



Knowledge Exchange Seminar Series (KESS)

...is a forum that encourages debate on a wide range of research findings, with the overall aim of promoting evidence-based policy and law-making within Northern Ireland



Interactive Technologies to Enhance Learning and Teaching in Higher Education

Prof Stephen McClean

Dr William Crowe

School of Biomedical Sciences,
Ulster University

Email: s.mcclean@ulster.ac.uk



Twitter: @PlanetChemistry





Active Learning...

“..involves students in doing things and thinking about the things they are doing.”

Bonwell & Eison (1991)



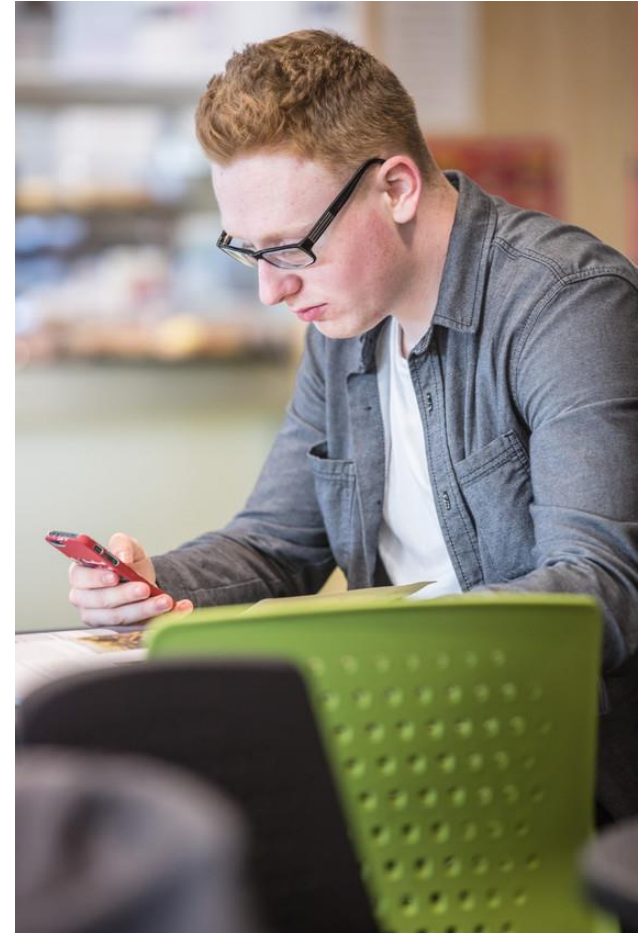
Campuses need a
“*participatory architecture*” to
support communities of
learning, harnessing the
power of “*existing physical
place and the emerging
virtual space*”

Dugdale (2009)



Engage Students in Lectures with...

- Video
- Questions
- Problems
- Discussions
- Case studies
- Audience response systems (clickers)
- Theatre



What is Nearpod?

Nearpod is a web-based audience response tool that facilitates interactivity in the classroom setting

Nearpod can operate on student owned laptops, PCs, tablet devices and smartphones (free Nearpod app available)

Students may engage in multiple choice quizzes, short answer style questions or drawing activities

Good Wi-Fi connectivity essential!



Pedagogy

The theoretical underpinning of our study followed a model of *active learning* (Bonwell & Eison, 1991; Prince, 2004).

Nearpod increases the opportunities for interactivity (Moore, 2015; Dyer and Hunt, 2015) and extends beyond the functionality of traditional audience response system handsets (clickers).

Nearpod has been utilised in the UK HE sector, one example being University of Brighton (Curdy, 2015).

Alternative tools are also available e.g. Socrative, uRespond, ResponseWare etc.



