

## COMMENTARY

### Pedagogical foundations to online lectures in health professions education

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#### PUBLISHED

29 May 2020 Volume 20 Issue 2

#### HISTORY

RECEIVED: 17 April 2020

ACCEPTED: 19 May 2020

#### CITATION

Seymour-Walsh AE, Weber A, Bell A. Pedagogical foundations to online lectures in health professions education. Rural and Remote Health 2020; 20: 6038. <https://doi.org/10.22605/RRH6038>

#### ETHICS APPROVAL

Ethical approval and consent to participate are not applicable for this commentary.

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## ABSTRACT:

Professional and tertiary health professions education (HPE) has been markedly challenged by the current novel coronavirus (COVID-19). Mandates for training organisations to reduce social contact during the global pandemic, and make learning available online, provide an opportunity for regional, rural and remote clinicians and students to more easily access learning and professional development opportunities.

Online lectures, while posing an opportunity for regional, rural and remote HPE, entail potential risks. Educators who are familiar with face-to-face pedagogies may find a transition to remote, digital interaction unfamiliar, disarming, and therefore they may not design maximally engaging lectures. The strategies used in a face-to-face lecture cannot be directly transferred into the online environment.

This article proposes strategies to ensure the ongoing effectiveness, efficiency and engagement of lectures transitioning from face-to-face to online delivery. Cognitive learning theory, strategies to promote learner engagement and minimise distraction, and examples of software affordances to support active learning during the lecture are proposed. This enables lecturers to navigate the challenges of lecturing in an online environment and

plan fruitful online lectures during this disruptive time. These suggestions will therefore enable HPE to better meet the existing and future needs of regional, rural and remote learners who may not be able to easily access face-to-face learning upon the relaxation of social distancing measures. Strategies to provide equitable HPE to learners who cannot access plentiful, fast internet are also discussed.

## Keywords:

cognitivism, distance learning, health professions education, online lecture.

## FULL ARTICLE:

### Background

The lecture is a well-established mechanism for delivering information and supporting knowledge development. Lectures remain accepted as an efficient communication method to disseminate core information to a large number of individuals in a relatively short period of time<sup>1</sup>. The lecture format use in health professions education (HPE) has evolved from a didactic method for knowledge delivery to an approach marked by interaction between lecturer and learners<sup>2,3</sup>. Enabling this transition, educators have embraced learning theories that enable learners to question new concepts, leverage and build upon previous knowledge, and, in doing so, have become more active in what was historically a passive learning process<sup>4</sup>. Such delivery tends to leverage the advantage of a live, face-to-face student cohort, with unobtrusive recording sometimes offered for those unable to attend.

The current novel coronavirus, COVID-19, has catalysed a rapid movement to fully online lecture delivery. The movement is supported by social distancing campaigns aimed at reducing the rate of spread and 'flattening the curve' during this global pandemic<sup>5-8</sup>. As a result, delivery may occur through synchronous (live-streamed) or asynchronous (recorded playback) lectures. If HPE can embrace the interactive online lecture, among other effective mechanisms to conduct engaging and collaborative online HPE, ongoing professional development that is easily accessible to geographically isolated health care may mark a new normal for the post-COVID-19 era. The online lecture also enables regional, rural and remote educators to share their expertise more broadly than face-to-face mechanisms allow.

In the face of such opportunities for fully online HPE, educators may remain uncertain about employing student engagement strategies in a fully online lecture, and are therefore at risk of developing asynchronous and non-interactive didactic resources<sup>9</sup> or delivering lectures that are not adapted to remote delivery<sup>10</sup>. There is a large body of literature to guide online lecture design; however, many educators are overloaded by the rapid educational shift, compounded by an increased concurrent demand on their clinical practice. Health professional educators, therefore, have little time to wade through the literature to ensure sound adaptation of practice to the demands of the new environment.

