

Can a story deepen comprehension, engagement and analysis skills in engineering strategy of undergraduate engineering students with diverse backgrounds?

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Abstract: *Innovative and successful engineers nowadays need to be able to function particularly effectively within complex commercial environments without the need for extensive training. The teaching of the wider business context and, in particular, how a company seeks to remain successful – namely business strategy – is now essential knowledge. How can you endow sufficient comprehension of this important area to undergraduates taking an engineering course?*

At Coventry University, engineering strategy is taught to approximately 250 full-time direct-entry undergraduate students each year with a diverse knowledge (engineering, economics, and business) and cultural background (several European countries). This year a fictional case-study has been introduced, presented as a story, and released to students on a week-by-week basis over 13 weeks with the aim of engendering sufficient analytical skills in the students as well as the underpinning knowledge to be able to apply a variety of business and operational strategies. The story is supported by in-class group discussion and facilitation by lecturing staff.

This paper presents the results from this teaching and learning approach with particular focus on the students' perception of the story and their views on whether it helped their understanding and comprehension. The views from the module teaching team on the efficacy of this method will be discussed. Recommendations for the use of this approach and improvements in next year's delivery will be presented.

Introduction

In this paper we will outline the preliminary results from the use of a fictional, multi-week case-study as a means to explore management decision-making, strategy and organisational behaviour within a final-year undergraduate module. The motivation to improve the ability of students to situate and personalise their learning is the need for graduate engineers to be able to navigate quickly and successfully through the increasing complexity of company environments - international teams, outsourced manufacture, shorter product and service lifecycles and off-shore suppliers to name a few. The focus of this paper is to look at whether a case-study presented as a story can help to develop their ability to apply relevant concepts in a practical setting. Results from the study's first year are presented as part of an ongoing programme to characterise the multi-cultural nature of the student body and to use this nature to enrich the students' learning experience.

Background

The Department of Engineering and Knowledge Management is one of five departments within the Faculty of Engineering and Computing at Coventry University. Teaching and learning within the Department is being influenced by the Faculty-led drive towards *Activity Led Learning* (ALL). Modules are being redesigned to reflect this pedagogy and in preparation for a new building for the Faculty also (Wilson-Medhurst 2008). The module – 320EMM Manufacturing Business Organisations – in which

the fictional case-study is being used, is part of three final-year direct-entry courses; further details on the module are provided in Figure 1.

Aims and summary	
To develop the knowledge and skills required to understand the relationship between a manufacturing organisation and its chosen marketplace. Develop the linkages required between individual function to establish sustainable competitive advantage. To enable students to evaluate business strategy, and equip them with the skills necessary to develop integrated product, technology and manufacturing strategies through appreciation of company-wide, functional issues.	
Module size and credits	
Module size	single
CATS points	20
Entry requirements	
120 ECTS credits; no pre-requisite modules.	
Excluded combinations	
None	
Course for which this module is mandatory	
BSc European Engineering Business Management BSc European Industrial Entrepreneurship	
Course for which this module is optional	
BSc Engineering (part-time course) BEng European Engineering Studies	
Module cohort size	264 full-time
Class size	~50 in 5 separate occurrences
Teaching environment	classic tiered lecture theatres (greater depth than breadth)
Teaching methods	2 hour session (50 minutes lecture, 50 minutes seminar based around fictional case-study)
Number of lecturers	3 (same lecturer takes both lecture and tutorial)
Assessment method	<i>Coursework (30%)</i> Individual written piece of coursework analysing strategic direction of company of their choice <i>Examination (70%)</i> 3 hour written examination

Figure 1: key facts about 320EMM Manufacturing Business Organisations module

The student body is multi-national (Figure 2), with students entering the direct-entry courses from varying educational backgrounds (courses of study, different pedagogical practices). Examples of their previous course backgrounds are given in Figure 3 as exemplars (this information was determined by a class poll by the lecturers at the beginning of the module, so no quantitative information on exact backgrounds is available).

This diversity of background, coupled with the varied cultural expectations and potential language barriers needs due consideration. These teaching and learning challenges and the desire for more developed cognitive skills motivated the module team to investigate the use of an extended case-study and design the module with this case study as a key element.

Despite diverse pre-Coventry University backgrounds, the full-time student body this year derives from two courses - European Engineering Business Management (EEBM) and European Engineering Studies (EES); 96% are from EEBM and 4% from EES.

