



**TEACHING AND LEARNING  
IN HIGHER EDUCATION:  
PERSPECTIVES FROM UCL**

Edited by Jason P. Davies and Norbert Pachler

‘This volume sets out the thinking and the principles informing this university-wide initiative and offers case studies across the disciplines. The central message is surely twofold: both that university education can offer a liberating experience and that, with an energetically-pursued whole-institutional project, universities can liberate their learning and teaching practices still further. This is an exemplary text of its kind, offering much to dwell on to all interested in advancing university education.’

**Ronald Barnett, Emeritus Professor of Higher Education,  
University College London Institute of Education**

‘The Connected Curriculum initiative at UCL has rightly attracted attention for its innovative approach to a researched-informed undergraduate education. This new collection enlarges on the theory and practice of the Connected Curriculum and provides the sector with examples of the highest-quality pedagogical endeavours.’

**Professor Jacqueline Labbe, Pro Vice-Chancellor (Academic),  
De Montfort University**

‘As OfS and UKRI take separate paths, this is an especially appropriate moment to encapsulate the synergy between education and research. As we are required to demonstrate value for money for student fees, it is vital that we can articulate the benefits to be gained from learning in a research-rich environment. This volume is, therefore, both timely and welcome in bringing to a wider audience the context for and explanation of UCL’s Connected Curriculum and, vitally, in Part Two a series of invaluable case studies of the theory in practice. This will prove to be an invaluable resource for research-intensive higher education.’

**Timothy A. Quine, Professor of Earth Surface Science,  
Deputy Vice-Chancellor (Education) University of Exeter**

‘For some years now, UCL has been leading the way in rethinking teaching and learning in higher education, drawing upon the university’s formidable research base in technology-enhanced learning, assessment for learning, improving learner outcomes, research-led teaching and much more. Sector-leading initiatives, such as the Connected Curriculum project, have taken this expertise into the heart of UCL’s teaching delivery. This collection of essays is an admirable testament to the university’s ambition to foster innovative, evidence-based and thoughtful approaches to teaching and learning. There is much to learn from here.’

**Professor Karen O’Brien, Head of the Humanities Division,  
University of Oxford**



# Teaching and Learning in Higher Education



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Perspectives from UCL

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Norbert Pachler

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# About the contributors

*Paul Bartlett* is a Principal Teaching Fellow within the UCL Department of Physics and Astronomy. He has experience of education and training in the public, private and university contexts where he has focused on practical skills acquisition for trainees and students.

*Chris Blackman* is a Senior Lecturer in Inorganic Chemistry at UCL. He has a particular interest in the use of e-learning resources to support the teaching of practical chemistry.

*Nicole Blum* is a Senior Lecturer in the Development Education Research Centre at UCL Institute of Education. Her research interests include pedagogy and learning in development education, internationalization and global perspectives in higher education, the ethnography of education, education for sustainability, and climate change.

*Douglas Bourn* is Co-Director of Development Education Research Centre at UCL Institute of Education and author of numerous books and articles on the themes of development education, global perspectives in higher education, global learning and global citizenship education.

*Amanda Cain* is a Senior Teaching Fellow in the Department of Structural and Molecular Biology at UCL. In addition to developing methods for research-led teaching, she has an interest in increasing the numerical fluency of UCL students and finding new and innovative ways to improve their experience.

*Mark Carnall* is the Collections Manager (Life Collections) at the Oxford University Museum of Natural History. His wide interests include digitization and 3D printing in museums. He has previously worked in a range of contexts to support public engagement with museum collections.

*Helen J. Chatterjee* is a Professor of Biology at UCL Biosciences and Head of Research and Teaching at UCL Culture. She has a particular research interest in the value of cultural encounters to health, well-being and education.

*Jason P. Davies* is a Senior Teaching Fellow in the UCL Arena Centre for Research-based Education. He is particularly interested in developing inclusive education in higher education, interdisciplinarity and ethnographic approaches to learning and university culture.

