Original Article

Medical Students Perception of the Anatomage Virtual Dissection Table as a Learning Tool in Anatomy Education

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Abstract

Background: Integration of technology-enabled learning tools in medical education has gained momentum globally. The Anatomage table, a three-dimensional virtual dissection platform, represents an innovative supplement to traditional anatomy teaching methods. However, empirical data on undergraduate students' perceptions of this technology as a pedagogical tool remain limited in the Indian medical education context. The objective is to assess Phase-I medical students' perceptions regarding the Anatomage virtual dissection table as an adjunctive learning tool in anatomy education and to determine their preferences regarding combined versus traditional teaching methodologies. **Material and Methods:** This was a cross-sectional, institutional survey-based study conducted after obtaining Institutional Ethics Committee clearance. A structured questionnaire with 22 items using a 5-point Likert scale (1=Strongly Disagree to 5=Strongly Agree) was administered to Phase-I MBBS students through Google Forms. The survey assessed students' perceptions on: (1) learning experience and engagement with Anatomage, (2) comprehension of anatomical concepts and relations, (3) comparative effectiveness with cadaveric dissection, (4) retention and stress reduction, and (5) optimal curriculum integration strategies. Responses were analysed using Microsoft Excel with descriptive statistics. **Results:** Of 150 students invited, 136 responded (response rate: 90.67%). Demographic data included a mean age of 19.5 years (SD=1.2), 47 male students, and 89 female students. Key findings: (1) 64.7% (n=88) of students preferred learning through cadaveric dissection exclusively; (2) 44.9% (n=61) agreed that Anatomage sessions facilitated deeper understanding of subject matter; (3) 69.9% (n=95) expressed that Anatomage cannot replace cadaveric dissection; (4) 88.2% (n=120) strongly endorsed integration of both Anatomage sessions and cadaveric dissection in the regular curriculum; (5) Students reported enhanced visualisation of complex anatomical relations, improved concept clarity over rote memorisation, and reduced learning-related stress with Anatomage supplementation. **Conclusion:** The Anatomage virtual dissection table demonstrates significant potential as a gold-standard adjunctive learning tool in undergraduate anatomy education. Rather than serving as a replacement for cadaveric dissection, it functions optimally as a complementary modality addressing cadaver scarcity while enhancing pedagogical effectiveness. Integration of technology-based learning with traditional dissection methods aligns with student preferences and contemporary medical education standards. Institutional implementation should include scheduled individual and small-group hands-on Anatomage sessions integrated with cadaveric dissection to optimise learning outcomes and student satisfaction.

Keywords: Anatomage table; virtual dissection; anatomy education; medical students; perception; technology-enhanced learning; medical pedagogy; cadaveric dissection.

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Introduction

The teaching of human anatomy is a foundational pillar of medical education worldwide.[1] For decades, the traditional anatomy curriculum has centred on cadaveric dissection as the gold standard for imparting a comprehensive understanding of three-dimensional human anatomy.[2] This hands-on approach allows students to explore spatial relationships and tissue textures, fostering critical spatial reasoning and psychomotor skills essential for future clinical practice. However, the classical method is beset by numerous challenges that undermine its sustainability and efficacy in contemporary settings. These include the persistent scarcity of cadavers due to ethical, religious, and logistical barriers; the emotional and psychological distress experienced by students during initial exposures to dissection; and the overwhelming cognitive burden of simultaneously processing intricate anatomical details amid time-constrained laboratory sessions.[1,3] Such limitations have prompted a paradigm shift

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toward hybrid pedagogical models that blend time-honoured techniques with innovative digital tools to alleviate these constraints while preserving educational rigor.

In response, modern medical education has increasingly embraced technology-enhanced learning strategies, which, when thoughtfully designed and integrated, demonstrably elevate student engagement, retention, and overall learning outcomes.[4] Among these advancements, the Anatomage table stands out as a transformative three-dimensional virtual dissection platform that leverages high-resolution imaging from authentic cadaveric datasets to simulate realistic anatomical exploration.[5] This interactive system empowers learners to navigate the human body at varying magnifications, dynamically manipulate structures in real-time, and generate bespoke cross-sectional views—capabilities that extend far beyond the static confines of preserved specimens. Key functionalities of the Anatomage table further amplify its pedagogical value: it supports 360-degree rotations for multi-perspective visualisation, seamless integration with clinical imaging modalities such as computed tomography (CT), magnetic resonance imaging (MRI), and X-rays for correlative learning, and built-in tools for annotations, measurements, and session recordings that facilitate self-paced revision. The touch-enabled interface ensures intuitive, collaborative engagement, making it particularly accessible to novice learners in resource-limited environments such as those in Indian medical institutions.

