# Imperial College London
## Educational Development Unit

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# Inclusive practice at Imperial - case studies

The following examples have been collected to illustrate inclusive practice across the College. We hope they will inspire you to develop your approaches. Please contact Kate Ippolito (k.ippolito@imperial.ac.uk) or Dr Iro Ntonia (i.ntonia@imperial.ac.uk) for further information or advice.

We have grouped the case studies under the following themes:

- Preparing Students for Learning
- Students Tailoring Learning to their Needs
- Promoting Student Collaboration
- Inclusive Assessment and Feedback

## Contents

# Preparing students for learning – mutual expectation setting

Imperial's Department of Chemical Engineering run a 3 hour-long session in Week 0 for their new first years to discuss expectations around what students want to get out of their degree programme and how to go about it. By the end of the session students will:

- Have given more thought to what you want to get out of your four years at Imperial
- Be clearer about what you will do and how you will go about it
- Know more about how we work with each other in the department

Students work in small groups, giving them opportunity to get to know the 5 students allocated to their academic tutorial group who they will work with 2-3 times per week throughout their first year.

The impact on students includes:

- sustained motivation and effort levels as students can better keep in sight their ultimate goal
- improved ability and attitude for giving constructive feedback to peers, which is then discussed with personal tutors.

Hear Andreas Kogelbauer talking about their experience at Education Day 2018

https://www.imperial.ac.uk/staff/educational-development/networks-and-events/education-day/

# Coaching and Learning: Skills and Mind-set in Early Years Medics

Dr Mike Emerson is Head of Academic Study Skills (Early Years) in the Faculty of Medicine. In collaboration with the Early Years team, he designed an integrated approach in helping early years students develop resilience. Part of this approach are regularly run 'Vital Signs' sessions, where students use Mentimeter to report on how they allocate their study time. In these sessions, students are also updated on what is going on in the course, and to self-evaluate their progress. The following characteristics of the typical cohort were observed:

- academically outstanding students
- a large cohort participating in a diverse and fast-paced learning programme
- some students will experience failure for the first time
- significant numbers of students need resits to progress, and some fail
- very hard-working cohort, taking up a variety of learning strategies throughout the year

As a result, a series of coaching sessions were introduced to manage effective transition into the medical school curriculum. The rationale underpinning development of these sessions was to foster growth mindset of the students, and to develop resilience and key skills. The aims of the coaching initiative were:

- Establish an adult-to adult conversation
- Avoid the victim-rescuer scenario
- Jointly agree a pathway to success

This was achieved through:

- 1-2-1 and small group meetings
- Drop-in sessions
- Targeted activity at induction and around assessment

The sessions were also a useful platform for the students to be introduced to Active Learning approaches, and to develop skills necessary for effective revision (i.e. using retrieval practice with flashcards as a study method). Students were also able to appreciate that Active Learning is how a practicing doctors continuously learn, as medicine is not sequential in practice.

Impact observed was manifold:

- Passive time consuming learning approaches are often the starting point
- This impacts academic performance at degree level
- Medical students can be coached to develop a growth mind-set and adapt their skill set
- We can map how this translates into performance
- Plan: "School of Medicine Academic Tutors"
- Facilitate students in achieving their potential

Hear Mike Emerson talking about their experience at Education Day 2018:
https://www.imperial.ac.uk/staff/educational-development/networks-and-events/education-day/

# Online visualisations for inclusive education

In summer 2017, Dr Caroline Clewley worked with a team of Python coding UROP students to develop a suite of visualisations. Involving students at the design stage helps to make such learning resources inclusive because it gives teaching staff additional insight into levels of students' conceptual understanding and how they approach their learning which differ from how you assumed.

The visualisations target abstract key concepts within Physics and other STEM subjects which students struggle to gain a deep conceptual understanding. These abstract concepts have applications in many courses across College; examples include mechanics, waves, electromagnetism, and vector algebra/calculus.

Online visualisations are versatile teaching tools which can be implemented during lectures to explain difficult concepts, used with an associated problem sheet for tutorials or coursework, or allow students to explore concepts in preparation for flipped lectures. In this way students can personalise this learning resource to their needs and make use of them to learn at their own pace.

Dr Clewley has trialled the visualisations in different lecture courses over the past academic year and is now investigating their effectiveness in different learning settings. The project has received funding for another year in order to create a multi-departmental UROP team in the coming summer break, collaborating with the departments of Aeronautics, Bioengineering, and Mechanical Engineering.

