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Business-Simulation Pedagogy, Assessments, and Barriers to Entry in an Australian Educational Environment

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Abstract

This paper evaluates the pedagogies and assessment tasks that enhance the learning outcomes of online simulations in business and related fields. Business simulations offer authentic learning experiences that mirror real-world problems and enable students to practice and develop graduate capabilities, technical skills, and strategic decision-making skills. Emerging technologies along with increased bandwidth are creating new opportunities for online and cloud-based simulations and provide improved flexibility and portability for students. However, online simulations are not effective unless they are embedded within a pedagogic framework that optimizes learning outcomes. This paper identifies the gap in the literature by identifying the main pedagogy concerns created by using business simulations at both undergraduate and post-graduate levels in Australia including a discussion regarding barriers of entry and showcasing the learning outcomes for students and educators through qualitative case studies.

Keywords: *Business simulations, Pedagogy, Teaching, Learning, Australia*

1. Introduction

There is growing evidence that business students studying at the undergraduate and postgraduate levels are questioning the appropriateness of the traditional university style of content delivery [1]. Biggs [2] argued that for universities to remain relevant, business programs need to be rehashed and reframed to achieve the desired learning outcomes. This can be undertaken in several ways however an obvious solution is for organizations to adopt an online business simulation created by industry to assist in replicating ‘real life’ industry experiences [3]. With technology rapidly advancing and the flexibility of accessing information from mobile devices and at home, students should have the ability to access information through these options [4]. Online simulations offer an experiential learning environment that allows learning through trial and error to add to the overall skill and knowledge bank of individual students [5]. Often simulations are implemented due to the practicality of the software, and the ability to apply critical thinking and decision-making skills making it 'fun' for the user [6].

Business simulations are administered in teams and on educational campuses. However, with the increasing speed of the internet, new and differing forms of 'real-time' interactivity of social sites such as Moodle, Blackboard, Learning Management Systems, and Facebook among others, the ability to work online and in teams is growing exponentially, especially with the popularity of massive open online courses or MOOC's [7]. As ‘e-education’ content

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can now be delivered in a dynamic environment, it is important to make sure that the assessment tasks are suitable for the desired student learning outcomes and overall pedagogy of the subject and/or course [8].

As there are studies that suggest that some students respond better to different learning styles which allows for diverse ways of assessment [9][10], a comprehensive evaluation of current practice is used to determine business simulations through qualitative research in Australia. This paper aims to highlight the main pedagogical concerns identified by educators using business simulations and a discussion of the most appropriate methods of assessment for students. The paper finishes by identifying the main barriers to entry encountered by university educators wanting to implement business simulations in individual subjects and courses.

2. The pedagogy of business simulations

Many advocates in higher education championed the use of simulations as an alternative method of student learning [11][12][13] after the first business simulation was implemented at the University of Washington in 1957 [14][15]. This is influenced by a growing number of studies highlighting the pedagogical benefits simulations can offer to both the student and educator [16]. Studies on business simulation pedagogy can date back to the mid-fifties when the critical incident technique was implemented in which students encountered a simulated problem and were given an outcome in which students could reflect on their actions [17]. The challenges for today's educators are to find interactive, empowering, and engaging learning initiatives that meet the increasing demands and expectations of students. Elliot and Joppe [18] suggest that web-based delivery is also flexible delivery and allows information technologies to enhance efficiencies in universities. This is coupled with the demands of industry placing pressure on educational institutions to have 'work ready' graduates who can succeed in a changing business environment without the risks of using actual trading companies as the first encounter with 'real world' decisions [19]. With major advances in technology and increasing options that educators have in delivering dynamic content, business simulations have been developed globally to reflect the changing world in which business now operates [16].

There are suggestions students are demanding more technology in higher education, so their courses are more relevant which is perhaps true, but simulations are no substitute for face-to-face teaching [16]. It is also acknowledged that online teaching does not equate to having the world's best teacher. However, students react to simulations more positively than traditional lectures or case studies [20]. Enabled learners must be able to foster cognitive skills by 'initiating, managing, monitoring, reflecting, and evaluating learning tasks and processes' states McLoughlin and Luca [21] ideally with a simulation facilitator present. According to Gibbs [22] the emphasis should be placed on the process and not the content or delivery method.

