Use of Business Simulation Software with Final Year MEng Undergraduates in the Department of Aeronautical and Automotive Engineering

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How the business simulation software 'Marketplace Venture Strategy' is used within the Year 4 (Part D) Management module for 72 MEng Aeronautical and Automotive Engineering students.

Reasons for engagement

It is a requirement of the Institution of Mechanical Engineers and the Royal Aeronautical Society that accredited engineering courses should include management skills. The Head of Department, Rob Thring, also expressed a desire to do more than just deliver lectures, and to provide something of sustainable practical value in the early life of graduates as they enter industry.

The Year 3 (Part C) MEng business modules provide a conventional lecture approach to various business aspects and a limited opportunity to apply this in submission and presentation of a business plan for a new business idea, similar to the BBC TV programme "Dragons' Den". The intention of the Year 4 module was to take this business idea through its early period of business life and provide hands-on experience of the full range of issues facing a business.

Working in teams, using vague or conflicting information, then processing that information with externally imposed time constraints and with only a partly developed understanding of the consequences of decisions are all part of the experience. It was expected that improvements in decision making through heuristic learning and an appreciation of the complex interactions involved in the real business world would emerge as the simulation progressed.

The engagement

John Grover delivered an initial two-hour lecture to introduce the business simulation to the students. 72 students were randomly placed into one of two simulations, each with seven teams of five or six students. Two simulations were necessary because the software limits team size to six members, and the resulting 14 teams, if competing in a single simulation, could cause lower performing teams to give up prematurely if they perceive that they could not win.

Assessment was by group submission of an initial business plan at the start of week three, a final group report at start of week 11 and a group presentation in week 11. Marks were split 45/45/10%. Web based peer assessment (WebPA) was applied with a 25% weighting of the overall group mark to provide some level of individual attainment.

The University Virtual Learning Environment (VLE) allowed group communication and feedback to students on common or group issues, and students were encouraged to use their group forum for communication. This enabled the lecturer to monitor and intercept any issues or misunderstanding before they affected a team's performance. Email was used for most lecturer incoming communications and some outward notes to individuals when necessary. The volume of email queries initially required daily monitoring and responses, which were sent back to all students in a VLE forum when of general interest or a recurring theme.

Issues

Students were advised that the help system in Marketplace should be consulted in the first instance for technical queries and over-reliance on emails to the lecturer to clarify issues which could easily be found in the help system might result in a 'consultation fee'. While this had the desired effect on email volume it was probably taken too literally and a better balance of the need to clarify versus over reliance on lecturer support needs to be managed.

There is a significant amount of material within Marketplace to be assimilated by the lecturer before the engagement begins so they can speak with some authority (students will expect expert status) and this should not be underestimated. The material and simulation is, however, very comprehensive and when required the Marketplace help-desk is quick to provide further support.

At the outset of planning the module it did not prove possible to meet the initial requirement to enable students to run their Year 3 business idea using a simulation. Software to enable any type of business to be simulated and compete on an even playing field was not available, and bespoke software would have been prohibitively expensive and timely to commission. A further issue was that the Year 3 teams and business projects could not in any case be retained since around half the students depart on industrial experience for a year with half from the previous year returning. Support was gained from the Engineering Centre for Excellence in Teaching and Learning (engCETL) and they short-listed three potential commercial business simulation products. These were evaluated and "Marketplace Venture Strategy" from Innovative Learning Solutions was chosen.

Some teams treated the simulation as merely a game from the onset and throughout the semester - the general opinion of the Tutor is that these teams did not maximise their learning. These teams had an expectation of a simple cause/effect relationship following a set formula (some comments from students also suggest they thought the game too simple). While the game does have structured hidden relationships between decisions, their level of complexity means that occasionally unexpected things do happen – just like the real world it is trying to simulate. The students' role in these instances is to try to see some underlying order in the chaos. Some teams just treated these events as "unfair" or as imperfect game rules.

Some of the Marketplace material suggests that different institutions run the simulation in different ways. In particular more support with lectures and tutorials through the semester. This may be an area for improvement. The marks for each element may not have been balanced and the timing of the initial submission too early in the semester. Both of these are recognised issues and potentially will be changed for a future year. Another issue mentioned was that the game runs for 6 simulated quarters and this is insufficient. There are rules intended to avoid a team becoming bankrupt too early, but these also prevent early growth. By the time the rules are relaxed the game only has two quarters to run. Running for more quarters might be a further improvement.

Benefits

Based on team interactions observed in the VLE the majority of teams approached the exercise positively. They reacted as if to real situations, considering other teams as adversaries in a competitive world and responded well to the conflicts and imperfect view they were presented with to make decisions to a deadline. There did not appear to be any significant conflict within teams and WebPA supports this. Mutual support for effort made and honesty when mistakes occurred were in evidence as was a willingness to reconsider decisions in light of new information.

Structured responsibilities and task assignment and delegation were all in evidence as were under-utilised members offering to help others and over-loaded members willing to relinquish responsibility. In short, team working was of a very high standard. There was general, although not unanimous, approval of the simulation in preference to lectures. As a learning mechanism it is a potential viable alternative to traditional approaches, particularly with the changes identified.

Unintended outcomes

Some views expressed by students of the simulation being too simple were not anticipated. It is possible these may be attributed to the same students who persisted in thinking of the simulation as a game and not embracing its full potential. While appearing simple in some areas the game is clearly not predictable otherwise teams' performance would have been more consistent.

Industrialist perspective

The simulation was significantly different to conventional lecturing and more enjoyable with less burden on travel to deliver lectures. The criticisms made overall were fair and can be addressed through simple improvements. It is clear that some level of face to face support is still expected/ required, possibly more than the level allowed for – this would be more in line with other institutions using the software. The experience of this module alone would not justify the use of software exclusively as a learning medium, but with lecture and tutorial support it could provide a richer experience for students and lecturer.

Reflections

The academic-industrialist partnership in this instance had already existed for two years so this module had the effect of enrichening an already firm relationship. The development of the module and bringing it into being was challenging, enjoyable and rewarding. The changes already mentioned, if implemented, would improve the module, and more face to face support might keep the exercise more real and avoid any tendency to treat it as a game. It is possible some teams felt a little isolated and working remotely provoked a tendency to use a game playing mindset. With more experience it might be possible to use interventions to change the business landscape unexpectedly and create more challenge for students as the simulation progressed.

Context

John Grover is a visiting lecturer in Aeronautical and Automotive Engineering at Loughborough University where he delivers the 3rd year MEng Business Strategy TTD200 module. He graduated with a BSc in Chemical Engineering from the University of Birmingham and has an MBA from City University London Graduate Business School (now the Cass Business School). Currently a self employed consultant, he previously spent over 30 years in industry, the last 27 with Ford Motor Company in Product Development, IT systems development and Business Process Reengineering.

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