*Rosalind Duhs* was founding Director of UCL Arena (2014–16). Her PhD was a comparative study of academic staff learning to teach in research-intensive universities in England and Sweden. Her interest in educational development has led to accreditor and consultancy work for Advance HE and she continues to contribute to UCL projects.

*Dilly Fung* is an international champion of research-based education and the architect of UCL's research-based education strategy, Connected Curriculum. She will become Pro-Director (Education) at the LSE in July 2018, and was previously a Professor of Higher Education Development and Academic Director of the UCL Arena Centre for Research-based Education.

*Carl Gombrich* is Programme Director of the interdisciplinary undergraduate Arts and Sciences BAsC at UCL. He is a regular speaker and writer on matters concerning interdisciplinary undergraduate education and was a member of the British Academy's Working Group on Interdisciplinarity.

*Lesley Gourlay* is Head of the Department of Culture, Communication and Media and a Reader in Education and Technology at UCL Institute of Education. She works predominantly on posthuman theory, and the digital and textual practices in higher education.

## *About the contributors*

*Leonie Hannan* is a Research Fellow at the School of History, Anthropology, Philosophy and Politics, Queen's University Belfast. She is a social and cultural historian with a particular interest in the value of heritage objects in teaching and learning contexts.

*Gwyneth Hughes* is a Reader in Higher Education at UCL Institute of Education. She has published widely on learning and teaching in higher education, particularly on the theme of ipsative assessment.

*Tansy Jessop* is a Professor of Research Informed Teaching at Southampton Solent University. She leads the TESTA project on programme assessment and feedback and has published variously on assessment and feedback, learning spaces, narrative methods and social justice in education.

*Thomas Kador* is a Senior Teaching Fellow at UCL Culture and for the Arts & Sciences (BASc) programme. His interests include heritage pedagogics, object-based learning, everyday practice and social change, as well as public and community-based approaches to heritage.

*Jonathan Kendall* is a Senior Teaching Fellow at the Bartlett School of Architecture, UCL, where he has taught since 1999, specializing in urban design. He combines teaching with professional practice, and is Partner and Director of Urban Design at Fletcher Priest Architects.

*Monika Kraska* is a doctoral candidate at UCL Institute of Education within the Development Education Research Centre. She is interested in internationalization and global citizenship within higher education.

*Jenny Marie* is a Principal Teaching Fellow at the UCL Arena Centre for Research-based Education. She has been working in academic development for more than ten years and has led UCL ChangeMakers since 2015.

*Teresa McConlogue* is a Principal Teaching Fellow at the UCL Arena Centre for Research-based Education. She has worked in the UK and internationally to support staff and students to develop higher education. Her main focus has recently been on assessment practices and inclusive education.

*Ruth Morgan* is a Professor of Crime and Forensic Science, in the UCL Department of Security and Crime Science, and Director of UCL Centre for the Forensic Sciences. Her chief research interest is the interpretation of forensic science evidence, and how interdisciplinary approaches from the sciences, social science and humanities can address this complex challenge.

*Emma Newall* is a Lecturer in Science Education at UCL Institute of Education. She has been working in STEM enrichment and education since 2003, with a particular interest in research-based learning.

*Julianne Nyhan* is a Senior Lecturer in UCL's Digital Information Studies. She has a broad interest in the Digital Humanities and its history, and in particular the overlooked non-canonical and oral aspects of the field's emergence.

*Martin Oliver* is a Professor of Education and Technology at the UCL Institute of Education. His research focuses on higher education, including areas such as the curriculum, doctoral study and students' experiences.

*Norbert Pachler* is a Professor of Teaching and Learning and Pro-Director: Teaching, Quality and Learning Innovation at the UCL Institute of Education. He is also Pro-Vice-Provost: Education at UCL with responsibility for e-learning and online learning. He has a particular academic interest in teacher education and development, technology-enhanced learning and foreign language education.

## *About the contributors*

*Caroline Pelletier* is a Reader in Culture and Communications in the Department of Culture, Communication and Media at UCL Institute of Education. Her research explores the significance of technology for teaching, learning and knowledge.

