

YouTube videos for teaching and learning in Chemistry

Faculty of Sciences | Department of Chemistry and Polymer Science

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Context

The idea for using YouTube as a means for delivering lectures and communicating with the students was born from a number of issues the lecturer has been considering. In 2012 Gareth Arnott was toying with the idea of using a video introduction for the (then) Chemistry 154 course which he was convening. This course had just over 900 students split into five classes, so a welcoming message to the class using a video would enable the lecturer to introduce himself to the whole class on a more personal note.



Welcome to Chemistry 154

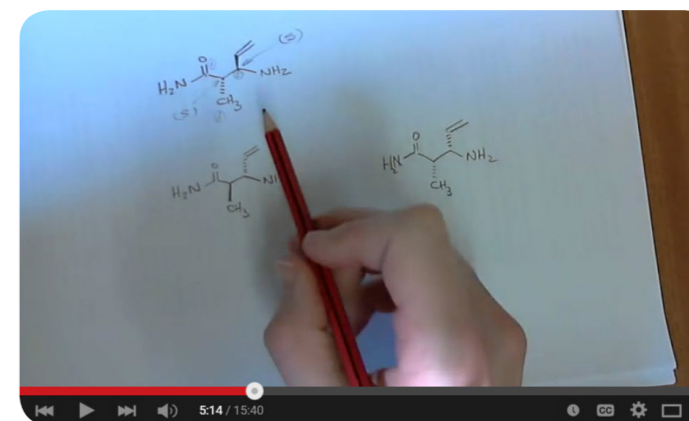


389 views

At the same time, the lecturer came to the realisation that lectures tended to be a lot of information 'pushing' without the students engaging in problems; some students were quick on the uptake, but many would be clueless no matter how well you thought you had explained something. The lecturer wanted to provide a 'weekly wrap-up' in video format such that students would have the opportunity to revisit the key concepts at a time convenient to them. Those that struggled would be able to replay the lecture or stop at a point if they didn't understand.

The choice to use YouTube was carefully weighed up. Placing the videos on WebCT (this was before SUNLearn) was one option, but considering that students outside of the university network would be hit with hefty bandwidth issues since videos were recorded in HD by default. YouTube

on the other hand has options to watch videos in different resolutions, partially mitigating the bandwidth problem. YouTube also has fairly nice built-in analytical tools for monitoring numbers of views over time. Ultimately the concern over bandwidth needed for YouTube was never realised as students never complained about this. IT also made YouTube free on campus to staff and students, which has helped a lot.



Learning and assessment activities

In 2012, Gareth Arnott was also teaching the third year organic chemistry course (Chemistry 344), where a weekly test system was implemented the year before. The concern was that placing the memo for the test online was not the most helpful for the students, whilst if the lecturer could 'show' them where they were making the biggest mistakes, their learning processes might improve. Doing this in class was prohibitive from a time perspective therefore YouTube was also used for this purpose. Straight after the class, the lecturer would mark the test and then immediately film the memo whilst the mistakes the students had made were fresh in his mind (screenshot of test memo video). The feedback that was received on these memorandum videos was very positive.

In 2013 and 2014, the YouTube platform was used for a 'flipped' classroom approach, putting pre-lectures online for the Chemistry 344 course. In principle the lectures could be used every year, but in practice some videos had to be redone as slight changes in the course and lectures had occurred. In 2014 the lecturer's YouTube channel was consolidated and neatened since it has become a hodgepodge of videos (link to YouTube



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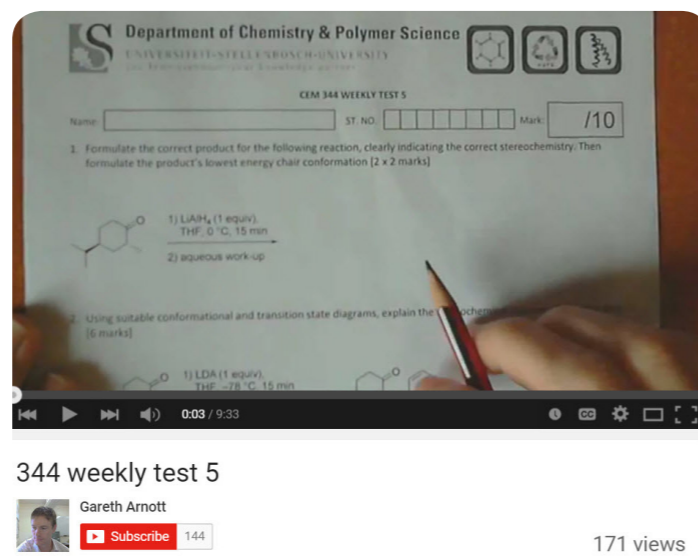
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channel: <https://www.youtube.com/user/chemistryonefivefour/featured>.



Initially, videos were only made available via links in the previous learning management system, WebCT, but then the videos were made available for general viewing when the honours class wished to have access to the lectures from the previous year. Every course has its own playlist, based on year. The videos were also edited to make them a little more professional. Opening the channel to the world has started to see people from other countries viewing the videos and posting some comments. In 2014, nearly a third (31.8%) of the channel's views was from countries outside of South Africa.

The channel does not only contain lectures, since the purpose was to be able to communicate with the class. One of the most viewed videos is one made for the 2013 third year class after their final weekly test. It was meant to be a fun response to encourage them. This video received over 1 700 views later, it is the most watched video on the channel.

Student experience

The videos is first and foremost a tool to complement the course content. It has been working for this lecturer, and the students have been generally positive, but it may not work for everyone. However, from the student feedback there has been a couple of negative feedback comments from

the third year class, that the videos took too much of their time. The lecturer suspects that this was because of the flipped classroom approach, but since each lecture was on average 11 minutes long (for 12 videos), the criticism was probably from weaker students who were struggling to keep up with the material and the rest of their course.

The following opportunities and challenges can be identified, from the lecturer's 30 months of experience using YouTube for teaching and learning purposes. These are listed below:

Opportunities

- Student feedback and engagement generated by the YouTube videos are valuable.
- The YouTube videos must be carefully planned and on a specific topic.
- Test memos via video explanations give a quasi-tutorial feel which may be more beneficial to learning.
- Showing the process can be better than reading a textbook. E.g. reaction mechanisms which need to 'flow' and not memorised by rote, or three dimensional models which are difficult for all to see in class.

Challenges

- Making YouTube videos takes time. Most of the videos have been made 'on the fly', but even so they involve a number of retakes and editing.
- Students think it is a quick-fix. The videos are meant to complement their learning which can only be an active process. Some think that watching the videos will somehow fill them with knowledge and experience.

Conclusion

Moving forward the lecturer will continue to use this platform and hope to improve the quality and presentation of the videos. The analytics from YouTube have also been interesting and have pointed to videos that have received more hits than others from across the world. This presents opportunities to polish these topics as their demand increases. To date the lecturer has managed quite well with a simple webcam mounted on a clamp-stand from the laboratory, but in the future something a bit more professional with better focus and colour reproduction will be used.

