Review Article

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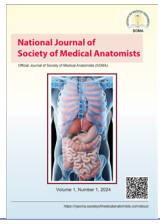

From dissection tables to digital screens: a review of the role of YouTube in human anatomy learning

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ABSTRACT

This review analyses the impact of YouTube on the transformation of anatomy education, emphasizing its advantages and difficulties. Anatomy education, which used to rely mainly on cadaveric dissection and lectures, now incorporates YouTube as a means of visual learning, engagement, and accessibility. This approach helps to overcome limitations in resources and ethical considerations. The audio-visual and interactive features of YouTube improve comprehension of anatomy, while the quality of the content is still a matter of concern. The platform provides adaptable and varied instructional approaches, but it is crucial to curate it meticulously to guarantee precision and enhance practical learning. Efficient tactics encompass integrating YouTube with conventional approaches, fostering interactive learning, and curating high-quality material. Evidence from case studies demonstrates the beneficial influence of it on student achievement. The evaluation also foresees future progressions with virtual reality (VR) and augmented reality (AR) technologies, suggesting the strategic incorporation of YouTube within a combined learning framework and more investigation. This transition is in accordance with contemporary educational requirements and advancements in technology.

Introduction

The field of human anatomy teaching-learning has evolved significantly from traditional techniques to the utilization of digital platforms, particularly YouTube. This evolution shows a pivotal shift in how anatomy is taught and learned in medical education. Traditionally, human anatomical knowledge has been the foundation of medical education. It relies mainly on cadaveric dissection and didactic lectures. The importance of this approach lies in the fact that it allows a comprehensive understanding of the human body's structure through hands-on experience. However, it is faced with challenges of reduced contact hours and a few ethical issues, which have led educators to explore alternative teaching-learning methods.[1]

The emergence of digital platforms and their integration with various teaching methodologies has made education more accessible and interactive and reduces the need for travel to attend in-person classes.[2] In particular, YouTube has shown the potential as a significant educational tool for anatomy students.[3] It is very handy to the "YouTube Generation" or "Generation Connected" (Gen C), who actively incorporate digital content into their learning style. YouTube has a vast reservoir of educational material, from dissection videos to three-dimensional animations, which helps the students visualize complex anatomical relations.[4,5] It is a user-friendly platform that the students can access at their convenience of time and place and do self-directed learning.[6]

In this review article, the role, advantages, challenges, limitations, strategies for effective use, and future directions in the use of YouTube in anatomy education are discussed

Literature search methodology

For this review article, we conducted a literature search of pertinent studies. We chose a variety of databases, including PubMed, Scopus, Web of Science, and Google Scholar. We conducted a search using the following keywords: "YouTube in medical education," "digital anatomy learning," "virtual dissection," "online anatomy resources," and "multimedia tools in anatomical pedagogy." We used boolean operators (AND, OR, NOT) to merge these keywords

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and phrases in different manners. We conducted a search specifically targeting scholarly publications, literature reviews, and case studies that have been published in English language. We restricted our search to publications within the past decade. Upon obtaining an initial collection of articles, we evaluated the abstracts and, if needed, the complete texts to determine their pertinence to our subject. Studies examining the efficacy, difficulties, and educational consequences of utilizing YouTube for anatomy education were taken into account. Our objective was to compile a varied and enlightening assortment of material, offering a comprehensive comprehension of how digital platforms such as YouTube are transforming the field of anatomy teaching.

YouTube in Anatomy education: an overview

The free accessibility of YouTube and diversity of video content show its educational value. Comments and social media integration create a dynamic learning environment where students may interact with peers. However, instructors using YouTube must consider the importance of quality video content, ethics, and institutional oversight.[7] YouTube contains dissection videos, 3D animations, and lectures on human anatomy. This wide range of content makes it a useful anatomy learning tool for self-directed learning. Professional and user-created video contents offer diverse viewpoints and instructional methods on the platform. Educators should judiciously select relevant and accurate videos from the vast quantity of available content and tailor them to their teaching program.[8]

Advantages of YouTube in Anatomy Learning

YouTube enhances visual learning, engagement, accessibility, and flexibility and provides different teaching styles and resources for anatomy learning. Audio-visual information on YouTube improves visual learning, which is essential to anatomy education. Many videos, including thorough dissections and three-dimensional animations, simplify difficult anatomical concepts. Visualizing anatomical information improves recall and comprehension. YouTube's comments and likes encourage student participation and feedback, making learning more engaging.[9] Students can access a variety of educational content anytime, anyplace, breaking classroom limits. This flexibility helps students learn at their own speed and daily schedule. YouTube is a popular resource for students globally due to its easy access to quality educational content.[10] YouTube has several video resources with different learning styles. The platform offers anatomical viewpoints from formal lectures by qualified educators to peer-generated tutorials offering a variety of educational methods. This variation enhances learning and improves anatomy comprehension.[11]

Challenges and limitations

Quality and accuracy are major issues when using YouTube for anatomy teaching. Anyone can upload videos to the open-access platform, resulting in a wide range of quality and reliability. Due to poor quality control, students may encounter misleading or erroneous information, which might hinder their learning. Thus, educators must direct students to reliable sources and evaluate available information.[12]