To see Caroline talking about her work and its impact on student learning watch the Panopto lecture capture via this link: http://www.imperial.ac.uk/about/leadership-and-strategy/provost/vice-provost-education/talking-teaching/13-december-2017/

# CHEMTRACK: Personalised journeys through chemistry

CHEMTRACK was developed in the Department of Chemistry, as a Chemistry Laboratory Education Programme. Laboratory teaching takes over a large proportion of face to face taught time. Although students are able to follow experimental protocols accurately, what is difficult to gauge is whether they understand the reasoning behind an experimental procedure. This led the project team designing four laboratory module types, each of which enable students to realise their potential as scientists and inventors. The module types designed are:

- "Make it" – Chemical synthesis from design to application
- "Measure it" – Acquiring, curating, and analysing data
- "Hack it" – Hypothesise and challenge
- "Prove it" – Post-it plans to prototype

These modules run several times a year, and students can choose which ones they want to do and when. The idea behind this is that students have choice in terms of the learning path they want to take by self-defining their laboratory curriculum. As a measure of their learning, students use a Skills Passport; this is an online, individual learning profile that can 'capture' students' learning as they progress. After completing an experiment, students complete a self-assessment and a reflection on their experience and learning, which they then discuss with their lab tutor who reviews and approves their statement. The student then updates their learning record on the Skills Passport, which in turn informs their planning and participation in the next experiment.

The project team have developed six assessment criteria against which the Skills Passport framework is assessed:

- Consulting the literature and forming research questions
- Designing the experiment
- Processing and analysis of data
- Concluding with respect to the hypothesis
- Communicating results and defending claims

Participation in the CHEMTRACK modules will allow students to design their own laboratory curriculum, while being able to self-evaluate and reflect on their learning process.

You can hear Dr Laura Patel talk about the CHEMTRACK project here:
https://www.imperial.ac.uk/about/leadership-and-strategy/provost/vice-provost-education/talking-teaching/18-april-2018/

# How can we equip students in becoming independent, critical thinkers and problem-solvers?

Dr Elizabeth Hauke, Centre for Languages, Culture and Communication, has developed the Global Challenges courses so that they inspire creativity in students by getting them to work independently, to actively engage with the material, and to solve problems.

- In the first year courses, students use a 'Blackboard wiki', an online space where anyone within the team, can write, comment and edit. Assessment is based on the wikis, performance during the course and a presentation. It also includes self-assessment and peer review. Students are asked to rate their skills before and after the course, and choose which skill they most want to improve. These include a range of research, writing and organisation skills.
- In the second-year courses, students look at individual communities – either those who are facing extreme hardship, or communities local to Imperial. Students begin with a five-week exploration of the communities using a technique called soft systems methodology. They are given completely blank sketch books and asked to draw an issue and solutions from different peoples' perspectives, for example a child, the mayor or an industrial worker. Next, students vote on the ideas and form study teams to develop them. The ideas might be practical things, such as an irrigation system, or a social enterprise, such as a coupon scheme.
- In their third and fourth years, students all work together examining a range of global events - natural disasters, conflicts and humanitarian crises - but from different angles. They look at six major global events and question what we have learnt from history, comparing for example Chernobyl with Fukushima. "The whole class must acquire 'dinner party' knowledge of each event, but then each team will gain a different perspective by studying different sources."

Lecturers and employers are beginning to notice the impact of the Global Challenges courses, saying that Global Challenges students are taking on leadership roles, and bringing a broader perspective to work-place projects and their main degree studies.

See Dr Hauke's interview for the Innovations in Learning section of the Learning and Teaching Strategy website: http://www.imperial.ac.uk/about/leadership-and-strategy/provost/vice-provost-education/innovations-in-learning/elizabeth-hauke----a-more-critical-look-at-the-world/

# Refreshing the skills agenda: How can we involve students to building their own skills profile?

Dr Elizabeth Hauke and Dr Mark Pope, Centre for Languages, Culture and Communication, have developed collaboratively with students a skills' manual for use in the Global Challenges courses. The development process allowed course tutors and students to identify five broad skills categories, each of which will be useful for the students in their further study, but also in terms of their professional development. Although there is a variety of Global Challenges courses, all of them include a balance of skills from all five categories. The categories identified were:

- Learning Fitness
- Thinking
- Handling Information
- Networking
- Imageneering

Through participation in a Global Challenges course, students are able to build their own individual skills profile by completing self-assessment sheets at specific times during the progression of the course. The self-assessment sheets allow students to identify which skills they have focused extensively or too little on, and to also identify which skills they need to develop further so that their skills' profile is complete..

