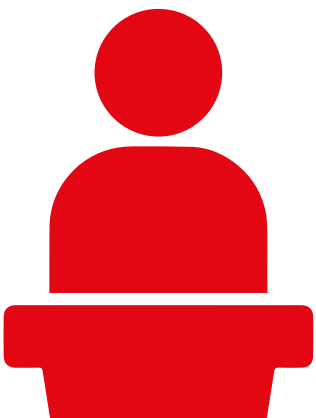
University of Reading

LARGE CLASS
EDUCATION TOOLKIT



INTRODUCTION

Dear Colleagues,

Large class sizes are often associated with teaching at University level in many subject areas. Instructing large cohorts can be challenging, and it can be difficult with increasing student diversity to create an inclusive and effective environment. But are large classes always bad?

We surveyed more than 1000 students from a variety of subject areas such as Biological Sciences, Economics, Law, Pharmacy and Psychology. We asked the basic question 'how large is large', as well as more complex questions around their teaching and learning expectations of coming to University. We also asked about their current emotional state (Marteu, 1992), and engagement with their School and other University societies.

Some of the headline outcomes are:

- Discipline-specific differences in what constitutes a 'large' class
- No real differences in academic-related questions across ethnicity and disability, but BME students reported less involvement with clubs and societies

In addition we have conducted focus groups with students and interviewed staff members involved in large class size teaching. As a result of this work we have created a toolkit for staff, to help improve the teaching provision in large classes. The toolkit is divided into three parts depending on how much time you can invest in improving the interactivity and inclusivity of your lectures:

- **5-10 min extra preparation time per lecture:** a few key tips to make your lecture better and more inclusive. Many of these tips will not be new to you, but will act as a handy reminder.
- **30-60 min extra preparation time per lecture:** ideas for some additional tools, which will help to engage your students. These tools vary from low-key activities to technology enhanced learning approaches.
- **Ideas for alternative teaching approaches:** the use of different pedagogic approaches can help to overcome many issues associated with large class size teaching, such as anonymity, potential lack of feedback and low engagement.

Education at university level needs to be seen holistically, where lectures are one part of the whole teaching and learning experience of students. Small tutorial groups, peer-assisted learning, workshops, practical classes and personal tutorials all help to overcome key challenges such as the provision of excellent assessment and feedback.

Follow us on Twitter @largeclassHE

Dr Katja Strohfeldt

Dr Rachel Pye

Marteau, T.M. and Bekker, H., 1992. The development of a six item short form of the state scale of the Spielberger State—Trait Anxiety Inventory (STAI). British Journal of Clinical Psychology, 31(3), pp.301-306.

5 minute activities »

30–60 minute activities »

60+ minute activities »

5 minute activities

START

If you have just 5–10 minutes of extra time, make sure you have a good start to your lecture.

It is important for any teaching that you ensure you get the attention of all the students present. A good start will also give you confidence to control the class, which in return will support the learning of a diverse student cohort. The following tips can help you to achieve these:

- **Lights:** Turn the lights off and on when you are ready to start a lecture.
- **Body posture:** Displaying a strong, distinctive body posture can be a really strong signal that you are ready to start your lecture.
- **Power of silence** together with a strong body posture can send a really strong message.
- **Move the podium:** Move the podium to the middle of the stage and always use this movement as a signal to start your lecture.
- **Acoustic signal:** You can use an acoustic signal to get the attention of your students, such as a cough, or a bell or whistle.

Weaver, R.R. and Qi, J. (2005). Classroom organization and participation: College students' perceptions. *The Journal of Higher Education* 76, 570-601.
Kugel, P. (1993). How Professors Develop as Teachers. *Studies in Higher Education* 18(3), 315-328.
Fry, H., Ketteridge, S. and Marshall, S. (2003). *A Handbook for Teaching and Learning in Higher Education*. 2nd Edition. Kogan Page, London.

ATTENDANCE

If you have just 5–10 minutes of extra time, encourage attendance.

Research has clearly shown that students who attend lectures are more likely to succeed on their course (Maloney, 1998). Increased student diversity might also bring a variety of demands on the student, which can in return lead to lower attendance.

- Set or collect **coursework** in the lecture
- Collect written **informal "exercises"** periodically and make them part of the discussion in the next lecture
- Practice **exam questions** at the end of the lecture
- Hand out **coded answer sheets**, which can easily be scanned, or answer sheets where students can reveal the correct answer themselves. Students answer feedback questions that the instructor provides throughout the session. Students' responses to feedback questions give the instructor a good sense of their progress.

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- **Record attendance:** sign-in sheets at beginning or end of lecture (might be preferred to monitor students leaving early), ideally at the front of the lecture theatre.
- Taking attendance at **irregular** intervals may be preferred.
- Students are assigned numbered seats and sign a **seating chart** when it is passed.
- **Card readers**. Plug-and-play card reader can be used to easily record attendance, when students present their student card to the reader.
- Be **mindful** of students with caring responsibilities or genuine appointments, who are not able to regularly attend lectures.
- Supply students with **material** they cannot easily get from other sources.
- Make it **worthwhile** – see "be engaging".

Maloney, M. & Lally, B. (1998). The Relationship between Attendance at University Lectures and Examination Performance. *The Irish Journal of Education / Iris Eireannach an Oideachais*, 29, 52-62

ENGAGEMENT

If you have just 5–10 minutes of extra time, be engaging.

It is important to create an active learning environment to ensure students don't become superficial learners, especially as students can come with a diverse variety of experiences and expectations.

- **Be responsive in your teaching.** A good lecturer is able to respond to students' needs flexibly. Make sure you are connected with your audience and understand when they are struggling to follow you.
- **Activities:** Ask the audience for their opinion – let them all stand-up and sit down to demonstrate their answers (see active lecturing)
- **Be flexible in your teaching.** Your students will be grateful to experience different styles of teaching within your lecture. Different styles of teaching will also help to support a diverse range of learners.
- **Change pace every 20 min;** divide your lecture into short segments. There is nothing worse than a monotone speaker at the front talking at you for 50 min in one block.
- **Involve students using small activities** (such as show of hands etc).
- **Instructor self-disclosure:** Make the context personable and relevant.

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- **Exam-directed problems** in class can be a good way to gain the interest of students.
- **Document camera:** The use of document cameras can be a good way to illustrate how to tackle certain problems in situ.
- **Use quizzes or simple questions** during lectures to give students practise.
- **Examples and images** help student to explain and memorise concepts
- **Hints and "cues"** can help students to remember key concepts
- **Mix media provision:** use videos, power point presentation, graphics and the white board to create an engaging lecture

Fry, H., Ketteridge, S. and Marshall, S. (2003). *A Handbook for Teaching and Learning in Higher Education*. 2nd Edition. Kogan Page, London.
Lenz,P.H. McCallister, J.W., Luks, A.M., Le, T.T., & Fessler, H.E. (2015). Practical Strategies for Effective Lectures, *Ann Am Thorac Soc*, 12, 561–566.

CLARITY

If you have just 5–10 minutes of extra time, make sure to be clear.

In large classes it is important to be very clear regarding the "rules" and what you expect of students. This will help to create an inclusive framework for your teaching and provides students with the same opportunities even in diverse cohorts.

- **Dates and crucial information:** in regard to the organisation of your course should be clearly and consistently displayed on slides and in accessible areas of your virtual learning environment.
- **Slides:** Should contain the essential information, but not an overload. It might be useful to provide additional information in the comment box for PowerPoint slides.
- Make **learning objectives** clear, at the start and end of each lecture.
- **Communication:** Clearly outline your preferred method of communication, e.g. via email, discussion boards, forum etc. Do not forget to outline your response time.
- Before the class begins, write **key words/concepts/names/dates** (as appropriate) on the board or prepare a transparency in advance to facilitate note taking. Research shows that seeing a new word as well as hearing it aids learning.

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- Try to be **enthusiastic** and expressive when lecturing without losing clarity of presentation.
- **Voice:** use a clear voice, but not a monotone. Speak slowly and make sure students can see your face when you speak to them. This will especially help non-native English speaker and students with disabilities to follow your lectures better.

Fry, H., Ketteridge, S. and Marshall, S. (2003). *A Handbook for Teaching and Learning in Higher Education*. 2nd Edition. Kogan Page, London.

Pace Miles, K., Ehri, L.C & Lauterback, M.D. (2016). Mnemonic value of orthography for vocabulary learning in monolinguals and language minority English-speaking college students. *Journal of College Reading and Learning*, 46, 99-112.

ACCESSIBILITY

If you have just 5–10 minutes of extra time, make your material accessible.

Any student will appreciate if you present your material in an accessible way. Especially in large classes with students who have diverse needs, it will really support your students with their learning.

- **Screencasts:** These videos are an excellent way to make information accessible to students. You can prepare a screencast (see Screencast) prior to the lecture.
- **Videocasts:** you can simply record your voice together with the powerpoint slides during the lecture and then make it available to your students. (See TechGuide)
- **Audio recording:** recording so-called podcasts of your lecture will be specifically well perceived by students with special requirements, but also gratefully appreciated by all students in support of their revision. You can easily use your phone and download an app, use a voice recorder or let students record the lecture themselves and make recording accessible. (see TechGuide)

continue reading »

- Make **slides accessible** prior to lecture. This will help all students, but especially students with special needs. Make sure that you have a set date (e.g. 1 week prior to the lecture) so students know when they can expect the material.
- Think about your **colour scheme** to take diverse needs into account.
- Develop a **concept** for your lecture handouts. Ideally make an outline of your lecture available prior to your lecture, which contains blank spaces. Students will appreciate a digital format they can manipulate and easily print.
- Check that your content is **inclusive** by making materials visually clear and checking that examples, illustrations and case studies are accessible
- Minimise **jargon**.

JiSC Guide, Supporting an inclusive learner experience in higher education, https://www.jisc.ac.uk/guides/supporting-an-inclusive-learner-experience-in-higher-education; Published: 17 February 2016, Updated: 15 March 2016.

TECH GUIDE

Podcasts: Audio recordings of your lecture can be a very useful tool for your students to aid their revision. These recording are easy to do and add real value to your teaching provision. Students do not really mind if the recordings are not of perfect quality. Therefore it is a simple process of recording the lecture and publication.

The widely established method to record lectures is by using voice recorders. They are cheap to purchase (around £30) and easy to use. The download of the data can be a bit tricky, however software is typically provided with the recorder.

Smart phones are becoming increasingly widespread and can be used to record audio. Therefore it is often an easy option to record your lecture on your smart phone. Simply use the pre-installed app or download a recording app such as Recordium. Once the audio has been recorded you can download the data from your phone using iCloud or dropbox before you publish the recording to your students.

Videocasts: Please refer to our case study on Screen casts (30–60 min activity), but there are also simple ways to record your lecture, with the aim to make your powerpoint presentation together with your voice description accessible to your students after the lecture.

You will need access to a computer with microphone and the right software. MacBooks are the easiest option in this case.

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1. QuickTime: You can use QuickTime, which is a pre-installed software as part of iOS, to screen record your presentation. Simply open QuickTime, go to File and click on new Screen recording. Make sure you check the setting (little drop down menu next to the red button) to see if the internal microphone is used. You can now record your presentation. The recording will be saved as a MP4 file, which can then be published.

Dr Patrick Lewis has published an excellent tutorial as a Youtube video:

https://www.youtube.com/watch?v=fQimy-g0jjE

2. Powerpoint: Depending on your powerpoint version there is an option to record your slide show. Basically use this setting to give your presentation and it will record your voice together with each slide. You can then (again depending on your powerpoint version) convert this presentation into a video or publish the original powerpoint presentation with the voice over for each slide to the students.

The advantage of the described methods over podcasts is that the students can see the slide with the audio. Depending on the setting they can see the cursor and can follow how the slides develop. Also there is no additional time required to record the lecture as you do it while giving your presentation.

INCLUSIVITY

If you have just 5–10 minutes of extra time, make sure your lecture is inclusive.

There is nothing more annoying (for students and lecturers) than a loud or lively audience, where it is not possible to understand the presenter clearly. This is especially pertinent for students with English as an additional language, special learning needs, or communication difficulties.

