Video-based lecture

- Student engagement in a flipped undergraduate medical classroom to measure optimal video-based lecture length
- A Video-Based Learning Module Is an Effective Way to Teach the Interpretation of Preoperative Electrodiagnostic Studies
- Video-based lecture engagement in a flipped classroom environment
- Teaching distinguishing semiological features improves diagnostic accuracy of seizure-like events by emergency physicians
- Preparing Neurology Residents and Advanced Practice Providers for the COVID-19 ICU-A Neurocritical Care Led Intervention

A video-based lecture is an educational or instructional session delivered primarily through video format. It is designed to convey knowledge or teach skills in a way that can be accessed remotely, allowing learners to view the content from any location and often at any time that suits their schedule. Here are some key features of video-based lectures:

Multimedia Content: Video lectures typically combine visual elements such as slides, text, animations, and live video footage of the instructor. This multimedia approach helps to illustrate concepts more vividly compared to traditional text-based learning.

Accessibility: They can be accessed on various devices, including computers, tablets, and smartphones, making them highly accessible to a wide audience. This flexibility also includes being able to pause, rewind, and rewatch parts of the lecture, which can enhance learning.

Scalability: Video lectures can be distributed to a large number of students simultaneously, making them an efficient method for delivering education at scale. This is particularly useful in massive open online courses (MOOCs) and other forms of distance education.

Interactivity: Although video lectures are often pre-recorded, they can include interactive elements such as quizzes, clickable links, or integrated discussion forums where students can discuss the material and ask questions.

Consistency: They provide a consistent learning experience, as every viewer receives the same content, delivery, and presentation. This consistency ensures that all students have the same foundational knowledge.

On-Demand Learning: Learners can view video lectures at their own pace and according to their own schedule, which supports individual learning preferences and needs.

Video-based lectures are an integral part of modern educational environments, especially in higher education and professional training, offering an effective alternative or complement to traditional classroom settings.

A single-center experience with video-based lectures in undergraduate medical education is described. The activity was applied to the subject of Neurosurgery during two consecutive courses (2021/22 and 2022/23). The videos were available prior to face-to-face classes through the online application Edpuzzle. Information was obtained from the own platform at the end of each course. Multivariable linear regression analyses were performed to assess the association between different

variables and the percentage of video viewing, the early dropout rate, and the percentage of audience retention.

A total of 109 students registered in Edpuzzle (87.2% of all enrolled students). Fifty-one videos were uploaded each course to cover 11 topics. Mean video viewing rate was 41%. Those videos linked to the earliest classroom lessons showed more percentage of viewing and audience retention than those programmed at the end of the course. With mandatory classroom assistance and homework assignments, the seminar videos were viewed more but retained less audience. Shorter videos were associated with higher viewing and audience adhesion, but the presence of questions embedded throughout the clip did not significantly engage students. No significant difference was observed regarding lesson topics.

It is essential to emphasize the importance of designing strategies to initially engage learners since more than half of our students never connected to the clips. Decreasing engagement was associated with the end of the course and video length. Seminar videos were viewed more but retained less audience. Active learning activities such as quizzes embedded throughout the clips did not significantly engage learners [1)]

Grönheit et al. evaluate whether a single, video-based lesson highlighting distinguishing semiological features can improve the diagnostic accuracy of emergency physicians for epileptic seizures (ES), psychogenic non-epileptic seizures (PNES) and syncopes (SY).

Methods: 40 emergency physicians (24 anesthetists, nine surgeons and seven internal medicine specialists by primary specialty) participated in a prospective trial on the diagnostic accuracy of SLE. They assessed video-displayed SLE at two time points: before and after a lecture on distinguishing semiological features. In the lecture, semiological features were demonstrated using patient videos, some were acted by the instructor in addition. The increase in correct diagnoses and recognition of distinguishing semiological features were analyzed.

Results: Before the lesson, 45% of 200 SLE-ratings were correct: 15% of SY (n = 40), 30% of PNES (n = 40), 59% of ES (n = 120, focal to bilateral tonic-clonic seizures (FBTCS) 87.5% (n = 40), focal impaired aware seizures (FIAS) 45% (n = 80)). Semiology teaching increased both the rate of correct diagnoses of SLE to overall 79% ($p < 0.001$) (ES 91% ($p < 0.001$), FBCTS 98% (n.s.), FIAS 88% ($p < 0.001$), PNES 88% ($p < 0.001$), SY 35% ($p < 0.001$)), and the number of recognized distinguishing semiological features. We identified several semiological features with high entity specific positive predictive values (> 0.8).