# Active and inclusive learning

In the MSc in Public Health, Mentimeter is used to promote deep learning with peers:

1. The teacher displays a question using Mentimeter and students respond individually using their internet enabled device (phone, tablet, laptop).
2. The teacher reveals all students' collated responses in a bar chart etc. to the whole class but doesn't tell students the correct answer.
3. If more than 80% of the class have got the answer wrong, students are asked to discuss in pairs **what** they think the answers is and the reason **why** this is the case.
4. Students resubmit their response to the original question as a pair.
5. Generally there will be more correct responses. Students will have been given opportunity to articulate, justify, compare and refine their reasoning and will experience the quantitative and qualitative value of peer learning.

Dr Filippos Filippidis, School of Public Health

# Team-based learning – a strategy that ensures active learning is inclusive learning

Team-based learning is an active learning strategy popular amongst Imperial teaching staff for developing their students' team working approaches and their deep understanding and application of disciplinary key concepts. Active learning is inclusive by its nature. It enables students and teachers to monitor students' understanding and progress towards the achievement of learning outcomes. There is evidence that active learning has a bigger positive impact on minority groups. However, we need to be mindful that active learning can be challenging and potentially anxiety-provoking for learners if they are not sure what is expected of them or they are not able to prepare themselves in the ways they would prefer. Inclusive curriculum design means making our expectations of students more explicit and enabling them to prepare themselves for learning, as appropriate.

TBL is a specific teaching strategy that offers the benefits of small group learning within large classes by creating opportunities for students to gain deeper understanding of conceptual knowledge, apply it to solve problems and get feedback. TBL supports learning by taking students through a systematic cycle of:

- Clearly defined pre-session reading or viewing (video, panopto lecture capture re etc.)
- Individual readiness assurance test using multiple choice questions (MCQs)
- Team readiness assurance test using multiple choice questions (MCQs)
- Applying team members' conceptual understanding to address 'real world' problems
- Getting immediate feedback on their understanding at each stage
- Giving feedback to peers on the effectiveness of their contribution to team-working

TBL can be more inclusive than traditional group work because: teams are formed by teachers to ensure diverse characteristics, ensuring a mix of academic ability, nationality, gender etc. Additionally, immediate feedback on team responses gives transparency around team member contribution that genuinely challenges preconceptions that students have about each other's ability to contribute.

The department of Life Sciences use TBL in all levels of the UG degrees and at PG levels. In order to make the experience even more effective and inclusive this year an additional session was introduced aimed at helping student to:

- Meet their team members
- Be familiar with the TBL timetable and start planning for it
- Know what to expect during the TBL process
- Agree on the criteria they will use to peer assess each other's contributions
- Agree on what constructive feedback looks like in preparation for giving feedback to peers

*For more information see Imperial's TBL webpage -* https://www.imperial.ac.uk/staff/educational-development/workshops/introduction-to/team-based-learning/

# Making teamwork work

**An example of preparing students to manage team contribution in Imperial Horizons:**

**"**At the start of the course, the students are asked to think creatively about how they might best engage with the course, both in terms of their own learning, and supporting the learning of their peers. For example, as the students are working in teams, we discuss how students can participate more within their teams, and perhaps take a leading role, when their schedules are more relaxed, and take a step back when they are under pressure. However, the teams need to discuss their schedules and negotiate this to make sure that no one team member is being taken advantage of, and that they share the responsibilities of the team work as equally as possible. The students can report on their team working each week, and they can justify certain students participating more or less and suggest whether or not they think the team marks should reflect this, or they can report under or over activity in other team members for investigation and later discussion."

