



---

Effectively engage with  
students within and  
beyond the classroom



Today's medical students want intuitive, active learning solutions they can access wherever and whenever they want.

Multimedia resources such as procedural videos, images, real-life case studies, and online practical assessments are increasingly being used to support students' foundational learning and clinical practice needs to enhance teaching, augment learning, save time and support self-directed learning.

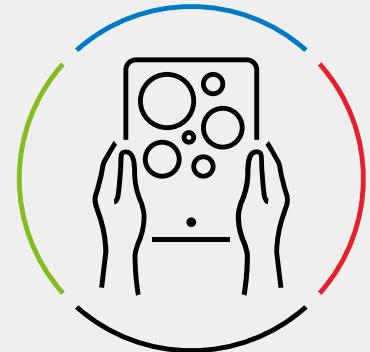
These dynamic and interactive tools can improve student engagement as they navigate the mountains of literature and seas of data while trying to understand complex medical and scientific terms, concepts, and skills.

According to Mayer's modality principle,<sup>1</sup> people learn more deeply from words and pictures (multimedia learning), and says medical education often requires a combination of verbal and pictorial learning:

Verbal learning	Pictorial learning
<ul style="list-style-type: none"><li>Printed words: slide presentation, textbook or computer-based lesson</li><li>Spoken words: in a lecture or computer lesson narration</li></ul>	<ul style="list-style-type: none"><li>Static graphics: illustrations, diagrams, photographs, drawings, charts</li><li>Dynamic graphics: animation or video</li></ul>

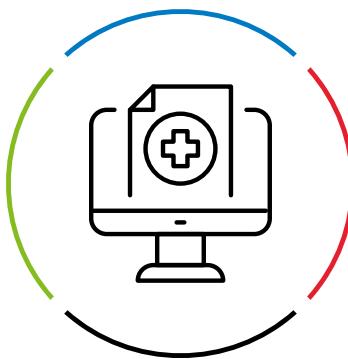
Educators therefore require a range of presentation tools within and beyond the classroom that facilitate students' attention, comprehension and integration.

Traditional lectures	Interactive multimedia resources
<ul style="list-style-type: none"><li>Attention span wanes after 15-20 minutes<sup>2</sup></li><li>Learners capture less than 50% of a lecture in their class notes<sup>3</sup></li><li>They remember less than 10% of a lecture several weeks later</li></ul> <p>Active learning techniques may be required more frequently<sup>4</sup> as attention spans drop further when students have several lectures throughout the day.</p>	<ul style="list-style-type: none"><li>Provide a visual context to physiological processes</li><li>Convey complex concepts in life-like, 3D virtual tours</li><li>Demonstrate clinical steps in real-world situations</li><li>Promote active learning and increase retention of key concepts and actions</li></ul> <p>Students can take a 3D virtual anatomy tour and immerse themselves in the inner workings of the human body to explore disease evaluation, progression, and treatment.</p>



*“Virtual patient simulations have been shown to enhance learning results in general. Gamification could improve learning, engagement, and cooperation by allowing for real-world application. They may also help with promoting risk-free healthcare decision-making, remote learning, learning analytics, and quick feedback.”*

#### **Benefits of gamification in medical education**



*“Digital anatomy has not only revolutionized undergraduate anatomy education via 3D reconstruction of the human body but is shifting the paradigm of pre- and vocational training for medical professionals via digital simulation, advancing health care. Importantly, it was noted that digital anatomy not only benefits *in situ* real time clinical practice but also has many advantages for learning and teaching clinicians at multiple levels.”*

**The opportunities and challenges of digital anatomy for medical sciences: Narrative review**

## How technology is transforming medical education

A [2021 review of emerging technologies](#) in simulation-based education highlights how the medical education landscape is being transformed by technology advancements and the next generation of learners: “Given the increased focus on patient safety and tightened supervision standards, simulation has emerged as an essential element of clinical education.”

The review notes that the shift from the traditional simulation lab into the virtual realm was already in progress when the COVID-19 pandemic impacted face-to-face classrooms.

“As learning becomes increasingly socially distanced and on the schedule of the learner, traditional simulation centers will need to adapt mixed reality modalities into the overall learning toolset. The identification of available resources, acceptable costs, and previously developed components is necessary for the educator to choose the best methodology to meet their specific goals.”<sup>5</sup>

Increased digital literacy by progressive generations of medical students is making technology essential and ubiquitous, according to the latest review [Benefits of gamification in medical education](#).

“As a result, the use of gamified training platforms to improve medical education is becoming a popular resource for clinicians at all stages of training, not only for instructors in the classroom or for learners individually.”<sup>6</sup>

An earlier landscape review of [Gamification and multimedia for medical education](#) also found that virtual patient simulations improved learning outcomes overall, and promoted student engagement.

Similarly, 2D and 3D animations and videos of the human body dissection allow students to learn without making or being afraid to make errors in real situations.<sup>7</sup>

## Exclusive teaching and learning resources

Ovid offers a range of multimedia resources that support student learning to help improve their comprehension, retention, and clinical efficiency.

**LWW Health Library:** A unique teaching and learning solution to help students understand foundational principles, develop clinical reasoning, and prepare for exams.