- Wear a **microphone** (and practice this) so everyone can understand you. Don't assume that everyone can hear you.
- **Disruptive behaviour:**
  - Perfect your evil stare
  - Power of silence
  - Be direct with disruptive behaviour
- **Walk** around the lecture theatre during your presentation
- Communicate your **expectations** in regards to the students' behaviour.

Kokkelenberg, E. C., Dillon, M. & Christy, S. M. (2008). The effects of class size on student grades at a public university. *Economics of Education Review* 27(2), 221-233.

« return to selection

ANONYMITY

If you have just 5–10 minutes of extra time, minimise anonymity.

Anonymity is a main characteristic of large class size teaching. On one hand this can be a real challenge for the lecturer and students, who benefit from direct interaction, on the other hand this potentially also provides an opportunity for students, who enjoy being part of a more anonymous "crowd" (Trees, 2007).

- **Record attendance** (see Attendance)
- **Arrive early** to your lecture and greet students as they come in.
- Encourage students to **ask questions** after the lecture
- **Make yourself personable:** Instructor self-disclosure.
- Use **name tags** in laboratory classes or workshops, where it can be important to call students by name
- Present from the **middle of the lecture** theatre. Don't hide behind the podium.
- You can **print-out student ID photos** (from the University database) – these might be helpful when you want to address students in presentations or workshops by their name.
- **Return exams** personally to associate names with faces and encourage students who are struggling.

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- When asking questions, you might start on a **personal level**, asking students to share their own experiences around a specific subject or context before moving on to more abstract concepts.
- Provide opportunities for **students to get to know each other**, e.g. let students introduce themselves to their neighbours on their first day, student work in pairs etc.

Trees, A. R., & Jackson, M. H. (2007). The learning environment in clicker classrooms: student processes of learning and involvement in large university level courses using student response systems. *Learning, Media and Technology*, 32(1), 21-40.

Teaching and Learning in Large Lectures, Cornell University, Center for Teaching Excellence, https://www.cte.cornell.edu/teaching-ideas/large-lectures/teaching-and-learning-in-large-leactures.html, accessed 9.5.2017.

FINISH

If you have just 5–10 minutes of extra time, be sure to end your lectures well.

Many of us will have experienced this: towards the end of the lecture the class becomes more and more unsettled. There will be many reasons for this. However it is important to finish well to ensure all students understand the lecture's learning outcomes.

- Make sure you have a **planned finish**.
- Summarise the **important points** of the teaching session and re-illustrate the learning objectives.
- Provide an **outline** of what to expect in the next lecture.
- Ask students to take out a piece of paper and **summarise learning outcomes** (within 1 min) giving the students the chance to reflect on the lecture.

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CULTURE

If you have 5–10 minutes of extra time to spend, make sure your teaching is culturally responsive.

It is important to reflect on your own teaching practice in regards to diversity and inclusivity. In return this will help you to engage with a diverse student cohort.

Ask yourself the following questions to see how your teaching and your interaction with your students is affected by:

- Your own social assumptions
- Your **cultural background** and experience
- The **social background** of your students
- The **cultural experiences** of your students
- Engagement and **motivation** of your students.

Diversify your lectures, your curriculum and your reading lists. For example, if you are teaching a course on British literature you might have inadvertently chosen white male authors for your reading list. Consider how you could diversify your primary resources.

For example, if you offer projects, you might be able to accommodate the cultural interests of your student, e.g. analysis of traditional herbal medicine – this can be Chinese, African, European etc.

Wlodkowski, R. J. & Ginsberg, M. B. (1995). Diversity & Motivation: *Culturally Responsive Teaching*. Jossey-Bass Higher and Adult Education Series.

COMMUNICATION

If you have just 5–10 minutes of extra time make sure you establish an effective channel of communication.

It is important to communicate well with your students. This will help to overcome many issues especially for new students and students less experienced with University life.

The following tips can help you to achieve these:

- When you first meet students make sure you **introduce yourself** and your role.
- **Publish** your name, office number, office hours and email address on lecture slides.
- Let students know how they can best **contact** you.
- Set out your expectations for **professional communication** from students right at the beginning.
- Make yourself **personable** and memorable, e.g. talk about your research interests.
- Explain how you **support** students in your role as lecturer or personal tutor.
- Set **realistic time-scales** for your responses.
- Use your **student representatives** to enhance communication, but let them decide how they do this.

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- Clarify **channels** of communication. This includes how to contact yourself, personal tutor, teaching support center, but which medium of communication you will use. Typical communication to students will probably go via email or announcements on your virtual learning environment.
- Make sure you reinforce your School's approach to information on your VLE (see 'using your VLE effectively')
- Clearly set out how you deal with **disruptive behaviour.**
- Set **office hours** to enable and encourage students to access support if needed.

FEEDBACK

If you have 5–10 minutes of extra time to spend, make sure you receive feedback about your teaching.

Even the best lecturer can improve their teaching style. It is important to adapt to the changing needs of your students. This becomes especially important if you are faced with an increasing diverse student cohort.

- Provide many **avenues for feedback** from students to check for understanding.
- Use out of **class discussions** via social networks or discussion boards.
- Critically use **module evaluation** feedback and staff-student liaison committees.
- **Feedback on your teaching:** ask 10 students each lecture to fill in an observation form for instant feedback on your lecture. You can also arrange to meet with them to discuss.
- Pass out **invitations** to 10 students to join you for coffee after class to get feedback.
- Work together with **course representatives**.
- **Feedback cards:** give each student a card and ask to write down the part of the lecture they have not understood. Give feedback via your virtual learning environment.

30–60 minute activities

Socrative »

Kahoot »

Screencasts »

Voting cards »

Document camera »

Padlet »

Twitter »

Facebook »

Polling »

Quizizz »

Multiple choice questions »

Mentimeter »

Peer discussion »

Pencasts »

SOCRATIVE

If you have 30–60 minutes extra time to spend, why not try engaging your class using Socrative?

Socrative is a tool that helps you visualise student understanding, prepare formative assessment and engage students through active learning.

Socrative is your classroom app for fun, effective classroom engagement. No matter where, or how you teach, Socrative allows you to instantly connect with students as learning happens. Quickly assess students with prepared activities or on-the-fly questions to get immediate insight into student understanding. Then use auto-populated results to determine the best instructional approach to most effectively drive learning. Engage your students as learning happens with your choice of activity type. Launch a quiz, receive exit tickets, or ask a quick question for instant student feedback.

Preparation

Go to www.socrative.com and click "Get a free account" or open your Socrative Teacher App and select: (iOS, Android, Chrome, Windows Apps).

Complete the registration form and you will instantly have an account.

Use the Dashboard to manage quizzes, assign Room Codes for the different groups of students, and launch one of the following:

- Quiz: A combination of multiple choice, open questions and True or False questions.
- Space race: Nothing better than an intergalactic quiz travel
- Quick question: Low hassle, low prep questioning with dynamic results
- Exit ticket: Quickly check understanding before your students leave the classroom.

In the class

Ask the students to download the Socrative student App ("iOS, Android, Chrome, Windows Apps) or simply log in via their web-browser by visiting https://b.socrative.com/login/student/.

Ask the students to login to the virtual Socrative classroom. They will need to know the unique room name assigned for your module.

socrative by MasteryConnect

continue reading »

Socrative can then be used for:

- Formative assessment – Quiz to check knowledge and understanding of previous session
- Quick question – check in-class understanding and use this as a tool for instant feedback. I sometimes use this for peer feedback in the case of group or individual presentations
- Use space race to break monotony and gain students' attention with a fun quiz

The benefit of using Socrative is that students receive an explanation for the right or wrong answer, and hence enables better understanding and acquisition of knowledge. Moreover, it makes it fun for the students and helps them engage!

Finally, I often use Socrative to receive feedback from students based on their learning experience.

After the lecture

- You can discuss the answers with the students instantly and allow them to see what other students have answered (anonymous responses)
- Analyse responses and receive direct feedback on concepts the students might struggle. Socrative gives you the opportunity to download the data as an excel spreadsheet.
- You can use the various tools for exam preparation and training

Top tips:

- Read all instructions and examples provided in the www.socrative.com website. This will help you to use Socrative to its full potential
- Attend any relevant to MCQ design training courses provided by the CQSD team
- When you allow anonymous responses in the case of instant feedback, be prepared to handle difficult cases. Some students will consider this as an opportunity to have fun in the classroom.
- Socrative is an ideal tool to engage all students in the discussion even the quietest ones.

Champion: Yiorgos Gadanakis (g.gadanakis@reading.ac.uk)

www.socrative.com
http://www.mrsgeology.com/the-socrative-review/

KAHOOT

If you have 30–60 minutes extra time to spend, why not try engaging your class using an online voting app?

Kahoot is a free (up to 1000 players) online voting app that can be easily integrated into a large lecture.

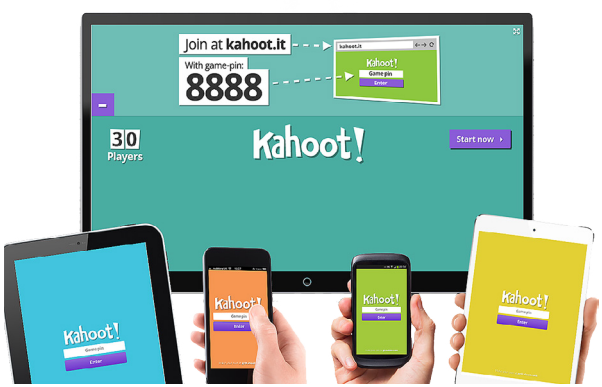
Students race to answer questions with points being awarded for speed as well as accuracy.

Kahoot helps you to...

- Enable student anonymity, which has been shown to reduce student fear and increase participation (Kay and LeSage, 2009; Rocca, 2010; Weaver and Qi, 2005)
- Reduce attention drift (Bligh, 1998), thereby reducing disruptive behaviour (Kokkelenberg et al., 2008)
- Instantly determine the level of understanding
- Be aware of:
  - Possible discrimination eg. International students, learning difficulties (larger classes typically have a wider diversity).
  - Accessibility – Encourage students who don't own a suitable mobile device to work in teams

Preparation

- Instructor sign on at: https://getkahoot.com/
- Create a Kahoot quiz:
- MCQs with 4 option answers.
- Questions limited to 95 characters.
- Answers limited to 60 characters.
- Standard time allowed is 20 seconds (can be altered). Each question needs a picture (Kahoot inserts picture if left blank). Select open or private.
- Insert reminder slide(s) into your powerpoint for the when you'd like to use your Kahoot question(s). 1-3 questions every 10-20 minutes helps to maintain student attention (Bligh, 1998).



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In the class

- Instructor sign on at: https://getkahoot.com/
- Log on, go to "my kahoots" and open prepared Kahoot quiz to reveal a PIN that students will need. Choose individual or team options. Option to mute music.
- Students go to: www.kahoot.it (no need to sign in or set up an account)
- Students enter the PIN (shown on the screen) to enter the quiz. They enter an anonymous name (easily and quickly screened by the instructor).
- Give your lecture as usual, switching from powerpoint to Kahoot to ask questions. After each question a bar graph of student answers appears enabling the lecturer to instantly determine the level of understanding.
- Regular leader boards encourage competitive students.
- On completion of the quiz, save the results.

After the lecture

Download the excel file of results (useful to look at feedback later)

Option to enable ghost mode (where students can play again to try and beat their previous scores) and set up a link for students to access the quiz again from home.

Top tips:

- Recommend player names to be something that students wouldn't mind either their mum or the Pro-Vice Chancellor seeing.
- For revision sessions start with a couple of warm-up questions, intersperse academic material with pub quiz style questions to even the playing field and keep all engaged
- Use the system to get feedback (whilst the students are engaged)
- Not suitable for serious or summative work due to the racing element of game play

Champion: Natasha Barrett
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Bligh, D.A., 1998. *What's the Use of Lectures?* Intellect books.
Kay, R.H. and LeSage, A., 2009. Examining the benefits and challenges of using audience response systems: A review of the literature. *Computers & Education*, 53(3), pp.819-827.
Kokkelenberg, E.C., Dillon, M. and Christy, S.M., 2008. The effects of class size on student grades at a public university. *Economics of Education Review*, 27(2), pp.221-233.
Rocca, K.A., 2008. Participation in the college classroom: The impact of instructor immediacy and verbal aggression. *The Journal of Classroom Interaction*, pp.22-33.
Weaver, R.R. and Qi, J., 2005. Classroom organization and participation: College students' perceptions. *The Journal of Higher Education*, 76(5), pp.570-601.