Dr Elizabeth Hauke, Imperial Horizons

# Capitalising upon diversity in culturally and linguistically diverse teams

Freeriding, personality clashes and coordination challenges are well-known threats to effective teamworking. However, increasing cultural and linguistic diversity within teams assigned to credit-bearing coursework often brings additional challenges. This is especially true for students encountering very different people or academic contexts for the first time. Jim McCloskey and Martin Lisboa from the Study Skills and Language Support team at Imperial College Business School have been running a number of sessions designed to allow students to realise the benefits of cultural and linguistic diversity in team-working, as a means of appreciating the wider pool of skills, abilities, and perspectives, which can produce more innovative solutions. To underpin the rationale of these sessions, they have researched the literature on team work and diversity, and identified the challenge of how members of multicultural teams find it difficult to utilise individual team members' strengths while minimising coordination loses from communication problems, language differences, varying working styles and possible misunderstandings.

They held student and programme team interviews, one-to-one consultations, and disseminated workshop surveys so as to gain a better idea on what challenges are commonly identified in the IC Business School context, with the two main ones being cultural backgrounds, and language differences. As a result, they have developed a comprehensive approach for both students and tutors. Tutors are asked to consider the task design, set-up, it's monitoring and review/evaluation, while students are asked to consider the following:

- Building a team profile
- Drafting and agreeing on a Team Charter (i.e. contract / code of conduct)
- Running frequent team reviews

To help structure the team profile building, the Study Skills team have developed a battery of scales which help team members focus and structure their awareness of the team member's personality and working style traits so as to increase better understanding and a healthy team working dynamic. The scales act as both an individual self-assessment, and an assessment/evaluation of the team's dynamic, as a way of preventing issues around expectations and assessment of the work.

Participating in this exercise helps students appreciate and value the benefits working in diverse teams has.

You can watch a video of Imperial Business School student perspectives on team working via this link: https://vimeo.com/edtechlab/review/230465079/e4942a9a49

## Fostering a sense of belonging

In Imperial's Department of Maths, international and home students are invited for coffee or tea in order to socialise with peers and practise their conversational English language. At first a shout-out was often done in the Maths Learning Centre just before the tea started if the group was short of native English speakers but we never had problems getting enough native English speaking students to drop in and soon the shout-out became unnecessary – the students came for the biscuits and the chat! Some students would be there for 10-20 minutes for a quick tea break, while some came for 2 hours to really practise their English, sometimes also solving maths problems at the same time. Generally conversation centred around maths at the start of the session, but inevitably moved on to more social topics. It also became a great place for the more reserved students, who found it difficult to meet new people, to find a safe space in a relatively small group of like-minded students who they knew were wanting to meet to chat. Ultimately demand for the sessions came from the native English speaking students, who obviously got as much out of it as those who were coming to help with their English and the quieter students who found a safe place to start social contacts.

Anne-Marie Hilder, Maths Undergraduate Liaison Officer

# Exploring perspectives: inclusive teaching and assessment in PG Regenerative Medicine

Prof Sarah Rankin has been involved in the design and delivery of the MSc in Genes, Drugs and Stem Cells in the National Heart and Lung Institute. In the design stages of the programme, the approach taken was to make the content inclusive for the cohort. An example of this approach was that students were assigned the task of researching for a maximum of two hours what information on private and public stem cell banks there are available in their home country, or in a country of their choice. In this way, the content becomes relevant to each individual student, while they research the legislation, ethics, and available information on stem cell banks in their chosen country. The overarching aim of the programme is to make students aware of the impact of public engagement and outreach work, through which crucial information about key scientific topics are disseminated to the general public.

Another example of the inclusive curriculum design approach taken in the programme is the Outreach and Public Engagement Group Activity, which has as its overarching aim to embed public engagement and outreach into Imperial postgraduate courses, and to inspire MSc students about the creative potential and tangible benefits (i.e. developing professional, transferrable skills) of public engagement.

In this group activity, students attend an initial lecture on impact of a number of key scientific topics, followed by participation in a session involving the local community (i.e. 'pop-up' shop on lung health in a shopping centre). Students then attend a workshop on how to develop an outreach activity. During the workshop, students have to brainstorm and design a mock public engagement activity using a randomly selected topic (i.e. cystic fibrosis), a venue (i.e. picnic), and a target audience (i.e. families, young adults, politicians).

After the workshop, students are put in groups of 4 or 5, with each group being assigned a topic related to stem cells and a target audience. Their task is to design a public engagement activity; they are not expected to deliver the activity, but need to produce the design, advertising, and activity materials.

