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Perception of Student Nurses Using Augmented Reality in Classroom Learning - Resources as An Educational Facility in Selected Colleges of Karnataka

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Abstract

The widespread impact of the Covid-19 pandemic has touched every aspect of human life. To address academic and psychological challenges, nursing students are encouraged to utilize AR applications in the sciences to enhance motivation and academic performance during these trying times. This study investigates the levels of perception regarding Augmented Reality as an educational facility in classroom learning among 190 first year nursing students. Perception towards AR were examined through a survey such as 5-point Likert-scale items. The research suggests that these learners were predominantly utilize downloadable AR apps, finding them highly engaging. Some students are also involved in creating AR content across various platforms. The findings from inferential statistics indicate a robust association between students' utilization of augmented reality for classroom learning and adherence to institutional protocols and policies.

Keywords: Augmented Reality, Perception, Educational Facility, Class Room learning, Nurses.

1. Introduction:

Learning media plays an important role in the educational process, and its evolution is closely tied to advancements in technology and science. For nursing students, learning media serves as a bridge to foster critical thinking and informed action. A relatively recent development in learning media is the incorporation of Augmented Reality (AR).

Augmented Reality is a technology that enables the overlay of digital images and information onto the physical environment. By leveraging the existing real-world surroundings, augmented reality enhances the learning experience by superimposing virtual information or even an entire virtual world into a new interface. AR primary function is to heighten an individual's perception of the surrounding world by integrating the virtual and real worlds. The advantage of this application is that it has high interactivity, namely the presence of AR virtual objects that can interact directly with users[1,2].

Currently, a survey estimates that by 2023, the world will have about 2.4 billion mobile users of augmented reality worldwide and its market will reach $72.7 billion by 2024[3].

1.1 Statement of the problem:

“Student Nurses Perception of the use of Augmented Reality in the classroom learning resources as an educational facility in selected colleges of Karnataka”

1.2 The objectives of the study:

This study tries to find out the level of perception in using augmented reality (AR) as an educational facility in class room learning in various nursing colleges of Karnataka.

- Assess the levels of perception regarding Augmented Reality as an educational facility in classroom learning.
- Associate the levels of perception with selected demographic variables.

2. Review of Literature:

Augmented Reality (AR) has emerged as a promising tool in nursing education, offering interactive and immersive learning experiences that can enhance student engagement and knowledge retention. Below is a summary of literature reviews and studies examining nursing students' perceptions of AR in educational settings:

High Acceptance and Anticipated Academic Benefits: A study involving 419 nursing students assessed their acceptance of AR technology in education and training. The findings indicated a high intention to use AR for self-learning, with students expecting it to improve their academic performance. They also recognized the potential future benefits of AR in their education.[4]

Enhanced Self-Directed Learning and Skill Acquisition: Research focused on developing and evaluating an AR-based educational program for nurses in intensive care units demonstrated that AR effectively promotes self-directed learning and hands-on practice. Participants showed active engagement and improved skill acquisition, highlighting AR's potential in critical care nursing education.[5]

Positive Perceptions and Satisfaction with Immersive VR: A quasi-experimental study examined the impact of an immersive virtual reality (VR) application on nursing students' perceptions, knowledge, and satisfaction in an anatomy course. The results showed that 96% of participants were satisfied with using the VR application, and it enhanced their knowledge retention in the human anatomy course.[6]

Improved Competency in Procedural Training: A study evaluating the usability and feasibility of anatomy-augmented virtual reality for nursing procedural training found that the AR trainer led to improved competency in simulated nasogastric tube placement compared to standard video and didactic training. Nursing students reported that the AR program provided a superior educational interface compared to traditional methods.[7]

These studies collectively suggest that nursing students perceive AR as a valuable educational tool that enhances learning experiences, promotes self-directed learning, and improves practical skills. While specific studies focusing on nursing colleges in Karnataka are limited, the positive perceptions and benefits of AR in nursing education observed globally indicate its potential applicability in this region.

3. Material & Methods:

Study Design: This study will employ a quantitative, cross-sectional survey design to assess the level of perception regarding the use of Augmented Reality (AR) in classroom learning across various nursing colleges

Study Population: The target population includes nursing students from multiple nursing colleges such as T.John College, Mangala College & Viswasai College of Nursing.

Inclusion Criteria: Students enrolled in nursing programs (Undergraduate) actively engaged in learning.