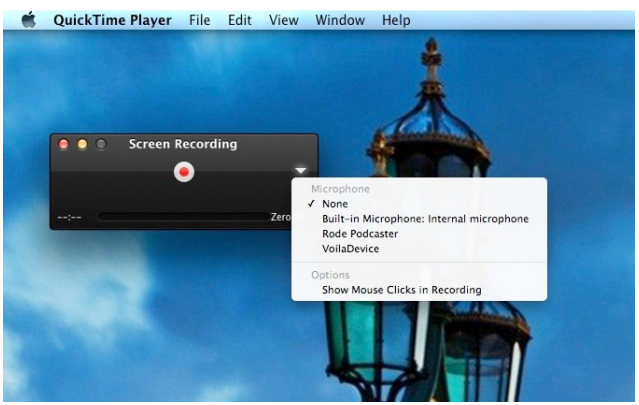
SCREENCASTS

If you have 30–60 minutes extra time to spend, why not try making a recording such as screencasts?

Are there questions that you are asked many times by students every year? Have you ever tried to create written instructions explaining how to use computer software or an online resource? Are you concerned about the accessibility of key information in written handbooks? Perhaps a screencast could be the answer!

A screencast is a recording of your computer screen made as you do something, accompanied by a voice-over and an optional web-cam view. This could include a presentation using PowerPoint or Prezi, talking through a Word document, demonstrating real-time use of some computer software or an online database...

They are quick to make, can easily be made available to students online and re-used from year to year!



Preparation

You'll need some screencast software. For PC users, Jing (https://www.techsmith.com/jing.html) is free but is limited to five minutes of recording and doesn't allow editing. For anything more complex, Camtasia (https://www.techsmith.com/camtasia.html) is a good choice, although it isn't free.

There is a growing number of Camtasia licences on campus, so you might be able to find someone who has a licence. Mac computers typically include screen capture software. A headset with microphone is normally sufficient for good sound quality.

You then might consider writing a script. This depends on how confident you are, whether you tend to waffle or say "umm" a lot, as well as the intended audience. It doesn't matter if a screencast for internal use only is a bit rough around the edges!

Making your screencast

It might sound obvious, but make sure that you set your phone to silent, put a "Do Not Disturb" sign on your door and, if including a web-cam view, check what's behind you! It might need a couple of takes before you are happy, but remember, it normally doesn't need to be perfect!

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Deploying your screencast

Once you have your final screencast, you then need to make it available. Think again about your intended audience. To restrict access to students on a certain module, Blackboard would be suitable. For a broader, internal audience, an internal web page or Blackboard portal would be an option. If you want to share with the wider world, consider a YouTube channel.

Top tips

- If you want a screencast to be re-usable, make sure you don't include any references to dates, hand-book page numbers, etc.
- Sound quality is very important, so it's worth doing a few trial runs to check that settings are right before making the final recording
- Students could make their own screencasts as an alternative to written assessment

Champion: David Nutt
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Take a look at the web pages of the GRASS project for examples, tips and ideas: http://blogs.reading.ac.uk/grass/

Oud, J., 2011. Improving screencast accessibility for people with disabilities: guidelines and techniques. *Internet Reference Services Quarterly*, 16(3), pp.129-144. doi:10.1080/10875301.2011.602304

This is a very useful guide for considering the accessibility of screencasts.

VOTING CARDS

If you have 30–60 minutes extra time to spend, why not try using different colour voting cards and a countdown?

In a world of voting apps and online quizzes, there is a novelty in going 'old school' with sets of coloured voting cards for students to hold up. Giving out sets of coloured cards (e.g. 1 red, 1 blue and 1 yellow card) to each student means you can run interactive multiple choice quizzes or gauge students' prior confidence or knowledge without having to be dependent on technology. Having something physical encourages participation as students can see their peers holding up cards, so there is an element of peer encouragement. It also adds a 'game show' feel to the session which can be furthered by having a Countdown clock and the Countdown theme music to limit the time for each answer. We have used the cards with groups of 90-150+ in lecture theatres and they work well as there is a big enough crowd so students don't feel self-conscious about voting, and you can see the relative proportion of each answer immediately at a glance. You can then adapt your teaching accordingly depending on the levels of prior knowledge or proportions getting the correct answer.

Preparation

The main preparation is making enough sets of voting cards. This can take a little time but can be therapeutic!

- Cut stacks of A4 sheets of coloured paper or thin card in half to give A5 size cards
- Sort them into individual sets for each student and fasten with a paper clip
- Make presentation slides with the required MCQ questions on and colour-code the answers according to the colours of voting cards
- Add the Countdown clock and sound effects to the slides if wanted

In the class

- Give out the sets of voting cards at the start of the lecture. Tell the students they will need them later, but leave the details of their use as a surprise to create a bit of interest!
- At the appropriate points in the lecture display the slides with the MCQ questions on and ask students to hold up the coloured card corresponding to their answer
- Use the Countdown clock, or a time limit, to let them know when voting time is over
- Look at the distribution of colours and summarise the trends in the voting and the correct answer

continue reading »

After the lecture

- Remind your students to return the cards at the end of the session so you can reuse them – pretty much everyone does return them!
- Have a large box so students can easily and clearly put the cards back
- Make some stocks of extra cards for 'repairing' sets that are returned with missing cards

Top tips:

- Create one large pool of voting cards for your School and then colleagues can share them
- Think about the diversity of your students when making the cards – students who are colour-blind may not easily be able to distinguish between red and green
- Don't overuse the voting in a session – the novelty tends to wear off after about 3 questions

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DOCUMENT CAMERA

If you have 30–60 minutes extra time to spend, why not try to visualise your working using a document camera?

This is similar in principle to the old fashioned OHP and is available in most of the larger lecture theatres. It allows you to project documents and objects onto the lecture theatre screens, and write on hardcopies of documents in real time, without the need for powerpoint slides. By projecting onto a large screen you gain greater clarity than using the whiteboard, and you can zoom in when more detailed analysis is required. It is also much more interactive and versatile than the traditional whiteboard or OHP.

Preparation

The only preparation that is required is printing out the documents that you wish to add to or annotate in real time, or preparing models, objects or experiments that you wish to visualise.

In the class

The document camera is invaluable when you wish to work through problems with students using notes that contain prompts. For example, there may be a gap in the notes where you wish to work through a calculation, discuss a chemical mechanism, or annotate a diagram. The document camera allows the students to do this alongside the lecturer in a clearer manner than using the whiteboard (this is especially true in large lecture theatres that may lack a large whiteboard). Because models can also be easily projected it is useful for visualising 3D shapes. You can also project small objects clearly. If students are set a problem or exercise to do during the lecture they can also use the document camera to project their ideas and answers onto the main screens straight away from their sheet of paper, rather than needing to prepare powerpoint slides.

If you wish you can prepare a manuscript or workbook, which includes gaps, to work through during your lecture. Students can then fill the gaps during the lecture with their own notes based on the working you have shown them with the visualiser.

continue reading »

After the lecture

The hardcopies are available for you to scan and generate a PDF document that can be added onto Blackboard to support the students' learning.

Top Tips:

- Combine a traditional powerpoint presentation with a more interactive problem solving exercise using the document camera
- Ask students to work in groups to prepare a sheet of information that can be shared immediately with the class without the need to prepare powerpoint slides
- Use the document camera to capture ideas as a lecture progresses – you can switch between the powerpoint presentation and the document camera to keep developing initial ideas
- Combine with pencasts for additional interactive learning

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PADLET

If you have 30–60 minutes extra time to spend, why not try a virtual discussion wall such as Padlet?

Tired of answering the same questions about as assignment again and again? We all set pieces of work that end up generating queries from students. Some queries may be technical, others procedural, but dealing with them by email is not particularly efficient, especially when the same question is often asked by several students. A "FAQ" document can be used, but students often ask valid, previously unanswered questions. Is there a better, more dynamic way of answering such questions so that all students can see the answer? Creating a 'padlet' is one way.

What's a padlet?

A padlet is a free, online "virtual wall" tool where staff and students can post messages on digital "sticky" notes. If a student posts a question, the academic sees the note and can edit it to add an answer. Crucially, the updated note is visible not only to the person who asked the question, but also to anyone viewing the site. As such, answers can be given in a "one-to-many" fashion. Academics can create a site for a specific task, and embed it into a Blackboard site to allow students easy, focussed access.

Creation

- Visit https://padlet.com and create a free account
- Click on 'MAKE A PADLET' and follow the simple instructions; this only takes a couple of minutes
- To embed it in your Blackboard site, first create a suitable link space on Blackboard using "Build content, Item"
- On your padlet, click "SHARE", "SHARE/EXPORT/ EMBED" ,"Embed in your blog or your website". Some HTML code will be displayed
- Click on the pink "COPY" button to copy this code into memory
- Then back on your Blackboard item, click on the HTML icon associated with the text box and paste the HTML code into this box before hitting "Update" and then "Submit"
- Your padlet will then be visible in Blackboard and immediately usable

continue reading »

Top tips:

- Remember to let students know that you have created the padlet and that when they post questions, they are not attributed, so they do not need to worry about appearing "stupid" to their peers
- Always put a post-it of your own at the top of the padlet to clarify its purpose and what types of questions you are prepared to answer
- Formatting options are limited, but when answering a question, it is a good idea to give the "post-it" a clear title and then format the student question in italics, to differentiate it from your answer e.g.

> **Referencing**
>
> *If I have already used a particular website/journal/patent one page and referenced it, do I still have to reference it again on the next page?*
> Good question. Normally you would not , but as each page is close to being a standalone article, and as each page will be marked by a *different* academic, if it probably safer to just reference it again.

- Padlets can be used for a number of different teaching scenarios. For example, in the lead up to the submission of reports or as a precursor ('question triage') to classroom revision sessions.

Pros and cons

- Padlets are simple, effective and anonymous. The main 'con' is that it as an external service, it could cease to exist with little or no notice.

Champion: Kenneth Shankland (k.shankland@reading.ac.uk)

Dyer, T., Larson, E. and Aroz, J., 2015. *Where Are You? A Model of Proximity in the Online Classroom.*
Wood, M., 2016. Padlet: A Graffiti Wall for Today's Agriculture Teacher. *The Agricultural Education Magazine*, 88(6), p.20.

TWITTER

If you have 30–60 minutes extra time to spend, why not try the use of social media such as Twitter?

Twitter can be useful in your life but it can also use up your life. There is a delicate balance between Twitter use and Twitter obsession. However it is a communication tool used by government agencies, many scientists, artists and other prominent people and is a social medium that simply cannot be ignored in much of modern life. Learning to use Twitter is not entirely simple. Here I describe steps that colleagues and I have used in getting MSc student groups to engage as soon-to-be-professionals in this challenging social medium. Twitter invites dialogue that can be positive or negative but it can also make people feel very unwanted and isolated if they don't pick up followers.

Preparation

Warn students you are going to ask them to set up a Twitter account if they don't already have one.

In the class:

1. Twitter is fundamentally a public communication medium when it is used well. Because of that students must be aware of laws of copyright, fair use etc. Start by teaching the laws. We have been using our excellent University copyright and IP officers to train our students. This is a fast changing area so you need a specialist to teach it. Allow 1-2 hours for lecture, group work and Q&A on legal issues.
2. Talk about how professionals use Twitter and give examples – Katy Perry, Justin Bieber and Barack Obama are currently the top 3 – and show examples relevant to your subject area.
3. Now the challenging part – ask the students what kind of professional identity they want to have? You have two images and a very short piece of text to describe yourself. Don't choose a fast car image if you want to be an environmentalist. Give students time for group discussion.
4. Get students to set up Twitter analytics – it does not start recording your activity until it is activated.

continue reading »

5 Set measurable tasks – follow x relevant people/ organisations, contribute to Twitter discussions, post some original material.

6 Set up some unique class hashtags for everyone to follow

After the lecture

You will need to revisit the tasks after a few months if you are to measure success. Set assignments linked to discovery, communication, networking. Include a download of the Twitter analytics in any assignment.