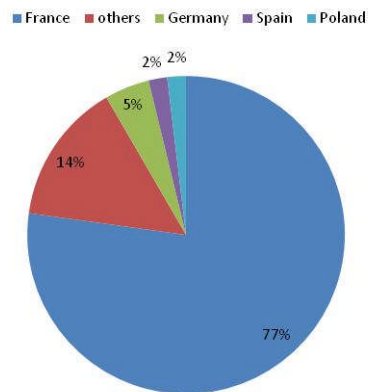


Figure 2: percentage breakdown of full-time students based on country of origin.

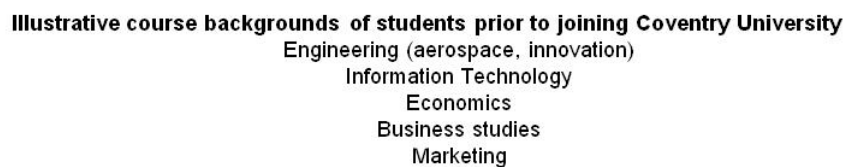


Figure 3: indicative course subject backgrounds of students prior to enrolment on this module

Literature review

Four main areas of literature can be considered pertinent to the focus of this case-study: developing teaching materials to support employers' requirements of our graduates, the current Higher Education practice in teaching business skills to engineering cohorts, teaching using case studies, and finally, issues being faced whilst teaching overseas students.

Employers' Requirements

Several reports have been commissioned to review the global shortage of engineers and the possible consequences that this shortage presents to ongoing competitiveness within a global marketplace (Spinks 2006, Kontio 2006, Kaspura 2006, Bishop 2006, DEST 2006). In a Royal Academy of Engineering (RAEng) commissioned report (Spinks 2006), engineering employers commented that in addition to their technical/scientific skills, a good graduate would be expected to show more generic/transferable skills such as creativity, innovation, team working, presentations skills and critical analysis; this was mirrored by the Engineering Council for Accreditation who specified five similar principle learning outcomes.

Moreover, in the RAEng study (Spinks 2006), several employers cited that their graduate intakes were often unable to apply the knowledge in the workplace that they had acquired at University.

Whilst it is accepted that these are issues that need to be dealt with by Universities at course/Faculty level rather than within individual modules, it should be noted that new initiatives such as this longitudinal case study should aim to respond to this external need.

Taking this into account, this case-study has been designed in a manner to support creativity, innovation and critical analysis whilst presenting management techniques in a commercial and economic context within a group learning environment.

The UK Higher Education context

The need to provide these broader "business skill" competencies within Higher Education led to a DfES-funded project in 2004 (Entrepreneurship in Engineering Education). This project studied the national network of support for Enterprise and Entrepreneurship within undergraduate Higher Education programmes. This study indicated that "... just under 50% [of 34 departments and faculties who participated] were already running enterprise modules..." (Arlett 2007). This analysis looked at the

modular level and, did not detail specific university or modules, current examples could include Engineering Management (M.Eng, Electronics Engineering, Glasgow University) and 'Introduction to Business' (Bachelors, Birmingham University). It is relevant to highlight that this business imperative has been expanded further, resulting in focussed courses at undergraduate level, for example B.Sc. Technology and Enterprise Management in the School of Engineering and Applied Science at Aston University. In the report by Arlett, general UK-wide conclusions about motivation, rationale and mode of delivery were not identified due to the limited data-set (2007).

In terms of implementation, various approaches appear to be taken at undergraduate level, with the two key factors being course award aim (B.Sc/B.Eng, M.Eng) and size of class (Engineering Subject Centre n.d.). Most modules are delivered to small classes at later stages in the degree programme – "...majority of modules (67%) being run were for only 20-30 students in a class" (Arlett 2007) with a maximum class size of 150 amongst the survey results. Analysing further, M.Eng degrees tend to have smaller module class sizes (<30) and focus on integrated engineering and management projects by looking at the design and development of innovative products along with the creation of the associated business plan (Armstrong 2004; Glasgow University n.d.). This integrated project approach can be extended across all undergraduate years also, for example at Purdue University (Coyle, Jamieson and Oakes 2005). Such an approach is highly relevant, but is most appropriate in small class environments, where there is either strong involvement of companies to engage with the projects or to act as sponsors, where external funds are available (Wang and Kleppe 2001), or where low staff-student ratios are possible. For final-year undergraduate programmes, class sizes tend to be larger (50-150 students), with a more traditional style of delivery (lectures and tutorials). This latter approach may result in a more shallow comprehension of material and module design is critical in these instances to ensure engagement and development of analysis skills.