Implementation of Nearpod

- PHA302 Pharmaceutical Analysis mass spectrometry lecture
- Students shared devices to participate
- Interactive elements included polls, open-ended questions, “Draw It” activities
- 32 students were in attendance; 27 logged in to Nearpod = 84% engagement. (Some of these logins may be “doubles”)

Evaluation of Nearpod

- Student views on the use of Nearpod were gathered via questionnaire & focus group
- Study referred to the School of Biomedical Sciences Ethics Filter Committee (Reference: FCBMS-15-072)

Qualitative Comments +ve

- *Allows more interaction with the lecture material.*
- *I engaged better in the class*
- *Interactive and can see notes up close.*
- *Easy to use and fun way of learning.*
- *Very engaging, helped me to really grasp what we were studying by doing questions at the end.*



Qualitative Comments -ve

- *If you are using a phone device and have to share it can be quite small.*
- *The amount of people being able to be connected at one time.*
- *The ability to look back at previous slides.*
- *Being able to edit notes, for extra material mentioned in lecture.*

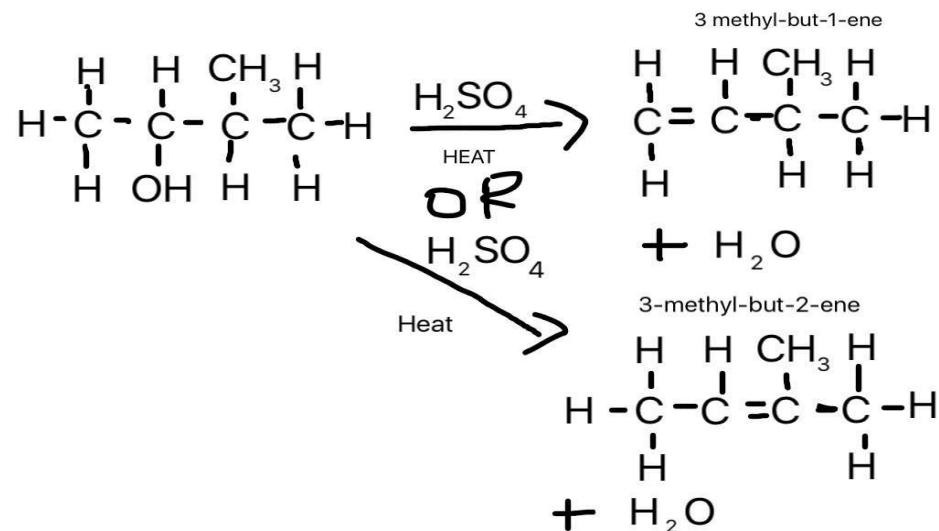
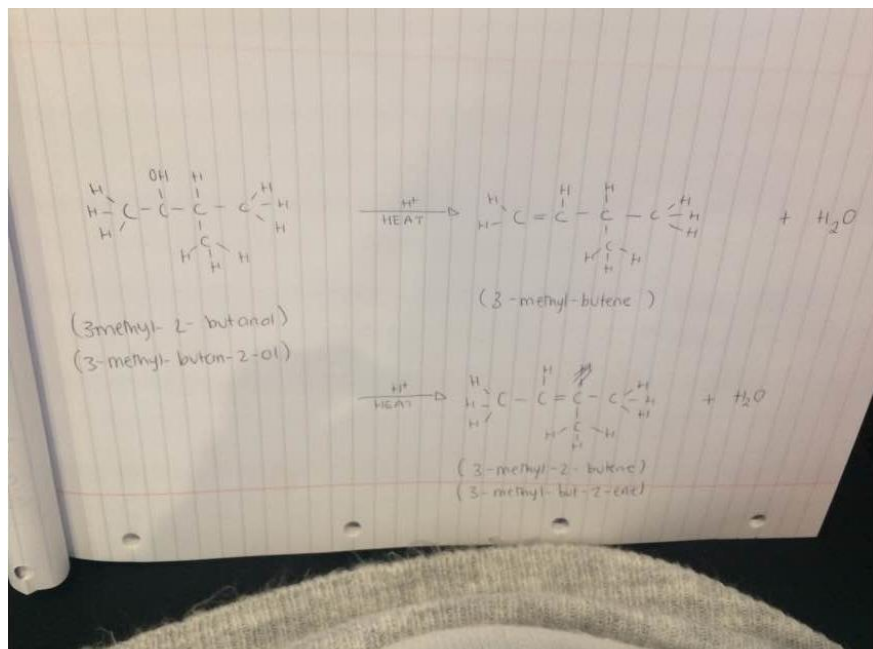
Developments from 2016/17

- Upgraded to a “School” account (200 logins)
- Additional functionality e.g. taking notes
- Implemented in a year one Chemistry in Practice module (n ~ 170 students)
- Students preferred to use their own devices even when tablet devices were offered to them
- Only 1 technical issue reported during semester!
- “Negative” aspects reported previously addressed by updates to user account



Student responses in 2016/17

Predict the dehydration products...