Top Tips:

- Don't rush the choice of Twitter identity
- Ensure students understand this can have a professional use
- Engage with the students by commenting and retweeting on their tweets to give them confidence
- Emphasise quality over quantity – Twitter will push them to tweet more often – you don't have to tweet every day

Champion: Alastair Culham
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Evans, C., 2014. Twitter for teaching: Can social media be used to enhance the process of learning? *British Journal of Educational Technology*, 45(5), pp.902-915.
Lackovic, N., Kerry, R., Lowe, R. and Lowe, T., 2017. Being knowledge, power and profession subordinates: Students' perceptions of Twitter for learning. *The Internet and Higher Education*, 33, 41-8.

FACEBOOK

If you have 30–60 minutes extra time to spend, why not try the use of social media such as Facebook?

Facebook offers an e-platform that is familiar to students, already installed on most of their devices and is designed for interactivity. It is sometimes seen as a distraction to learning but it can also be an aid. I believe strongly that lecturers should do their best to make their subject interesting to students. It can be an uphill battle. However, experiments in using Facebook as a student engagement technology with a first year Photosynthesis class of 300 has been a great success over a four year trial period (measured by student response).

Preparation

There is a reasonable lead time if you are to have the class enrolled in your Facebook group in time for the lecture. I set up a closed group (which prevents outsiders joining who could be disruptive) and then email the group link to the class using either the Blackboard or RISIS email function for the relevant module. In the message you need to explain why the student should join and that you do not need to become Facebook 'friends' to do this so the student is not opening their whole Facebook profile to you.

- Keep a checklist of who you want to enrol against who has enrolled and send reminders.
- Post something interesting and relevant to your lecture to draw the students in.
- Run a brief Facebook Poll (this is what you will use in class) – I usually run a poll on what devices they use to link to Facebook
- Before your class you should aim to have 90% of the students signed up.
- Get all your poll questions typed into a notepad document – you will need to cut and paste live during the lecture.

In the class

Welcome the students, explain that you plan to use Facebook to reinforce learning during (and after) the lecture. Offer a last chance for students to sign up and invite them to switch on their phones/tablets/pcs.

Teach the first 10-20 minutes of introductory material then run a poll on that material. Keep it simple.

Every 10-20 minutes (depending on length of lecture session) you can run another poll. I design some to have inbuilt ambiguity and some do not include any correct options. This can be used to stimulate discussion even in very big classes.

continue reading »

After the lecture

- Keep the Facebook group running, post one more poll to remind students of what they have covered.
- Approaching revision time offer Q&A sessions via the group.

Top tips:

- Start simple & keep it fun
- Use polls to test understanding as well as memory
- Offer polls where students can add their own poll option (this improves interactivity)
- Expect the students to test your reactions to unexpected posts

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Culham, A. 2014. http://blogs.reading.ac.uk/engage-in-teaching-and-learning/2014/02/21/engaging-large-student-lecture-groups-using-facebook-by-dr-alastair-culham/
Facebook Guide for Educators, The Education Foundation 2013. http://www.ednfoundation.org/wp-content/uploads/Facebookguideforeducators.pdf

POLLING

If you have 30–60 minutes extra time to spend, why not try polling apps such as Poll Everywhere?

Poll Everywhere is an online voting system that allows interactive audience participation. Lecturers pose questions that are shown on screen and receive answers from students in real time. Students use their own mobile devices (e.g. phone, laptop) to respond, and responses are anonymous.

Question types: Multiple choice, open-ended, Q&A, rank order, clickable image, survey, word cloud.

Questions can be grouped under *headings* to make them easy to find for different classes. Poll questions can be *copied* to use in different sessions.

The *free version* of Poll Everywhere (*Higher-Ed Free plan*) is currently limited to *40 responses per poll*, but you can create and pose an *unlimited number of poll questions* to your class.

Preparation

- *Create an account* using the *Higher-Ed Free* plan at: www.polleverywhere.com/plans/higher-ed. Click the 'Sign up' button under this option. You will need to use your university email account (ac.uk) to receive this.
- *Create your questions* and to see how the polling process works. Watch: www.polleverywhere.com/videos/tutorials

In the class

1. At the start of the class, log in to your account at: www.polleverywhere.com
2. Ask your students to go to your personal response page PollEv.com/your-*username* to access your questions.
3. Choose the *question* you want to ask, and *activate* it to allow responses.
4. Ask students to enter responses. These will *appear instantly* on screen. Use the '*Lock*' button to prevent further responses.
5. Move to the next question using the '*Next Poll*' navigation arrows. Remember to click the 'Activate' button to start the next poll.

After the lecture

- Post up the poll results in Blackboard as a record of activity.

Poll Everywhere

continue reading »

Top tips

- To overcome the *response limit* of the free plan, you could ask students to *team up and provide a joint response* to the question.
- The *extended question types* allow you to create more flexible and engaging activities to promote active learning. For example:
  - The *Q&A* option lets students *submit their own ideas* that can be *voted either up or down* by the class.
  - Use the *Survey* option to ask *multiple questions at once* for *quizzing* or *pre-class assessment*.
- Use the '*Hide / Show Chart*' button when presenting a question to hide the responses being entered, to *prevent students being influenced by the answers given by others*.
- Use '*Share link*' to put up polls in Blackboard that can be responded to before your class.

Champion: CQSD Technology Enhanced Learning Team

NB: Although Poll Everywhere is a useful tool, please bear in mind that it is not officially supported by the University. You'll need to create your own account to use it. Make sure you read the terms and conditions of use and check the limitations for each version before you sign up.

Polleverywhere 'In the wild' showcase videos: www.polleverywhere.com/videos/in-the-wild
Warren A (2016) Polleverywhere Review, TELIC: *A blog about technology enhanced learning*: https://telic.wordpress.com/2015/02/06/poll-everywhere-review/

QUIZIZZ

If you have 30–60 minutes extra time to spend, why not try online quizzes in the lecture theatre; Quizizz?

Classroom quiz games can be a fun way to engage students and to give formative feedback. Quizizz is a multiplayer gaming website, which is free to use. You can create your own quiz games (or chose from existing ones), which can be played on mobiles, tablets or computers. The game is useful as a tool for testing knowledge and recall. I have used it for up to 150 students, but it also works with bigger classes. Students play on their own or in teams, and you can take the diverse needs of your class into account as you set up the quiz to your own needs. Students enjoy the anonymity of the quiz as they use an alias to play.

Setting up the quiz

- Go to www.quizizz.com and create an account (Sign up)
- You can now choose an existing quiz game or create your own one:
  - Each question must be multiple choice with 2 to 4 possible answers, one correct
  - Each question can have one photo
  - Instant preview available

"Playing it in the lecture theatre":

- Load up the webpage before the lecture and chose the correct quiz. You will be given a 5 digit code.
- Ask the students to go to quizizz.com and click on join the quiz. The students will be asked to enter the 5 digit code.
- Start your lecture.
- When you want to play the quiz, ask the students to enter a player name.
- Once everyone is ready, you click start and the students can have fun
- Players see questions and answer options on their own screens. The question order is randomized for each student, so it's not easy for players to cheat. Players don't have to wait for the whole class to answer a question before they continue to the next one.
- Instructor sees the progress on the big screen in a league table.

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After the quiz:

- You can discuss the answers with the students
- "Crown" the winners of the quiz
- Analyse all the statistics and receive direct feedback on concepts the students might struggle with. Quizizz gives you the opportunity to download the data as a excel spreadsheet.
- Set the quiz on timed release as homework or exam preparation.

Top Tips:

- Ask students to upload the website before the lecture, it can take a moment until everyone is logged in.
- Carefully think about the content of the questions.
- Consider the format of the questions in order to take the diverse student cohort into account.
- The online game can be perfectly used as homework through timed release.

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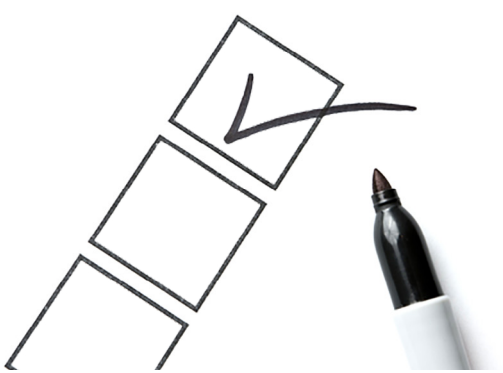
www. quizizz.com

Metz, A.M., 2008. The effect of access time on online quiz performance in large biology lecture courses. *Biochemistry and Molecular Biology Education*, 36(3), pp.196-202. http://learninginhand.com/blog/ quizizz

MULTIPLE CHOICE QUESTIONS

If you have 30–60 minutes extra time to spend, why not try encouraging active learning and engagement in the classroom with multiple choice questions?

Whilst a lecture is a popular and widely used teaching method for transmitting information to large classes, maintaining the attention and interest of students and supporting active learning can be challenging. Use of multiple choice quizzes can be a fun way to keep students engaged, test their comprehension and apply information they have learnt. Multiple choice questions can be shared through online polling websites (i.e. Poll Everywhere) or multi-player quiz websites (i.e. quizizz or Kahoot) to allow students to test their understanding of a lecture's content at strategic points to break up the lecture or at it's end. Multiple choice questions also can be used to support the development of problem-solving or decision making skills and peer learning through team-based learning (TBL).



Multiple choice questions: the basics

- Create the question you want students to answer (the "stem")
  - It should be clear, concise and complete (i.e. avoid unnecessarily complicated, wordy questions or asking students to fill gaps in a statement)
  - Focus on asking students to identify the correct answer (i.e. by asking students to identify an incorrect option or using "none of the above" as the key, you do not prove that they know the correct response).
- Write the correct answer (the "key").
  - Make sure that there is only one correct answer.
- Develop your distractors: Plausible answers that are similar in complexity and length to the correct answer.
  - Don't give away any clues that will allow students to eliminate distractors easily (i.e. Avoid using "All of the above" as identifying just one incorrect distractor eliminates two options)

continue reading »

Multiple choice questions: question styles and increasing their complexity

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Different styles of multiple choice questions range from the most commonly used simple completion format to more complex formats that require problem solving and/or decision making to identify the correct answer. Formats that I have found useful in my teaching include:

- Simple completion or single choice format: A single question with 3-5 options presented, one of which is the correct answer
- Single best answer format: A single question with 3-5 options presented; all options are correct but one answer is more appropriate than others
- Multiple completion or multiple choice format: A single question with 3-5 options presented, one or more options are correct
- Extended matching format: A list of 6-8 thematically related options is provided and is used to answer series of questions relating to the theme

Top Tips:

- Keep the learning outcomes of the session in the forefront of your mind when writing your questions.
- Keep the wording of your questions as clear and concise as you can to support a diverse student cohort.
- Have someone proof-read your questions. It is particularly easy to miss errors in this question format.

Brame, C (2013) Writing good multiple choice test questions: (https://cft.vanderbilt.edu/guides-sub-pages/writing-good-multiple-choice-test-questions)
National Board of Medical Examiners (2003): http://www.nbme.org/pdf/itemwriting_2003/2003iwgwhole.pdf

MENTIMETER

If you have 30–60 minutes extra time to spend, why not try using an online presentation tool like Mentimeter?

Mentimeter (Menti.com) can be used to create fun and interactive presentations during lectures. You can choose from a variety of question types (e.g. multiple choice, word cloud, open ended, etc.) to test students' existing knowledge or understanding of various topics covered in class, or simply to use as a polling tool for feedback. Students can interact using a browser on any mobile device without the need to download an app. The results are saved automatically and you can visualise them in real time. Students can provide answers anonymously, which may encourage student engagement and interaction.

Currently the free version of Mentimeter can be used with an unlimited audience size, although some of the other features might be limited for this version. See www.mentimeter.com/plans for details.

Preparation

- Go to www.mentimeter.com and create an account (sign up).
- Create a presentation by adding the questions you'd like to ask on each slide, choosing from the different question types.

In the class

1. Before the class starts, go to www.mentimeter.com, log in to your account and choose the presentation you'd like to use.
2. When you're ready to use the presentation, load the presentation by choosing 'Show presentation' – this will generate a unique code students will use to access your presentation.
3. Students will see your first slide/question and instructions to go to www.menti.com and enter the code.
4. Then students will see and can answer the questions.