*Bahijja Tolulope Raimi-Abraham* is a Lecturer in Pharmaceutics at King's College London. During the time of her Nuffield Research Placement she was also an Engineering and Physical Sciences Research Council-funded Postdoctoral Research Associate at UCL.

*Kerstin Sailer* is Reader in Social and Spatial Networks at UCL's Bartlett School of Architecture. Her research interests lie in the interplay between complex buildings and social behaviours. For the Master's course 'Space Syntax: Architecture and Cities' she has developed interactive and iterative methods of teaching academic writing to students, including blogs.

*Matthew Seren Smith* is the Learning Technologist for UCL's Faculty of Engineering. He advises academics and students on technology use in education. He is interested in how the two intersect and ways in which to better understand this relationship.

*Melissa Terras* is a Professor of Digital Cultural Heritage at Edinburgh University, the Director of Digital Scholarship in the College of Arts, Humanities and Social Sciences, and Honorary Professor of Digital Humanities at UCL. Her research focuses on the use of computational techniques to enable research in the arts, humanities, and wider cultural heritage and information environment that would otherwise be impossible.

*Keith Turner* is CEO of Learnexx3D Virtual Labs. He is an entrepreneurial business and software products manager with over 20 years' executive level experience in founding, funding, developing, restructuring and selling companies.

*Anne Vanhoestenbergh* is an Associate Professor with the Aspire Centre for Rehabilitation Engineering and Assistive Technology at UCL. She leads Medical Engineering courses for undergraduate and postgraduate programmes.

*Sarah Warnes* is a Senior Teaching Fellow at the UCL School of Management. Since entering higher education in 2007, Sarah has been committed to developing her teaching practice, always looking for new and effective ways to inspire students to actively learn.

*Andrew Wills* is a Professor in Physical Chemistry at UCL and a member of the Royal Society of Chemistry's Education Division Council. He has a broad interest in bringing innovations into the support and pedagogy of university students.



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# Scenario-based learning

*Matthew Seren Smith, Sarah Warnes and Anne Vanhoestenbergh<sup>1</sup>*

Continuing the theme of using the real world as a teaching resource, Smith, Warnes and van Hoestenbergh describe learning scenarios where students find their own way and make their own choices in exploring an authentic situation. The intended learning outcomes are explained to the students to guide them to what is relevant, but these are thoroughly embedded in the tasks set: they do not have to make a special effort to work out what is being assessed. Again, assessment requires careful thought, which makes having student input to the design all the more relevant; this allows the teaching staff to actively guide students through their learning rather than merely acting as dispensers of knowledge: just as the Connected Curriculum strategy invites, students find things out for themselves.

## What is scenario-based learning?

Scenario-based learning (SBL) is the use of scenarios as a vehicle for the teaching and learning process, providing students with the opportunity to learn from and apply their learning to realistic experiences. Such scenarios may be a particular set of circumstances, a critical incident, or a narrative (Errington, 2005). Errington (2005) further suggests that they often feature common elements, including role-play, problem-solving, a demonstration of taught skills, the exploration of an issue(s), and the contemplation of outcomes. Scenarios can therefore range from simple sets of circumstances and conditions, to detailed sequences of events that take into account plots, roles and team relationships, which students may navigate via multiple pathways and which therefore have a multitude of possible outcomes.

Scenarios, as Errington (2005: 10) succinctly notes, ‘provide an ideal platform for students to experience deep level learning tasks, and attain higher order cognitive skills (decision-making and critical analysis)’. This

we fully agree with and have found to be the case in the two scenarios outlined in this paper.

## **Elements of scenarios**

Through our experience of working with scenarios on two different undergraduate modules, Understanding Management and Bone Modelling, we have identified the following five key aspects that we consider are characteristic of scenario-based learning: challenge, narrative, choice, roles and role-play, and authenticity. These will now be discussed in turn.

### *Challenge*

Challenge is inherent in all learning scenarios, be it medical students diagnosing a patient's symptoms, marketing students launching a new product, or archaeology students curating an exhibition.