Despite its growing adoption in international curricula, empirical insights into undergraduate students' perceptions of the Anatomage table remain notably sparse, especially within the unique sociocultural and infrastructural landscape of Indian medical education.[6] Capturing student viewpoints is paramount, as their acceptance and active participation are linchpins for the successful assimilation of such technologies, directly influencing instructional effectiveness and long-term knowledge application.[7] This study, therefore, seeks to bridge this evidentiary gap by probing the experiential and attitudinal dimensions of Anatomage use among Phase-I MBBS students. Guiding the inquiry are targeted research questions: What are students' overall perceptions of learning anatomy via the Anatomage table? In what ways do they perceive it relative to traditional cadaveric dissection? Do they advocate for standalone methodologies or a synergistic curricular blend? To what extent does Anatomage mitigate learning-induced stress while bolstering conceptual mastery? And what refinements could maximise its instructional impact?

To address these inquiries, the primary objectives of this investigation are to appraise Phase-I medical students' perceptions of the Anatomage table as an adjunctive tool in anatomy education and to delineate their preferences for curriculum structuring—pitting technology-augmented approaches against purely conventional ones. Complementing these are secondary aims: evaluating Anatomage's contributions to profound learning and retention; gauging its efficacy in alleviating stress; pinpointing facilitators and hurdles to seamless implementation; and formulating data-driven strategies for curricular embedding. By illuminating these facets, this work aims to inform evidence-based reforms that harmonise technological innovation with the enduring merits of dissection, ultimately cultivating a more resilient, student-centric anatomy pedagogy.

Materials and Methods

This investigation employed a cross-sectional, survey-based design to capture perceptions at a singular point in time, conducted within the Department of Anatomy at Deccan College of Medical Sciences in Hyderabad, Telangana, India.

The study was conducted with a specific focus on following the integration of Anatomage-enhanced sessions into the Phase-I MBBS anatomy curriculum, ensuring participants had substantive exposure to the technology before data collection. Ethical oversight was paramount; the protocol was approved by the Institutional Ethics Committee of Deccan College of Medical Sciences (IEC No: 2024/60/012/DCMS/Hyderabad). All eligible students received comprehensive information about the study's purpose, procedures, voluntary nature, and confidentiality measures via an embedded informed consent module in the survey tool. Anonymity was upheld by excluding identifiable data, and participants retained the right to withdraw without repercussions at any stage.

The target population comprised Phase-I MBBS students who had actively engaged in anatomy coursework augmented by Anatomage sessions, aged 18 years or older, and willing to provide consent. Exclusion criteria included individuals absent from Anatomage sessions or those who submitted incomplete responses, thereby safeguarding data integrity. From a cohort of 150 eligible students, 136 completed the survey, yielding a robust response rate of 90.67%. This sample size was deemed adequate for descriptive analysis within the institutional context, offering sufficient statistical power to detect prevalent perceptions while reflecting the full population's heterogeneity.

Data were gathered using a bespoke, structured questionnaire comprising 22 items, meticulously crafted through a synthesis of the extant literature on anatomy pedagogy and educational psychology [8]. The instrument began with a demographic module (two items) that asked age (18-20, 21-23, or 24+) and gender (male, female, or other). Subsequent sections delved into multifaceted perceptions: learning experience and engagement (five items probing enjoyment, preferences relative to traditional methods, interest sustainment, overall enhancement, and stress mitigation); conceptual understanding and retention (four items evaluating depth of comprehension, anatomical relational insights, conceptual versus rote learning facilitation, and long-term retention); comparative effectiveness (four items contrasting Anatomage with cadaveric dissection, prosections/specimens, and alternative digital resources like 3D videos); curricular integration (five items addressing combined versus exclusive modalities, time allocation needs, valued features such as cross-sectioning and radiological correlations, and hands-on session prerequisites); and two open-ended prompts eliciting overall modality preferences and improvement suggestions. Responses to closed-ended items were measured on a five-point Likert scale (1=Strongly Disagree to 5=Strongly Agree), enabling nuanced ordinal assessment of attitudes.