After the presentation

- You can discuss and analyse the answers with students
- You can share the presentation results with students by sharing the URL

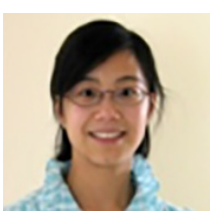
Mentimeter

continue reading »

A few tips

- When you create a presentation, you can choose the voting pace to be either at presenter pace or at audience pace.
  - Choose 'presenter pace' to pause after each question in class and discuss the results before moving on to the next – this is useful for giving formative feedback to students.
  - Audience pace' is useful if you're sharing the link to the questions and asking students to answer in their own time. This can be done during or after the class, or before coming to class to encourage flipped learning.
  - You can use a countdown to make answering the questions more competitive and fun.

NB: Although Mentimeter is a very useful tool, please keep in mind that it is not officially supported by the University. You'll need to create your personal account to use it. Make sure you read the terms and conditions of use and check the limitations for each version before you sign up.



Champion: Wing Man Lau (w.lau@reading.ac.uk)

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www.mentimeter.com

Nosek M (2017) *Mentimeter and PollEverywhere – Audience Response Systems Introduction*, Cardiff University Blogs: Learning Technology, http://blogs.cardiff.ac.uk/learning-technology/2017/04/28/mentimeter-and-polleverywhere-audience-response-systems-introduction

PEER DISCUSSION

If you have 30–60 minutes extra time to spend, why not try to encourage peer discussion in your lecture theatre?

Peer discussion within the lecture theatre is not only useful to break up your teaching session and introduce a change of teaching pace, but it also has been shown to be beneficial to students' learning. Research shows that a combination of peer discussion followed by instructor-centred teaching increases the average student performance. Students of all abilities have been shown to benefit from peer discussions (Smith, 2011). Studies suggest that active engagement with peers enhances conceptual understanding. But critics do raise the issue that students do not actually learn from peers, but follow the answer most strongly supported (Nicol, 2003).

What are peer discussions?

Peer discussion can be encouraged using a number of ideas, such as small case studies, question and answer pairs or short questions.

"Peer discussion within the lecture theatre is not only useful to break up your teaching session and introduce a change of teaching pace, but it also has been shown to be beneficial to students' learning."

Case studies: Small case studies can help to conceptualise the theory presented by the lecturer. Real-life examples will help to engage the students by making the material taught relevant to them. Case studies can be presented to the students, which are then encouraged to discuss this in small groups, neighbours or teams. The outcomes can be presented either orally to the whole class or in writing. When you decide to use written dissemination of the answers you can think about traditional paper submission, post-it notes or the use of electronic notice boards (such as Padlet).

Question and Answer pairs: You can present the students with a number of questions and they match the answers. Give the students a few minutes to discuss the results with their neighbours. You can debrief the class by using personal clickers, online polling or asking students to simple raising their hands or stand up/sit down.

Questions: Short questions can be used to encourage the students to engage with the theoretical material. Peer discussion can be used to help the students to understand different approaches to a given problem. Outcomes can be captured by using post-it notes, voting apps, short oral presentations of a selection of teams or small written submission.

continue reading »

Top tips

- Select case studies and/or questions which are relevant to your topic and ensure they support your learning outcomes
- Case studies and/or questions should be short and precise; keep in mind if any additional info required is accessible in the lecture theatre
- Debriefing of the class is important; personal response system ("clickers"), voting apps, coloured cards, standing up/sitting down and roaming microphone are just a few examples
- Ensure the class is calm before you start the next part of your lecture

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Nicol, D.J. and Boyle, J.T., 2003. Peer instruction versus class-wide discussion in large classes: a comparison of two interaction methods in the wired classroom. *Studies in Higher Education*, 28(4), 457-473.

Smith, M.K., Wood, W.B., Adams, W.K., Wieman, C., Knight, J.K., Guild, N. and Su, T.T., 2009. Why peer discussion improves student performance on in-class concept questions. *Science*, 323(5910), 122-124.

Smith, M.K., Wood, W.B., Krauter, K. and Knight, J.K., 2011. Combining peer discussion with instructor explanation increases student learning from in-class concept questions. *CBE-Life Sciences Education*, 10(1), 55-63.

PENCASTS

If you have 30–60 minutes extra time to spend, why not try creating virtual notes using Pencasts?

Potentially one of the most challenging aspects of teaching large class sizes is showing the individual students how to actually apply their knowledge. In science subjects this could be working out equations, drawing the correct chemical structures or being able to understand and draw biological systems. However this equally applies to many other subject areas, where you simply want to take a piece of paper and explain to the students a concept by writing it down and develop it in partnership with the student. Ideally you want to do this by sitting down with individual students and not on a white board in front of hundreds of students. The use of virtual notes or so-called Pencasts might be an option for you.

What are Pencasts?

Pencast are virtual notes, basically a video including the sound of someone writing on a notebook page. A special pen, a SmartPen made by Live Scribe, is used to record this video. The SmartPen has a small video camera at the tip and a microphone to record audio. Special notebooks are required for the recording. The notebook pages have a fine grid system, which allows the system to record your drawings. Function keys are also included on the page.

This system allows you to show any working to your students by scribbling around on a piece of paper and recording your voice (if you wish). Recordings (with and without sound) are then uploaded on the Live Scribe virtual platform, where it can be formatted and then be shared with students.

"Pencast are virtual notes, basically a video including the sound of someone writing on a notebook page."

continue reading »

Top tips:

- Ensure that a pencast is appropriate for what you are trying to convey i.e. does it add value, rather than just come across as a gimmick?
- A good example of something appropriate would be a step-by-step explanation of how to do long division. The ability to explain what you are doing in a voiceover, as you write out the steps, is a powerful combination as the student sees the calculation evolve with the explanation, rather than just appear as a static image.
- Although pencasts are quick to create in realtime, like any "performance", they benefit from a bit of rehearsal. Do a dry run with an ordinary pen and paper first, in order to get a rough "script" into your mind, before you tackle the pencast. That will save on a lot of awkward silences during playback, and wasted pages in your Livescribe notebook.
- If you don't want to record audio as you write, you don't need to – it's entirely optional. If you are not doing a voiceover however, you might want to consider searching SoundCloud for some royalty free music that you could play in the background as you write, just to make playback a little more interesting for the intended audience. https://soundcloud.com/essa-1/ambient-loop-1-free-to-use
- If you are buying a Livescribe pen, be careful which one you go for: the 'Echo' has a built-in microphone / speaker and so operates standalone, whilst the '3 Smartpen' relies on having a Bluetooth-paired mobile device (such as an iPad, iPhone or Android phone) in order to record and replay audio. Remember to order some spare ink cartridges too, as they are pretty small and can run out quickly with heavy use.

Champion: Kenneth Shankland
(k.shankland@reading.ac.uk)

Murray, J. (2012). Pencasts for introductory macroeconomics. *The Journal of Economic Education*, 43(3), 348-348.

Stasko, D. and Caron, P.G. (2010). Digital notes and lecture capture: pencasts as electronic copies of live STEM lectures and student access to digital lectures. *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications*, 1868-1876.

Powers, M.F., Bright, D.R. and Bugaj, P.S. (2010). A brief report on the use of paper-based computing to supplement a pharmaceutical calculations course. *Currents in Pharmacy Teaching and Learning*, 2(3), 144-148.

60+ minute activities

Active learning »

Enquiry-based learning »

Problem-based learning »

Team-based learning »

Virtual learning environment »

Blended learning »

Flipped classroom »

Engaging students »

Question & quizzing apps »

Development portfolio »

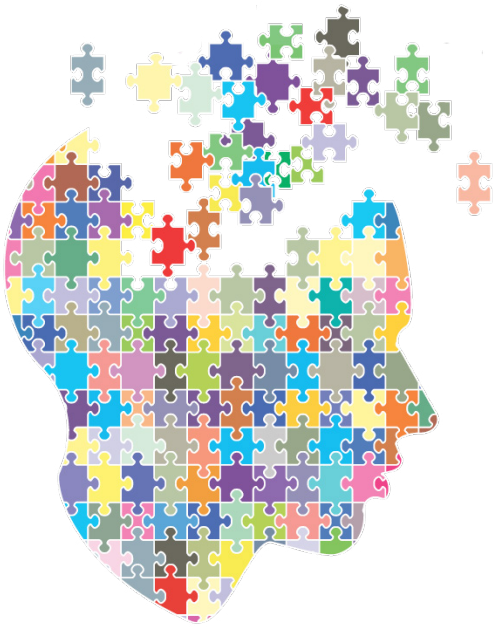
ACTIVE LEARNING

If you have a chance to change your pedagogic approach to teaching, you should use active learning.

What is active learning:

Active Learning is an instructional design in which students engage in an active and meaningful way with the material. Students are active participants in the lecture rather than passive listeners. It is well known that the attention span for a lecture only last for around 15-20 min. A change of lecturing style and/or pace will help to keep students engaged with the material. Also active learning helps to provide students with feedback about their own progress and can foster team work skills depending on which method you use. As such Active Learning teaching design can be created and used in a variety of ways. This includes critical or creative thinking, working in the class or at home, and works for pairs, small groups or bigger teams. You can incorporate topics such as feedback or feed-forward, reflecting on progress or learning outcomes or simply use the time to manifest subject knowledge.

Many individual items have been already presented within this Toolkit as stand alone items, hence details can be found in the relevant sections. However the idea here is to bring some of these ideas together to facilitate a full lesson.



Activities can include:

- The use of **classroom polls**. This can be a simple poll such as using coloured card, show of hands or let the students stand up and sit down. You can also use more sophisticated approaches and use personal response clickers or polling apps. The use of personal response clickers is disadvantaged by the heavy equipment (clickers for 400 students are heavy). Licensing fees etc. can often restrict the use of polling apps on the other hand. Both options provide you with immediate feedback (to a different level), which can be extremely useful.
  - **Think-Pair-Share** exercise: prepare a few questions for your lecture ahead of time. Ask the students to answer these questions with a partner and then sample some answers.
- **Case studies:** Present students with little case studies or little exercises in small groups (group size depends on your lecture room layout). Give the students 5 min to discuss and then sample some answers.
- **Quizzes** can be a useful tool to engage student with the material and collect feedback.
- **Videos or animations:** Videos can be used to illustrate your examples. You can set a few questions the students have to discuss or answer after the video to make sure they engage with the material.
- **Social media break:** since many students cannot wait to get back to their social media account why not use it for your teaching. Use Twitter and let them tweet about a certain topic.
- **Roaming microphone:** Let students comment on problems or slides; ask questions and get answers by letting a microphone roam through the audience.
- **Poll students about prior knowledge:** You can use a one-minute paper, e.g. let the students talk about their knowledge on the main topic or an aspect. There are several ways you can facilitate this using paper or technology enhanced methodologies.

continue reading »

Case study

It is quite difficult to illustrate this with a case study as every lesson is different and depends on the subject area and learning outcomes. However there are a few rules you should take into account.

- Have a good start, make sure the class is quiet and engaged (switched on). Why not use an activity at the beginning? This will help to focus your class on the topic, allow students to settle in. Keep in mind it depends on the time of the day how successful some activities are. You can even start a case study, questions or poll your students.
- Do not lecture more than 20 min in one block. It is really time for an activity then and certainly this activity should be something lively. Even if you ask the students to stand up and vote or answer questions by sitting down etc. this will help to engage the class again.
- If you are planning a 45 min lecture, you are looking at a good start activity, potentially two activities during the teaching session and a good finish.
- Debrief the class after each activity to achieve an impact with your activity.
- After each activity, make sure you calm the class down again before you go to the next part of your teaching session.
- Also make sure the students know what you expect of them; set a few ground rules and stick to them, so students can get used to your style of teaching.

Top tips

- Be prepared
- Create a lesson plan or have a fixed structure for your lesson including timings
- Make pre-requisites or pre-reading available to students well in advance and let them know when they can expect it.
- Make sure you are inclusive in the methodology you use. Not every student may have an up-to-date smart phone.
- Active learning will take more time, but fosters deeper learning
- Display learning activity directions on a presentation slide.
- Interact with individual students during the activity
- Clearly signal the end of the activity and make sure you calm the class down again

Champion: Katja Strohfeldt
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Bonwell, C.C. and Eison, J.A., 1991. *Active Learning: Creating Excitement in the Classroom. 1991 ASHE-ERIC Higher Education Reports.* ERIC Clearinghouse on Higher Education, The George Washington University, One Dupont Circle, Suite 630, Washington, DC 20036-1183.