Business simulations offer workplace scenarios in a computer-based learning environment that allow students to practice their knowledge and skills in a controlled setting (the digital environment). Business simulations are used to bridge the gap between the traditional academic literature and the advances in experiential learning [15] therefore it is appropriate to try and determine what students learn suggests Gosen and Washbush [24]. Studies have found that simulations assist in the cognitive development of students and enable students to progress their knowledge and skills [25] but simulation failings are also well documented [26][27].

Simulations are also useful for MOOCs which represent many global business courses [28]. Having the ability to deliver content via online cloud-based environments also appeals to universities that have multiple campuses and large cohorts of students from many countries [29]. It also allows business courses to grow in student numbers and encourage productive teamwork situations with automated data and feedback that can motivate the students to achieve higher results [30].

There is strong evidence that business simulation educators focus on student attitudes relating to what the student believes they have learned from the simulation [31][32]. This is generally gauged through student feedback, being formal responses. However, some authors advocate other methods. For example, Gentry and Burns [33] suggested educators use simulations to classify learning based on Bloom et al., [34] taxonomy of six learning objectives basic knowledge, comprehension, application, analysis, synthesis, and evaluation. The learning outcomes should reflect or at least influence some of these measured techniques. Palmunen et al. [35] also suggest that what is defined to be learned is put forth by the facilitator however often unintentional learning is more valuable and this can occur by using simulations. These authors highlight business simulations have shown increased profit awareness of novice learners and learning connections increased throughout the course.

Additionally, Feinstein [36] concluded that 'simulation modeling increases dynamic knowledge' which allows students to understand dynamic complexities advocating the use of simulations as a learning tool. Students do understand the importance of strategy suggests Gopinath and Sawyer [37] but also highlight that students can explain poor performance after the simulation.

Furthermore, business simulations need a champion to implement software that can occur at many levels such as subject coordinators, course designers, Heads of Schools, or even Pro Vice Chancellors of academia. All may experience some barriers to entry regarding software adoption based on cost, time, and technology resources [16]. Careful consideration then needs to occur in course design to make sure that the graduate learning outcomes have been met with an in-depth evaluation of course design and appropriate assessments offered.

2.1. Barriers to entry

There are numerous reasons why business simulations are not implemented into business courses. These include cost, access, and equity [8]. 'Off-the-shelf' business simulations have different costing models depending on the software and student numbers. Cost is generally determined by educational management. Access refers to how is the simulation going to be delivered and supported whereas equity relates to lower socioeconomic students who may not have the same facilities at home to practice the skills required for simulation usage [38]. But there are many other more specific considerations.

Clarke [39] highlights the issues of business simulation being access and delivery. For example, is the software administered by CD ROM, accessed through the web, purchased individually with a book as a companion, or custom-made? Furthermore, access to reliable technology, pedagogical change, professional development concerns, learner expectations, other support materials, and the instructor's role also need to be considered. These barriers to entry are showcased further in the outcomes and discussion section.

What assessment tasks to use in business simulations?

Feinstein [40] acknowledged simulations do not need to be exact replicates of industry but do need to perform certain functions. This suggests that all business simulations should be well-researched in their capabilities and reporting. Once the decision to implement a business

simulation has been made, most subjects embed the technology into a capstone subject at the undergraduate level and can vary within postgraduate courses claims van Ackers, Bailey, Wilson, and French [41]. A capstone subject can be defined as:

A crowning course or experience coming to the end of a sequence of courses with the specific objective of integrating a body of relatively fragmented knowledge into a unified whole. As a rite of passage, this course provides an experience through which undergraduate students both look back over their undergraduate curriculum to make sense of the experience and look forward to life by building on that experience [42].

House and Napier [43] have argued that since business simulations produce financial data, assessment criteria should be based on quantifiable financial information based on Return on Investment (ROI) for example. Whereas Wolfe [44] believes there is no link between financial performance and actual learning. Students may be able to achieve high financial results without understanding how it occurred. Too much emphasis can be placed on financial performance suggests Teach [45] who has argued a better method would be for students to accurately forecast events and budgets.

