Stretching available technology to provide an enhanced online learning experience

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I co-ordinate a module in the Bioinformatics and Computational Genomics MSc. Fortunately, I did have time to prepare for online provision of teaching in the autumn semester, a task made much easier having transferred the module to Canvas the previous year.

Creating Content Tabs

Given that the primary interaction with students would be via Canvas and Teams, I wanted to make these interfaces as appealing as possible. While Canvas is an excellent platform, navigation through the 'module' pages for each teaching session requires either scrolling down through a lot of information or navigation to another page. At the suggestion of my colleague, Dr Caroline Meharg, this was improved by adding tabs using the HTML editor. The content can then be divided into manageable chunks available through tabs that appear along the top of your page (see Fig 1).

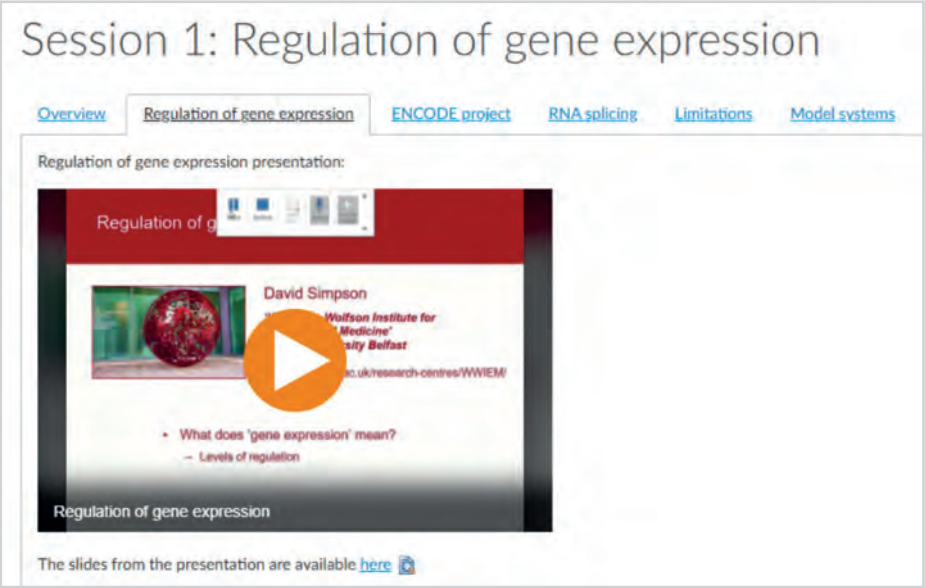

Fig 1. Screenshot illustrating the use of tabs

Pre-recording Presentations

Presentations can be delivered live through Teams, with a recording made available afterwards or prerecorded and made available ahead of the session. While live presentations do give opportunities for interaction, I have found this difficult, particularly with larger classes. However, this format did work well for group presentations, in which the presenting group turned on their cameras; each went through their own slides and then, as a group, answered questions from the rest of the class. The pre-recorded approach provides the opportunity to have a live Q&A session at the time scheduled for the lesson. This can be more fruitful because students have time to consider the content and formulate questions ahead of time.

Both these approaches can be rather impersonal, with the presenter either not visible in a standard PowerPoint pre-recording, or appearing as a small talking head in a Teams session. While preparing my module I came across a video online in which the presenter was standing in front of their slides and pointing at relevant material, engaging with the audience in a similar or even more effective way than one would in a face-to-face presentation in a lecture theatre. There was a time when a specialized recording studio would have been required to make such a video, but it reminded me of the ability to use virtual backgrounds in Teams and other video-conferencing platforms. After some research, I discovered a beta function in Zoom which enables use of a PowerPoint presentation as your background. You can set up a Zoom meeting (with just yourself) using this function and scroll through your slides explaining the content. If you press the record button at the start your talk will be available as a video at the end of the meeting.

I thought I had the technique cracked until I tried to point at a specific region on the PowerPoint slide projected behind my image! The problem of interacting with an inverted image behind you can be addressed by duplicating your display on a second screen, which could be attached to your PC or a laptop to which you project wirelessly. Place the second screen at right-angles to the first with your web cam attached to it. You can then record your video while looking at your second screen and pointing to things on the first screen. Make sure you have no content in the bottom corner of the slides and locate you image here. If you talk to the camera and look/point at the first screen, in the finished video this will appear as if you are addressing the audience and interacting with the content (Fig 2).

I think the videos made using this technique provide the closest possible experience to watching a presentation in a lecture room. It does take a bit of effort to set up but should be easy for anyone familiar with Windows and Teams – it is also possible to use an iPad as a second screen. The main issue is achieving effective segmentation of your image from the background so that bits of your office (ie bedroom!) don't appear as you move around. It is important to have good lighting and a plain background works best.