In Understanding Management, the challenge was presented to students via a written statement on the virtual learning environment (VLE). This described the proposed merger of Burger King and the Canadian-based doughnut chain Tim Hortons and was coupled with an authentic video news clip to add intrigue and engage the students in the scenario. The challenge was simple: through group presentations and individual business reports, the students would present recommendations to company board members as to how the merger should go ahead.

A similar approach was taken on Bone Modelling, where a statement was again displayed on the course page of the VLE, and also emailed direct to students. The statement informed students that they would be modelling bones to estimate their mechanical properties. Additional information was provided in the form of recommended readings, setting the context and demonstrating the potential of the methods. This acted as a way of engaging the students early on in the task.

As can be seen from both of these examples, there is a clear purpose presented to the student in a way that intends to inspire interest and encourage a solution-focused approach. As such, we consider that challenges have the greatest impact when they are communicated clearly to students at the beginning of the scenario, with the most effective challenges simultaneously introducing the learning and setting overall objectives, as well as hooking the student in – igniting their imagination and desire to complete it. The aim is that students will be intrinsically motivated to engage with the scenario and therefore the learning, that they will find the activity rewarding in and of itself rather than being motivated by extrinsic rewards

such as receiving a high grade, or obtaining course credits (Nakamura and Csikszentmihalyi, 2002).

### *Narrative*

Another method of hooking students into a scenario is the use of a narrative. In the Bone Modelling scenario, its realistic nature comes from the laboratory environment, and a constructed narrative is not necessary. The short and uninterrupted nature of the scenario means that less intervention is needed to maintain motivation.

By contrast, on Understanding Management the narrative provides an important thread, presenting students with a timeline of the events, such as the merger of the companies and the presentation to the board. As the scenario evolves, there are opportunities to develop the plot in response to levels of student engagement, adding unexpected issues to change its course. The narrative provides a way of introducing conflict to our students, while maintaining a measure of intrigue and surprise. This naturally requires students to think effectively on their feet, thus replicating the pressures found in the workplace (Errington, 2008).

### *Choice*

Choice is fundamental to the learning experience of scenarios. It encourages learner autonomy and critical thinking, allowing students to reach a deeper level of learning as they evaluate the options and analyse the implications of their decisions.

A learner-centred approach allows students to align their personal goals, values and interests with the learning (Ryan, 1993; Ryan and Deci, 2000) and is a key aspect of both modules. On Bone Modelling, students are required on the first day to define a strategy to demonstrate at the end of the week that they have understood the core concepts and met the intended learning objectives. The activity is presented to students as their taking ownership of their education and offering an opportunity to reflect on their strengths and weaknesses in the acquisition of engineering knowledge. A similar activity is applied on Understanding Management, where students are required to identify their expectations for the course and motivations for completing it in the first lecture. The aim of this is to create ‘buy in’, setting a clear precedent that students are free to approach and engage with the scenario in a way that is valuable to them.

On a more granular level, choice activities are formally built into the timeline of our two scenarios. This is where students are presented with a limited set of predefined options, typical of compromises required in a real situation. First, on Bone Modelling, students are given four academic

papers to read two weeks before the scenario begins. From these they must choose one on which their individual assessment will be based. This funnelling approach allows students to narrow their focus to an area in which they are interested while ensuring a concrete grounding for the learning. There is a similarly important decision for students to make on Understanding Management. In Week 2, students are required to select their team management role, which they will adopt for the length of the scenario. Before doing so, however, they are instructed to read overviews of each management role and watch interviews with role professionals. Again, this provides them with a base knowledge of each area before allowing them to specialize. We will explore the undertaking of these roles in the following section.

### *Roles and role-play*

Through our experiences of developing scenarios, we identified two types of roles that students undertake in scenario-based learning. The first are function-based roles in which a student ‘plays’ a fictional role, e.g. health officer, forensic scientist. The second are intrinsic roles (or natural roles), which people take within a group, for example a leader or a scribe. These are akin to the functional roles and team roles, respectively, proposed by Belbin (Belbin, 2010). Both types will now be explored.