Dufresne, R.J., Gerace, W.J., Leonard, W.J., Mestre, J.P. and Wenk, L., 1996. Classtalk: A classroom communication system for active learning. *Journal of computing in higher education*, 7(2), 3-47.

ENQUIRY–BASED LEARNING

If you have a chance to change your pedagogic approach to teaching, why not try enquiry-based learning?

What is EBL:

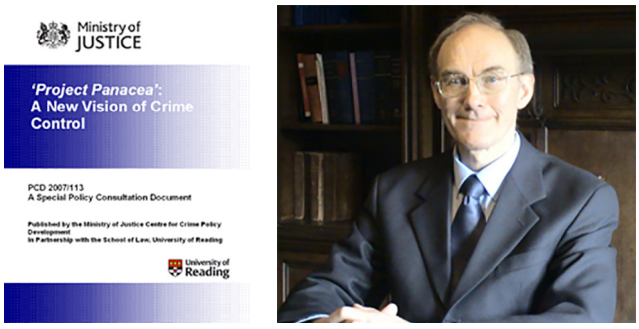
Enquiry-based learning (EBL) is where knowledge is generated via a process of enquiry owned and led by the learner themselves. As such, it is closely related to problem-based learning (PBL) pedagogies (which are often viewed as a sub-set of EBL, and the terms are sometimes interchanged). EBL approaches assert that "the starting point for learning should be a problem, a query or a puzzle that the learner wishes to solve" (Boud 1985, p13). The key features of EBL are the use of stimuli materials to present a problem as a simulation of 'real life' or professional practice; the limitation of the resources available to answer the question so that students learn by defining the problem; elements of co-operative/ group work; and the deliberate lack of a simple solution or answer. Because the problem is open-ended and has no 'correct' answer, and because a degree of flexibility of thought is required in determining how to solve the problem as well as what the solution should be, students learn both substantive content and thinking strategies at the same time.

Case study:

While EBL may seem to necessitate specially-designed modules, this case study relates to its adoption within the existing teaching and assessment structures of Criminology, a large (100 students), conventionally structured final-year Law optional module, taught via lectures and tutorial classes, and assessed via a piece of Assessed Work (term 2, 50% of module mark) and an exam (term 3, 50%). EBL was used to ensure that assessment addressed the learning outcomes for the module (the capacity to apply theoretical insights and empirical evidence to criminal justice policy and practice), and to combat the existing 'compartmentalization of knowledge' within the module.

For their Assessed Work, students received a briefing from the 'Minister for Justice', asking them to produce a report outlining the crime reduction policies that the student recommended (drawn from 21 possible options, each presented in vignette form). This posed challenges for the students:

- Each policy option is costed (vales range from £15-40m) and the student only has £100m to allocate. As such, trade-offs and prioritisation are required to allocate a finite budget;
- The assignment requires students to meet the needs of an external 'client' – the Minister communicates directly with them via video, email, and briefing paper. They have to take account of his brief, and tailor the presentation of their work accordingly;
- There are an almost infinite number of possible policy combinations – students have to find one they can argue is conceptually coherent and likely to be effective in practice.



(L): The Project Briefing, an example of the branding used across all documents and communications. R): The 'client', the Minister for Justice, Sir Geoffrey Hagan (in reality, played by the Module Leader's father-in-law)

Each of these challenges prompts the student to think in a professional, focused way about linking the research evidence and module content they are taught to issues of real-world policy, about setting parameters around their inquiry and research, about the need to evaluate (and not just present) materials, and about effective communication. They also require students to take risks and exercise autonomy as empowered learners. This empowerment, plus the focus on 'higher-level' research skills, and the alignment of the assessment with the marking criteria, led to improved student performance on the Assessed Work itself, but also in the subsequent examination process.

continue reading »

Top tips

- Class presentations can be used to develop/check student ideas as the assignment progresses;
- Interactive, fun materials (videos, documents) can be produced cheaply and quickly – make sure they are generic enough to recycle from one year to the next!
- Empowerment can also mean uncertainty – provide 'scaffolding' to students as they adjust;
- Be explicit in setting out the criteria students are assessed on (there is no 'right' answer), and emphasise that it is about them exercising an informed judgement;
- Have fun but don't go too far – students will (and need to) know it is not 'really real'!

Champion: Paul Almond
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Almond, P., 2009. Using an Enquiry-Based Learning Project to Develop Criminological Understanding. *Web Journal of Current Legal Issues, 3.* (http://www.bailii.org/uk/other/journals/WebJCLI/2009/issue3/almond3.html).

Check out the resources and materials produced and made available via the *Centre for Excellence in Enquiry-Based Learning* (CEEBL: http://www.ceebl.manchester.ac.uk/ebl/).

PROBLEM–BASED LEARNING

If you have a chance to change your pedagogic approach to teaching, why not try problem-based learning?

What is PBL:

Problem-based learning (PBL) is a student-centred pedagogy in which students learn about a subject through the experience of solving an open-ended problem. Students learn both thinking strategies and domain knowledge. PBL is a style of active learning, which originated at McMasters University in Canada and was used for teaching medical students. Groups of 5-6 students typically work through a range of case studies. There are initial case evaluations as a team, combined with self-directed individual tasks. Each team has an academic member of staff as a mentor and the assessment is mainly oral. Case studies are the only instrument of teaching in the "real" PBL. Depending on the team composition, this can be an excellent teaching environment to integrate a diverse group of students. The idea is that students learn from each other by sharing their thought processes.

Case study:

PBL is often associated with small class sizes and significant investment in tutor time. This case study describes a PBL approach which can be used for large class size (150 students) with minimal supervision (1-2 academics).

PBL is one of our major teaching methods in Therapeutics, a core module for Part 2, 3 and 4 students in Pharmacy. I teach on the first course of Therapeutics (up to 150 Part 2 students) and every teaching unit is based on a case study for which the students have to create a care plan using a PBL approach. Therefore, the objectives are to design a course, which has the ability

- to assess the ability of the group to solve a problem
- to assess the team work and the contribution of the individual
- to give the groups generic feedback
- to give the group members individual feedback.

Within Therapeutics 1 teaching consists of 5 weekly sessions, each lasting 2h. Each session follows a similar scheme (see Figure 1):

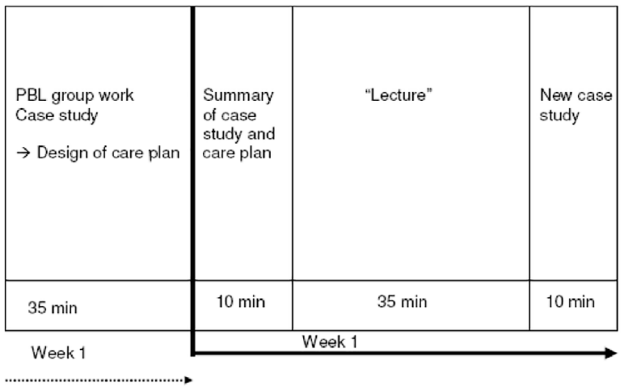


Figure 1: "Teaching unit" for PBL session.

The students work in their groups of 5-7 on a case study received the week before, creating a treatment (care) plan. The students are acquiring knowledge and developing problem-solving skills as they develop their care plan. The actual "lecture" part is then based around the case study and summarises the students' findings. Within these sessions feedback is crucial in order to help the students develop their problem-based learning skills. At the end of the PBL session the students receive general feedback in form of a master care plan for this case study. After each session the care plans are additionally marked by the lecturer in order to give each group feedback. The assessment of these care plans is important to the students as it often works as an additional motivation. Additionally, the students can mark each other's input into the group work via peer assessment. This peer assessment counts for 10% of their PBL mark and is used for scaling the marks the students receive for their care plans (80%). The final 10% of the PBL mark is attributed to attendance. The peer assessment helps the students to weight the contributions of their colleagues, and within most groups these marks reflect the effort of each member quite well otherwise the facilitator reserves the right to apply marks based on evidence provided, such as minutes etc).

continue reading »

Top tips

- Always answer a question with a question.
- Be organised
- Do not be afraid and enjoy it.
- Work together with the students on the problem, you do not have to be an expert.
- Set strict rules, but not too many.
- You will be surprised how little help the students need.

Champion: Katja Strohfeldt
(k.strohfeldt@reading.ac.uk)

Strohfeldt, K. and Grant, D.T., 2010. A model for self-directed problem-based learning for renal therapeutics. *American journal of pharmaceutical education*, 74(9), 173.

Strohfeldt, K. and Khutoryanskaya, O., 2015. Using problem-based learning in a chemistry practical class for pharmacy students and engaging them with feedback. *American journal of pharmaceutical education*, 79(9), 141.

TEAM–BASED LEARNING

If you have a chance to change your pedagogic approach to teaching, why not try team-based learning?

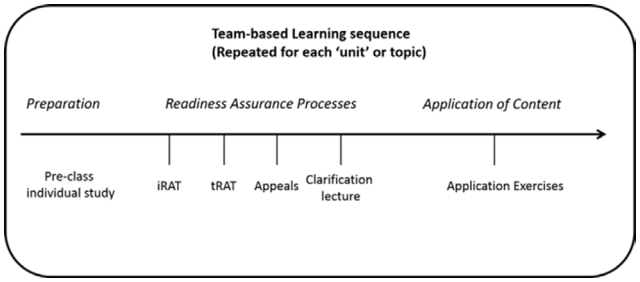
What is team-based Learning:

Team-based Learning extends the principles of flipped learning approaches, by using a formalised structure to scaffold teaching and enhance student-led learning. It was first introduced in the US by Larry Michaelson, who developed the technique to enable discursive teaching approaches to be used with rapidly expanding class sizes. The technique lends itself easily to applied subjects, such as Pharmacy, Medicine and Nursing, but can also easily be used for more theoretical subjects. It not only encourages a deep learning of the material, but develops students' confidence and understanding of team dynamics.

There is a structured approach to TBL, and the devil is in the detail. This is an approach that you should prepare for carefully. However, you can also introduce TBL occasionally within 'normal' teaching, as a way to check understanding, encourage student interaction or increase confidence in the material.

There are 3 stages to TBL. Students are required to prepare for the class, either by reading set papers or texts, watching a screencast, or doing some independent research. Once in the class, the 'Readiness Assurance Process (RAT)' occurs, to check students' understanding of the prepared material. First, students do an iRAT: an MCQ test taken individually. Then the same test is repeated as a tRAT, in a team, using a scratch-card to discover the correct answer. Whilst this is happening, the lecturer can check the knowledge of the students at an individual level, by asking them to hand-in their iRATs. As a lecturer, you have feedback on which areas your students understand, and which need further explanation. At the end of the RAT process, lecturers can give a mini-lecture on the concepts that were most misunderstood, though the tRAT process allows students to discuss the questions and answers in depth already. Once understanding is assured (already further than a traditional lecture), the Application stage occurs, where students are asked to use their knowledge. There are several techniques that can be utilised here, including the simultaneous reveal (teams are given a vignette and multiple-choice answers, and all teams reveal their answer simultaneously on cards), or more creative versions: see below for a description of how Gallery Walks can be used to test theories.

Pros: Students explore material in more depth; students take more ownership of learning, and are always prepared for sessions; fun for staff and students; teams become strong and confidence increases; feedback is provided throughout the module.



Cons: Staff preparation time is high, especially for iRAT/tRATs; staff need to be confident in adjusting material 'on the fly'; students can feel undersupported given few powerpoint slides; bad teams can be hard to manage.

Further resources: Michaelsen, L.K., Knight, A.B. and Fink, L.D. eds., 2002. *Team-based learning: A transformative use of small groups.* Greenwood publishing group. Team Based Learning Collaborative (TBLC) – www.teambasedlearning.org

> "Team-based Learning extends the principles of flipped learning approaches, by using a formalised structure to scaffold teaching and enhance student-led learning."

continue reading »

Case study

Full TBL in part 3 Psychology (Dr Rachel Pye)

Module PY3TAR Typical and Atypical Reading: 7 weeks x 2 hours, ~25 students

This module has used TBL for three years, since its inception. It is consistently evaluated highly by students, who appreciate its interactivity and engagement with the materials. However, they simultaneously request more traditional teaching to augment the TBL – they are not entirely confident in their own knowledge.