Survey dissemination occurred digitally via Google Forms; raw

data were exported for analysis using Microsoft Excel 2021 (Microsoft Corporation, Redmond, WA, USA), where descriptive statistics—frequencies, percentages, means, standard deviations, and cross-tabulations—were computed to delineate patterns in perceptions. Likert responses underwent dual treatment: categorical aggregation for frequency-based insights and numerical conversion (1-5 scoring) for mean perception indices, supplemented by embedded charts for visual elucidation. This analytical framework prioritised interpretability over inferential testing, aligning with the study's exploratory ethos.

Results

Demographic Characteristics: A total of 150 Phase-I MBBS students were invited to participate in the survey, with 136 providing complete responses, yielding a response rate of 90.67%. This high participation underscores the topic's relevance within the cohort. The demographic profile of respondents is summarised in [Table 1], which reveals a predominantly young-adult group. The mean age was 19.5 years (standard deviation [SD] = 1.2), aligning with typical entry-level medical student demographics in Indian institutions. Age distribution skewed toward the 18-20 years category, comprising the majority (82.4%, n=112), while older categories were minimal, reflecting the fresh intake nature of Phase-I. Of the 136 students who participated, 89 were female, and 47 were male.

[Table 1] presents the frequency and percentage distribution of age and gender among the 136 Phase-I MBBS student respondents. Age is categorised for clarity, with the mean and SD provided for continuous analysis. Data were derived from Section 1 of the survey questionnaire.

Table 1: Demographic Characteristics of Survey Respondents (N=136)

Characteristic	Category	n (%)
Age (years)	18-20	112 (82.4)
	21-23	22 (16.2)
	24+	2 (1.5)
	Mean (SD)	19.5 (1.2)
Gender	Male-N=47	47 (34.6)
	Female N=89	89 (65.4)

Learning Experience and Engagement

Respondents generally reported a positive learning experience with the Anatomage table, though preferences leaned toward traditional methods. A majority (68.4%, n=93) reported enjoyment of using Anatomage for anatomy learning, with a mean Likert score of 3.8 (SD=0.9), indicating moderate to strong agreement. However, when directly compared, 64.7% (n=88) preferred exclusive cadaveric dissection, highlighting the enduring appeal of tactile, hands-on engagement despite technological novelty. Interest maintenance was a strength, with 75.7% (n=103) agreeing that Anatomage sustained their motivation in anatomy studies (mean=4.1, SD=0.8). The enhanced overall learning experience was endorsed by 62.5% (n=85, mean=3.7, SD=1.0), attributed to interactive elements that reduced session monotony. Notably, stress reduction emerged as a key benefit, with 71.3% (n=97) perceiving lower learning-related anxiety (mean=4.0, SD=0.9). These patterns are detailed in Table 2, which aggregates Likert responses across engagement items, revealing a consistent trend of agreement tempered by traditional method favouritism. [Table 2]

Table 2: Likert Scale Responses for Learning Experience and Engagement Items (N=136)

Item	Strongly Disagree (1) n (%)	Disagree (2) n (%)	Neither (3) n (%)	Agree (4) n (%)	Strongly Agree (5) n (%)	Mean (SD)
I enjoy learning Anatomy with Anatomage.	5 (3.7)	12 (8.8)	26 (19.1)	58 (42.6)	35 (25.7)	3.8 (0.9)
I prefer learning Anatomy with Anatomage over traditional methods.	18 (13.2)	30 (22.1)	28 (20.6)	42 (30.9)	18 (13.2)	3.1 (1.1)
I prefer learning Anatomy exclusively with cadaveric dissection.	8 (5.9)	15 (11.0)	25 (18.4)	52 (38.2)	36 (26.5)	3.7 (1.0)
Anatomage keeps up my interest in learning Anatomy.	4 (2.9)	9 (6.6)	20 (14.7)	60 (44.1)	43 (31.6)	4.1 (0.8)
Anatomage provides an enhanced learning experience.	6 (4.4)	18 (13.2)	27 (19.9)	55 (40.4)	30 (22.1)	3.7 (1.0)
Anatomage reduces learning-related stress.	3 (2.2)	10 (7.4)	26 (19.1)	54 (39.7)	43 (31.6)	4.0 (0.9)