As was mentioned in the ‘Choice’ section, students of Understanding Management are required early on in the scenario to select function-based management roles that they will adopt for the duration of the merger. These roles reflect the types of roles that exist within the organizational structures of companies, for example marketing manager. This enriches and extends the learning experience in three key ways. First, it places students within the narrative, encouraging them to immerse themselves in the detail of the scenario further and in turn achieve a deeper connection with the learning. Second, it provides an anchor for students, or vantage point, from which they can explore the issues at hand. It is hoped students begin to specialize and form a professional identity, taking on responsibility and considering the specificities of their role when interacting within their team. This encourages them to value a collaborative approach, where the team is greater than the sum of its parts. Working in this way requires them to view issues from varying perspectives, developing skills such as negotiation, communication and consensus building. Third and finally, to a greater or lesser extent role-play imparts to the student what it may be like to work within the profession, introducing the culture, attitudes and language of the sector.

By contrast, in the Bone Modelling scenario students are not explicitly assigned function-based roles and instead the focus is on the intrinsic roles that they adopt. At three points during the scenario (once before, during and after the task) the students reflect and discuss their strengths and weaknesses with their team. They reflect on the role they expected to undertake within the team, how this was influenced by the rest of the team, and so become aware of the team interplay as typical of a real situation. As teamwork is part of the formal teaching material, this experience shows students the value of their learning, and how it is relevant to their future profession from the first year of their study.

### ***Authenticity***

One of our key aims in designing the scenarios was to ensure that both the scenarios and the work undertaken were authentic. We consider that for the experience of learning from, and for, real situations to be positive, a certain level of authenticity must be achieved. According to Errington (2011: 87), ‘scenarios must not only be authentic in replicating aspects of the professional setting, but also be robust and relevant’; if not, there is a greater risk that students will become bored and disengaged.

Stewart (2003) considers that scenarios are ‘essential slices of reality’ and therefore demand authenticity. This is observed on the Understanding Management scenario, where the students’ interest increased as the scenario became more authentic. This increased authenticity was achieved by simple additions, such as offering students their own business cards and branded lanyards, as well as integrating news clips and articles. In the Bone Modelling scenario, the authenticity is provided by the environment (a biomedical lab) and the real-world methods, tools and technologies used by the students. This was crucial in this scenario, which aimed to develop the students’ professional skills.

### **Context**

This chapter is built on our experience of teaching for, and from, real situations. Here we introduce the two courses in which we implemented scenario-based learning, and our reasons for adopting this teaching method.

### **Course 1: Understanding Management**

Understanding Management, run by UCL’s School of Management, is an undergraduate elective module with classes scheduled over a ten-week term. Student numbers during the academic session 2014/15 were roughly 80 in Term 1 and 150 in Term 2. A scenario-based approach was introduced as an

effective way of linking the class activities (3 hours of lectures and e-seminars each week) with those taking place out of class (expected to be 15 hours each week). It also gave students the opportunity to apply the management theories covered in an authentic context, which we hoped would lead to higher levels of student engagement and sustained motivation over the ten weeks. The assessment was divided between a group presentation (30 per cent) and an individual business report (70 per cent).

### **UNDERSTANDING MANAGEMENT SCENARIO**

This module introduces you to the practice of management, providing you with a real insight into the role of the manager in today's dynamic and exciting business environment. As such, a range of management tools and roles are explored from both a practical and theoretical perspective, including strategic thinking, analysing the business environment, marketing, and motivating the self and others.

The primary learning objectives are as follows:

- Critically approach problems and issues that surround management practice
- Explain and evaluate the main environmental, strategic and operating concerns facing organizations and managers
- Produce, justify, and support arguments in favour of, or against management approaches
- Apply a range of methods and analytical approaches to specific cases