The assessment for the activity involves the following elements:

- o Peer group marking (20%)
- o Group presentation (40%)
- o Questions (10%)
- o Individual writing task (1100 words in layman's language) (30%)

Hear Sara Rankin talking about their experience at Education Day 2018

https://www.imperial.ac.uk/staff/educational-development/networks-and-events/education-day/

# Could your programme offer more assessment choice?

Students in your department undertake an MSc which involves writing a 20 000 word dissertation. In addition, students are required to deliver an oral presentation about their research project to an audience of academic staff and their peers and then undertake an oral (viva voce) exam involving the supervisor and an external examiner.

**How might inclusive assessment design be used to make the presentation and the viva fair for a student with auditory memory and processing speed weaknesses?**

Suggested approach:

- Give the student the option to make a full or partial video presentation or the traditional option of giving it in person. The video option will be played back with the student present.
- After the presentation or video the audience or viva panel is given a short amount of time to write down initial questions.
- Either the student or the viva panel leave to allow the student an extended time for reading and formulating responses.
- In the case of a presentation, the audience will obviously remain and could be shown a short follow-up related video to pass the extra time.
- The student or viva panel returns for the answers to the written questions.
- Any follow up questions are dealt with by the student on the spot or the option is given for a later e-mail response.

**Could this alternative choice be offered to all students?**

For more ideas, see Activity: Designing choice into your assessment via this link:
https://www.imperial.ac.uk/staff/educational-development/teaching-toolkit/inclusive-learning-and-teaching/making-assessment-and-feedback-inclusive/activity-designing-choice-into-your-assessment/

Developed by David Mooney, Disability Advisory Service.

# Strategies for making assessment more inclusive of all students

- Reduce the number of summative assessments and increase the amount of formative assessments.
- Consider alternative assessment methods, including open book exams, shorter exams, essay/report-based assignments that address the same (or more appropriate) learning outcomes as existing assessment.
- Ensure that assessment is aligned to learning outcomes and teaching and learning methods (constructive alignment).
- Check that there is a varied diet of assessment at programme-level. However, do not use too many different and unfamiliar types of assessment that can result in students feeling anxious and exhausted by working out each time what is expected of them and how to perform.
- Prepare students for assessment. For example, provide opportunity to discuss and/or practise new formats. Imperial's Faculty of Medicine creates opportunity for a mock version of each new type pf assessment.
- Monitor scheduling of assessment at programme-level to avoid bunching of assessment deadlines.
- For coursework consider using staged assessment design, with opportunity for formative feedback, including peer and self-assessment on draft versions.
- Design into the module on-going formative assessment and feedback that students can feed forward to future learning and assessment.
- Ensure transparency in terms of what's expected and how it's going to be assessed, through provision of:
  - assessment criteria
  - marking scheme
  - exemplars/model answers
  - information about weighting
    Examples of assessment criteria, grade descriptors and marking schemes used at Imperial

- See the Assignment Brief Design website for helpful suggestions on improving clarity of assessment briefs for students.
- Offer choice of assessment method, questions or titles.
- To make your feedback more engaging and useful to students follow principles of good feedback.
- Give students advice on how to make use of your feedback. Giskin Day (Imperial Horizons) has written How to use your assignment feedback [pdf] for students. This is informed by Winstone and Nash's Developing Engagement with Feedback Toolkit.


Examples of assessment choice at Imperial include:

- Students choosing journal articles they are interested in to present to peers at journal club or to critically appraise for a written assignment. Students are then given access to all student-selected articles using Leganto reading lists.
- Students choose the focus of their Year 3 or MSc projects.
- Students choose from a range of essay titles.
- Students choose from optional modules that have different assessment methods (e.g. exams or coursework).
- Students are asked to choose what aspects of their work they would like to receive feedback on.

# Assessment and feedback: encouraging self-reflection to improve essay writing in Life Sciences

Dr Magda Charalambous, Principal Teaching Fellow, Department of Life Sciences

"But they don't even read the feedback – they just look at the mark!" bemoans the tutor when asked to give more feedback. The challenge for us is to use assessment and feedback to help students develop their essay writing. We don't want to over-assess students and so need both parties to be on board with creating an on-going dialogue that promotes self-regulation of behaviour. Self-regulation is a cyclical process: self-reflection of prior learning will feed into the planning phase of the next task and may lead to higher levels of perceived academic self-efficacy, i.e. the belief that that one has the capability to succeed in attaining a specific education goal (Bandura, 1997; Elias et al., 2007).

