

by David Sands

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## The challenges of online teaching

I am relatively new to on-line teaching. When the UK first entered lock down, I had already completed my teaching and retired from my full time position shortly afterwards. Now, as a visiting lecturer at another university, I have had to deliver a small number of lectures and offer the following opinion based on my, admittedly, limited experience.

engagement and whilst pretty much all on-line platforms now facilitate interactivity, not to mention the existence of web-based interactive polling platforms which enable both quizzes and rapid feedback from students, some students still just do not participate. If students are not inclined to interact with academic staff they are even less inclined to engage in open discussion with their peers.



▲ Hopefully we can return soon to physical teaching. © iStockPhoto

Recently, I reported on the experiences of several academics in the UK (Europhysics News 51/4, 2020 p.30-32) and it became clear to me that online teaching is very demanding of time. Even if the online time was used to deliver information in the manner of a normal lecture, time was spent afterwards offering students individual support. Important though the impact on staff might be, the impact on students is what really counts. As an old colleague of mine put it, learning is an activity: you have to do something to learn and for many students in an online environment, it is too easy to hide. Moreover, it has been my experience recently that increasing numbers of students are struggling to move beyond a view of physics teaching as the delivery of factual information which need only be learnt by rote.

Students will only do with knowledge what their assumptions will allow and a naïve view of physics is a serious impediment to their development. Discussion with peers is an effective way to challenge such assumptions, but I find this very difficult to do online. Interactivity drives

Undoubtedly, the technology exists for highly effective interactive teaching if students are aware of their own responsibilities and are willing to participate. Perhaps it is my limited experience, but it seems to me that there is still a technological gap to be filled when this is not the case. Within a classroom setting I can create groups, give them media through which to interact (small whiteboards are very effective), move between the groups, pose questions and guide the discussion. If something arises that needs to be brought to the attention of the whole class, it is easy to do so. None of the platforms I have looked at make overseeing different groups in breakout rooms easy and on-line peer-to-peer discussion remains a challenge. However, peer-to-peer discussion not only helps students to restructure their knowledge, it is also essential for challenging limited assumptions about the nature of physics knowledge and learning and for developing complex skills like problem solving. Initiating this kind of interaction on-line is perhaps the next big challenge in educational technology. ■