It is worth highlighting that the DfES project (2004) did produce a number of relevant case-studies on entrepreneurship (please see Engineering Subject Centre for further details (<http://www.engsc.ac.uk/er/entrepreneurship/index.asp>)). The material available appears to be flexible and would be able to be delivered in different manners, although in the authors' opinion, would typically be of a short duration (1-3 weeks) at undergraduate level. Therefore, the authors' concept of an extended case study does not appear to have been considered within these exemplars; it may be a step towards the integrated project approach, more commonly associated with smaller class sizes.

Case-study Framework and Evaluation

It is not the purpose of this paper to provide the reader with a detailed review of the merits of the use of case-studies within teaching (see Fry 1999, Savin-Baden 2003, Davis and Wilcock 2009 for such considerations), but to select the points pertinent to the research documented in this paper. For the purpose of this paper, we have used Davis and Wilcock's definition of case-studies, "...*student-centred activities based on topics that demonstrate theoretical concepts in an applied setting.*" (2009)

With students at the centre of the experience, relevancy and engagement are important aspects (Bonwel 1991, Sivan 2001). Within any case-study design, the scenarios must attempt to respond to the different backgrounds and have a high currency amongst the students; further comment on this aspect for the current case-study is given in a subsequent section.

A combination of the 9 different case-study types (Lundberg (2001) are evident in the authors' case-study, most notably 'incident', 'illustrative', 'application' and 'prediction': students are presented with incidents that they are expected to relate with the relevant models and their own experience. Moreover, the students' considerations are supported by the lecturing team who offer possible interpretations on the application of the relevant techniques to the case-study. This case-study is written as a series and has a structured format with the students making a sequence of predictions about characters' actions and choices. Similar approaches over shorter periods of time have been documented elsewhere (Sarmiento 2004; Sarmiento and Read 2004).

When considering how the case-study would be evaluated, the 'Teaching Materials Using Case Studies' guide developed by Davis and Wilcock was used as a key reference (2009). This guide suggests four possible options for evaluation;

- Questionnaire (closed questions)
- Questionnaire (open-ended questions)
- Interviews and discussions

- Independent Evaluator

The current work used aspects of all four of these suggested techniques with the students filling in anonymous questionnaires consisting of closed questions and structured focus groups using open-ended questions run by a Royal Academy of Engineering trained independent evaluator.

Teaching Overseas Students

Coventry has a multicultural student base, which enriches the institution for all students, but can cause issues with some students having vast differences in educational background, academic background, professional experience, age, language and culture (Abanteriba 2006). However, such a campus is an ideal learning environment to nurture engineers' ability to function in an international context (Borri, Gubert and Melsa 2007). Therefore, as the significant majority of students are non-UK, it was felt relevant to develop a case-study based around UK business practices.

Overseas students often felt that there were aspects of approaches to teaching and learning that were distinctive from those in their home countries (Montgomery 2008). Whilst case studies are a well-adopted method of instruction globally, part of the following research is to examine the benefits of this case-study to their engagement. This is important as previous pedagogical research has suggested that engagement is a primary issue when students are developing skills and competences (Halstead 2003).

Case-study Design

The design parameters of the case-study were to provide an engaging framework that

- provided a focus for models and frameworks introduced during normal lecture sessions (scaffolding approach);
- used named characters within the case study with a central figure to provide common thread (aim was to increase contextualisation and individualisation of knowledge);
- to create a number of chapters (around 14) that could be read within ten minutes by a diverse group of students (aim was to reduce barriers of access);
- to offer sufficient latitude for differing interpretations (aim was to allow students to find different interpretations within the story that allows ambiguities to be drawn out and discussed, reflecting the real world);
- to introduce business decisions and the human perspectives (aim was to highlight that in the real-world you are required to make decisions using your current knowledge of a topic and to appreciate the impact of people within decisions) .

The resulting fictional case study is based around a central character who is approached to be a turn-around CEO of a failing technology business. The story is split almost equally into two main sections – the lead-up to accepting the role as CEO and her first day at the office meeting her team and outlining her modified business strategy and examining the existing functional-level strategies' strengths and weakness. The story is split into 13 chapters with each of these being written to align, as closely as possible, to the delivery of concurrent lecture material; the length of each chapter is typically two-sides of A4. A number of questions are posed at the end of each chapter.