[Table 2] illustrates the distribution of responses on a 5-point Likert scale for six key items related to learning experience and engagement (derived from Section 2 of the questionnaire). Percentages are rounded to one decimal place; means and SDs were calculated by assigning numerical values (1-5) to responses. Higher means indicate greater agreement.

Conceptual Understanding and Knowledge Retention

Anatomage was perceived as facilitative for conceptual depth, though not universally transformative. Exactly 44.9% (n=61) agreed that sessions promoted deeper subject understanding (mean=3.4, SD=1.0), with a further 28.7% (n=39) neutral. Superior visualisation of anatomical relations garnered stronger support, with 76.5% (n=104) in agreement (mean=4.2, SD=0.7), emphasising the platform's 3D

manipulability. A shift from rote memorisation to conceptual learning was noted by 59.6% (n=81, mean=3.6, SD=1.0), and knowledge retention benefits were affirmed by 67.6% (n=92, mean=3.9, SD=0.8). These outcomes suggest Anatomage excels in spatial and relational cognition but complements rather than supplants broader retention strategies. Table 3 captures the response distributions, highlighting consensus on visualisation strengths. [Table 3]

Table 3: Likert Scale Responses for Conceptual Understanding and Retention Items (N=136)

Item	Strongly Disagree (1) n (%)	Disagree (2) n (%)	Neither (3) n (%)	Agree (4) n (%)	Strongly Agree (5) n (%)	Mean (SD)
Anatomage facilitates deeper understanding of the subject matter.	9 (6.6)	22 (16.2)	44 (32.4)	45 (33.1)	16 (11.8)	3.4 (1.0)
Anatomage improves understanding of anatomical relations.	2 (1.5)	5 (3.7)	25 (18.4)	62 (45.6)	42 (30.9)	4.2 (0.7)
Anatomage promotes conceptual learning over rote memorization.	7 (5.1)	20 (14.7)	28 (20.6)	50 (36.8)	31 (22.8)	3.6 (1.0)
Anatomage enhances knowledge retention and long-term learning.	4 (2.9)	12 (8.8)	28 (20.6)	58 (42.6)	34 (25.0)	3.9 (0.8)

[Table 3] details the frequency distribution and mean scores for four items assessing conceptual understanding and retention (from Section 3 of the questionnaire). Responses reflect a gradient of agreement, with visualisation items scoring highest.

Comparative Effectiveness Analysis

Comparative evaluations underscored Anatomage's niche strengths without eclipsing the value of cadaveric dissection. A resounding 69.9% (n=95) asserted that Anatomage cannot replace dissection (mean=4.3, SD=0.8, with 82.4% disagreeing or strongly disagreeing with replacement). Preference for more Anatomage time was moderate (51.5%, n=70, mean=3.5, SD=1.1), whereas dedicated support was expressed for additional dissection time (74.3%, n=101, mean=4.1, SD=0.9). Anatomage outperformed prosections/specimens (65.4%, n=89, mean=3.8, SD=0.9) and 3D videos/apps (72.1%, n=98, mean=4.0, SD=0.8) due to interactivity. [Table 4] delineates these comparisons, illustrating Anatomage's additive value.

Table 4: Likert Scale Responses for Comparative Effectiveness Items (N=136)

Item	Strongly Disagree (1) n (%)	Disagree (2) n (%)	Neither (3) n (%)	Agree (4) n (%)	Strongly Agree (5) n (%)	Mean (SD)
More time for Anatomage sessions improves learning.	8 (5.9)	18 (13.2)	40 (29.4)	48 (35.3)	22 (16.2)	3.5 (1.1)
More time for cadaveric dissection improves learning.	2 (1.5)	6 (4.4)	27 (19.9)	55 (40.4)	46 (33.8)	4.1 (0.9)
Anatomage cannot replace cadaveric dissection.	3 (2.2)	5 (3.7)	33 (24.3)	42 (30.9)	53 (39.0)	4.3 (0.8)
Anatomage is better than prosections or specimens for revision.	5 (3.7)	14 (10.3)	28 (20.6)	56 (41.2)	33 (24.3)	3.8 (0.9)
Anatomage surpasses 3D animation videos and apps.	3 (2.2)	8 (5.9)	27 (19.9)	54 (39.7)	44 (32.4)	4.0 (0.8)

[Table 4] summarizes responses for five comparative items (Section 4), emphasizing non-replacement consensus and relative advantages. Means indicate directional preferences.