## **Course 2: Biomedical Engineering**

A new programme in Biomedical Engineering started in the academic year 2014/15, as part of the Integrated Engineering Programme run by UCL's Faculty of Engineering. The programme includes six scenarios, each a week long, during which all taught courses are interrupted, so the students can dedicate all of their time, or about 7.5 hours a day, to the scenario. In this chapter we present the scenario that took place at the end of the second term of academic year 2014/15, with 12 first-year Biomedical Engineering students. The aim of integrating a scenario was to demonstrate to students that, after less than one year, they had already acquired knowledge and skills relevant to real situations. By applying these in an authentic environment (the bulk of the work took place in a lab, using real engineering equipment),

they would consolidate the knowledge learnt from technical modules while developing transferable soft skills such as teamwork and communication. The students were asked to produce a virtual and a physical model of a section of a bone, and test its mechanical properties, hence this scenario was called the ‘Bone Modelling’ scenario. They were assessed on theoretical and practical knowledge as well as on collaboration and communications skills. This was done through a group presentation, a personal five-minute pitch with questions and answers, and a brief reflective piece.

### **BONE MODELLING SCENARIO**

Successful engineers need to be able to identify and analyse problems, conceive and design potential solutions, liaise with and present to clients, and work with and direct colleagues. They need to do these things efficiently, ethically, professionally, and competently. Our goal is to give you the tools you need to be effective from the start of your career. This will not only help you to work as a competent professional when you graduate, but also help you to achieve more while you are doing your degree.

The primary learning objectives are as follows:

- Demonstrate a general understanding of biomechanics and physiology
- Understand and apply technical skills such as mechanical concepts, technical drawing and finite element modelling
- Demonstrate critical thinking, hypothesis testing, iterative evaluation and assessment
- Develop professional skills such as collaboration, delegation, communication of ideas, planning (and contingency planning), evaluation and decision making, creativity

Although the motivation for employing a scenario on the two courses was distinctly different, we will explore the similarities and differences in the techniques used and their effect.

## **Practical aspects of developing and delivering a scenario**

### ***Learning design***

Although there are many similarities in the design and delivery of the two courses, the motivation for employing a scenario and the effect this has on student learning differs.



On Bone Modelling, the primary learning objective is for students to develop professional workplace skills. As this is the focus, the course content (bone modelling) is familiar and should not require much effort to understand. This frees up the student’s working memory, allowing them to engage fully with the scenario. Here the content is a vehicle for the scenario. In contrast, on Understanding Management, the primary learning objective is for students to gain a strong foundation in core management theories. Here the scenario quickly becomes familiar, acting as a lens through which students can understand and manipulate the content. The scenario in this case is a vehicle for the content.

In addition, we observed secondary effects on each course. In the bone modelling scenario, although the content is familiar, there is a consolidation of core knowledge. In the management scenario, the secondary effect is the development of professional skills and good practice.

On both courses, we considered the design and progression of the learning, with emphasis on the journey undertaken by students. As the courses progressed we ensured that students were exposed to increasingly demanding activities, requiring them to achieve a deeper level of understanding. The figures below, created with Learning Designer,<sup>2</sup> give a snapshot of Understanding Management at the beginning and towards the end. As can be seen, the time dedicated to higher-order learning activities such as Practice and Produce is greater in the latter stages of the course.

Finally, we found that student input was, and is, vital to the design process. For both scenarios, a student was consulted to evaluate the design, test the scenario and propose changes. Moreover, we collected students’ feedback via a scenario-specific questionnaire and ensured that we were available for live and continual feedback throughout the course. On Bone Modelling this was semi-formalized, with students encouraged to meet with the scenario lead to discuss any issues encountered.

