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INVESTIGATING THE EFFECTIVENESS OF AN AUTHENTIC LEARNING TASK: A CLASSROOM-BASED SIMULATION IN FINANCE EDUCATION

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Abstract

In this study, the effectiveness of a classroom simulation is evaluated in finance education. The simulation involves teams of students negotiating a business sale and/or purchase, by applying their discipline knowledge and graduate capabilities. The effectiveness of the simulation activity is evaluated on three criteria and shows firstly, that its utility as a learning task, as assessed using the Structure of Observed Learning Outcomes (SOLO) Taxonomy, is supported. Secondly, the activity requires students to draw on a range of graduate capabilities in meeting a negotiated outcome. Thirdly, the graduate capabilities developed through this activity are extended, at least partially, to the graduate workplace. The simulation design is based on the constructivist theory of learning. A case study approach provides a basis for interpretation. Interviews with current students and graduates of the subject now in the work-place are undertaken. These data, along with statistical information and relevant policy documents, are analysed and interpreted to generate the findings.

Background

Changing economy and a changing role for universities

Since the 1980s, the Australian economy has been largely based on the production, distribution and use of knowledge and information termed as a 'Knowledge Economy' (OECD, 1996). To compete effectively in this economy, Australia requires a highly skilled workforce (Parliament of Australia, 2001). Baard, Rench et al. (2014) report that today's employers are faced with work-tasks that present novelty, unpredictability and complexity, and since the mid-1990s there has been a call by employers that university courses should not only embed discipline knowledge and skills but also graduate capabilities such as problem solving, teamwork and communication (AACSB, 2013; CPA, 2012;

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AQF, 2011; Litchfield, Frawley et al., 2010; BIHEC, 2007). Increasingly, there has also been a call for real-world experiences or authentic learning tasks to be embedded in the curriculum to enable students, for example those enrolled in finance education, to draw connections between finance concepts and how they are applied in the real-world (Bailey et al., 2003). This would make the learning relevant to the students' future work goals (Lambert, Tant et al., 2008) and potentially develop desired graduate capabilities. Simulations are an example of authentic learning and are described as tasks that:

> *… replicate a real world decision making scenario set in a dynamic operating environment that requires progressively higher levels of decision making competency in order for students to improve performance* (Voss, 2014, p. 58).

Many studies describe the benefits of learning through simulations. They report that simulations maximise student engagement (Bell & Loon, 2015; Hertel & Mills, 2002; Neely & Tucker, 2013; Nygard, Courtney et al., 2012). Engagement occurs if the students perceive that the learning has value and that their engagement in it will realise the expected value (Biggs, 2003). Another benefit described is that the students' already acquired knowledge is activated and exploited and built upon as they acquire new learning and that students therefore see the relevance of the new learning (Chadwick & Raver, 2015; Lambert, Tant et al., 2008). Further, given that the students make the decisions as the simulation progresses, they are engaged in reflection and discussion which potentially leads to further learning (Bowness, 2004). Finally, effectively constructed simulations immerse students in a deep level of understanding, which is not only long lasting but also transferable to other subjects or the workplace (Erselcan, 2015; Hertel & Mills, 2002).

Despite these claims, Rudd (2013) states that there is little robust evidence for best practice and the use of the simulation to achieve optimum learning outcomes. In medical and nursing education there too is a need for evaluating the effectiveness of simulation in improving learning outcomes (Rutherford-Hemming, 2012), as is also the case with technology enhanced simulations learning in the business field (Benckendorff, Lohmann et al., 2016).

These varying perspectives show that there is a need for more evidence-based research around classroom simulations to validate whether they are effective tools that deliver the desired learning outcomes. This is especially important in the field of finance. Hui & Koplin (2011) claim that, although much research into authentic learning has been conducted in a range of disciplines in the past 10 years, this has not been the case in the finance discipline.

