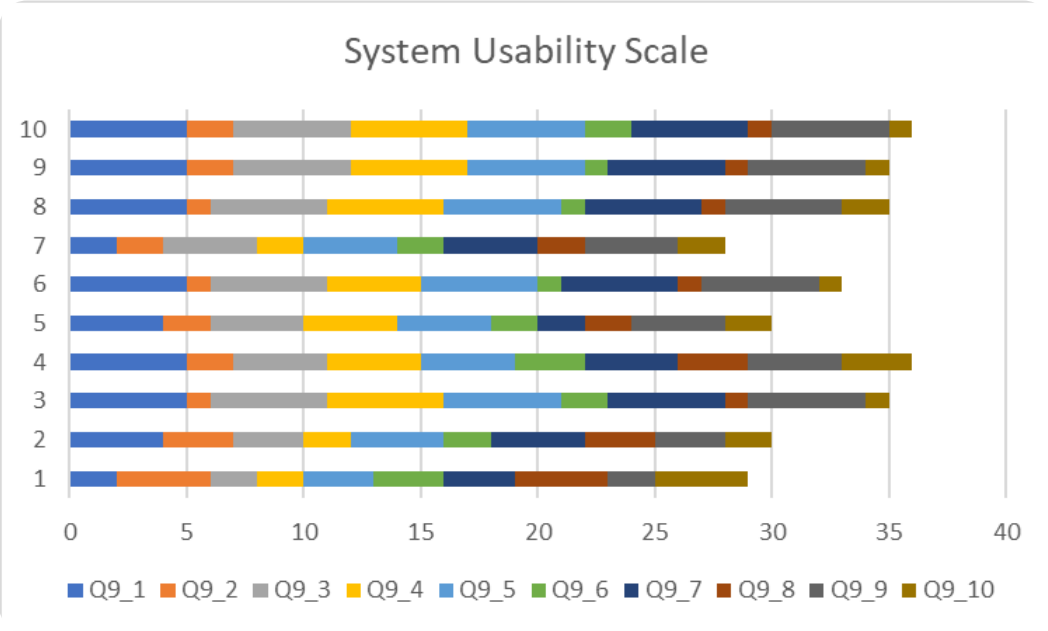
- For the quantitative portion, we had a total of n=10 participants who completed the VR experience and the TAM questionnaires.
- For the qualitative portion, there were n=6 participations who participated in interviews

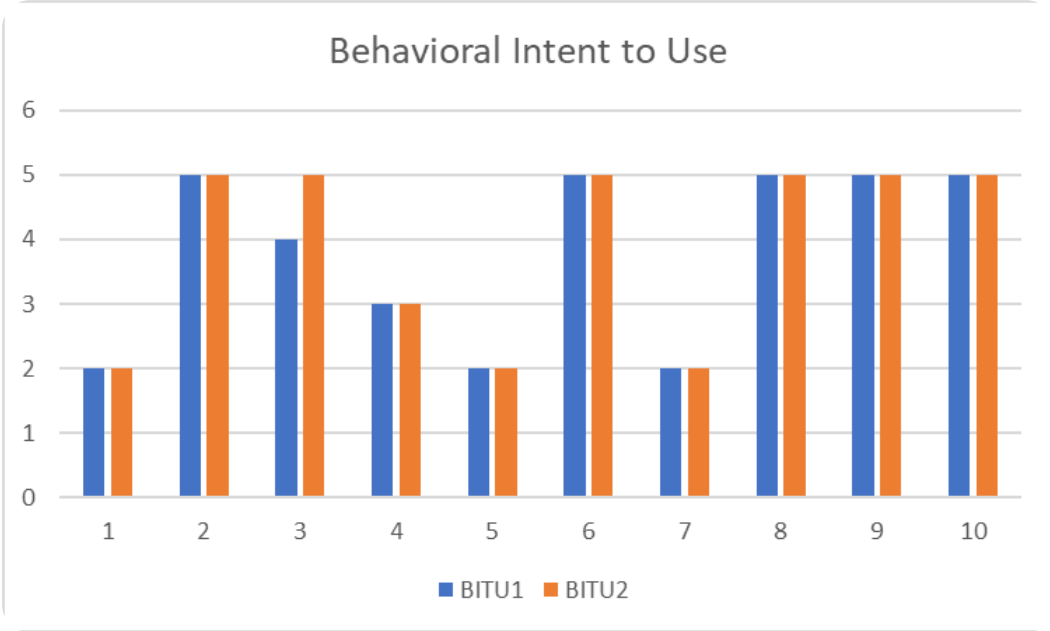




QUANTITATIVE RESULTS

- High perceived usefulness and ease of use of VR for learning home assessment skills.
- Behavioral intent to use VR technology was generally positive.
- System Usability Scale (SUS) scores indicated room for improvement.