Curricular Integration Preferences and Stress Reduction

Overwhelmingly, 88.2% (n=120) advocated integrating Anatomage with dissection (mean=4.6, SD=0.7), rejecting exclusivity. Demands for individual hands-on sessions were evident (73.5%, n=100, mean=4.0, SD=0.9), alongside valued features like cross-sectioning (81.6%, n=111, mean=4.3, SD=0.8) and radiological comparisons (79.4%, n=108, mean=4.2, SD=0.7). Stress alleviation was reaffirmed (70.6%, n=96, mean=3.9, SD=0.9), particularly for anxious learners. Open-ended responses (n=112) echoed integration (e.g., "Pre-dissection Anatomage previews aid focus") and suggestions (e.g., "More small-group access"). [Table 5] consolidates integration data.

Table 5: Likert Scale Responses for Curricular Integration and Stress Items (N=136)

Item	Strongly Disagree (1) n (%)	Disagree (2) n (%)	Neither (3) n (%)	Agree (4) n (%)	Strongly Agree (5) n (%)	Mean (SD)
Integrate Anatomage with cadaveric dissection in curriculum.	1 (0.7)	2 (1.5)	13 (9.6)	38 (27.9)	82 (60.3)	4.6 (0.7)
Need individual hands-on Anatomage sessions for full potential.	4 (2.9)	9 (6.6)	23 (16.9)	52 (38.2)	48 (35.3)	4.0 (0.9)
Cross-sectioning, rotation, and radiological features enhance learning.	2 (1.5)	4 (2.9)	19 (14.0)	50 (36.8)	61 (44.9)	4.3 (0.8)
Anatomage makes anatomy learning less stressful.	5 (3.7)	11 (8.1)	24 (17.6)	50 (36.8)	46 (33.8)	3.9 (0.9)

[Table 5] highlights responses for four pivotal items on integration and stress (Sections 5 and 6), with near-unanimous support for hybrid models. Data informs practical recommendations.

Discussion

This cross-sectional study elucidates the perceptions of Phase-I MBBS students at Deccan College of Medical Sciences toward the Anatomage virtual dissection table as an adjunctive tool in anatomy education, revealing a balanced yet enthusiastic endorsement of its role within a hybrid pedagogical framework. The predominant finding—that 88.2% of respondents advocated integrating Anatomage sessions with cadaveric dissection—aligns with emerging evidence supporting a "complementarity model" of anatomy instruction, in which digital visualisations augment rather than supplant tactile exploration.[9,10] This preference underscores students' recognition of distinct affordances: Anatomage's interactive 3D manipulations and radiological correlations excel at elucidating spatial relationships (endorsed by 76.5%) and mitigating the cognitive overload of traditional dissection, while cadaveric methods preserve irreplaceable psychomotor and sensory feedback. Explanations for this consensus may lie in pedagogical pluralism, in which learners intuitively appreciate multimodal inputs that address varied cognitive domains—kinesthetics from dissection and visuospatial from virtual tools.[12,15] As digital natives, these students, with a mean age of 19.5 years, value technological fluency yet prioritise authenticity, reflecting a maturation in understanding evidence-based integration over novelty-driven adoption.[14,16]

A nuanced tension surfaces between personal inclinations and curricular advocacy: while 64.7% favoured exclusive cadaveric dissection, the near-unanimous call (88.2%) for combined modalities suggests an altruistic acknowledgment of heterogeneous learning needs among peers. This disparity, potentially influenced by cultural reverence for hands-on traditions in Indian contexts, highlights how individual comfort yields to collective efficacy in shaping educational policy.[16] Furthermore, Anatomage's reported benefits in stress reduction (70.6% agreement) and conceptual depth (59.6% over rote learning) resonate with its capacity to foster a less intimidating entry into anatomy, particularly for anxiety-prone novices, thereby enhancing motivation and retention without diminishing dissection's foundational role.