The case-study was designed to be implemented as follows:

- Each chapter was to be provided to students a week in advance (for first session in paper copy and subsequently through virtual learning environment (VLE) for this module) so that students could come prepared.
- The answers to the set questions were to be prepared in advance by each student and would then be discussed in class in self-formed groups of 4 or more people based on physical proximity within the lecture theatre; these groups are constituted for duration of each seminar (so vary from week-to-week), resulting in approximately 10 groups per seminar.
- Group discussions would be facilitated by the lecturer on an individual group basis to provide some guidance and formative feedback.
- Whole class discussions would result from facilitated group discussions to bring together answers from different groups.

- The method of group feedback could be adapted as the weeks progressed and confidence grew amongst the groups in both their analytical abilities as well as their language fluency.
- The case-study did not constitute or contribute to the assessment of the module. The feedback resulting from these sessions was two-fold: a) to be part of the students' learning cycle and (b) to be used by the lecturers to determine comprehension of relevant concepts amongst students.

Logistically, these discursive seminars follow immediately after a previous lecture slot within the same classroom, so lecture and workshop form part of a two-hour teaching slot.

Rationale and Feedback

The primary focus of evaluating the case-study this year was to determine whether it helped with contextualising the taught material at a personal level. The situating of this knowledge was to support the development of analysis skills. The desired feedback from the researchers was to understand the impact of the case-study, to establish a baseline and to highlight areas for further development.

It was felt important to sample as many students as possible with regards to the key questions, so a simple structured questionnaire was created with largely binary answers (28 questions in 4 main sections – students background, understanding of the case study, use of prior knowledge and enjoyment and engagement); it was concluded that no other method would allow the overall reaction of the large student body (cohort of 264 students) to be gauged effectively. Participation in the questionnaires was completely voluntary and was administered by an academic not associated with the module to seek as unbiased an opinion as possible; these questionnaires were completed within the normal teaching period of the five weekly teaching sessions for this module with sufficient time being provided by the module lecturer.

The questionnaire was structured to elicit understanding of the following

1. Have case-studies been used by the students previously to establish base-line understanding of this method and effectiveness of this method historically for the students;
2. Did they find this particular case study informative and of use;
3. The balance of prior and new knowledge used to answer questions set;
4. Their comfort levels with the ambiguity within the case study;
5. The level of benefit provided through in-class discussions;
6. Whether the students recognised the importance of people within an organisational context;

More focused and open methods were required in order to explore some of the nuances of the case-study. It was felt that focus groups offered the best opportunity to understand the students' reaction, as it would allow students to discuss amongst themselves their feelings about the benefits they had obtained from the case study and its relative strengths and weaknesses. Other methods, such as individual interviews, were viewed as placing too much pressure on individual students and, due to time constraints on both students and researcher, would reduce the sample size and potentially result in atypical comments. Once again, these focus groups were led by a member of academic staff independent from the module at the end of the normal teaching sessions.

Finally, members of staff involved in the delivery of this module were asked for their reflections on the effectiveness of the case study as a teaching and learning resource as well as the lecturers' perceptions of the students' engagement and reaction to the story. This method was felt appropriate as the lecturers had been involved in the module design, thereby understanding the aim of the case study, so structured interviews were not viewed as necessary.

Results and discussions

Definitions

For the subsequent analysis section, the following definitions are adopted:

Experienced student(s): students who have identified through the questionnaire that they used case-studies in their formal education prior to Coventry University;

Unexperienced student(s): students who have identified through the questionnaire that they have **not** used case-studies in their formal education prior to Coventry University.

Data entry and validation

In order not to introduce any bias on the part of researchers, where questionnaire answers were ambivalent (partly agreed and partly disagreed) no judgement was made on the part of the researchers; these results were excluded from the subsequent analysis. In addition, for those questions using a 5-point Likert scale, if a non-integer answer was provided (for example 2.5) then this was rounded down for the purposes of this analysis.

The questionnaire answers were analysed initially for any potentially anomalous data, namely answers that were consistently the same response. The criterion used was to review the questions with binary answers (yes/no or agree/disagree) to look for skewness, i.e. skewness means more than 80% of the questions had the same answer. From the sample of 116, only 7 questionnaires were identified as falling within this category. On analysis of these specific results, these results were viewed as relevant (albeit extreme cases). Of these seven, six *experienced students* were strongly supportive of the case-study method, whereas the other *experienced student* did not like this method of teaching.