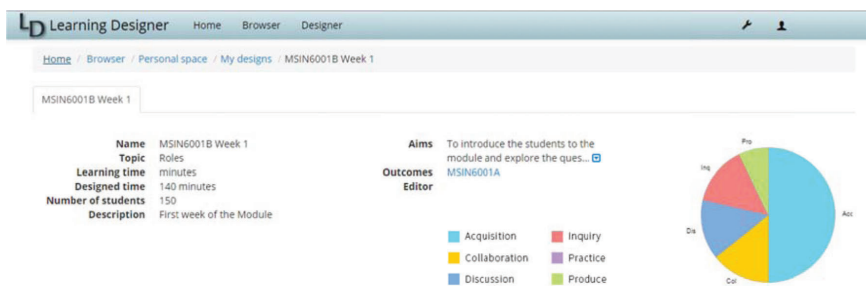


Figure 10.1: Understanding Management Week 1: breakdown of learning activities

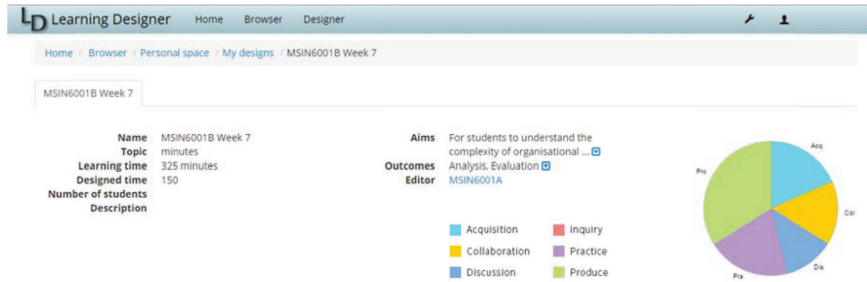


Figure 10.2: Understanding Management Week 7: breakdown of learning activities

### *Delivery*

As noted at the opening of this chapter, the delivery and duration differed between the two scenarios. The Bone Modelling scenario took place over one week, during which all other teaching activities were suspended. As the work is practical, and relies on previously acquired knowledge, aside from the occasional instruction, none of the course material is delivered online. For Understanding Management, the scenario provided the thread that linked together each week of the ten-week module, with almost all of the non-assessed portions of the scenario taking place online and outside scheduled class time.

Despite these differences, one characteristic common to both courses is the nature of the lecturer's involvement. In both cases, students are encouraged to work independently within the scenario, largely without an academic present. This allows students to practise application freely, learning experientially and constructing their own solutions.

A further similarity is the timing of taught material and student application. On Understanding Management, the content covered is aligned with the development of the scenario and there is a short time between concepts being learnt and their application by students. For example, in Week 6, when the lecture focuses on leadership, teamwork and motivation, students are put into cross-company teams and are required to apply the theories they have just encountered. Equally on Bone Modelling, although the content is not new to students, the theoretical knowledge surrounding the design process and technical practices relating to its analysis are new, and again taught in conjunction with their application.

### ***Assessment and group work***

When designing a course around a scenario it is essential that assessment is planned within the context of the scenario, that it is authentic and reflective of the practices found in the professional setting that it intends to imitate (Errington, 2011).

We consider that both courses achieve this in comparable ways. Students of Bone Modelling are required to present the result of their tests to a panel of experts. Presenting research to a panel in this way is reflective of professional practice within the field and therefore authentic. In addition to this, students must present individually, discussing a paper of their choice in the light of what they have learnt during the scenario, as well as completing a written portfolio in which they must reflect on the learning process, demonstrating acquisition of the stated learning objectives. Again, these types of assessment are authentic and akin to the types of appraisals found in industry.

On Understanding Management, students are similarly required to present their findings and recommendations in a way reflective of the industry – to their fellow students, the ‘shareholders’; and their tutors, the ‘board’. In order to further the authentic nature of the presentation, the students/shareholders then vote on whether they approve the recommendations, with those groups achieving over 50 per cent of the vote being given the ‘backing of the board’. Finally, students must complete an individual business report outlining their recommendations for the merger, using the concepts they have been taught in class and in the light of what they have learnt during the scenario. Again, this aims to mimic the type of reports written by managers in the corporate world.

### **Student feedback**

Students on both courses were positive about the scenario-based approach. Compared with the 2013/14 delivery of Understanding Management, the introduction of SBL contributed to a measured increase in attendance, grades and student satisfaction, as can be seen in Table 10.1 which compares the Term 2 deliveries of the module in each year.