Conclusions: A single 45-min video-based lesson highlighting distinguishing semiological features improves the diagnostic accuracy of ES, PNES and SY by emergency physicians. We expect that including this aspect into the curriculum of emergency physicians will lead to better individual patient treatment in pre-hospital medicine and more appropriate subsequent use of clinical resources [2)]

Ch'ang et al. investigated whether a focused video-based learning curriculum could effectively teach high priority intensive care topics in this unprecedented setting to these neurology providers.

Neurocritical care clinicians led a multidisciplinary team in developing a 2.5-hour lecture series covering the critical care management of COVID-19 patients. We examined whether provider confidence, stress, and knowledge base improved after viewing the lectures.

A total of 88 residents and APPs participated across 2 academic institutions. 64 participants (73%) had not spent time as an ICU provider. After viewing the lecture series, the proportion of providers who felt moderately, quite, or extremely confident increased from 11% to 72% (60% difference, 95% CI 49-72%) and the proportion of providers who felt nervous/stressed, very nervous/stressed, or extremely nervous/stressed decreased from 78% to 48% (38% difference, 95% CI 26-49%). Scores on knowledge base questions increased an average of 2.5 out of 12 points (SD 2.1; $p < 0.001$).

A targeted, asynchronous curriculum on critical care COVID-19 management led to significantly increased confidence, decreased stress, and improved knowledge among resident trainees and APPs. This curriculum could serve as an effective didactic resource for neurology providers preparing for the COVID-19 ICU [3)].

Future

The future of video-based lectures looks promising, driven by continuous advancements in technology and evolving educational needs. These developments are likely to shape how video-based content is created, delivered, and interacted with, offering a richer and more effective learning experience. Here’s what we can anticipate:

1. Advanced Personalization through AI Artificial intelligence (AI) will play a crucial role in personalizing video-based lectures. AI can analyze learning behaviors and preferences to tailor video content to individual needs, adjusting the pacing, complexity, and focus areas based on learner performance and engagement data. This will make learning more effective by addressing the specific weaknesses and strengths of each student.

2. Interactive and Immersive Experiences As virtual reality (VR) and augmented reality (AR) technologies become more accessible, they will be increasingly integrated into video-based lectures. This integration will transform passive video watching into an interactive, immersive experience where students can virtually step into a 3D environment, perform experiments, or explore historical events firsthand.

3. Increased Use of Microlearning The trend towards microlearning—short, focused video segments that address specific topics or skills—is likely to grow. These bite-sized videos cater to decreasing attention spans and the preference for on-demand, just-in-time learning. They are particularly effective for refreshers or quick learning sessions, making them a versatile tool for both formal education and professional development.

4. Enhanced Accessibility Features Future video lectures will incorporate more advanced accessibility features to ensure all learners, including those with disabilities, have equal access to educational content. Expect advancements in speech recognition for real-time captioning, enhanced descriptive audio, and better customization of display settings to accommodate various visual impairments.

5. Integration with Smart Devices and IoT As the Internet of Things (IoT) continues to expand, video-based lectures will become seamlessly integrated with various smart devices. Learners will be able to interact with lectures through voice commands, receive notifications on wearables, and even use smart home devices to control their learning environment, such as adjusting lighting and sound for optimal viewing.

6. Blockchain for Certification and Security Blockchain technology could be employed to secure video lectures and provide verifiable certificates of completion. This technology ensures that educational

content is tamper-proof and that certifications are credible and recognized across platforms and institutions.

7. Social Learning Environments Future video-based lectures will likely incorporate more social learning elements, where students can interact with peers and instructors directly within the video platform. Features like integrated chat, forums, and collaborative tools will make learning more engaging and foster a community around educational content.

8. Data Analytics for Improved Outcomes Enhanced data analytics will allow educators to gain deep insights into how video content is consumed and understood. Analytics can track which parts of a video are most watched, where students rewind, or where they drop off, providing valuable feedback to refine and improve the educational content.

9. Global Learning Platforms Video-based lectures will increasingly be part of global learning platforms that offer courses from institutions worldwide. This global approach will democratize access to top-tier education and facilitate cross-cultural exchange and collaboration.

10. Continued Focus on Lifelong Learning With the rapid pace of change in many fields, video-based lectures will be critical in supporting lifelong learning and continuing professional development. The convenience and flexibility of video lectures make them ideal for ongoing education throughout a person’s career.

The evolution of video-based lectures is aligned with broader educational trends toward more dynamic, customized, and interactive learning experiences, leveraging technology to meet the diverse needs of modern learners.

1)
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3)
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