Students' prior use and perception of case-study method

It was important to understand how many *experienced students* were taking this module, as this group may have an appreciation (positively or negatively) for this style of learning. 74 students (64%) have had previous experience of case-studies. The general impression of the *experienced students* was a positive one, as shown in responses to questions (Figure 4); please note that *unexperienced students* did not complete this part of the questionnaire, as the question related to students' previous impressions of the case-study method. Interesting aspects that were not so strongly identified were that students did not discuss case-studies with fellow students and that the role and involvement of individuals in making decisions was not so strongly emphasised in their prior experience. The human aspects within business, strategy and particularly change management are important topics, of which graduates need to develop a deep and practical appreciation. This aspect will be discussed later in the results section.

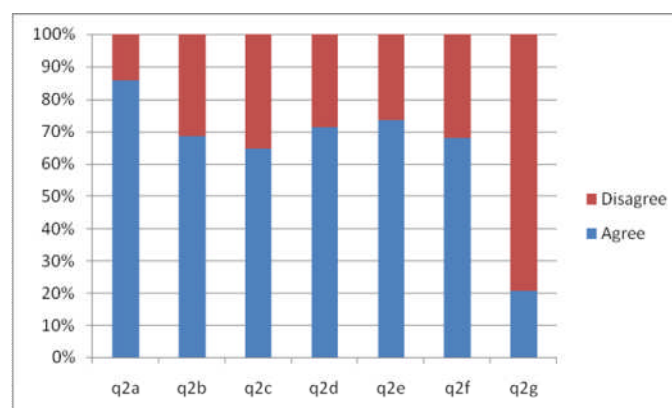


Figure 4: response of *experienced students* (those with prior experience of case-studies) exploring their previous impressions of case-study method: q2a) provide useful examples, q2b) show how models/tools can be used, q2c) encourage discussion amongst students, q2d) improve understanding of taught material, q2e) provide insight into real-world, q2f) show human perspective in management decisions and q2g) confuse understanding of material.

Results from longitudinal case-study

Comprehension and the impact of module organisation

A preliminary question is whether the language of the case-study is clear and can be understood. 87% of all replies viewed the language as appropriate with 87% indicating that they could understand the content. 75% indicated that the length of the weekly chapters was suitable, and a smaller percentage (68%) said that they understood the questions set at the end of each chapter. With regards to comprehension, some of the questions were left deliberately open-ended. Interestingly, the *experienced students* were better able to understand the questions set initially, but the open-ended nature of the case-study allowed *unexperienced students* to contribute in seminars from the beginning (with lecturer's guidance) and by the end of the seminar had improved their understanding; assessing this improvement quantitatively is planned for next year using written replies to questions or electronic voting. It appears that a primary concern is to acclimatise students to the case-study methodology and the need to critically read the provided material in order to answer the questions. On reflection, the questions could have been graduated (from more closed questions initially – within a session and across the weeks – leading onto wider, more open questions later). However, two-thirds of the sample indicated that they understood the questions, so the impression from the students is that any rewording appears not to have to be significant; this will be discussed further in staff reflections.

Student focus groups highlighted some consistent issues about barriers to comprehension:

- Too many characters involved in case-study leading to an inability to remember character from one week to the next; 81% of students did, however, like use of named-characters.
- Two-hour combined session was too long.
- Difficulties in accessing chapters, which were time-released through the VLE; students wanted all information up-front.

Some solutions were proposed by the students and the following will be implemented next academic year:

- Separate lecture and seminar into two separate one-hour sessions;
- Providing weekly proforma for students to summarise that week's developments, for example which new characters were introduced, their role within the organisation, the key models and frameworks used and how these applied to the case study material.
- The move to Moodle, as the VLE across the whole of Coventry University from September 2010 onwards, allows for updates to be emailed effectively and directly to students. This will ensure improved release of information. Staff do not want to release the whole of the case-study up-front as they want students to become comfortable with ambiguous scenarios (as discussed further below).

Level of integration between taught material and case-study

The case-study material was intended to be supportive and integral to the overall design of the module. 61% of all respondents believe that the story related to the taught material; 54% for *experienced students*. The authors believe that this reflected the progressive nature of the case-study, where information and characters are introduced on a weekly basis, so that not all information is available to answer the questions fully (or in a manner to which the *experienced students* may have been able to do in the past with more self-contained case-studies). One of the module lecturers commented "*It is not unusual for students to feel insecurity when presented with complex information with no predefined solutions; this type of open-ended case-study allows the student to develop their own creative skills and the self confidence of this group is greater than in previous years.*"

The story was designed to highlight that not all information is available at any particular time to answer questions, which is potentially a shift in approach for all students. This opinion is shown in the students' response, where 39% believed that they had sufficient information to answer the questions. It is interesting to note that, despite not having all the information that the students desired to answer the questions, 76% indicated that they were happy with the quantity of information provided (4% comfortable, 19% uncomfortable, 1% not bothered). No difference was seen between the *experienced* and *unexperienced students*. Therefore, all students are able to deal, to varying degrees, with the

ambiguities presented within the case-study and recognise that they could develop solutions without all the desired data.