This article presents a collection of pedagogical design principles that may guide the development of online lecture resources for

either synchronous or asynchronous delivery. It assumes that readers are already familiar with face-to-face lecturing, and already implement modern teaching considerations such as the flipped classroom<sup>11,12</sup>, a lecture structure<sup>1,13</sup> and sound content expertise. The article will be of particular relevance to experienced educators who are, by necessity, refining their online lecture skills in the mandated conversion of face-to-face lectures to online.

### *The elephant in the room*

The current pandemic has clearly disrupted HPE. Jen Heemstra, Associate Professor at Emory University in Atlanta, tweeted an important reminder on 13 April: 'What we are doing is not online teaching. It is emergency remote teaching ... in a pandemic'. That is not to say we cannot construct pedagogically informed online courses, but the catalyst is no secret. Due to COVID-19, many students are now learning exclusively online for the first time, just as many educators are delivering education exclusively online for the first time. Therefore, we should acknowledge the difficulties this brings to the lecture and affirm the resilience of students during such a tumultuous time. This reinforces the purpose of their health professional studies – the world desperately needs healthcare professionals like them.

### **The face-to-face lecture**

The face-to-face lecture carries many advantages: it allows the educator to perceive visual cues from students' expressions or body language, and enables real-time interpretation of learner engagement and understanding; when several students ask questions or respond simultaneously, it is easy to determine who has offered a verbal contribution (or at least from where in the room the voice originated); attendance to a physical educational setting (such as university or workplace training room) requires a temporospatial transition, to which expectations and behaviour may be tethered<sup>14,15</sup>, and the co-location of students enables peer learning and micro-discussions to improve student understanding during a lecture.

The online lecture has the potential to threaten some advantages of face-to-face delivery: during a large group online lecture, the educator is unable to easily track posture and restlessness, and therefore visual cues of engagement are impaired; engagement may be requested through online mechanisms (including real-time polls and monitoring a chat feed), but this may be harder to elicit if learners experience feeling distanced from the learning.

Additionally they may encounter technological barriers, such as audio bleed from other students; and if students are watching even the most interactive lecture online during a global pandemic, they may feel isolated from their peers, and remain in a state of distracting anxiety, thus reducing cognitive resources.

### **Challenges in online lecturing**

Online lectures risk becoming no more than the delivery of scripted information to watch while students partake in other activities that are now established in their daily home routines. Whether delivery is synchronous or asynchronous, lecturers may find that eliciting interaction from learners disrupts the planned delivery flow. The alternative may be that lecturers retrieve notes from a lecture previously delivered face-to-face, and record it as a continuous monologue for upload onto an online learning management system. Some educators may instead repurpose software primarily designed for virtual meetings (such as Skype, Zoom or Microsoft Teams) for this purpose.

Watching a one-hour monologue places the learner in a passive position, and this delivery assumes that they are an empty vessel to be filled with knowledge. This approach overlooks the previous experience learners bring to the lecture, and therefore reduces engagement<sup>3,13,16</sup>. When a learner is not actively engaged, distractions from the home environment can insidiously make their way in<sup>6</sup>, and the distractions are currently plentiful: friends and family reaching out to check in on those who are self-isolating or socially distancing; the news channel intrudes from the background reporting a new surge in COVID-19 diagnoses or deaths; even everyday household duties are a welcomed relief from difficult cognitive work. Major et al. argue that the modern learner was already distracted<sup>12</sup>, however the current state of heightened anxiety and uncertainty is likely to make it even harder to maintain engagement. Over 60 years ago, George A Miller (as distinct from George E Miller, who is also cited) proposed 'seven plus or minus two' as a measure of learners' cognitive limitations when processing new information<sup>17</sup>. Where, in the past, we could expect our learners to hold approximately seven new ideas in mind, this is no longer the case in the midst of competing distractions, and a lecture which conveys large volumes of new information is therefore poorly suited to the current educational task.