Using PeerWise to Encourage Active Learning... outside scheduled lectures....

peerwise.cs.auckland.ac.nz



PeerWise...

- Students create, share and explain their understanding of course-related multiple choice questions (MCQs)
- In the process they earn “badges” for engaging and build a “reputation” score – competitive!
- PeerWise is free and easy to use

(Source: peerwise.cs.auckland.ac.nz)



Reported Advantages of PeerWise...

- Increases student engagement (Rea & McClure, 2012)
- May be implemented for large groups of students; e.g. 600-700 (Tierney & Sykes, 2011)
- Enhances digital capability (Mackey et al, 2012)
- Results in higher academic attainment for students who engage (Bates, Galloway, & McBride, 2012; Hancock et al, 2018; McQueen et al, 2014)

BMS102 Biochemistry

- **195** students enrolled in the 2013/14 academic year, **209** in 2014/15
- Students drawn from courses in the Schools of Biomedical Sciences and Pharmacy and Pharmaceutical Sciences at Ulster University



Activity – Students were asked to...

- 1. Create 1 MCQ per week of teaching
- 2. Answer 3 MCQs per week of teaching
- 3. Comment on 2 MCQs per week of teaching
- Two “checkpoints” to measure engagement at the end of weeks 8 & 12 of semester

Activity

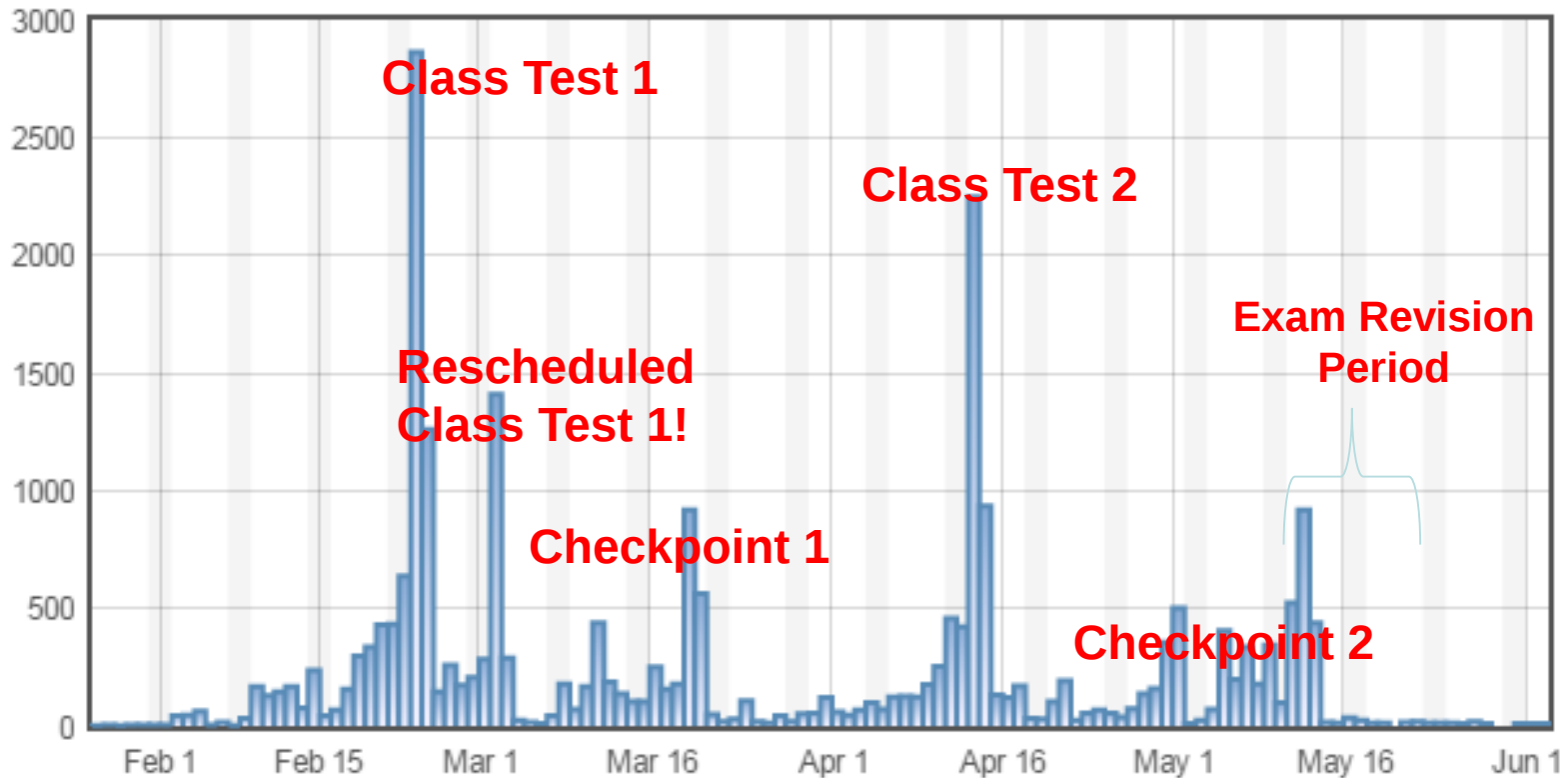
- A small number of coursework marks were assigned to students who successfully completed the activity
- Some of the PeerWise questions were included in summative class tests during semester (weeks 5 and 10)
- Students are anonymous to each other but not the instructor