Exclusion Criteria: Students with limited classroom participation or no exposure to AR-based tools.
Sampling Technique : Convenient sampling technique was used to ensure representation of study samples.
Sample Size: A total of 190 participants were selected from different nursing colleges.
Data Collection Tools Survey Questionnaire: A structured questionnaire were designed with closed-ended questionnaire to assess perceptions regarding AR in education. The questionnaire was include sections on Demographics,20 items in the questionnaire 5- point Likert scale with levels of responses was composed of five responses. They are strongly disagree, disagree, neutral, agree, strongly agree. The information gathered from these surveys measured their perceptions toward using AR with students. Finally, participants were shared their experience in using AR.Previous exposure to AR Perceived usefulness and ease of use of AR in classroom learning.
Data Collection Procedure: Participants was approached in person and via email to explain the study and obtain consent.Surveys were distributed via Google Forms and in-person during class hours to ensure a higher response rate.The estimated duration for completing the survey is 10-15 minutes.
Data Analysis: Data were into SPSS software.Descriptive statistics (frequencies, percentages, means) will be used to summarize participant demographics and responses.Inferential statistics (Chi-square tests, t-tests) will be used to compare perceptions across different demographic variables
Ethical Considerations: Written and verbal informed consent were obtained from all participants.Data were kept anonymous and confidential, with results presented in aggregate form. The study ethical approval was obtained from the nursing colleges' institutional authorities.
Limitations: study is limited to a cross-sectional design, capturing perceptions at a single point in time.Potential bias in self-reported data may affect the accuracy of perceptions.

4. Results

The purpose of the analysis is to reduce the data into an interpretative and meaningful form so that the results were obtained and the significance was interpreted.

4.1 Organization and Presentation of data analysis:

4.1.1 Description of demographic variables of the selected students.

Table 1: Demographic distribution of the selected students.

l. No.	Demographic variable	N = 190	%
1.	**Age group**		
	17 – 20 years	165	87%
	21 – 24 years	21	11%
	25 years & above	4	2%
2.	**Gender**		
	Male	158	83%
	Female	32	17%
3.	**Course of study**		
	B. Sc Nursing	123	65%
	GNM	67	35%
4.	**Electronic Gadgets which you own**		

	Laptop	1	0.5%
	Smartphone	173	91%
	Smartphone & laptop	9	5%
	Smartphone, laptop & tablet	4	2%
	Smartphone & personal computer	3	1.5%
5.	**Do you have previous exposure to augmented Reality**		
	Yes	63	33%
	No	127	67%
6.	**If yes, mention the subject**		
	Physics, Chemistry & Biology	34	18%
	Anatomy	17	9%
	Others	12	6%
	None	127	67%
7.	**Name of the institution**		
	Mangala College	28	15%
	T. John College	97	51%
	Viswasai College	65	34%
8.	**Have you ever subscribed any app related to Augmented Reality**		
	Yes	43	23%
	No	147	77%
9.	**If yes, mention the no. of apps subscribed***		
	None	147	77%
	One app	30	16%
	Two app	9	5%
	Three or more apps	4	2%

*The apps subscribed includes – AVS brilliant, Byju's app, Edu-port, Exam-winner, Geogebra, Gireesh physics, Google, Nursing guru, Smart class, Time, Unacademy, Vedantu, Xylem and Youtube

4.1.2 Assessment of levels of perception regarding Augmented Reality as an educational facility in classroom learning among the nursing students.

Table 2: Distribution of the levels of perception of the selected students.

Perception Level	**N**	**%**
Strongly disagree (1 - 20)	0	0%
Disagree (21 - 40)	1	0.5%
Neutral (41 - 60)	6	3.2%
Agree (61 - 80)	**164**	**86.3%**
Strongly agree (81 - 100)	19	10%

Table 3: Mean and Standard deviation of the perception level of the selected students.

Samples	**Max Score**	**Mean**	**SD**
190	100	73 (Agree)	7.73

Table 4: Distribution of perception levels among the responses to the statements of the questionnaire and the mean of each category of responses

S. No.	Questions	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly agree (%)
1	Using augmented reality may help me get more information about Nursing	0.53	0	19.47	**62.11**	17.89
2	I think that augmented reality is enhancing my clinical performance.	1.05	0.53	30	**60.53**	7.89
3	I think that my interaction with augmented reality will be clear and understandable.	1.6	1.1	20	**62.6**	14.7
4	It will be easy for me to become skillful Nurse at using augmented reality.	1.05	0	30	**57.37**	11.58
5	I have the resources necessary to use augmented reality (e.g. smartphone).	2.1	0.53	14.74	**64.74**	17.89
6	Augmented reality is compatible with other technologies I use.	1.05	7.9	39.47	**46.84**	4.74
7	I can get help from others if I have difficulties using augmented reality.	0.53	3.16	30	**57.89**	8.42
8	I feel nervous about using augmented reality.	6.84	31.05	**34.74**	23.16	4.21
9	AR helps me to retain the contents.	1.57	1.57	31.6	**60**	5.26
10	AR motivates me to learn.	1.05	3.16	28.42	**51.05**	16.32
11	AR makes possible studying in different ways avoiding in this way feeling frustration.	0.53	5.79	35.79	**51.05**	6.84
12	It helps me to see/to imagine very clearly what I am being explained.	2.63	0.53	23.68	**58.95**	14.21
13	It helps me to revise at home.	0.53	1.05	21.05	**65.26**	12.11
14	It has allowed me to learn to guide the treatment of choice.	0.53	2.63	39.47	**52.11**	5.26
15	The quality of the AR material helped to hold my attention.	0.53	5.26	23.68	**62.11**	8.42
16	The information was so much that it was difficult for me to remember the important points.	3.16	16.32	35.26	**42.1**	3.16
17	It was difficult to discover the digital information associated with the real image.	1.57	23.16	**39.47**	34.2	1.6

