ISSN: 2347-6567

International Journal of Allied Medical Sciences and Clinical Research (IJAMSCR)

IJAMSCR | Vol.14 | Issue 1| Jan - Mar - 2026

www.ijamscr.com

DOI : https://doi.org/10.61096/ijamscr.v14.iss1.2026.233-238

Metaverse Application in Dental Education and Patient Care - A Questionnaire Based Study

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Published by: 28.02.2026

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Abstract: The metaverse, a convergence of digital technologies is reshaping various industries and holds significant potential to revolutionize dentistry. The study aimed to appraise the knowledge, understanding, and awareness of dental students and professionals regarding the application of the metaverse in dental practice. A cross-sectional study was administered to gather insights from both dental students and professionals, evaluating their familiarity with metaverse technologies such as XR, Blockchain, Cloud Computing, Digital Twins, ax nd AI, and their perceived potential in patient care, education, and training. A total of 201 participants were involved in the study. The results revealed varying levels of awareness among participants, with a majority expressing interest and enthusiasm towards integrating metaverse technologies into their practice and education. However, concerns regarding technical proficiency, privacy, and data security were also identified as potential barriers to adoption. The findings highlight the need for targeted educational initiatives to enhance awareness and proficiency in metaverse technologies among dental professionals, ensuring they are well-equipped to leverage its transformative potential for improved patient care and education in dentistry.

Aim: To assess the knowledge regarding effectiveness and usability regarding Meta verse acceptance in Dentistry

Objective: To assess the knowledge regarding the effectiveness, usability, and attitude regarding the acceptance of metaverse in various dental contexts.

Method: A cross-sectional survey was conducted among 201 dental students, comprising 64 males (31.8%) and 137 females (68.2%), including. The survey included 12 questions exploring the metaverse application in dental education and patient care were analyzed based on gender, age and year of study using chi-square tests to identify statistically significant differences.

Key Words: Metaverse, Dentistry, Dental education, Patient care, Patient education.

INTRODUCTION:

In the constantly developing settings of technological advancements, the concept of the metaverse has emerged as a ground-breaking paradigm, transcending traditional boundaries, and redefining the way we interact with information and engage in virtual environments. The word "Metaverse" originated from two words meta and universe, delineates a digital realm blending elements from both the virtual and physical domains. The metaverse, originating from Neal Stephenson's speculative fiction, "Snow Crash," [1] has transcended its fictional origins to become a dynamic amalgamation of digital technologies reshaping various industries, including dentistry. With XR, Blockchain, Cloud Computing, Digital Twins, and Al at its core [2], the metaverse introduces a new era in patient care, where virtual consultations bridge distances [3], immersive VR experiences soothe anxieties, wearable devices monitor oral health remotely, and Blockchain ensures secure record-keeping [4]. Additionally, patient education can also undergo a revolution, leveraging interactive campaigns, immersive journeys, VR tutorials, gamified apps, and virtual clinics to empower individuals with oral health knowledge. With regard to dental education and training, the metaverse offers lifelike simulations and collaborative environments, preparing professionals for real-world challenges and propelling the field towards higher standards of care through Innovative technological integration. This metamorphosis underscores the transformative capability of the metaverse in reshaping the landscape of dental practice, education, and patient engagement. The present study aims to assess the knowledge regarding the effectiveness, usability, and attitude regarding the acceptance of metaverse in various dental contexts, such as patient care and education and dental training and education.

METHODOLOGY:

a. study design and area: A cross sectional study was carried out at tertiary care teaching hospital khammam.

b. Study population: The health care students including those of first year to internship dental students who responded to the offline paper print questionnaire survey.

c. Study Instrument: A self administered questionnaire was designed based on "Metaverse Application In Dental Education And Patient Care" had a total 12 questions. Each participant has to fill their demographic data like Name, age, and year of study. Participants have to select one option from the answers provided against questions and the questions were based on social media use and e-professionalism among health care student.

d. Pilot study: A pilot study was conducted on a group of students to assess the validity and reliability of study

e. Sampling method: The sampling method used is convenience method

f. Inclusion criteria: The students who were interested in study and who are willing to participate

g. Exclusion criteria: students who are not willing to participate are excluded

h. Organizing the study: The study was designed in a paper based version of the self-administered questionnaire of 12 questions focusing on knowledge, awareness. Includes the sections of demographic data: Name, Age, Sex and Year of study demographic information and asked to answer all questions by selecting one option from the provided answers.

i. Statistical analysis: Data from the filled questionnaire was conducted in a tabular form in an excel worksheet and evaluated for analysis.the analysis was performed by SSPS version 29.