QUANTITATIVE RESULTS

QUANTITATIVE RESULTS

Table 2. Descriptive statistics for perceived usefulness, perceived ease of use, behavioral intent to use, and system usability.

Scale/Item	Minimum	Maximum	*M*	*SD*	Variance	*n*	Cronbach's Alpha	Total Mean
Usefulness								
Q1	3	5	4.40	.699	.489	10		
Q2	2	5	3.80	1.23	1.51	10		
Q3	2	5	3.60	1.08	1.16	10	.93	24
Q4	2	5	3.70	1.16	1.34	10		
Q5	3	5	4.30	.823	.678	10		
Q6	2	5	4.10	1.29	1.66	10		
Ease of Use								
Q1	3	5	4.30	.675	.456	10		
Q2	2	5	3.80	1.23	1.51	10		
Q3	2	5	3.60	1.17	1.38	10	.94	24
Q4	2	5	3.70	1.16	1.34	10		
Q5	3	5	4.50	.707	.500	10		
Q6	2	5	3.90	1.37	1.88	10		
Intent to Use								
Q1	2	5	3.80	1.40	1.96	10	.98	7.70
Q2	2	5	3.90	1.45	2.10	10		
Total System Usability	55	75	67	7.82	61.12	10		

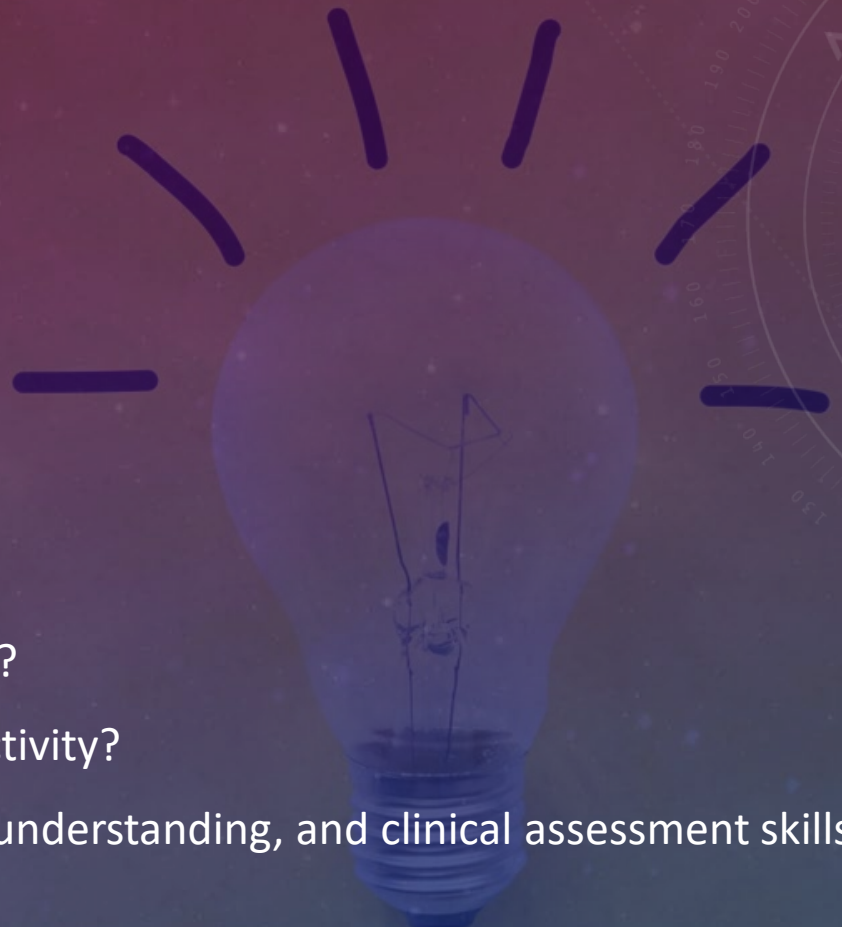
REGRESSION ANALYSIS

PE and PU predicted behavioral intent to use

The prediction accounted for over 80% of the variance in the sample

The results align with the TAM

INTERVIEW QUESTIONS



- What was your favorite element of this simulation activity?
- What was your least favorite element of this simulation activity?
- How do you think this activity will improve your learning, understanding, and clinical assessment skills in the community/psych nursing course?