Gallery walks: Of the possible Application Exercises, I utilise Gallery Walks the most. In weeks 3 and 4 students have been asked to read two (one per week) heavily theoretical papers, and do an iRAT/tRAT on each. They are then asked to design a study to test each theory. Students are given the same problem, which enables them to adequately critique each others' work, in a way that PBL often doesn't allow. They create a poster with their study design, including rationale. Once created, they stick their posters around the room, and then as a team choose another team's design as the best. I love listening to their discussions about whether the study actually tests the theory, considering cause and effect, interactions, controls, etc. Teams complete a short report on why they chose that design, and then vote simultaneously. As a group, we then discuss what was so strong about the winning design, and compare it to the other team designs. This enables students to see the link between theory and empirical evidence, and apply their knowledge of research design in a practical way, and as a lecturer I can point them to flaws they may not have identified. Students who are shy do not need to speak to the whole group, but have contributed to the team's discussion, and so have interacted in a safe manner.

Assessment: I use a poster conference as the coursework component for the module (worth 25% of a 10 credit module). The two previous gallery walks practise the skills needed for the assessment. In addition, the poster itself is submitted a week following the conference, allowing students to integrate peer feedback into the final submission. The peer feedback provided at the conference is given using the same cover sheet as the final submission, meaning that students actively use the marking criteria prior to submission.

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VIRTUAL LEARNING ENVIRONMENT

If you have a chance to change your pedagogic approach to teaching, why not try to create a virtual learning environment using Blackboard Collaborate™?

Why create a virtual learning environment?

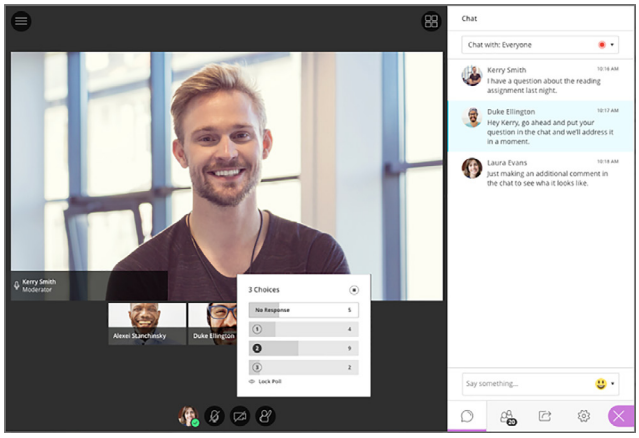
Universities have started to look at more flexible forms of delivering their teaching, starting to move away from traditional lecture-style teaching. As part of this move, virtual learning spaces and blended learning (a combination of face-to-face teaching and online delivery) are gaining popularity.

The creation of a virtual learning environment sounds like a great idea from a diversity and inclusion angle as well as global strategy point of view. Students do not have to live close to the University and can be more flexible with their own time juggling the ever increasing demands placed upon them. However there are also limitations and these have to be considered when evaluating your learning outcomes. Not every student might have the right technical equipment or internet connection at home. Many learners benefit from learning alongside peers and from experiences with role-models. Therefore a distance-learning approach or **blended-learning** might not be beneficial.

We have therefore decided to use this form of teaching to bring our students at the Malaysia and UK campuses together in order to provide a platform for exchange of knowledge and experiences. In order to facilitate this we use Blackboard Collaborate™, an online collaborative learning platform included in our BlackBoard subscription.

What is Blackboard Collaborate™?

Blackboard Collaborate™ (BbC) is an online collaborative learning platform, which allows you to easily hold webinars, online live discussions and classroom interactions with students participating from across the world. It is web-based, so easily accessible from anywhere with reliable internet access. It is reliable and stable, so there is little 'drop-out' by participants. BbC has a 'chat room' so users can communicate via typing as well as voice. It also has an interactive whiteboard, and allows you to share documents, slides and your screen easily with your students. You can move students into virtual break-out rooms so they can work together – you can visit the rooms and participate or monitor. BbC also includes simple polling functions to make your teaching even more interactive.



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Case study:

The idea was to introduce the use of BbC for a cross-campus activity as a way to introduce Pharmacy students on each campus to each other, and for them to share their experiential learning visits to hospital and community pharmacies.

I worked very closely with the TEL (technology enhanced learning) team as an early adopter. The TEL team discussed with me my specific requirements and needs. There were many points to consider, such as specific access to BbC: are students based in classrooms or at home, and are webcams present. As our students joined in a classroom settings, we needed headsets and the PCs had to have Chrome installed, as this is the preferred internet browser for BbC.

Choosing and purchasing the headsets was probably the most challenging part as they need to use USB rather than 3.5mm jack connections (to ensure good quality audio), have a microphone, and be cleanable (for hygiene reasons, unless you can buy one set per student and they keep them!). Also go for two earpiece sets rather than telephonist-style one earpiece sets to help block out room noise.

The use of video can bring its own challenges as it uses a lot of bandwidth and you might need to consider the environment of the students if they login from outside the University. Therefore it is best to use mainly audio only.

A colleague on the UK campus was happy to work with me on this project, and we started to practice using BbC functions, such as moving each other in and out of the virtual break-out rooms, using the virtual whiteboard and sharing slides and documents.

Once I had an idea of what could be achieved, I drafted a lesson plan with a timeline and created some PowerPoint slides. The TEL team recommended to start with an ice-breaker, so students could meet, and practice using the functions of BbC – I uploaded a world map and showed students how to mark their location on it, and they spent a few minutes playing around with the draw and write functions. I then explained the plan for the session to them, and moved them into break-out rooms to start on their discussions.

Things went pretty well, but took longer than I expected, so I dropped one task from the plan to make more time. Moving students into rooms took longer than anticipated, so next time I'll have my colleague start the moving while I'm talking – moves are not actioned until clicking on the 'start' button.

Feedback from the students was really useful – one suggested that they could have got started on tasks quicker if they had them in advance, so I will do that next time.

Top tips:

- Discuss your idea with a BbC 'expert' to check if it will work
- For 'room-to-room' sessions, find a colleague who will supervise the other room for you
- Plan your sessions carefully, but build in 'wriggle-room'
- Practice your first few sessions
- Start with an ice-breaker
- Think about giving tasks to students before the session so they can get started quickly
- Get feedback on each session

Champion: Kate Fletcher
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Harper, K.C., Chen, K. and Yen, D.C., 2004. Distance learning, virtual classrooms, and teaching pedagogy in the Internet environment. *Technology in Society*, 26(4), 585-598.
Weigel, V.B., 2002. Deep Learning for a Digital Age: *Technology's Untapped Potential To Enrich Higher Education*. Jossey-Bass, 989 Market Street, San Francisco, CA 94103-1741.

BLENDED LEARNING

If you have a chance to change your pedagogic approach to teaching, why not try blended learning?

What is blended learning:

Blended learning is, as the name suggests, an approach to teaching that combines different teaching methods. Indeed, blended learning combines two quite opposite pedagogic approaches: online learning and face-to-face classroom-based teaching. Blended learning is very flexible in its approach and can be applied in many different ways. This makes consensus on an absolute definition very tricky and has constrained research as to the effectiveness of the blended learning model. How blended learning is applied will differ according to context and the intended learning objective. It is compatible with combination with a variety of online and face-to-face pedagogies, including problem-based learning.

Some key advantages to the blended learning model, as opposed to purely face-to-face teaching, is that the student gains some control over the when, where, how, or pace of their learning during the online, technology-enhanced learning element. This personalises the learning journey. However, in contrast to exclusively online courses, in the blended model the student benefits from face-to-face teacher and, ideally, peer contact, which facilitates focused instruction and/or classroom discussion, and prevents learners becoming demotivated through feelings of isolation that can be a drawback to online learning conducted at a distance.

Blended learning can be particularly advantageous to facilitate teaching to cohorts who may be studying part-time by day- or block-release. In the context of growing interest in degree apprenticeships, one can envisage the blended learning model as being a key approach to delivering learning in a way that allows the student the freedom to structure their learning around their other commitments, while retaining the advantages of face-to-face contact time.

Case study

Blended learning was a teaching philosophy central to the development of the model of delivery employed by the Food Advanced Training Partnership (ATP) at Reading. The Food ATP students are work-based learners working in the food industry for whom time is an issue; hence we wished to build flexibility into their learning pathway. However, we did not want to lose the benefits of face-to-face contact, particularly classroom discussion of issues, and also wished to build a cohort identity and to facilitate/encourage peer networking and supported learning. These needs made blended learning an ideal choice.

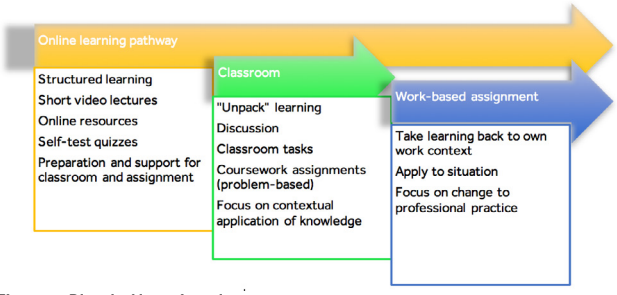

Figure 1. Blended learning elements

Our learning pathway was designed around three blended elements (see Figure 1) typically running over a three-month period. Online learning was threaded throughout the learning and used initially to support the preparation of the learner for the classroom. In the case of the Food ATP, learners have disparate backgrounds and prior knowledge/experience; therefore, the initial period of online learning serves to prepare the student for what they will encounter in the classroom. To achieve this, an online learning pathway (via a virtual learning environment) guides the learner through online lectures, reading resources and self-test knowledge quizzes to build background knowledge and insights ready for face-to-face teaching. This is available over an extended six-week period to give flexibility over pace, and is delivered with a structured path.

continue reading »

The second part of the learning pathway is based in the classroom, where a cohort is brought together for a residential period of a week (or less) and encouraged to engage in discussion with the teacher and peers about topics encountered in the online learning to date, but also about new topics introduced in the classroom that build on the prior acquired knowledge. It is important that the classroom element is active and seeks to engage active learning models to encourage enquiry and to challenge the learner to consider how to apply their new knowledge to their own industry context. This is facilitated by classroom group tasks and residential coursework assignments that facilitate peer networking and supported learning.

The final element is an individual work-based assignment that challenges the learner to apply new knowledge and approaches in their work setting, i.e. to put theory into practice.

Top tips:

While the above case study is based on a unique cohort type, others have adopted a similar approach in Food and Nutritional Sciences to apply to "traditional" cohorts. Timing of elements would be different, but the general principles of using online learning to facilitate knowledge acquisition, while focusing the classroom time on discussion, remains the same. Three key tips if thinking about blended learning in your teaching are:

- Focus on the learning objectives
- Keep it simple – don't let the technology take over
- Plan the online learning to enhance the effectiveness/ value of your face-to-face time with students

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For more information:

https://www.heacademy.ac.uk/enhancement/starter-tools/blended-learning

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FLIPPED CLASSROOM

If you have a chance to change your pedagogic approach to teaching, why not try flipped classroom teaching?

What is flipped Classroom teaching?

Have you ever wondered whether standing at the front of the lecture theatre and telling your students what they need to know is the best way of helping them learn? Or perhaps you feel frustrated that you don't have time to allow students to discuss and explore the exciting applications of the material? The flipped classroom approach involves transferring some, or even all, of the lecture content into pre-classroom activities that the students complete before coming along to class. This then frees up valuable contact time to explore worked examples, real-life case studies, and address any areas of difficulty. From the student perspective, this allows them to study the material at a time, in a place, and at a pace that suits them. For staff, this makes the lecture much more interactive and engaging. It's important to note that this doesn't involve more material, rather a shift in focus from 'covering' the material, to supporting students' learning. There is an increasing body of literature demonstrating the effectiveness of flipped learning in improving learning outcomes, and it's ultimately much more satisfying for the lecturer. In short, everyone benefits!

Case study

I have 'flipped' my Part 2 lecture course on spectroscopy (part of module CH2PH1, 5 lectures, ~80 students) since 2012. This is a course that students tend to find quite difficult and covers a number of key concepts that students just have to understand and be able to apply.