### **Proposed solutions for planning and delivering an online lecture**

#### ***Determine the capability of your online systems***

Before an educator can plan the most pedagogically informed lecture, the capacities of the available online learning management system and communication software need to be understood. For example:

- Is there video and/or audio streaming capability, or must the lecture be pre-recorded?
- Does it promote *interactive* streaming (ie can students ask questions by text or audio)?
- Does it allow recording of live lectures (and does this need to be activated manually)?
- Is additional hardware (such as a lapel microphone) required?
- What other functions exist, for example screen sharing, sharing slides, playing embedded video, or a camera view to show a whiteboard?

The presence of a tool or functionality does not always warrant its inclusion; however, by determining what functionality is available, lecturers can be more empowered to craft an educational activity that suits both their strengths and the needs of their students.

#### ***Clarify expectations***

Learners in modern HPE are not new to technology; however, learning that is *exclusively* available through technology may well be a shift. Spend a few moments at the start of the lecture to address distractions to learning and establish student engagement expectations: suggest that students silence mobile phones, find a quiet space, prepare refreshments prior to the start of the lecture, and turn off email notifications and other pop-ups that may compete for attention<sup>18,19</sup>. A sign on a learner's door or on the back of their chair to ask housemates 'please don't disturb – lecture in progress' and the use of headphones to reduce competing distractions may also be helpful. If students can initiate audio-input, then request that they mute their microphones to reduce distracting noise. For text-based interaction, a simple code for 'I understand', 'I'm confused', 'I have a question' or 'I'm bored', for example by means of emoticons, will allow the lecturer to skim text comments and respond promptly to the group's needs. Demonstrating the use of attention-seeking tools such as a raised hand emoji can also streamline communications. Learners will now be better equipped to focus, fight distraction, and have easy mechanisms to communicate their engagement.

#### ***Support the organisation of new knowledge***

Cognitivist learning principles focus on how information storage and retrieval is processed in the mind<sup>20</sup>. Imagine that the mind is a backyard shed and new information presented to a learner is represented by new items just purchased at the hardware store. If those new items are delivered in a box and placed on the bench inside the shed, then the items can probably be retrieved in the short term. But next week, another box appears. And the next week, another. Unless the items are removed from the boxes and sorted into a logical storage system within the shed's shelving and cupboard space, items that have been purchased and delivered in subsequent weeks may not be readily retrieved.

This analogy applies to the lecture in different ways. A lecture delivers the same ideas to the whole cohort, so students all end up with the same package in their cognitive 'shed'. If students already have a hammer in their shed, however, they don't need another. If students are empowered to perform a stocktake of current

knowledge (eg by means of a preliminary anonymous online assessment or groupwork), then they identify their own gaps, develop agency in their own learning, and the lecturer is better informed to construct and deliver the content appropriately. Students can take stock of what they already know through carefully designed learning activities, which flips the classroom<sup>21</sup> and brings all to the lecture with an expectation of common preparation. In this way, the lecture and its surrounding activities enable active learning, which students invest in, collaborate with, and bring themselves to, which may enhance the development of analytical skills<sup>10</sup>.

### **'Chunk' information**

Famously, in 1934 Abraham Maslow proposed a hierarchy of needs, which remains relevant to educators today<sup>22</sup>. The foundation of the hierarchy is that an individual has their physiological needs met (food and shelter), after which immediate safety is important, without which belonging, esteem and 'self-actualisation' (the upper levels) cannot be achieved. In the current crisis, a perception of the threat of even the most basic needs exists, even if not yet fully realised. Maslow's model has been applied to education due to its clear applicability: when students do not feel safe, they will not learn effectively, and their cognitive capacity will be reduced. Limiting the volume of new information and allowing it an opportunity to be understood, applied, organised, and for existing schemata to accommodate it, incorporates Miller's notion of the 'magic number seven' regarding working memory limitations<sup>14</sup>. In current HPE, however, lecturers might adopt an approach of the *magic number three or four*.