RESULTS:

A total of 201 students took part in this with females (68.2) and male of (31.8), Age of the participants ranging from 18-25 years. In this study females were more likely to demonstrate perception in dissection room experiences than male. Significantly second years showed greater familiarity with advanced applications than first, Third, and fourth year students.

AGE

	N	Minimum	Maximum	Mean	Std. Deviation
Age	201	21	31	23.62	1.113

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	64	31.8	31.8	31.8
	Female	137	68.2	68.2	100.0
	Total	201	100.0	100.0	

Year of study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I BDS	25	12.4		
	II BDS	84	41.7		
	ÌII BDS	45	22.3		
	IV BDS	47	23.3		
	Total	201	100.0		

Distribution and comparison of responses based on gender:

Item	Response	Males		Females		Chi-Square value	P value
		n	%	n	%		
Q1	1	4	6.2	8	58.3	10.434	0.03*
	2	46	71.8	112	81.7		
	3	9	14	20	14.5		
	4	5	7.8	17	12.4		
Q2	1	4	6.2	15	10.9	12.656	0.05*
	2	5	7.8	7	5.1		
	3	26	40.6	84	61.3		
	4	29	45.3	31	22.6		
Q3	1	8	38.1	13	61.9	6.574	0.07
	2	10	31.2	22	68.8		
	3	19	44.2	24	55.8		
	4	27	25.7	78	74.3		
Q4	1	3	4.6	82	59.8	3.646	0.338
	2	4	6.2	42	30.6		
	3	50	78.1	5	3.6		
	4	7	10.9	8	5.8		
Q5	1	13	20.3	81	59.1	11.553	**0.04***
	2	45	70.3	43	31.3		
	3	4	6.2	8	5.8		
	4	2	3.1	5	3.6		
Q6	1	3	4.6	91	66.4	3.551	0.03*
	2	12	18.7	33	24		
	3	46	71.8	7	5.1		
	4	3	4.6	6	4.3		
Q7	1	15	23.4	31	22.6	8.546	**0.04***

	2	5	7.8	13	9.4		
	3	40	62.5	27	19.7		
	4	4	6.2	66	48.1		
Q8	1	5	7.8	48	35	3.545	0.325
	2	47	73.4	14	10.2		
	3	4	6.2	34	24.8		
	4	8	12.4	41	29.9		
Q9	1	3	4.6	25	18.2	2.253	0.07
	2	8	12.4	27	19.7		
	3	49	76.5	14	10.2		
	4	4	6.2	71	51.8		
Q10	1	4	6.3	43	31.3	1.536	0.008
	2	4	6.2	24	17.5		
	3	47	73.4	38	27.7		
	4	9	14	32	23.3		
Q11	1	5	7.8	40	29.1	12.&65	**0.06**
	2	5	7.8	16	43.7		
	3	54	84.3	81	59.1		
Q12	1	16	25	17	12.4	11.655	**0.02***
	2	4	6.2	80	58.3		
	3	41	64	22	16		
	4	3	4.6	18	13.1		

P≤0.05 is statistically significant

Distribution and comparison of responses based on year of the study:

Item	Response	I BDS		II BDS		III BDS		IV BDS		Chi-Value	P-Value
		n	%	n	%	n	%	n	%		
Q1	1	5	20	10	11.9	5	11.1	4	8.5	11.464	0.04*
	2	12	48	54	64.2	25	55.5	32	68		
	3	4	16	11	13	9	20	6	12.7		
	4	4	16	9	10.7	6	13.3	5	10.6		
Q2	1	5	20	10	11.9	7	15.5	6	12.7	12.654	**0.06**
	2	11	44	53	13	19	42.2	28	59.5		
	3	4	16	12	14.2	10	22.2	8	17		
	4	5	20	9	10.7	9	20	5	10.6		
Q3	1	3	12	8	9.5	11	24.4	7	14.8	6.727	0.660
	2	13	52	51	60.7	19	42.2	20	42.5		
	3	5	20	15	17.8	7	15.5	11	23.4		
	4	4	16	10	11.9	8	17.7	9	19.1		
Q4	1	10	40	11	13	20	44.4	7	14.8	5.354	0.944
	2	2	8	12	14.2	7	15.5	5	10.6		
	3	12	48	45	53.5	6	13.3	7	14.8		
	4	1	4	16	19	12	26.6	28	59.5		
Q5	1	10	40	10	11.9	7	15.5	9	19.1	12.106	0.594
	2	12	48	14	16.6	13	28.8	8	17		