Anderson and Lawton [48] recommend multiple assessment tasks with no dominating method. Benckendorff et al., [25] advocate assessments which consist of team-based work, peer assessment, individual reflective reports, and individual posting to a weekly forum is essential. As ‘assessment is a necessary complement to purpose’ says Gosen and Washbush [26], from the educator’s perspective, consideration should be given to three categories: internal validity; external validity; and transfer-internalization says Burns, Gentry and Wolfe [32]. For example, Feinstein [40] has suggested internal validity asks the question: Does the simulation function in the intended manner? External validity: Does the simulation replicate what occurs in the industry? Transfer-internalization refers to how it will influence a student's career [47].

Thought must be given to how the simulation is administered and educators should also understand what works and what does not, Thavikulwat and Pillutla [47] have suggested. This will also assist in setting assessment tasks which include the pedagogical features being ‘authentic assessment, cognitive support, social support, and design of appropriate learning activities’ suggested McLaughlin and Luca [21]. Whereas Goosen, Jensen, and Wells, [24] have argued that ‘defining and clarifying objectives will dictate that certain decisions must be included and that others may be omitted’ and that will strongly impact which assessment tasks to include in courses using business simulations.

3. Methods – qualitative case study interviews

Qualitative researchers seek to answer questions that stress how social experiences are created and given meaning. As this study is primarily focused on data that encapsulates 'best practice approaches', business-simulation implementation, and pedagogical outcomes it is appropriate that a qualitative approach to data collection be utilized [31]. Qualitative methods can also be described as ‘research procedures which produce descriptive data: people's own written or spoken words and observable behavior' Taylor and Bogdon [48] have said. This also implies that a qualitative approach is an appropriate method as the data is recorded verbally and transcribed later. In-depth interviews are a useful way of data collection in qualitative inquiry in determining perceptions [49]. They also provide the possibility of getting to know people personally and of coming to understand their perceptions of the world

[48]. Stake [50] has argued there are significant benefits of using case studies as a qualitative research method as aspects of this approach can be drawn on from a variety of sources including holistic, ethnographic, naturalistic, phenomenological, and narrative areas. Yin [51] also is a strong supporter of qualitative research for similar reasons. Veal [52] prefers in-depth interviews to be relatively small therefore most of the interviews for this study were conducted in a face-to-face setting or via technology such as by telephone or Skype software for example.

This method allowed for a greater number of participants in different locations and time zones with the participant requesting their preferred method of contact. Nineteen interviews were undertaken by twenty people who actively use business simulations in Australia in either a distribution or a teaching capacity. All interviewees were originally contacted by email and consented to participate with some participants identified through the snowball technique [53]. The interviews were recorded and lasted between thirty minutes and one hour. Pre-determined questions were used as prompts after a reference panel evaluated their suitability for the overall project outcomes some of these outcomes are presented in this paper. The names of individuals and educational organizations have been omitted for anonymity as supported by an ethics evaluation committee at the lead university. As this is only one part of a larger study, more cases can be evaluated in the future through replicating the methodology and semi-structured questions.

4. Outcomes and discussion methods

The examples used in this study were by facilitators and educators using business simulations in undergraduate and post graduate courses in Australian universities. The participants were all actively using a business simulation in the 2021/2022 period in either the first or second semester or a winter or summer teaching period. The case studies had student cohorts of 40 students to over three hundred depending on the time type of delivery. Students are all enrolled in an Australian university but may be geographically located in another country such as China, Thailand, or Malaysia. Most business simulations were delivered in teams in a computer laboratory physically on a university campus with the ability to access the software remotely at any time to access reporting information. Two metropolitan Sandstone universities were completely online and are considered MOOC courses as identified by McAuley, Stewart, Siemens, and Corimer [28], due to the number of students enrolled however the students still participated in teams by communicating online via email, Skype, Facebook, or telephone.

5. Simulation skills and knowledge outcomes of students

Participants offered a range of skills and knowledge outcomes of students for this study. Although business simulations are technically based, all indicated that 'by final year their computer skills are pretty solid' therefore this was not a learning outcome for any course. 'We’re trying to create a more holistic student, a student that’s not solo focused, and a student that can see different aspects of the business and of them and the world' commented a participant. Another mentioned student 'gets a sense that the decisions are connected. They come out of it with a wider, richer understanding of how that discipline or skill set fits in the context of the other workings and major decisions in the businesses. Additionally, an educator said simulations 'help them consolidate their information. So, more recall information.