No hands-on experience is another drawback. Traditional anatomy education uses dissection and physical examination to teach students human anatomy. Though visually appealing, YouTube videos cannot replace hands-on dissection and palpation. This might cause a shallow awareness of anatomical features and spatial relationships, which is critical for medical practice.[13]

Diverse and entertaining YouTube material might distract students. The platform's algorithm-driven content suggestions can distract pupils from academic subjects. Not all YouTube content is verified. Therefore, misrepresentation is a major problem. Videos that promote myths or unscientific material may confuse students. [14,15]

Pedagogical strategies for effective use

YouTube and traditional anatomy education can create a mixed learning environment that combines their strengths. YouTube videos can boost learning by offering visuals and alternative explanations for classroom lectures. This integration is convenient in a 'flipped classroom' setting, where students watch videos independently before applying their information in class. This method will improve anatomical comprehension and classroom engagement.[16]

Curating high-quality YouTube content is essential for student information accuracy and reliability. Teachers must actively choose and recommend video content that fulfills course objectives and academic requirements. The source, accuracy, and educational value of content are evaluated during curation. Educators can improve student learning by curating a list of YouTube materials that are dependable and pedagogically acceptable.[17]

YouTube can boost critical thinking and active learning. Students can learn to analyze, assess, and solve problems by watching videos. Teachers can improve this process by having students analyze, criticize, and discuss YouTube content. Such activities enable students to think deeper and learn more.[18]

Impact on Student Performance and Engagement

In anatomy instruction, YouTube content improves student performance and engagement. Using multimedia case studies will improve learning and grade performance for slow learners. These case studies will help to boost student engagement and real-world exposure.[19]

YouTube and other active learning approaches help students achieve course goals and gain confidence irrespective of gender, race, or ethnicity of students by means of a highly structured human anatomical pedagogy that uses YouTube videos and active engagement (Figure 1 and 2).[20]

Future directions and potential

Digital technologies are increasingly changing anatomy instruction from didactic lectures to interactive and engaging course content. A scoping assessment of digital anatomy instruction across medical science disciplines found a growing usage of three-dimensional (3D) digital printing, augmented

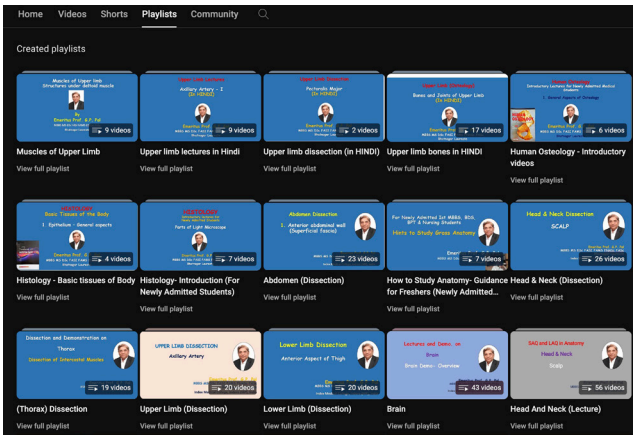

Figure 1: YouTube channel of Prof. G.P. Pal showing the structured arrangement of lecture and dissection videos. (Accessed from https://www.youtube.com/@ProfGPPal/playlists on 5th January 2024)

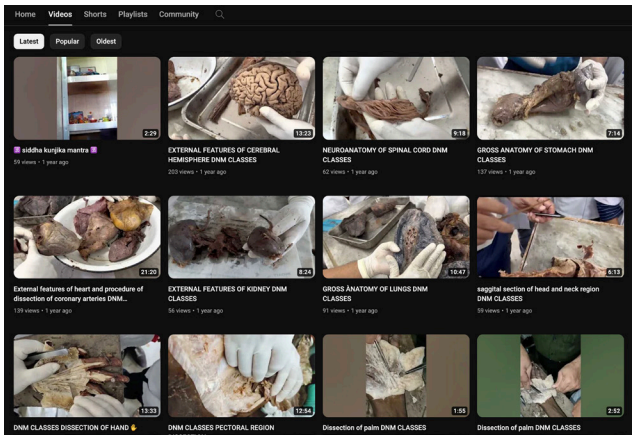

Figure 2: Demonstration videos of human anatomical organs (prosections). (Accessed from https://www.youtube.com/@dharmaniranjanmishra1255/videos on 5th January 2024)

reality (AR), virtual reality (VR), web-based programs, and tablet-based apps. In advanced regional anatomy and neuroanatomy curricula, these tools are increasingly used for interactive anatomy education. VR anatomy incorporating digital simulation for surgical training is rising rapidly, indicating a move towards an immersive learning experience.[21] The use of VR and AR in anatomy instruction can revolutionize it. Immersive encounters using these technologies improve students' comprehension of the 3D human body, boosting interactivity, engagement, accessibility, and knowledge retention. VR and AR augment traditional teaching methods in undergraduate and postgraduate settings. In anatomical training, they must reflect the human form and spatial relationships between structures realistically. These tools should supplement traditional anatomical instruction and training methods, not replace them. [22]

Conclusion

The application of YouTube in imparting human anatomy instruction alongside traditional teaching improves visual learning, engagement, accessibility, and flexibility. However, content quality, lack of hands-on experience, distraction, and misinformation are its main drawbacks. Educators should use YouTube in blended learning to ensure content quality and active learning. Long-term effects on learning outcomes, content effectiveness for different learning styles, and integration with virtual reality should be implemented in the future. Digital learning issues like student distraction must be addressed. YouTube can improve anatomy instruction, but it needs cautious deployment and research.