QUALITATIVE FINDINGS

Question 1	P1: "I think you all did a good job rendering the inside of the house. What I saw was a fairly realistic layout"
	P2: "My favorite element is probably just being able to walk around without having to get up and seeing the environment without having to go through the complicated process of doing a home visit or an actual home visit"
	P4: "I like how you're able to move around like in space. I thought it was a good rendering. I think it was a good start for looking into what a home visit would look like. I think I like that. It would prepare you for sort of what to look for before you go in, like when I did my home visit. I didn't really know what I was doing going in. I wish I had done this before"
	P6: "I was able to be exposed to home visits in a safe environment"
Question 2	P3: "I don't know what caused it. I mean the graphics. Maybe, but that's just you know the graphics are just a little bit blurry at times. But I think that could be fixed. I could clearly see everything I just needed time. Sometimes the picture would go out, or look a little bit blurry, but I could still get the idea of everything. I still felt immersed in the experience as well."
	P4: "I thought the rendering was really good, but there are parts of it, especially in the bathroom, and in some parts of the bedroom, where either the quality wasn't good enough, and I couldn't tell if it was because of the graphics. The simulation is about safety in the home. I had a hard time telling if rendering was part of it, or if it was just a flaw in the simulation, so it was just a little bit of a quality issue there"
	P5: "I mean, you told me not to move quickly both the head and the feet. It does make you dizzy, but I mean I really didn't get too too dizzy. But there's just that aspect where it's like you can get dizzy, and you can't really do much about that in virtual reality."
Question 3	P1: "I think it will make it a lot easier for students to see a variety of different types of households without having to arrange meetings with people in their homes that we see. Depending on where the school was located, students were provided different opportunities for different types of communities"
	P2: "It was just the motion sickness. It was really getting to me. I feel like if there was any way to slow down the movement it might help. Like me pressing on the button"
	P3: "I think this puts you in a mind-set that you're not in this person's home but you're seeing a home, so it calmed you down, and you can actually know and learn what to look for without feeling the stress of being actually in somebody else's home."
	P5: "I believe if we are actually able to go to a home and do the assessment and do their home visit, then this could be supplemental. Sure, use this as supplemental. But if they are people to visit, no. If everything fell apart and we're just gonna send you all to a nursing home, I'd rather use this" [the participant is referring to the fact that home visit volunteers cancel and they would rather take this VR experience over going to a nursing home instead of someone's home as previously planned]
	P6: "It will allow me to be observant of my surroundings, in a safe environment."

QUALITATIVE FINDINGS

1

Realistic VR environments enhance understanding and preparation for home visits.

2

Technical limitations and physical discomfort identified.

3

VR viewed as a beneficial supplement to traditional learning, not a replacement.

IMPLICATIONS

Simulation in nursing requires a paradigm shift to meet the challenges of the contemporary clinical setting.

Importance of addressing technical and usability issues in VR applications.

VR's potential as a supplementary tool in nursing education.

Need for further research to optimize VR learning experiences.

QUESTIONS?

THANK YOU!

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REFERENCES

- Aebersold, M., & Tschannen, D. (2013). Simulation in nursing practice: The impact on patient care. OJIN: The Online Journal of Issues in Nursing, 18(2). https://doi.org/10.3912/OJIN.Vol18No02Man06
- Dustman, W. A., King-Keller, S., & Marquez, R. J. (2021). Development of gamified, interactive, low-cost, flexible virtual microbiology labs that promote higher-order thinking during pandemic instruction. Journal of Microbiology & Biology Education, 22(1), ev22i1.2439. https://doi.org/10.1128/jmbe.v22i1.2439
- Fealy, S., Jones, D., Hutton, A., Graham, K., McNeill, L., Sweet, L., & Hazelton, M. (2019). The integration of immersive virtual reality in tertiary nursing and midwifery education: A scoping review. Nurse Education Today, 79, 14–19. https://doi.org/10.1016/j.nedt.2019.05.002
- Shorey, S., & Ng, E. D. (2021). The use of virtual reality simulation among nursing students and registered nurses: A systematic review. Nurse Education Today, 98, 104662. https://doi.org/10.1016/j.nedt.2020.104662