FEEDBACK

MOOC pros and cons

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Letters and comments that appear here may have been edited.
Physics World, Temple Circus, Temple Way, Bristol BS1 6HG, UK
E-mail: pwld@iop.org
Web: physicsworld.com
Twitter: @PhysicsWorld
Facebook: facebook.com/physicsworld

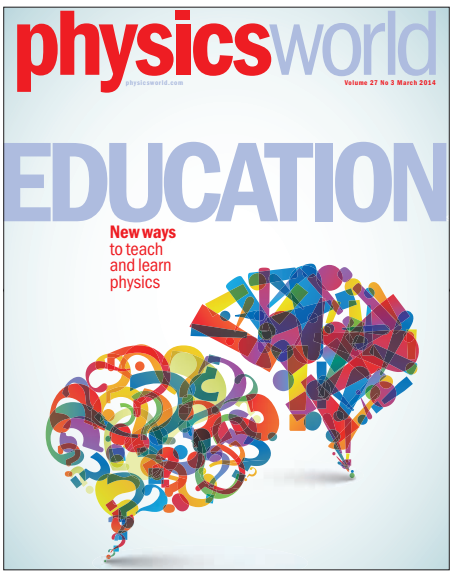
Beyond MOOCs and videos

In reply to Philip Moriarty's article "The power of *YouTube*" (March p31–34, http://ow.ly/vAL2T) in the *Physics World* special issue on education.

Having spent last year working with the Edinburgh Physics Education Research Group, I was thrilled to see the topic of education featured in *Physics World*. I was, however, surprised by Moriarty's comments in which he implied that online education consisted solely of *YouTube* videos and MOOCs (massive open online courses), and questioned whether it can ever result in learning. Online education can in fact be much more varied, and often offers features that are not available in face-to-face learning.

For example, the use of asynchronous discussion boards encourages students to spend more time thinking about the posts and considering their answers than would typically take place in a classroom setting. This is beneficial for developing deep conceptual understanding. Having recently graduated with an MSc in e-learning/digital education (taught solely online) from the University of Edinburgh, I can say from personal experience that online learning can be just as interactive, effective, challenging and rewarding as face-to-face learning – if not more so.

Of course, as with any technology, the use of online learning in physics education should be guided primarily by pedagogy, not technology. For example, the use of electronic voting systems in undergraduate lectures is unlikely to lead to deeper student learning unless it is used with an effective pedagogy such as peer instruction. Many research groups around the world are evaluating, developing and understanding student learning and pedagogies, making education more a science than an art. This means that the use of new technology and novel learning techniques, such as those discussed in the March issue of *Physics World*, can be introduced in a research-informed way,



thereby increasing their chances of success. Continued discussion of, and investment in, physics education research is vital.

Anna Wood
Glasgow, UK
anna.k.wood@talktalk.net

MOOC pros and cons

In reply to James Dacey's article "The MOOC point" (Features, March pp43-46, http://ow.ly/uqH4W) about the rise of MOOCs in science education.

As an educator as well as a researcher, I have participated in quite a few MOOCs, from Peter Norvig and Sebastian Thrun's original "Artificial intelligence" course to courses such as "Probabilistic graphic modelling and computational molecular evolution". I was (and continue to be) interested in what innovative applications of technology and talent can bring to ordinary "talking head" distance learning. Some of these courses have been pretty far away from my area of experience, but I have found them all to be extremely interesting.

Whether MOOCs can match the "social and educational experiences" to be found in a class on campus is an interesting question. In my view, discussion forums are among the most beneficial parts of the MOOC courses. They create real and timely discussion among students from all over the world, with totally different backgrounds, on current quiz problems and assignments of the day in a "help each other understand" environment. I guess I am becoming a fan!

There are some downsides, though. One is that it seems like almost every community college believes it needs its own MOOCs on algebra or physics or whatever to be taught online by its own faculty. The problem is not that the faculty couldn't do it well (though that is sometimes a possibility), but that requiring students to come to campus in order to access and participate in "online courses" seems like an effort to increase enrolment and decrease the number of faculty, with little apparent benefit for students. Schools doing this often seek grants for the substantial IT investment required, and are often also in "revenue-critical" situations, worsened by poor student retention rates.

ASIWEL
via *physicsworld.com*

Teaching by doodling

In reply to the article "Learning by doodling" (March pp40–41) in the *Physics World* special issue on education.

I teach basic physics within a first-year undergraduate module called "Physical oceanography and meteorology foundation", which is taken by students on a range of marine science degrees here at Plymouth University. Most of these students have no background in physics beyond GCSE science and tend to find the physics concepts they encounter difficult. A few years ago, I therefore started drawing out the content I wanted to cover in my lectures, using a mix of linked text and quirky pictures (such as the one overleaf) to add fun/interest. I write/draw out the content "live" during the lecture so the students get to see things unfold in front of them.

This approach to teaching basic physics within my module has proved popular with students and routinely receives very positive feedback; in fact, I received the university's Student and Staff Teaching and Representation Award for "Most Innovative Use of Teaching Methods" for this work in 2011. Alongside my visual aids, I also include a few other quirky "gimmicks" such as using a *Star Wars*-style "lightsaber" as a pointer when I cover forces, trying to play a fanfare on a bugle to emphasize a key result or equation, using a line of students to demonstrate longitudinal and transverse "Mexican waves" and throwing a foam ball around. All of this works to maintain positive engagement from students towards topics that many have previously struggled to enjoy – although I realize that my efforts are more "teaching by doodling" rather than "learning by doodling".

On a separate note, I also enjoyed your video interview with the Massachusetts Institute of Technology's Walter Lewin ("Walter Lewin – a truly inspirational teacher", http://ow.ly/vAMzc). I think he is an extreme version of how I aspire to be with these first-year lectures at times. It was interesting to hear his comments