Opportunity to apply and analyse?

A key question was whether the story had improved the students understanding and ability to apply the new knowledge taught in the classroom. Unfortunately, no suitable baseline data exists to form any sort of comparison to previous groups of students, so the focus was very much on whether the story was useful to this particular group of students. Three similar questions were posed in the questionnaire to try and get a more accurate response as to the usefulness of the case-study and ability to apply knowledge. Figure 5 shows the range of responses; minimum means that minimum percentage obtained in any of the questions and similarly for the maximum.

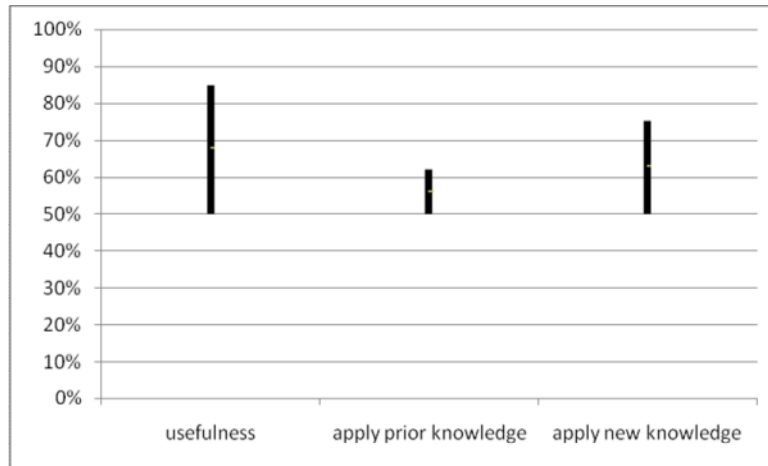


Figure 5: usefulness and ability of students to apply prior and new knowledge.

In probing this aspect further, of those using prior knowledge, 84% were using prior taught knowledge and 89% were using general knowledge (this was ~10% higher for *experienced students* compared to the others). Results from a separate question expand on the distribution of prior and new knowledge (Figure 6) indicating a fair balance. Generally, it can be concluded that the case-study and teaching sessions were useful and helped the majority of students to apply their knowledge to answer the questions posed. An interesting aspect is the degree of prior subject knowledge possessed by the students and further studies are planned to explore this aspect more fully.

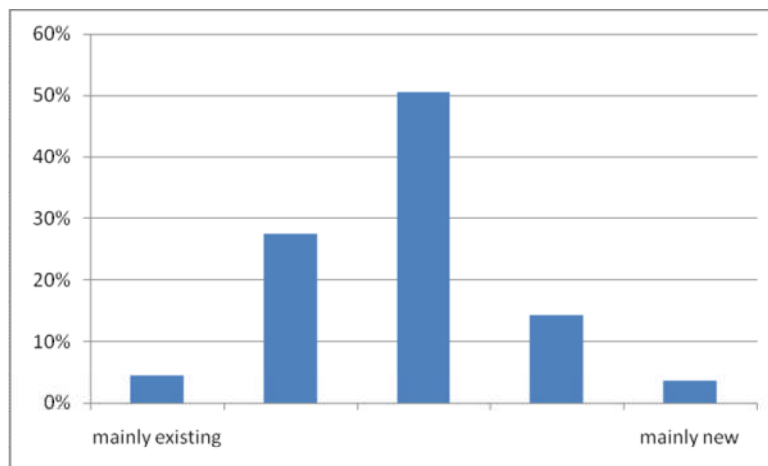


Figure 6: distribution of existing and new knowledge being used to answer the longitudinal case-study questions.

Environmental and cultural contributions

In the implementation of the module, the classroom environment (standard lecture theatres - Figure 7) has not made group discussions as easy as desired and appeared to create a psychological barrier for some students. Moreover, such a layout has created a physical barrier to the lecturer engaging with the individual groups as part of the formative learning experience. The result of this has been that

classroom-wide discussions have not been as expansive as the lecturing team would have desired and the students have not been given as much positive reinforcement and constructive feedback in smaller groups before discussions at a classroom level. Therefore, the socialising aspect and creation of an engaging and discursive environment amongst staff and students has not been fully achieved with this implementation. Despite these limitations, the students have found the classroom discussions largely positive and supportive of the learning experience.