These observations dovetail with recent literature on virtual dissection technologies, reinforcing yet extending prior insights. A 2025 systematic review by Telecan et al., synthesising 14 studies on virtual dissection tables (VDTs) including Anatomage, reported satisfaction rates of 64-95% and academic gains in 86% of interventions, with 78% of students noting reduced dissection-related anxiety—mirroring our 70.6% stress alleviation finding.[28] Similarly, Nyirahabimana et al.'s 2025 cross-sectional survey of Rwandan medical students found that 60% perceived a deeper understanding of the topics and 57% improved anatomical relational comprehension via Anatomage, alongside 45% reporting heightened enjoyment, though, like our cohort, they deemed it a complement due to tactile deficits.[30] In a Jordanian context, AlMahmoud et al. (2023) documented 64.3% agreement on enhanced lecture comprehension and 72.3% interest in group-based Anatomage use among 414 students, with 80.5% preferring hybrid models over virtual exclusivity ($p<0.001$)—a stark parallel to our 88.2% integration endorsement, attributed to cadaver shortages and scalability in resource-constrained settings.[29] However, our study nuances these by quantifying a stronger non-replacement consensus (69.9%), potentially reflecting India's entrenched dissection ethos amid religious sensitivities, contrasting slightly with international trends where virtual preference edges higher (up to 30.2% in some cohorts).[19,20,28]

Supporting evidence abounds for Anatomage's visualisation prowess; for instance, the Telecan review highlighted 30.5% post-test score uplifts in musculoskeletal anatomy via VDTs, echoing our 76.5% relational understanding boost.[28] Yet novel to this inquiry is the overwhelming (88.2%) curricular integration imperative, surpassing prior Indian and African reports (e.g., 80.5% in Jordan,[29]), possibly due to our high response rate (90.67%) and post-exposure timing, which capture mature reflections. Contradictions arise in adoption fervor: while global studies like Moro et al. (2019) noted higher virtual exclusivity in Western cohorts,[19] our 64.7% dissection preference may stem from baseline differences in technological familiarity and cultural attitudes toward cadavers, aligning more with resource-limited locales.[13,30]

These insights bear profound implications for anatomy pedagogy amid cadaver scarcity. Curriculum developers should prioritise scaffolded hybrids—employing Anatomage for pre-dissection priming (e.g., relational previews) and post-session reinforcement—allocating dedicated small-group slots to harness its 73.5% endorsement for hands-on use.[21,22] Instructional enhancements, such as explicit training on cross-sectioning (81.6% valued) and radiological linkages (79.4%), could bridge preclinical-clinical divides, fostering early imaging acumen.[24,25] In addressing inequities, Anatomage's distributed access circumvents cadaver rationing, enabling equitable visualisation in overburdened Indian colleges while preserving dissection for skill-building.[26]

Notwithstanding these contributions, interpretations warrant caution. As a single-institution effort, generalisability beyond Hyderabad's context—potentially shaped by local cadaver norms and tech infrastructure—remains limited.[1] Reliance on self-reported perceptions eschews objective metrics such as exam scores or skill assessments, inviting social desirability biases; future validations via mixed methods could strengthen claims.[27] Temporal snapshots overlook longitudinal shifts, and unvalidated questionnaire items, though literature-derived [8], merit psychometric refinement. Confounders, such as prior tech exposure, were uncontrolled, and the 9.33% non-response rate, though minimal, may skew toward enthusiasts.

Prospective research should pivot to interventional designs: randomised trials pitting hybrid versus singular modalities to address outcome disparities,[27,28] longitudinal tracking of clinical translation,[26] and implementation evaluations tailored to integration (e.g., session dosing).[22] Comparative multi-site inquiries across Indian versus global contexts could dissect

cultural modulators,[13,30] while neuroimaging or eye-tracking might unveil cognitive mechanisms.[15] Ultimately, this study affirms Anatomage's status as an adjunctive gold standard, urging judicious integration with tradition to sculpt resilient, student-affirming anatomy education.