The main skills and knowledge the participants believed students obtained from using business simulations can be summarized by the following points. Students:

- Can consolidate information
- Have a wider and richer understanding of business operations and decisions
- Have the ability to produce professional business plans and business reports
- Can practice and improve their consultative skills
- Can implement decisions and reflect on their consequences
- Can interpret feedback and financial data
- Can draw on academic theory to assist in decision-making
- Can utilize a variety of dynamic communication technologies
- Can further develop their critical thinking skills
- Can gain further teamwork and group work skills

These skills and knowledge can be classified into Bloom et al.'s [34] taxonomy of learning objectives therefore indicating their research is still valid in today's dynamic environment. Some participants also likened simulations to gaming, but all suggested that business simulations have an element of 'fun' which also assists in the learning process as Palmunen, Pelto, Paalumäki, and Lainema [20] have suggested.

6. Types of assessments for business simulations

There are many types of assessments used in business simulations and vary depending on if used in an undergraduate course or a postgraduate course. For example, a regional university offering CapSims at the postgraduate level participant stated that 'there needs to be more detail, theory and reflection at a higher level' usually submitted in reports whereas all undergraduate courses offer a mixture of oral presentations, simulation participation as well as business reports. A summary of the types of assessments is offered in [Table 1].

Table 1. Summary of types of assessments for business simulations

Assessment Type	Word Count	Weighting	Undergraduate Course	Post Graduate Course
Student Attendance	N/A	5-10%	X	
Simulation participation	N/A	5-10%	X	
Simulation ranking	N/A	5-10%	X	
Simulation activities	N/A	40%	X	
Business plan	200-1000	10-20%	X	X
Strategic Plan	500-3500	10-20%	X	X
Team Meetings/ Communications	N/A	10%	X	
Quizzes	N/A	10-20%	X	
Case Study Oral	N/A	10-20%	X	
Case Study Written	300-2500	20-40%	X	
Group presentation	N/A	10-30%	X	X
Group report	1000-3000	20-40%	X	
Individual reflection report	2000-4000	20-60%	X	
Market analysis report	3000-5000	40%		X
Final Exam	N/A	30%	X	

As [Table 1] demonstrates, there are a variety of methods of assessment for business simulations embedded in undergraduate courses as identified by Anderson and Lawton [31]. This directly correlates to trying to align student learning with graduate outcomes as Palmunen et al. [35] have suggested. A participant mentioned having three assessment tasks

including a report as it 'has more detail and depth than they could cover in a presentation'. This statement echoes other comments made by most participants that assist in ‘keeping students engaged’ which was also frequently mentioned.

Group or teamwork was the preferred option of simulation participation which linked to at least one assessment task for all business simulations at all educational levels. It was suggested that using a 'group approach was a good way for the simulation to operate because it gave them all the aspects of the real-life environment'. Another stated 'You can put people in teams where they can communicate. That's one of the strengths of that particular software' [Collaborate is the name of the software]. Working in teams has other benefits as summarized by the following comment made by a participant at the post-graduate level:

It's for students and it particularly motivates them to learn commerce students. To be honest with you, particularly some of our students I think that it puts them in a competitive situation, and it seems, for many students, to trigger a level of interest. They get to select themselves with people that they know and that are comfortable with being in their teams so that probably makes a relatively enjoyable experience. They get to see, pretty immediately, the impact of their decisions, so there's no waiting around for the system to mark traditional assignments and get back to them weeks later. So, I think they enjoy the immediacy of the impact.