Evaluation (2014/15)

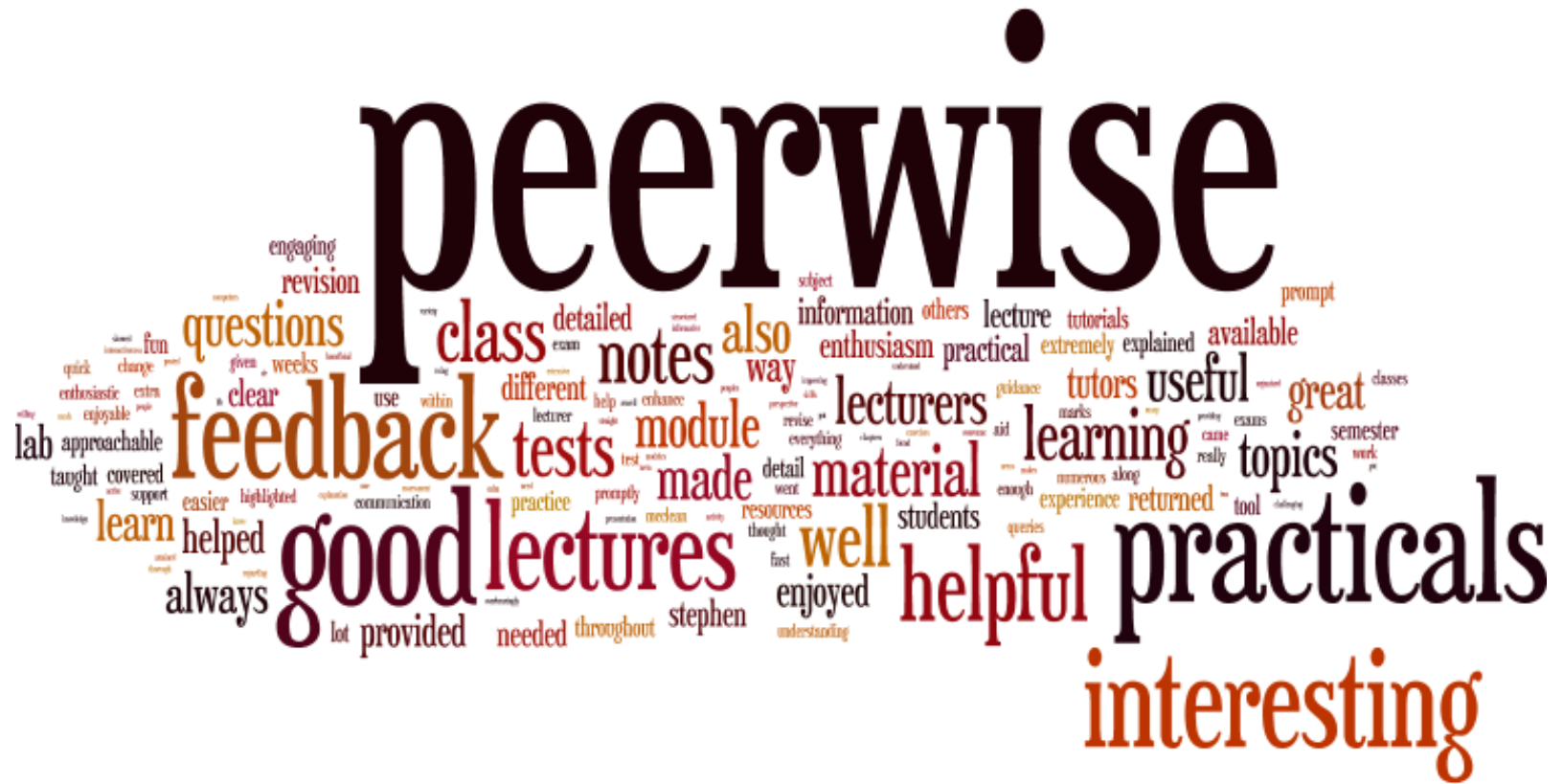
- By the end of semester **2,144** questions had been created by **201** students on the module
- **25,847** questions answered
- **4,794** comments posted
- **Many** badges earned!



Number of answers submitted per day



Summary of the number of PeerWise answers submitted per day during semester two, **2014/15** on the module BMS102 Biochemistry.



Qualitative comments from Ulster Module Feedback Survey for BMS102 Biochemistry.
131 respondents from a total enrolment of 209 students (62.7% response) in 2014/15.

Student Comments

- “I enjoyed the PeerWise element as it encouraged me to go out and learn my notes. I liked the competitiveness.”
- “..PeerWise made this module better because you were able to ask your fellow peers about the topics learnt and you were able to answer their questions also.”
- “Not interested in Peerwise, people are just using it to get marks, it’s hard to learn from it”

Student digital experience tracker

A survey of students' expectations and experiences of technology

“It’s clear that students want the same convenience they get from using digital in their day to day lives, at university.

What they don’t want, is a deluge of different technologies and ways of using them. Institutions need to adopt a joined-up approach to digital, in order to meet the needs of students” - Sarah Knight

<https://www.jisc.ac.uk/news/its-official-higher-education-students-want-staff-to-be-better-with-digital-not-to-use-more-of-it-11-sep-2017>



Key Recommendations

- Technology should be seen as an enabler or a means to augment and assist the pedagogic experience of students in HE.
- University departments should actively listen to the student voice to be aware of technology trends followed by their student cohorts and respond accordingly.
- Exposing students to a range of carefully chosen digital platforms develops digital confidence and student practical, digital skills. Support for staff also needed!



Key Recommendations

- Agility in procurement can be a challenge especially for higher education establishments trying to collaborate with smaller start-up companies.
- Analytics and the availability and use of individual learner identification numbers is not yet mature.
- Greater openness of data would allow local developers to build applications using Schools data (exam results, demographics etc) so that universities can be more proactive in supporting students.

(Andy Jaffrey, Head of the Office for Digital Learning at Ulster University)



Acknowledgments

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- Richard Beggs – support of Nearpod
- Andy Jaffrey – input on implementing digital strategies





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