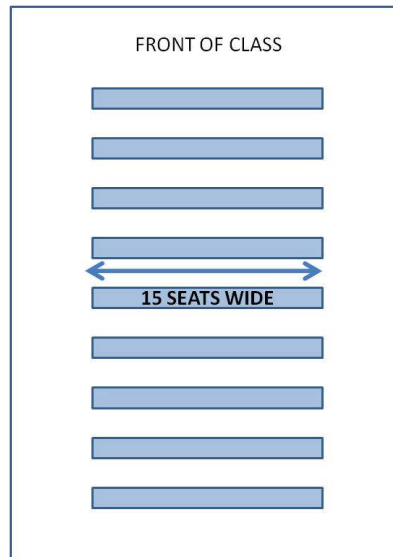


Figure 7: layout of classroom indicating physical teaching environment; blue shaded rectangles indicate fixed rows (combination of one bench and several seats).

People and motivations within business decisions

Finally, all the students were asked the importance of people in the decision making process (Figure 8). 99% of all respondents now have a level of positive appreciation of the role of people within decision making and change management processes in a modern business environment. As this was one key aspect that the case-study was attempting to illustrate, it is encouraging to see such a positive affirmation of the students' current comprehension.

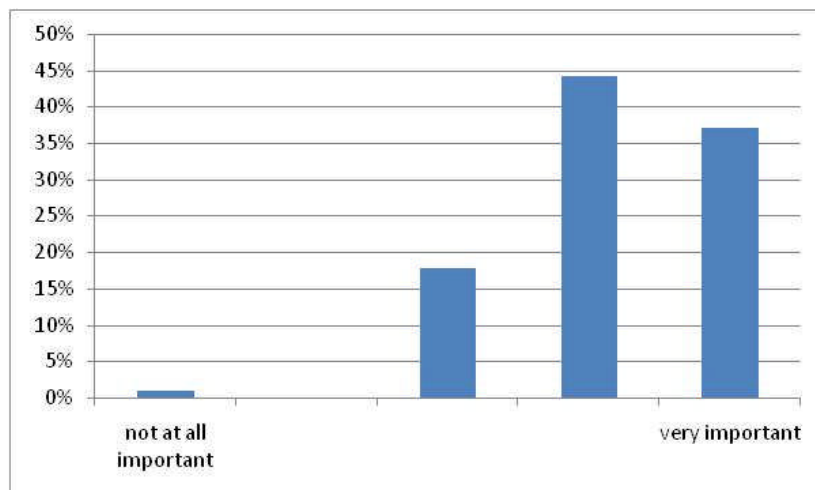


Figure 8: students' rating of importance of people in decision making processes.

Staff reflections

The main focus of this case-study was to provide a framework within which students could develop their analysis skills around business decisions in an open and formative environment. Figure 9 examines identified factors and, within that context, to what extent does the lecturing team believe that

these factors have influenced the first-year of this case-study. In particular, whether the desired outputs have been achieved.

Module organization and logistics (including environment)
<p>The current 5 occurrences of 2 hour sessions are too long for the students, particularly in the initial weeks as they develop their fluency in English;</p> <p>The 5 occurrences present challenges for the lecturing staff not to bias the discussions towards output from previous discussions (by Friday session have already had 4 similar discussions);</p> <p>Action: the above two points will be addressed by splitting the teaching time into 1 or 2 off 50 minute lectures and a set of 1-2 hour seminars with smaller groups.</p> <p>The classroom environment is not ideal for formative group discussions, as there are physical and psychological barriers between student groups and lecturing staff.</p> <p>Action: request through timetabling to have seminars in classrooms.</p> <p>Staff-student ratio was higher than desired (intention to support with a graduate intern did not happen), making it challenging to provide in-depth formative feedback to all students.</p> <p>Action: a graduate intern has been recruited and will be present in the seminar sessions next year.</p>
Challenge of multi-national group
<p>The significant percentage (77%) of French students has made the class dynamics difficult, as they prefer to speak in French, which can exclude (certainly initially) others within their group.</p> <p>Also, the different competencies in English made the initial weeks challenging, as students found, to varying extents, both the reading of the case-study chapters and the class discussions required frequent use of translation dictionaries.</p> <p>Action:</p> <ul style="list-style-type: none"> - In the initial weeks next year, written responses on flip-chart paper in English will be desired output from all groups in seminar sessions; - In later weeks, verbal explanation of ideas will be expected; - Review language and terminology using overseas students input; <p>Some students are not culturally used to independent and self-directed study.</p> <p>Action: this aspect needs to be explored further and work in this area is planned, including whether marks or sanctions are used.</p>
Effectiveness of longitudinal method
<p>Lecturing staff have used single-session case study material in the past. Students find the single-case approach more reassuring as the answers are typically contained within the example. Lecturing team believed this approach was useful as provides continuity across a number of weeks.</p> <p>12 weeks appears to be long in the current format.</p> <p>Action:- Consider releasing case study material every 3-4 weeks (and condense story to accommodate this), moving from more closed questions to open and ambiguous questions requiring independent study, research and analysis; OR.</p> <ul style="list-style-type: none"> - Reduce longitudinal case-study to 6 weeks starting it after a more standard case-study method has been introduced, so that students develop their analytical skills initially within a more structured framework.
Named characters
<p>Named characters were useful, as they provided a method to explore human perspective. However, there were too many characters to remember all of them unaided.</p> <p>Action:- Provide blank organizational chart that students will develop over weeks;</p> <ul style="list-style-type: none"> - Consider whether some “one-off” characters can be dropped from the case-study.