### **Stimulate thought through images**

Lectures are well supported when visual aides are used, and in some cases visuals are essential. However, the reduction of face-to-face learning may tempt lecturers away from interactive teaching styles toward an increased use of text on visual media, and a reduction in engagement<sup>1,23</sup>. Text on a slide is difficult to read while audible input is also being received. The use of images, on the other hand, is linked to emotional engagement<sup>23</sup>, and conveys understanding while the learner can also consider what is being said about the concept.

### **Promote enquiry through application and interaction**

Images can be fodder for learner enquiry, and thoughts can be gleaned through real-time chats (text or audio-based), online voting polls or brief break-out group discussions during the lecture. Interactive learning may alternatively be facilitated by pre-recorded mini-lectures, which students work through asynchronously between live online small groups. This approach draws students up the levels of Bloom's taxonomy from recalling information to applying and creating knowledge individually and in a group<sup>23</sup>, reduces the occurrence of mind wandering<sup>24</sup> and accommodates potential reductions in cognitive resources in light of understandable anxieties at the present time. Such 'micro-learning'<sup>12</sup> incorporates the principle of chunking, with the additional emphasis on applying new knowledge. Lecture handouts made available a priori can be designed as worksheets

to promote engagement<sup>1</sup>, and should be constructed to accommodate students who are only able to access the lecture in audio format. Online HPE should not only be accessible to those in urban cities or who can afford fast, plentiful internet, but also regional, rural and remote learners, who may have insufficient internet speed to support a video stream<sup>25</sup>; other learners in locations where the infrastructure for internet communication is poor; and students who have lost casual employment due to COVID-19 and are unable to afford large data allowances.

Interaction can be difficult in a face-to-face lecture when the student cohort is large, and this can be exacerbated in the online environment. However, engagement is not a part of HPE that should be sacrificed in the movement to online delivery. Making the effort to maintain connection through making eye contact with the camera and directing questions to those virtually present (by name), may help students feel connected to each other and like a valuable part of the lecture. The lecture can therefore be highly engaging and promote an 'experience of relevance' for students<sup>3</sup>, thus promoting deep learning through identifying with a lecturer's contagious enthusiasm for a topic.

### **Conclusion**

An online lecture can easily fall prey to lack of familiarity and confidence with the features of modern technology; however, embracing the breadth of functionality from modern online learning management systems may also alienate learners who rely on limited internet to access learning. We must ensure that our pedagogical approaches consider and accommodate the barriers some of our learners face by means of socioeconomic status, geographic location, or both.

Delivery of the lecture online need not reduce the quality of educational design and need not be reduced to a uni-directional transference of knowledge by means of didactic monologue. In this article we propose that lecturers consider:

- questions and images to stimulate thought and encourage problem solving
- gathering real-time input from students by text-based chat or audio responses for those whose hardware supports it
- planning to leverage small groups to supplement and extend that which is addressed in the lecture
- exercises to enable students to identify their individual and corporate gaps prior to the lecture
- providing resources to review previous learning, retrieve existing knowledge and adapt existing schemata to the new content
- reducing the volume of new information to align to potential reductions in learners' cognitive reserves.

HPE is under immense pressure to provide tertiary and ongoing professional development online amidst varying levels of physical isolation requirements, and coupled with this is licence to trial innovative approaches to online education. The new 'normal' that may emerge from such an environment has the potential to revolutionise HPE for regional, rural and remote students, clinicians and educators. When accredited training bodies embrace online

learning with rigorous pedagogy, the many community-based clinicians who are otherwise extracted from their communities in order to attend training in an urban centre will instead be able to remain in their homes, communities and local regional health systems, enabling in-situ upskilling. The long-term social, environmental and professional advantages are significant. The HPE community must embrace this opportunity to maximise

improvements in future HPE development and delivery.

## Acknowledgements

The authors would like to thank Associate Professor Tony Smith for his feedback and guidance on the principles contained in this article.

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