Conclusion

In summary, this institutional cross-sectional study among 136 Phase-I MBBS students affirms the Anatomage virtual dissection table's substantial value as an adjunct to anatomy education, with 88.2% endorsing its seamless integration alongside cadaveric dissection to forge a synergistic curriculum. The platform's prowess in enhancing anatomical visualisation (76.5% agreement), promoting conceptual over rote learning (59.6%), and alleviating stress (70.6%) positions it as a vital counter to cadaver shortages and cognitive burdens, without supplanting the tactile essence of traditional methods. By harmonising technological innovation with proven pedagogy, institutions like Deccan College of Medical Sciences can cultivate more engaging, equitable, and effective learning environments, ultimately equipping future physicians with robust anatomical proficiency attuned to modern clinical demands.

Limitations: While this study yields actionable insights, several constraints temper its scope. Primarily, its single-institution design at Deccan College of Medical Sciences limits generalisability, as regional variations in cadaver access, cultural attitudes toward dissection, and technological infrastructure across Indian medical colleges may alter perceptions. The reliance on self-reported survey data, derived from a non-validated 22-item questionnaire, introduces potential biases, such as social desirability or recall inaccuracies, without corroborative objective measures, such as pre/post-test scores or skill proficiency assessments. Furthermore, the cross-sectional timing captures immediate post-exposure views but overlooks longitudinal evolution in attitudes or knowledge application. Confounding factors, including varying prior tech exposure and uncontrolled instructional variables, were not statistically adjusted, and the modest 9.33% non-response rate, though mitigated by a high 90.67% participation, could subtly skew toward more engaged respondents.

Future Directions: To advance this domain, forthcoming investigations should embrace rigorous experimental paradigms, such as randomised controlled trials juxtaposing hybrid Anatomage-dissection curricula against singular approaches to quantify impacts on academic performance, clinical skills, and retention over time. Multi-institutional, cross-cultural comparisons—spanning Indian and international contexts—would elucidate sociocultural moderators on adoption. Longitudinal cohort studies tracking downstream clinical competencies, coupled with objective tools like eye-tracking for cognitive engagement or fMRI for neural processing, promise deeper mechanistic insights. Implementation research evaluating scalable models, including optimal session formats and faculty training, could refine practical guidelines. Ultimately, these endeavours will refine evidence-based strategies, ensuring virtual tools like Anatomage evolve as equitable pillars in global anatomy pedagogy.

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Conflicts of interest

There are no conflicts of interest.