I developed a pilot reflective feedback exercise in Year 2 BSc Biological Sciences *Genetics with Statistics* module as shown in the diagram below to help students with their forthcoming 4000-word Tutored Dissertation (TD)
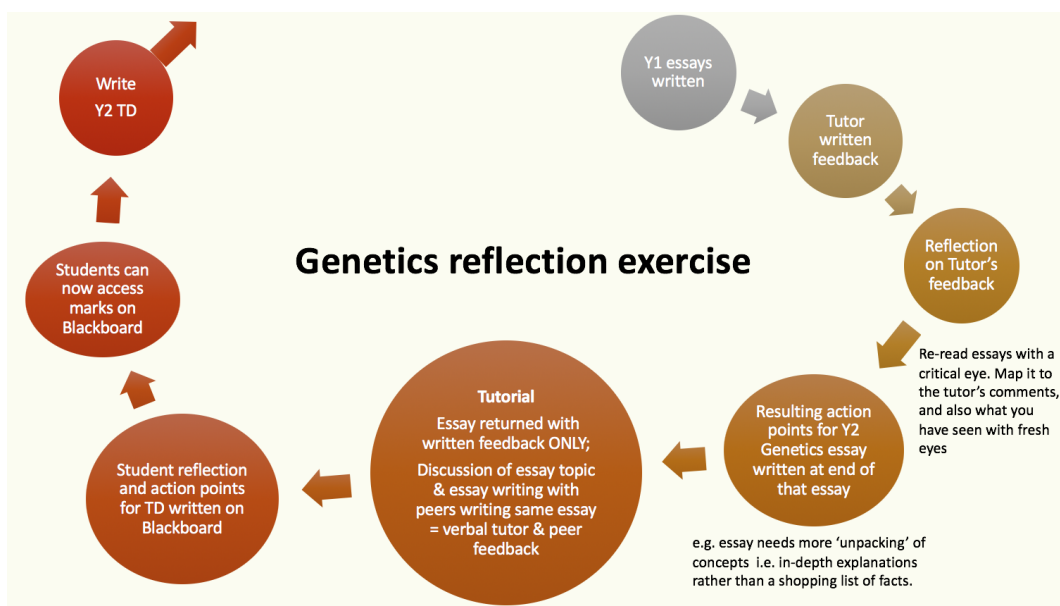


Year 2 (Y2) students were given the rationale and theory behind the exercise and were asked to reflect on their Year 1 (Y1) essays and inform their Genetics tutors how they used this to help write their Genetics essay. The Genetics essays were handed back in the tutorials that took place within 2 weeks. Written feedback was given on how students could improve their essay in the usual manner, and comments also addressed the extent to which students achieved the aims stated in their reflection. The tutorials comprised groups of 8 students who had written an essay with the same title. Discussion in the tutorial groups focused on the essay topic *per se*, how one might construct the essay, the different ways of answering the essay question (i.e. to illustrate that there is not one model answer), and general points about essay writing from the tutor all served to increase self-efficacy for future similar coursework. After the tutorial, students were asked to write a reflective statement on

Blackboard stating how the written and verbal feedback had fed-forward into an action plan that could be discussed with their TD tutor. Students would then see that using feedback effectively is an on-going dialogue with tutors. Once the reflection had been made, students were given their mark. Disassociating marks from the reflection process encourages students to reflect on how they would improve their future (TD) performance rather than focus on the past mark (Hepplestone et al., 2009).

Students appeared to engage with the process is a meaningful way:

*"From this essay I have improved in my ability to be more concise and accurate, which I will aim to continue incorporating into my TD. Distinguishing between plants and animals was used as a part of critical analysis, so I will continue to focus on more comparisons and distinctions in order to assess things. I missed a few recent papers on the topic, so I will be more aware and diligent with my searches for the TD. I also need to include more figures and tables to make it easier to convey messages and mechanisms."*

This student later reported that the reflection

*"did in fact help me with my TD, for which I ended up receiving a 1st! I'm definitely a lot more conscious of being critical in my analysis and in general, I think it helped me gain maturity in my coursework."*

Comments at the Student-staff meeting were also positive. On the basis of this feedback, a similar exercise was developed for Y2 BSc Biochemistry/Biotechnology students to help with their TD. Furthermore, as part of the curriculum review, the exercise will also become embedded in some Y1 modules to ensure that students get into the habit of self-reflection from the start of their university careers.

References

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