This seems apparent for other business simulations as McAuley, Stewart, Siemens, and Corimer, [28] also found. A sense of competitiveness can be derived from students wanting to do well from feedback, reports, and data generated by the simulations. One participant indicated that they offer 'two different prizes' for each team that comes first in the simulation rankings by Rate of Investment (ROI). They continued: 'I want to motivate them to be the winners. I present them with a certificate, and I present them with chocolates which we all eat in class’. Table 1 also indicates that simulation participation and simulation ranking also feature in some of the assessment tasks at the undergraduate level. A facilitator commented that 'this motivates students to attend class and have input into the decision-making of the team'. Another participant suggested that 'some students respond better to constant motivation. Having different assessment tasks seems to achieve this which supports Holmes et al., [10] findings. However, a facilitator of Red Global admits that ‘their grade has nothing to do with the mistakes they make or why they rank in the simulation. What students must do is write reports which support Wolfe’s [44] findings but the opposite of House and Napier [43] suggestions being students should be foremost striving for positive financial outcomes.

Teamwork also appears to motivate students to participate. Comments made by participants include 'students feel obligated to participate' 'encourages them to turn up' and 'simulations work better in teams as there can be clear divides between responsibilities and input'. Although one participant mentioned, it’s a massive teamwork bonus, he continued:

Teamwork is not favorably thought upon I don’t think in any university. Because the teams are multidisciplinary…we get to make their teams. We generate their teams based on their discipline and we also mix up international and domestic. So not only do they not know each other but they’re from totally different parts of the world. We do that because we all have different cultural values and beliefs.

Other educators organized their students into teams for similar reasons: 'for students to learn to get along with others' and 'share the workload' and 'for the students to find their

strengths and weaknesses'. [Table 1] also indicates assessment tasks such as team meetings, team communications, group presentations, and group reports that are used to encourage cooperation and assist students in learning to communicate with each other as a learning outcome. However, one participant delivered the airline simulation called Humelater in both a team and individual environment and believes 'the individual format worked better' admitting that it was due to avoiding team conflict.

At the graduate level, no participant had more than three assessment tasks. The learning outcomes for students also differed from those at the undergraduate level. For example, 'Students have to have a greater depth of knowledge and understanding of the data' remarked a participant using HOTS. Another mentioned that 'post-graduate students should already possess most of the communication skills hence a greater emphasis on report writing to industry standard'. This is also reflected in the types of assessments, business plans, strategic plans, and market analyses. Additionally, there is a greater weighting of these assessment tasks and the upper end of the word count compared to the undergraduate level.

Communication between students occurred at many levels and with the use of different technologies. Participants acknowledged that each university offered at least virtual or online resources so that information could be accessed remotely and dynamically. These typically included Blackboard, Learning Management System (LMS), and Moodle. As one participant suggested 'we use Moodle to post background documents, submit assignments and show the students their results'. However, others went further than that: 'We encourage students to swap email addresses or mobile phone numbers, create a Facebook page or even Skype each other'. Furthermore, a facilitator of Red Global confirmed using LinkedIn as a medium for communication during their master's course. He suggested this is two-fold. Firstly, there is a permanent record of communications during the simulation. Secondly, he said, 'I have a group and I try to put all students that get in touch with me in that group so that they are School of Hospitality and Tourism Management (SHTM) alumni that have an interest in revenue management.'. He added that he assisted a female student after the course by coaching her for a job: 'We strategized together, and she got the job. Within six to eight months of training, she was appointed as a revenue manager and now she relocated as a revenue director already' that was partly due to the introduction of a LinkedIn group.

7. Barriers to entry regarding implementing simulations

The participants identified ten barriers to entry and ongoing issues regarding business simulation implementation and continuance. These relate to the simulation champion, type of software, management decisions, cost, Information Technology (IT) capabilities and support, delivery method, support materials, facilitator skills, simulation continuance, and facilitator movements.

Firstly, all participants identified that a champion of simulation software is required. This is typically raised 'by the lecturer' at the undergraduate level. A participant suggested that 'it is generally the facilitator or lecturer in charge of the subject that wants to implement the software. They would lobby higher management for support'. Conversely, at the postgraduate level, the decision to embed a business simulation appears to come from management 'for competitive advantage reasons'.

The participants all acknowledged that the research into which business simulation to adopt is generally delegated to the subject coordinator. As one participant mentioned 'the subject coordinator is generally the lecturer and facilitator, so it makes sense for them to choose the best fit for the outcomes they are trying to achieve'. Another participant

mentioned ‘many simulations are fit for purpose therefore the sales pitch by the supplier may be of influence, but it comes done to the lecturer in charge’.