References

1. Ghazanfar H, Rashid S, Hussain A, Ghazanfar M, Ghazanfar A, Javaid A. Cadaveric Dissection a Thing of the Past? The Insight of Consultants, Fellows, and Residents. Cureus. 2018;10(4):e2418,1-9.
2. 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.
3. Jaffar AA. YouTube: An emerging tool in anatomy education. Anat Sci Educ. 2012;5(3):158-64.
4. Mustafa AG, Taha NR, Alshboul OA, Alsalem M, Malki MI. Using YouTube to Learn Anatomy: Perspectives of Jordanian Medical Students. BioMed Res Int. 2020:6861416,1-8.
5. Barry DS, Marzouk F, Chulak-Oglu K, Bennett D, Tierney P, O'Keeffe GW. Anatomy education for the YouTube generation. Anat Sci Educ. 2016;9:90-6.
6. Tariq MU, Khan S, Araci ZC. Self-directed learning through YouTube: Challenges, opportunities, and trends in the United Arab Emirates. Int J Mech Prod Eng Res Dev. 2020;10(3):1949-66.
7. Curran V, Simmons K, Matthews L, Fleet L, Gustafson DL, Fairbridge NA, Xu X. YouTube as an Educational Resource in Medical Education: a Scoping Review. Med Sci Educ. 2020;30(4):1775-82.
8. Maani A, Forma A, Brachet A, Czarnek K, Alashkham A, Baj J. The Future of Morphological Science Education: Learning and Teaching Anatomy in the Wake of the COVID-19 Pandemic. Int J Environ Res Public Health. 2023;20(7):5367,1-12.
9. Strkalj G, Hulme A, El-Haddad J, Luo K, Crafford D, Rampe M. Students' perceptions and usage of short anatomy videos: A preliminary study. Int J Morphol. 2018;36(2):493-9.
10. Raikos A, Waidyasekara P. How useful is YouTube in learning heart anatomy? Anat Sci Educ. 2014;7:12-18.
11. Welbourne DJ, Grant WJ. Science communication on YouTube: Factors that affect channel and video popularity. Public Underst Sci. 2016;25(6):706-18.
12. Abu-Taieh E, AlHadid I, Masa'deh R, Alkhawaldeh RS, Khwaldeh S, Alrowwad A. Factors influencing YouTube as a learning tool and its influence on academic achievement in a bilingual environment using extended information adoption model (IAM) with ML prediction—Jordan case study. Appl Sci. 2022;12:5856,1-26.
13. Romero-Reveron R. The use of YouTube in learning human anatomy by Venezuelan medical students. MOJ Anat Physiol. 2016;2(7):200-203.
14. Alzoubi H, Karasneh R, Irshaidat S, Abuelhaija Y, Abuorouq S, Omeish H, et al. Exploring the Use of YouTube as a Pathology Learning Tool and Its Relationship With Pathology Scores Among Medical Students: Cross-Sectional Study. JMIR Med Educ. 2023;9:e45372.
15. Tewfik GL, Work AN, Shulman SM, Discepola P. Objective validation of YouTube™ educational videos for the instruction of regional anesthesia nerve blocks: a novel approach. BMC Anesthesiol. 2020;20(1):168,1-7.
16. Viveka S, Sagar TV, Sudha MJ. Effectiveness of flipped classroom for teaching anatomy and students' perceptions. Natl J Clin Anat. 2017;6(1):71-81.
17. Helming AG, Adler DS, Keltner C, Igelman AD, Woodworth GE. The content quality of YouTube videos for professional medical education: A systematic review. Acad Med. 2021;96(10):1484-93.
18. Brame CJ. Effective educational videos: Principles and guidelines for maximizing student learning from video content. CBE Life Sci Educ. 2016;15(4):es6,1-6.
19. Khan A, Saeed M, Anwar MN, Kanwal L. Unleashing the potential: A study of the effectiveness and impact of YouTube educational content on student learning outcomes. J Mass Commun Journalism. 2023;13:538,1-9.
20. Shaffer JF. Student performance in and perceptions of a high structure

undergraduate human anatomy course. Anat Sci Educ. 2016;9(6):516-28.
21. Adnan S, Xiao J. A scoping review on the trends of digital anatomy education. Clin Anat. 2023;36(3):471-491.
22. Dhar P, Rocks T, Samarasinghe RM, Stephenson G, Smith C. Augmented reality in medical education: students' experiences and learning outcomes. Med Educ Online. 2021;26(1):1953953,1-9.

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