1: Preparation of the pre-class learning materials

I chose to make screencasts of my lecture material. In short, I sit in my office, unplug my phone, put a 'Do Not Disturb' sign on my door and give my PowerPoint presentation to myself, recording the screen and audio, and sometimes a webcam view, using screencapture software such as Camtasia. I find a 50 minute lecture tends to compress down to a 15-20 minute screencast. I do as little editing as possible and then upload the final mp3 file to my YouTube channel.

There's more than one way to do it: You don't need to use technology! You could set reading or some other task. Screencasts can be as private or as public as you wish and hosted wherever best suits your requirements (YouTube, Blackboard, ...)

2: Ensuring student engagement with the learning materials

The students need to engage with the materials in order for this approach to work. I do this by requiring the students to watch the screencast and complete a short, formative, Blackboard test on the material before the classroom session. As well as making sure the students complete the test (which is easy to check), it also gives them the opportunity to shape the classroom session through their responses to my standard final test question: "After watching this video podcast, one (or more) concept(s) I'm finding difficult or am unsure about is(are) ..."

3: Preparing the classroom session

Much of this can be prepared in advance (worked examples, application exercises, etc.), but having the feedback from the students means that the session can be tailored to the cohort, increasing student engagement by responding to their individual learning needs. I find that the students say very similar things from year to year, so this isn't difficult or time-consuming.

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4: Running the classroom session

It is key that the students know that you will not 'go over' the advance learning materials, as this would undermine the whole approach. I structure my sessions around the feedback and questions from students, slotting in the various pre-planned activities at the most appropriate moment. The students spend most of the time doing things, and I spend most of the time circulating and interacting with individuals and small groups of students. This is much easier second time around!

Top tips

- Get the students on board: explain at the start why you are adopting this approach and how it will benefit them
- Be responsive and supportive: it'll probably be new to them
- Chase up students who don't appear to be engaging, at least at first
- Remember that you can flip any amount of material, from part of a single lecture to a whole course, depending on your confidence and time available.

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ENGAGING STUDENTS

If you have a chance to change your pedagogic approach to teaching, why not gather ideas and thoughts from a large class?

How and why

One of the biggest issues when teaching large classes is building connections with students so that they feel more involved. Being able to draw together and elicit the ideas, and thoughts of students during the class can ensure they are actively engaged in learning, whilst explicitly acknowledging the value of their contributions. Using technology such as audience response systems (e.g. Mentimeter) and online collaborative pin boards (e.g. Padlet) can enable lecturers to manage this process at scale.

They provide a:

- Mechanism for all students to respond equally and fairly,
- Filter ideas and organise thoughts,
- Collate and present what has been generated,
- Allow lecturers to provide immediate feedback or guide the development of thinking,
- Retain a record of students' ideas that can be used as learning resource and for revision.

Ideas for using technology

1: With group work

Allocating students to groups within the class and setting them group work tasks that require minimal supervision is a well-recognised strategy for dealing with large class sizes but ensuring all students are engaged and participating can be an issue. This approach can be facilitated using online 'pin board' apps such as Padlet (https://padlet.com/) or Lino.it (http://en.linoit.com/). These allow students to post their collective thoughts and ideas in a single place that is viewable by the rest of the class. This can include text, image, audio, video and web links. The lecturer can see the progress and contributions made by each group, and the output can form a collaborative or collective response to a topic.

2: To prioritise ideas

Being able to rate and prioritise ideas can easily be facilitated by audience response apps. The ability for students to vote or respond with a greater degree of anonymity can provide a more accurate view of students' opinions. For example, the lecturer could create a '100 points' question in Mentimeter during the class, based on the ideas generated by students (e.g. Which is most important...? Rate in order of difficulty...) and ask them vote by apportioning points to each idea. A lecturer can then see what students have prioritised, as it has the most points and this can form the basis for further discussion or show what the lecturer should to concentrate on.

Other ideas for activities: Summarise the main points of the lecture, summarise discussion topics, curate resources, generate questions, provide plenary feedback, give peer feedback.

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Benefits

- Lecturers can modify their content based on the responses students give.
- Students are actively engaged and applying their knowledge.
- Students can construct and contribute their own knowledge and thinking.
- It can reveal hidden voices that might not otherwise be recognised or heard.

Top tips

Keep idea generation activities short and focussed. Use a countdown clock to keep the work pace high and students on track.

- Allow time for thinking and reflection before asking students to respond.
- Turn on moderation or hide responses so that you can check and remove inappropriate content before it is seen. (This is a setting in Padlet and some other apps.)
- Directly respond to and reference the contributions of the students. Be positive and affirmative to encourage participation.
- Make it clear what the purpose and value of the activity is e.g. the direction of the lesson is influenced by their ideas and thoughts.

Limitations

- Consider classroom management strategies to minimise and discourage inappropriate content.
- The lecturer will need access to an internet connected computer and projector to show the questions and see or display the live responses.
- The room being used for the lecture requires a good WiFi reception and the capacity for all the students to connect to the network.
- Not all of your students will bring a mobile device to the lecture and an alternative way to include these students needs to be considered.
- Be aware of the terms and conditions of apps, especially the free versions in relation to data protection.

Champion: CQSD Technology Enhanced Learning Team

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QUESTION & QUIZZING APPS

If you have a chance to change your pedagogic approach to teaching, why not use question and quizzing apps?

What are question and quiz apps?

There are a number of different online apps that allow academics to prepare and pose questions in real-time to their students in class; collect the answers and present the responses on screen (e.g. Mentimeter and Kahoot). Students use their own digital devices (e.g. mobile phone or laptop) to respond. These tools often provide a variety of question types (e.g. multiple choice) that facilitate a range of ways to test students' knowledge and understanding during a lecture. In a quiz format there is the option to define a correct answer and award points. The quiz based approach introduces an element of competition that can motivate and increase the focus of students. These tools have provided the opportunity for academics to enhance engagement in lectures and be responsive to the instant feedback generated. In the context of large classes these tools can:

- Promote interaction.
- Enable opportunities for active learning to take place.
- Gain feedback systematically from a large audience.

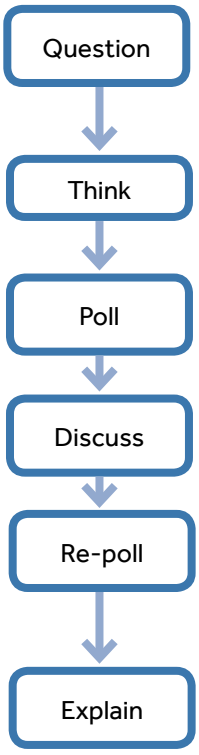
In this way:

- All students can participate and feel involved, especially where a student may feel embarrassed to speak in class or unconfident to commit to giving an answer.
- Academics gain a better understanding of what is being learnt and can provide immediate formative feedback.
- The answers provided can form the basis for further discussion or gauge broad opinions.

Using the 'Peer Instruction' technique to ask questions

The Peer Instruction technique was created by Eric Mazur, Prof. of Physics and Applied Physics at Harvard University. The method is designed to make lectures more interactive and encourage active participation, especially where the traditional design of the lecture theatre, and large class sizes can inhibit this. A question app is used to collect student responses and enables the lecturer to see the distribution of answers.

The 'Peer Instruction' process



1. The lecturer briefly describes a concept and poses a question that requires students to apply the concept.
2. The students think about the question and answer individually.
3. The lecturer checks the answers but does not show them to the students.
4. Students discuss the thinking behind their answer with their peers.
5. The students answer the question again and the lecturer reviews the responses; shows the answers to the students and decides if more explanation is needed.

Key benefits of this technique:

- Students need to apply their knowledge.
- Engagement is a fundamental part of the teaching process.
- Learning is personalised.
- Students need to articulate and externalise their thoughts.
- Promotes reasoning.
- Students are emotionally invested in the answer.
- Encourages innate curiosity (intrinsic motivation).

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Top tips for question and quiz apps

- Think carefully about the context and purpose of asking questions in a session.
- Use the apps strategically. What is the value of getting instant feedback?
- If some students don't have devices, ask them to discuss their answers in a small groups with someone who has a device and provide joint answers.
- Make sure you have practiced with the app you want to use beforehand.
- Ask students to come up with questions to ask in the lecture.
- Use quizzes to re-energise or re-focus students after a break.

Limitations

- The lecturer will need access to an internet connected computer and projector to show the questions and see or display the live responses.
- The room being used for the lecture requires a good WiFi reception and the capacity for all the students to connect to the network.
- Not all of your students will bring a mobile device to the lecture and an alternative way to include these students needs to be considered.
- Be aware of the terms and conditions of these apps, especially the free versions in relation to data protection.

Champion: CQSD Technology Enhanced Learning Team

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DEVELOPMENT PORTFOLIO

If you have a chance to change your pedagogic approach to teaching, why not try introducing a personal & academic development portfolio (PADP).

A PADP can incorporate continuing professional development (CPD) into your curriculum.

Over the last decade or two, greater emphasis has been given to supporting students in their personal development throughout their academic career. Engaging students in their own personal development planning (PDP) is crucial for successful execution. It is important that students monitor, build and reflect on their own personal development, and portfolios can be an excellent medium for this process (Stefani, 2005).

PDP can be described as a structured process whereby the learner reflects on his or her own performance in the context of their achievements, the support they have been given and their current educational status or career development. A closer look at PDP reveals several similarities to continuous professional development (CPD), which is considered to be an integral part of many professions.

"CPD means engaging the individual in a coherent programme or range of activities that support or encourage identification of learning needs and actions to enhance current practice. An integral aspect of the process of CPD is reflection on and recording or journaling the learning, the actions and the outcomes." (Stefani, 2005)

In an ideal learning environment students would be encouraged to achieve their learning outcomes though reflection on their past and current experiences, which would help them to make strategic decisions in planning and taking action to address their learning needs. They would also evidence this learning process. This would mean PDP would be seamlessly followed by CPD once students enter their work life. However, differences might arise in the way you record your learning development and achievements and how assessment takes place.

Case study

As future healthcare professionals, it is important that MPharm students develop the skills required for an effective approach to reflective practice. Portfolios are widely used within pharmacy pre- and post-registration training to record progress and provide evidence of competence.

The pharmacy regulatory body, The General Pharmaceutical Council, published Standards for Initial Education & Training of Pharmacists, which specify learning outcomes, many of which relate to personal and professional development and reflective practice. There is also a focus on the integrated application of science and practice concepts. In 2014, we introduced our Personal & Academic Development Portfolio (PADP) as an integral part of our MPharm, in order to facilitate and encourage students to take ownership of their development of these skills.

The PADP has five sections:

- Career management
- Self-development
- Clinical knowledge (integrating science and practice concepts relating to key medicines)
- Research skills
- Feedback & assessment – encouraging engagement with feedback

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Students work on their portfolio throughout the MPharm, building on transferable skills from year-to-year in a spiral approach. Learning activities/opportunities are signposted within our integrated teaching where appropriate and support sessions are timetabled within each year. Further support is provided through the Personal Tutor system. Tutees are required to bring their PADP (which currently is a physical folder) to each tutor meeting and there are small tasks (such as a learning needs analysis), which they are required to undertake in preparation for the meeting so that their tutor can provide formative feedback. There are minimum requirements specified in regards to content and topic areas, but students are encouraged to exceed these throughout their own development.

The portfolio is summatively assessed in three sections:

1. Engagement
2. Continuing Professional Development (CPD)
3. Medicines Information Monographs

Aspects 2 and 3 are assessed via viva voce. The use of viva voce for portfolio assessment is time intensive, but was chosen to enable assessment of students' understanding of the CPD process and their ability to use and apply science concepts within a practice context.

Top tips

- Keep it simple
- Train staff (personal tutors) to promote consistency
- Set out very clear expectations to students at the start and reinforce this information throughout the programme – as the portfolio is built over a long period of time, some students struggle to engage with it at the beginning seeing that the main assessment is 3 years ahead.
- Make information and documentation easily accessible
- The use of a physical folder (blue in our case) can be beneficial, as many students report it sits on their desk and reminds them of the need to work on it
- Remind students (continuously) of the aim of this portfolio, both in terms of the assessable learning outcomes and, also, the utility of the portfolio in the wider context of personal development and career management.

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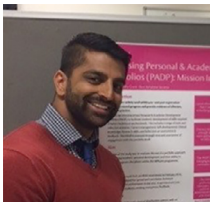

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