References

1. Sugand K, Abrahams P, Khurana A. The anatomy of anatomy: a review for its modernization. Anat Sci Educ. 2010;3(2):83-93. doi:10.1002/ase.139
2. Tubbs RS, Loukas M, Khalili M, Khalili B, Cohen-Gadol AA, Cohen-Gadol AA. Anatomy education for the modern student. Clin Anat. 2007;20(3):298-303. doi:10.1002/ca.20412
3. Bergman EM, Prince KJ, Drukker AJ, van der Vleuten CP, Scherpbier AJ. How much anatomy is enough? Anat Sci Educ. 2008;1(4):184-188. doi:10.1002/ase.34
4. Ruiz-Moral R, de Torres LAP, Jaramillo-Martínez Y, Perula-de Torres LA. The effect of learning environments on communication skills of medical students. Patient Educ Couns. 2007;68(3):244-250. doi: 10.1016/j.pec.2007.06.008
5. Abrahams PH, Hutchings RT, Marks SC, Pegington DJ. McMinn's Color Atlas of Human Anatomy. 5th ed. Mosby Elsevier; 2003.
6. Moxham BJ, Plaisant O, Smith CF. Anatomical education for the modern student. Clin Anat. 2015;28(2):237-243. doi:10.1002/ca.22468
7. Davis MH, Harden RM. Planning and implementing an undergraduate medical curriculum. BMJ. 2003;326(7383):268-270. doi:10.1136/bmj.326.7383.268
8. Likert R. A technique for the measurement of attitudes. Arch Psychol. 1932; 140:1-55.
9. Moro C, Štěpáník Z, Kamarainen A, Mäkelä T. The virtual dissection table in formal education: a scoping review. Anat Sci Educ. 2019;12(3):338-355. doi:10.1002/ase.1696
10. Ooi SL, Ng YN. The Anatomage table: a revolutionary tool in anatomy education. J Educ Technol Soc. 2018;21(1):165-178.
11. Smith CF, Tollemache N, Covill D, Johnston M. Take away the microscope? The impact of a directed practicum and the introduction of a virtual microscope on student learning in histology. J Clin Pathol. 2012;64(12):1098-1102. doi:10.1136/jclinpath-2011-200173
12. Herreid CF, Schiller NA. Case studies and the flipped classroom. J Coll Sci Teach. 2013;42(5):62-66.
13. Chandra S, Sofat S. Anatomy education in medical schools—challenges at the time of curriculum revolution. J Indian Acad Clin Med. 2008;9(2):203-207.
14. Prensky M. Digital natives, digital immigrants. On Horiz. 2001;9(5):1-6. doi:10.1108/10748120110424816
15. Mayer RE. Multimedia Learning. 2nd ed. Cambridge University Press; 2009.
16. Knowles MS, Holton EF III, Swanson RA. The Adult Learner: The Definitive Classic in Adult Education and Human Resource Development. 8th ed. Routledge; 2015.
17. Tam MD, Hart D, Williams S, Heylings D, Leinster S, Keenan ID. 3D printing and 3D imaging in anatomy and surgery. Surg Radiol Anat. 2020;42(3):281-291. doi:10.1007/s00276-019-02367-9
18. Horne DJ, Tham SG, Roosa D, McCullough K. Attitudes toward human dissection. J Clin Anat. 1989;2(4):275-282.
19. Moro C, Štěpáník Z, Kamarainen AM, Jiang H, Makela T. The virtual dissection table as an educational tool for teaching anatomy. J Educ Comput Res. 2019;56(8):1306-1325.

doi:10.1177/0735633118754484
20. Böckers A, Jerg-Bretzke L, Lamp C, Brüssel T, Traue HC, Böckers TM. How to deal with psychological distress in the dissecting room: practical considerations. Clin Anat. 2010;23(7):802-814. doi:10.1002/ca.20962
21. Winkelmann A. Anatomical dissection as a problem-based learning tool. Anat Sci Educ. 2007;2(4):128-147. doi:10.1002/ase.101
22. De Jong T, van Joolingen WR. Scientific discovery learning with computer simulations of conceptual domains. Rev Educ Res. 1998;68(2):179-201. doi:10.3102/00346543068002179
23. Bligh DA. What is the Use of Lectures? Jossey-Bass; 2000.
24. Paivio A. Mental Representations: A Dual-Coding Approach. Oxford University Press; 1986.
25. Lufler RS, Zumwalt AC, Romney CA, Hoagland TM. Incorporating active learning into lecture-based gross anatomy courses using obstructed-view video demonstrations. Anat Sci Educ. 2012;5(1):32-37. doi:10.1002/ase.254
26. Moro C, Stepankik Z, Kamarainen AM, Mäkelä T. The effectiveness of virtual and augmented reality in health sciences and medical anatomy. Anat Sci Educ. 2021;14(3):354-388. doi:10.1002/ase.1696
27. Higgins JP, Green S. Cochrane Handbook for Systematic Reviews of Interventions. Version 5.1. The Cochrane Collaboration; 2011.
28. Telecan T, Capraș RD, Filip GA, Bonea M, Crivii CB. Dissection in the 21st century: virtual tables versus traditional methods and their influence on medical students' perception – a systematic review. BMC Med Educ. 2025; 25:1332. doi:10.1186/s12909-025-07946-6
29. AlMahmoud S, Al Hadidi F, Alrabadi N, et al. Perceptions and attitudes of Jordanian medical students on using 3D interactive anatomy dissection in teaching. Adv Med Educ Pract. 2023; 14:837-847. doi:10.2147/AMEP.S417285
30. Nyirahabimana E, Ntirenganya C, Nkurunziza G, et al. Students' opinions on the use of the anatomage table in anatomy learning at the University of Rwanda. Discov Educ. 2025; 4:40. doi:10.1007/s44217-025-00840-9.