	3	2	8	9	10.7	16	35.5	7	14.8		
	4	1	4	51	60.7	9	20	23	48.9		
Q6	1	3	12	15	17.8	10	22.2	6	12.7	7.843	0.805
	2	2	8	53	63	16	35.5	8	17		
	3	16	64	9	10.7	7	15.5	9	19.1		
	4	4	16	7	8.3	12	26.6	24	51		
Q7	1	6	24	7	8.3	9	20	8	17	7.985	0.617
	2	2	8	10	11.9	10	22.2	5	10.6		
	3	14	56	12	14.2	7	15.5	9	19.1		
	4	2	8	55	65.4	19	42.2	25	53.1		
Q8	1	6	24	10	11.9	10	22.2	11	23.4	15.342	0.223
	2	14	56	9	10.7	21	46.6	8	17		
	3	4	16	58	69	9	20	22	46.8		
	4	1	4	7	8.3	15	33.3	6	12.7		
Q9	1	4	16	10	11.9	7	15.5	10	21.2	7.847	0.797
	2	2	8	16	19	25	55.5	13	27.6		
	3	15	60	10	11.9	4	8.8	15	31.9		
	4	4	16	48	57.1	9	20	9	19.1		
Q10	1	5	20	16	19	22	48.8	7	14.8	7.788	0.701
	2	1	4	5	5.9	7	15.5	10	21.2		
	3	16	64	59	70.2	9	20	21	44.6		
	4	3	12	4	4.7	7	15.5	9	19.1		
Q11	1	3	12	20	23.8	15	55.5	15	31.9	2.823	0.07
	2	5	20	44	52.3	15	55.5	15	31.9		
	3	17	68	20	23.8	15	55.5	17	36.1		
Q12	1	9	36	9	10.7	10	22.2	6	12.7	16.645	0.05*
	2	10	40	5	5.9	4	8.8	7	14.8		
	3	4	16	51	60.7	5	11.1	5	10.6		
	4	2	8	19	22.6	26	57.7	29	61.7		

P≤0.05 is statistically significant

DISCUSSION:

The integration of metaverse technology within dentistry represents a transformative shift in patient care and professional development. The demographics of the respondents in this study provide valuable insights into the demographic distribution of individuals interested in or engaged with the concept of the Metaverse, particularly within the context of dentistry. The predominance of respondents within the age group of 21-25 years, followed closely by those aged < 22 years, suggests a strong interest or familiarity with emerging technologies among younger generations.

The findings of this study underscore the growing interest and enthusiasm for integrating Metaverse technology into healthcare delivery, patient education, and dental training. As these technologies continue to evolve, further research and development efforts are warranted to explore their full potential and address any associated challenges. Future studies could focus on evaluating the effectiveness of Metaverse-based interventions in improving patient outcomes, enhancing health literacy, and optimizing training experiences for healthcare professionals. Additionally, efforts should be made to ensure equitable access to Metaverse applications and address potential barriers to adoption, particularly in resource-limited settings. Overall, the findings suggest a promising future for metaverse technology in transforming healthcare and education paradigms.

CONCLUSION:

In conclusion, the survey reveals a prevailing optimism among respondents regarding the transformative impact of Metaverse applications in dentistry. While there is widespread enthusiasm for integrating this technology into dental education, patient care, and practice, several significant limitations were identified. These include concerns regarding equipment costs, network security, privacy issues, as well as challenges related to ethics, usability, accessibility, expertise, and legislative frameworks. Despite these obstacles, there is a clear desire among participants to examine the integration of Metaverse technology into multiple facets of dental practice. Notably, a considerable portion of respondents expressed unfamiliarity with specialized platforms like Dentaverse, suggesting a potential awareness gap within the dental community. These findings underscore the importance of addressing both the opportunities and challenges associated with Metaverse applications in dentistry. Moving forward, concerted efforts to mitigate limitations and enhance awareness are essential for fully realizing the potential of this innovative technology within the field.

REFERENCES:

1. Joshua J. Information bodies: Computational anxiety in neal stephenson's snow crash. Interdiscip Lit Stud. 2017;19(1):17-47. Doi: 10.5325/intelitestud. 19.1.0017
2. Lippert K, Khan MN, Rabbi MM, Dutta A, Cloutier R. A framework of metaverse for systems engineering. In2021 IEEE International Conference on Signal Processing, Information, Communication & Systems (SPICSCON) 2021 Dec 3 (pp. 50-54). IEEE. Doi:10.1109/SPICSCON54707.2021.9885722
3. Dagli N. Advancement in telemedicine and teledentistry with virtual reality and metaverse. J Int Oral 2022; 14(6):529-30. Health. Doi: 10.4103/jioh.jioh_135_22
4. Ullah H. Manickam S. Obaidat M, Laghari SU, Uddin M. Exploring the potential of metaverse technology in healthcare: applications, challenges, and future directions. Access. 2023. Doi:10.1109/ACCESS.2023.3286696
5. Koss H. What is the metaverse? [Internet]. [cited 2024 Apr from: Available 13]. https://builtin.com/articles/what-is-metaverse