It was also acknowledged that the champion of simulation usage must garner support from higher management. 'This can be from the Head of School, the Dean, or office management' commented a participant from a large metropolitan university. Another mentioned 'that once management is on board, cost becomes a consideration'. The participants were all asked directly if cost was a concern and the responses suggested that it was not once the benefits of simulations were presented which contrasts with Ryan’s [8] findings. A participant represented many responses by stating:

You would think that cost is the overall issue. But once you break down the cost on a per-student basis, off-the-shelf business simulations are affordable. The companies that own the software cannot afford not to be competitive so they must make their product affordable, or no one will use them.

It was acknowledged that the costing models varied for each educational institution. An owner of the HOTS software suggested 'that each university has their delivery method. Those who conduct HOTS on campus prefer a one-off annual fee whereas those who are online in many countries prefer a per-student option'. Participants who knew the simulation costs estimated that the annual charge per student equated to be between AUD 10-$55. Two participants mentioned that they had the simulation software developed specifically for their courses, however, the costs exceeded AUD 100,000 and were not recommended for relatively small cohorts of students.

Consideration needs to be given to the IT department of the university. As all participants use business simulations that are ‘cloud-based’ meaning that can be accessed remotely, the IT department becomes an important factor in the delivery capabilities. ‘The IT department needs to support the software by having a fast internet connection and perhaps providing a computer lab [laboratory] for the students to use’. A software developer of the HOTS simulation also mentioned that ‘there may be security concerns or additional software required such Abode Acrobat, but we generally overcome all these problems when installing the software’ that supports Clarke's [39] research.

It was noted that the delivery method of simulations varies between each educational facility and with the teaching semester. For example, at the postgraduate level, courses tended to be stand-alone subjects and delivered in a condensed format over a week or two. At the undergraduate level, it is generally a semester being thirteen weeks, but the simulation only operated between five to ten weeks with the other weeks dedicated to familiarizing, training, and trialing the software.

As previously mentioned in the communication discussion, support materials include an online website to access information such as Moodle or Blackboard. As a participant commented 'We use Moodle to upload the background documents and other materials of interest. That is all that is required. Interesting to note is every participant mentioned that the use of the university library is not embedded in the course, however, the assessment tasks suggest otherwise having academic referencing as a requirement in reports for example. This is perhaps attributed to ‘students instinctively knowing how to research when report writing’ as mentioned by a report assessor.

Fifteen participants mentioned the skills of the facilitator and the tutors are essential to the success of the delivery and learning outcomes of students. This includes educators having 'an intimate knowledge of how the simulation functions and its capabilities'. The same participant

mentioned that they 'have over sixteen tutors facilitating the tutorials' implying they all must be well trained which is consistent with McAuley et al., [7] research. This also segues into the continuance of the software. The ongoing support needs to occur from the educators, the IT department, and the suppliers of the software. This includes a handover of the ongoing concerns of simulation delivery when educators change universities. It was suggested by a software developer that 'when staff change institutions, they most likely will implement the same simulation in their new job. If no one knows how it operates, it may not be renewed at their old job'.

8. Conclusions

The participants used in this study highlight the importance of the pedagogy of business simulations in Australia at both the undergraduate and postgraduate levels. Although previous research highlights specific methods of delivery and types of assessments, this study showcases that Australian universities embed simulations into both capstone and stand-alone subjects, and every course differs in method of delivery and types of assessment. Large cohorts of students access the software individually online but still work in teams whereas, at the undergraduate level, the simulations are still 'cloud-based' but accessed in teams generally in a computer laboratory. Teamwork is a common theme in all simulations however the assessments vary greatly and are strongly linked to learning outcomes. At the undergraduate level, there will be at least four or more assessment tasks whereas at the postgraduate level, there are only three and generally require a larger word count and all have different weightings. The barriers to entry concern having a simulation champion, type of software, management decisions, cost, IT capabilities and support, delivery method, support materials, facilitator skills, simulation continuance, and facilitator movements. Although previous research suggests cost is a major concern, this study suggests it is not as relevant due to the competitiveness of business simulations currently available and the desire to have blended learning in dynamic environments.

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