**Table 10.1:** Student feedback on Term 2 deliveries of Understanding Management

	2013/14 Term 2 (%)	2014/15 Term 2 (%)
	Response rate: 66.67%	Response rate: 88.59%
Average attendance	73.58 ( $\pm 6.35$ )	80.00 ( $\pm 7.58$ )
Average grades	61.24 ( $\pm 7.38$ )	66.28 ( $\pm 8.26$ )
<b>Student satisfaction</b>		
<i>Course overall</i>	75.93 ( $\pm 16.58$ )	80.90 ( $\pm 15.21$ )
<i>Lecturer overall</i>	84.44 ( $\pm 16.25$ )	88.12 ( $\pm 13.97$ )

On Understanding Management, students appreciated the real and timely nature of the narrative: ‘Structuring the course around a real and relevant case study was the best part of this course’; ‘Focusing on this real merger made the course current and relevant’. Equally, students of Bone Modelling appreciated the contextual application: ‘I often find that I don’t fully understand or appreciate the significance of a subject until I have fully practised it myself outside the classroom’; ‘There is no way you can fully understand a scientific subject until you have fully engaged with it by predicting and hypothesizing, changing parameters, testing and adapting, and learning from doing.’

On both courses, they were positive about group work. On Understanding Management, ‘The best part for me is the group work. We finally got a chance to apply what we learn to a real case and I love the cooperating process!’ and on Bone Modelling, ‘I enjoyed the teamwork aspect of this week. It is important to divide up tasks between a team, trust each other’s work, and then collate all the information usefully at the end of the process.’

Presentations as an assessment method were equally well received. On Understanding Management, students commented that they ‘simulated a real professional experience’, and ‘allowed a communal platform to share ideas’. On Bone Modelling, ‘teaching others let me understand someone else’s perspective and also showed me that there are sometimes gaps in my path of thinking’, and ‘presenting my work to others also made me more conscious of what I tried to achieve and let me go back again to what I had done previously and therefore made me understand my own work better’.

## Reflections

Despite the differences between the two scenarios, several of the issues encountered were similar. Although the collaborative aspects were received positively by students, this also led to confusion, with students unsure of how to function as a team. To address this, changes have been made on both courses. On Understanding Management, students are provided with a more clearly defined timeline of events to focus their efforts, and details on the formation and merging of groups. For example, students are given in Week 1 of the course a timeline of key dates, stating when initial company teams will form and when management role selection will take place. They are informed that in Week 4 of the course the ‘merger’ will take place and this will be accompanied by an important ‘negotiation meeting’. In this meeting larger student teams are formed, comprising one team from each of the two companies (Burger King and Tim Hortons). On Bone Modelling, more obvious links will be drawn to other modules undertaken by the students in communication and project management, as well as more specific guidance on group work.

Another common issue is that students viewed the presentations more as assessments rather than learning experiences *per se*. This led to a lack of interest from the other teams on Understanding Management. Hence, presentation evaluation sheets have been introduced for students to fill out when not presenting and teams have been paired up, with one acting as the ‘board’ for the other and being required to ask questions. On Bone Modelling, the assessment has been revised. The group presentations will be formative, and with the introduction of peer assessment, provide an occasion for reflective learning. The personal pitch will be summative, after the students have received feedback from the group presentations.

Additionally, other improvements will be made based on observations by the teachers and student feedback. On Bone Modelling, the work of Cowan (2006), Kolb (2014) and others on reflective learning will be further explored to help students learn more from the presentations and reflective portfolio. For Understanding Management, the use of technology, especially ‘flipped classroom’ pedagogies, will be incorporated in the module.

## Conclusion

Students increasingly want to know that the theories and concepts they are being taught have real-world applications, especially in fields such as management and engineering, where career aspirations are often in direct alignment with the course of study. Scenarios are an effective way of doing

this. By creating an environment centred around practice and application, they give purpose to the learning, bridge the gap between theory and application, and improve professional skills.

In our experience, scenarios are effective when teaching professional skills as well as knowledge. They can be successfully augmented using technology, though this is not essential, and they are expedient when run as a single session or a continuous element interspersed with core learning.

## Notes

<sup>1</sup> Addresses for correspondence: m.s.smith@ucl.ac.uk; s.warnes@ucl.ac.uk; a.vanhoest@ucl.ac.uk

<sup>2</sup> Learning Designer is a tool developed by the UCL Knowledge Lab to map the breakdown of learning activities by the time spent on them.

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