**Acland Anatomy:** A comprehensive package of over 300 3D rotational gross anatomy videos across a range of specialties and programs, including Physical and Occupational Therapy, Dentistry (head and neck), Medical School, Nursing and Physician Assistant.

**Grant's Dissection Videos:** A collection of approx. 80 videos that demonstrate cadaver dissection sequences, organised by body region, and show students what they are expected to achieve in the lab, the steps required for each dissection, and information they need to learn for practical exams.

**BioDigital Human:** More than 8,000 searchable, interactive 3D structures provide students with a virtual tour to explore disease evaluation, progression, and treatment.

**Bates' Visual Guide:** Features head-to-toe and systems physical exam with an emphasis on clinical accuracy and patient care.

**TelemedInsights:** This series of interactive, self-paced telehealth learning modules helps students stay up to date with the latest technology to provide safe, person-centered care.

**Astute Doctor Communicate Program:** Six CME-accredited interactive online courses help medical school students acquire practical skills to improve how they communicate with their patients, resulting in better patient safety, satisfaction, and health outcomes.

**Stedman's Online:** Content-rich medical dictionaries provide access to thousands of medical terms, illustrations and pronunciations, giving students the tools to learn, understand, and use medical terminology correctly.

## References

Abdulrahaman MD, Faruk N, Oloyede AA, Surajudeen-Bakinde NT, Olawoyin LA, Mejabi OV, Imam-Fulani YO, Fahm AO, Azeez AL. Multimedia tools in the teaching and learning processes: A systematic review. *Heliyon.* 2020 Nov 2;6(11):e05312. doi: 10.1016/j.heliyon.2020.e05312. PMID: 33195834; PMCID: PMC7644889

Kassutto SM, Baston C, Clancy C. Virtual, Augmented, and Alternate Reality in Medical Education: Socially Distanced but Fully Immersed. *ATS Sch.* 2021;2(4):651-664. Published 2021 Oct 18. doi:10.34197/ats-scholar.2021-0002RE

Krishnamurthy K, Selvaraj N, Gupta P, Cyriac B, Dhurairaj P, Abdullah A, Krishnapillai A, Lugova H, Haque M, Xie S, Eng-Tat A. Benefits of Gamification in Medical Education. *Clin Anat.* 2022 May 30. doi: 10.1002/ca.23916. Epub ahead of print. PMID: 35637557

Mayer, R. Applying the science of learning to medical education. *Medical Education* 2010 May 20 doi: 10.1111/j.1365-2923.2010.03624.x

McCoy L, Lewis JH, Dalton D. Gamification and Multimedia for Medical Education: A Landscape Review. *J Am Osteopath Assoc.* 2016 Jan;116(1):22-34. doi: 10.7556/jaoa.2016.003. PMID: 26745561.

Nicola S, Stoicu-Tivadar L. Sharing the IT Educational Experience of Developing 3D Applications for Medical Students Training. *Stud Health Technol Inform.* 2022 Jan 14;289:204-207. doi: 10.3233/SHTI210895. PMID: 35062128.

Sheehy R. This is Not Your Grandfather's Medical School: Novel Tools to Enhance Medical Education. *Mo Med.* 2019;116(5):371-375

Wickramasinghe N, Thompson BR, Xiao J. The Opportunities and Challenges of Digital Anatomy for Medical Sciences: Narrative Review. *JMIR Med Educ.* 2022;8(2):e34687. Published 2022 May 20. doi:10.2196/34687



## Endnotes

- 1 Richard Mayer. Applying the science of learning to medical education. *Medical Education* 2010; 44 : 543–549
- 2 Michelle Daniel, Rachel Fowler, Chris Merritt, Neha Raukar, Elizabeth Sutton, Genevieve Allen, Brian Clyne. Creating effective and engaging presentations. *The Clinical Teacher* 2018; 15: 191–196
- 3 Denman M. How to create memorable lectures. *Cent Teach Learn NewsL*.2005;14:1–6.
- 4 Jennifer M. Babik, Vera P. Luther. Creating and Presenting an Effective Lecture. *JCEHP*; 2020, Volume 40, Number 1. doi: 10.1097/CEH.0000000000000281
- 5 Kassutto SM, Baston C, Clancy C. Virtual, Augmented, and Alternate Reality in Medical Education: Socially Distanced but Fully Immersed. *ATS Sch.* 2021 Oct 18;2(4):651-664. doi: 10.34197/ats-scholar.2021-0002RE. PMID: 35079743; PMCID: PMC8751670.
- 6 Krishnamurthy K, Selvaraj N, Gupta P, Cyriac B, Dhurairaj P, Abdullah A, Krishnapillai A, Lugova H, Haque M, Xie S, Ang ET. Benefits of gamification in medical education. *Clin Anat.* 2022 May 30. doi: 10.1002/ca.23916. Epub ahead of print. PMID: 35637557.
- 7 Nicola S, Stoicu-Tivadar L. Sharing the IT Educational Experience of Developing 3D Applications for Medical Students Training. *Stud Health Technol Inform.* 2022 Jan 14;289:204-207. doi: 10.3233/SHTI210895. PMID: 35062128.