Providing focus for models and frameworks
<p>The case-study was highly effective and provided a good link to the taught lectures. However, the students were expected to apply concepts taught in the first hour in the second hour.</p> <p>Action: consider staggering the case-study material by one week from the lectures to allow the students sufficient time to digest the concepts and frameworks and work through structured examples and questions.</p>
Awareness of human perspective
<p>Lecturing staff are happy that the students have a deeper appreciation of the human perspective in decision making. This currently is not part of the module learning outcomes.</p> <p>Action: consider altering the MID to make it formally an intended learning outcome of the module.</p>
Mode of delivery of case-study via VLE
<p>The delivery via the VLE did not work this year, partly due to technical issues with time-triggered, automatic release. A new VLE (Moodle) will be used next year and has been trialled this academic year and has the ability to email students directly as well as send them automated updated messages when new material is posted on the VLE.</p> <p>Action: configure module web on Moodle to ensure students receive, via email, the next installment of the story.</p>
Groups as formative and learning environments
<p>Groups are an effective method of discussing material and developing understanding. The environmental factor has been considered already above, but a key aspect is whether to have dynamic groups or static groups. Dynamic groups (that change every week) do not allow trust to be developed, which will be an impediment to open discussions. Static groups can result in students being excluded (e.g. due to different backgrounds).</p> <p>Action: Next year have static groups ~6 weeks to allow development of trust and team dynamics. After 6 weeks, swap one group member every 4-6 weeks to continue to provide a fresh perspective within each group.</p>
Whole-class discussions
<p>These are effective when different opinions are expressed by different groups. As the group dynamics did not develop as envisaged, the benefit derived from this was not as strong as expected; in fact, lecturing staff had to strongly lead this part of the seminar (particularly initially), as opposed to facilitate. A structured approach from written feedback to verbal feedback will be implemented over the year.</p> <p>Action:</p> <ul style="list-style-type: none"> - implement structured feedback mechanism at end of each seminar, whereby the students and groups provide feedback in written format in initial weeks, moving towards verbal feedback in later weeks; - share opinions from seminars in lectures (using intern to collate information on weekly basis);
Assessment regime
<p>This year the case-study did not form a part of the assessment regime. With a structured feedback mechanism, as discussed above, then the case-study could be used as an element of coursework for next year. This needs to be considered further.</p>

Figure 9: staff reflections against key factors for this case study.

In addition to the factors identified above, a future objective of this ongoing work should to explore whether this longitudinal case-study method had a different impact on those students with and without work-experience. While this question was not part of the questionnaire, the student focus groups indicated that the case-study appears to have been effective for those students with previous work-related experience with one student saying “... it was good to see how a company runs, and I compared it to my experience in other companies and I think – oh, yes, that is why that happened.” Determining the different needs of students with and without work-experience to develop relevant business skills deserves further and more detailed consideration.

The lecturing team believe that the actions detailed above can be achieved within only minor increases in resources, principally the use of graduate intern.

Conclusions

In the first year of using this longitudinal case-study the majority of students have gained something personally useful from this approach across many facets - cultural, analytical skills and the “inside” view of decision making. As this is the first year of the study, a number of actions are planned to address identified points of improvement, which can be implemented with minimal increases in resources. The authors hope to report on the success of these identified developments at future events.

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