18	In addition to seeing virtual images with augmented reality, I would like to do in real setting.	0.53	4.2	33.16	**54.21**	7.9
19	I plan to use augmented reality applied to teaching profession in the future.	1.05	5.26	21.58	**62.11**	10
20	I think in future AR will be inevitable in curriculum-based education.	0.52	1.57	23.68	**62.63**	11.6
Mean		1.4475	5.7385	28.763	**54.551**	9.5

Table 5: Distribution of perception levels based on knowledge, attitude and practice-based questions

Questionnaire distribution of perception	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly agree (%)
Knowledge-based	0.96	3.24	25.35	**58.77**	11.67
Attitude-based	1.96	7.80	29.71	**51.81**	8.71
Practice-based	0.53	3.16	32.10	**56.14**	8.07

The above table 2 to table 5 proves the primary objective of the study. The descriptive statistical analysis portrays that the students AGREE to the fact that the augmented reality can be a good educational facility to aid in classroom learning *(mean = 73 ~ Agree)*.

4.1.3 Associate the levels of perception with selected demographic variables of selected students.

Table 6: Association between the levels of perception with selected demographic variables

Sl. No.	Demographic variables	N = 190	%	Perception Levels				$\chi 2$ | df
				Mean ≦ 73		Mean ≧ 74		
				n	%	n	%	
1.	**Age group**							
	17 – 20 years	165	87%	82	49.6%	83	50.4 %	3.201
	21 – 24 years	21	11%	7	33.3%	14	66.7 %	
	25 years & above	4	2%	1	25%	3	75%	df=2
2.	**Gender**							
	Male	158	83%	75	47.5	83	52.5 %	0.004
	Female	32	17%	15	46.9%	17	53.1 %	df=1
3.	**Course of study**							
	B. Sc. Nursing	123	123%	59	48%	64	52%	0.045

4.	GNM	67	67%	31	46.3%	36	53.7 %	df=1
5.	**Name of the institution of study**							
	Mangala College	28	15%	22	78.6%	6	21.4 %	**12.84**
	T. John College	97	51%	41	42.3%	56	57.7 %	
	Viswasai College	65	34%	27	41.5%	38	58.5 %	df=2
6.	**Do you have previous exposure to augmented Reality**							
	Yes	63	33%	27	43%	36	57%	0.77
	No	127	67%	63	49.6%	64	50.4 %	df=1
7.	**If yes, mention the subject**							
	Physics, Chemistry, Biology	34	18%	14	41.2%	20	58.8 %	1.07
	Anatomy	17	9%	7	41.2%	10	58.8 %	
	Others	12	6%	6	50%	6	50%	df=3
	None	127	67%	63	49.6%	64	50.4 %	
8.	**Electronic Gadgets which you own**							
	Laptop	1	0.5%	1	100%	0	0%	1.41
	Smartphone	173	91%	82	47.4%	91	52.6 %	
	Smartphone & laptop	9	5%	4	44.4	5	55.6 %	
	Smartphone, laptop & tablet	4	2%	2	50%	2	50%	df=4
	Smartphone & personal computer	3	1.5%	1	33.3	2	66.7	
9.	**Have you ever subscribed any app related to Augmented Reality**							
	Yes	43	23%	21	48.8%	22	51.2 %	0.0434
	No	147	77%	69	47%	78	53%	df=1

The above table 6 depicts the result of Chi-square analysis which was aimed to understand and identify the association between the perception level and selected demographic variables — age group, gender, course of study, name of institution, electronic gadgets owned, previous exposure to AR and the subjects for which AR was utilized, and if they have subscribed any app related to AR. The results show that there is a significant association with the variable — institution of study. This strongly suggests that the institution the students' study play a vital role in encouraging them to utilize AR in classroom learning.

5. Recommendations:

- Increase the use of AR for complex nursing concepts like anatomy, pharmacology, and patient assessment.
- Develop AR-based clinical case scenarios to improve critical thinking and decision-making skills.
- Encourage collaborative learning by integrating AR into group discussions and problem-solving exercises.
- Ensure all students have access to AR-compatible devices and provide alternative options for those with technical constraints.
- Conduct further studies on long-term impact of AR on nursing competency.
- Develop guidelines for standardizing AR-based education in nursing curricula.
- Conduct workshops to demonstrate AR's effectiveness and encourage their participation.

6. Summary

The result chapter dealt with the establishment of the two objectives of the study. The differential statistics proved the first objective, i.e., the students accept AR was a useful tool for classroom learning. The second objective was proved for the variable institution of study, using Chi-square analysis. The result of the inferential statistics suggested the students' usage of AR for classroom learning has a strong link to the institution protocols and policies.

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