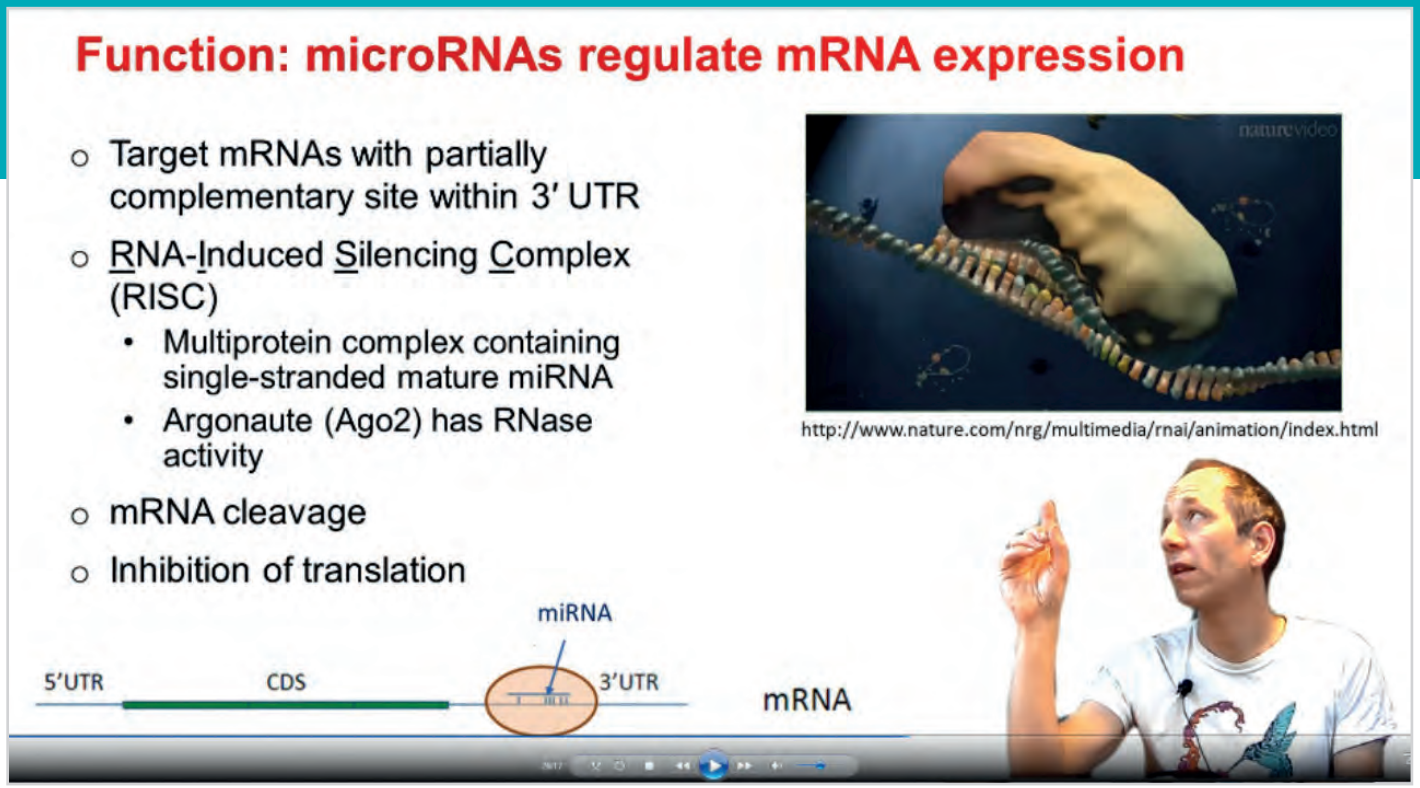

Fig 2. Screenshot of interactive video created using Powerpoint slides as background.

Practical steps to make a video

1. Set up a second display screen

If you have **2 monitors**, simply duplicate the display. To use a **laptop** make sure PC and laptop are on the same network. From the 'action center' in the bottom right of the Windows screen select 'Project' screen, 'Duplicate' and 'Connect to wireless display'. Accept on your laptop. To use an **ipad** download SplashTop App on ipad and XDisplay Agent on PC. Connect ipad with USB lead to PC.

2. Microphone and webcam

You can use the microphone with your webcam or integrated in a headset. Wearing headphones can interfere with segmentation of your image from the background, so if possible, use a separate microphone. Keeping the webcam connected to your main PC, position it on/beside the second screen.

3. Record presentation with Zoom

Start Zoom, select New meeting, Share screen, Advanced, 'Beta' Powerpoint as virtual background, Share and Open your Powerpoint file. Move and resize your image as required (usually lower right corner of the slide). Position yourself such that you can move your arms within the field of view of the camera by moving it and yourself further apart if necessary. Adjust lighting and background to minimise the background showing behind your image as you move. Practice moving through your slides using the arrows on the bottom of the Zoom screen. Unfortunately, animations are not supported, so to mimic these you will need to split them across several slides.

To start recording simply press the record button on Zoom. When you stop the recording, you will see the message 'the recorded file will be converted to mp4 when the meeting ends'. When you end the meeting the video file will be saved to your computer. You can open and trim etc as required with any video editing software, such as the Windows Video app.

Place second screen at right-angles to the main one.