In response to the literature review, an investigative study was designed to evaluate the effectiveness of a simulation learning task in a final year undergraduate finance subject. The simulation replicated a real-to-life, team-oriented, negotiation exercise based around a business acquisition framework. The purpose of this investigative study is to establish whether the simulation activity would bring about:

- enhanced student learning as shown by the Structure of Observed Learning Outcomes Taxonomy (Biggs &Tang, 2007)
- the development of particular graduate capabilities
- the extension of the graduate capabilities to the workplace by the graduates.

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The study therefore adds to the evidence-based literature on simulations and also advances the literature about authentic learning in the field of finance education in Higher Education.

In the next parts of this section, an overview is presented about the constructivist theory of learning and its applicability in providing the theoretical foundation for developing a simulation activity. Second, a rationale is provided for the selection of the SOLO Taxonomy to evaluate the simulation's effectiveness in enhancing learning. This is then followed by a discussion related to graduate capabilities.

Simulations as learning tasks based on constructivism

The constructivist theory puts forward the view that humans construct knowledge and meaning from their experiences. Birenbaum (1996, p. 6) describes that the learner is involved in the active construction of 'schemas' in order to understand and create meaning. 'Schemas' are a type of framework for interpreting information or solving problems. New information is either 'assimilated' into the existing 'schema' or the existing 'schema' is 'modified' to 'accommodate' the new experiences. The student begins to think with this modified 'schema' and this brings about learning (Biggs, 1999; Trigwell & Prosser, 1996).

Further, learning is embedded in realistic or relevant contexts such as simulations and learners learn through the construction of a product. The learners are engaged in activities over which they have a large degree of control and find personally meaningful (Papert, 1986). Kolb (1984) states that when learners are immersed in experiential activities, such as simulations, they need to activate their prior learning and test their beliefs and theories to meet the demands of that new experience. This establishes a need for learners to reflect, gain feedback and examine their actions from varied perspectives. The collaborative nature of the activities places responsibility for production on each team of learners so that they can benefit from both the peer-assisted elements of dialogic pedagogies (Laurillard, 2002), as well as the productive component of constructionist pedagogies. Interaction is a critical component of the educational process and context (Anderson, 2003). Anderson (2008) asserts that learning designs should be organised around modes of student engagement: learner-content interaction; learner-teacher interaction; and learner-learner interaction. The simulation activity evaluated in this study supports the notion of learner-learner interaction.

Current simulations design principles linked to the constructivist approach

The design principles of the current simulation followed a constructivist approach. Hertel & Mills (2002) describe key design principles for setting up a classroom simulation activity. Four key principles are outlined next and linked to the constructivist theory of learning and the finance simulation.

First, students are presented with a real-to-life task where they, as a team, negotiate the sale/purchase of a business. The students are provided with financial data about the company which are analysed by the team to make key decisions about the value of the company and the design of their negotiation strategy (Papert, 1986). The learning is embedded in a social experience where interaction is critical (Anderson, 2003). As a team, the students define their objectives, allocate team roles, make all

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decisions and discuss their team's financial and strategic approach in negotiating a deal (Papert, 1986). Students are involved in three rounds of negotiations and therefore, have three cycles to test out and enrich their understanding (Kolb, 1984). Consequences of the team's decisions are evaluated by the team members after each negotiation through reflection and peer feedback. This sets up the conditions for significant further learning (Anderson, 2008; Kolb, 1984).

Second, solutions to the issue or problem inherent in the simulation are not determined quickly (Laurillard, 2002). In the finance simulation, the team's preparation for the negotiation was interrupted by intermittent newsflashes about government regulatory or legal decisions. These required the team to review their strategic approach.

Third, the lecturer's role is important:

- in developing the design and setting up the learning environment
- during the simulation, as facilitator who moves the momentum of the simulation along, clarifies any problems, encourages students to do their best and guides the students to relevant information
- in the debriefing stage at the end of the simulation, where students reflect and evaluate the consequences of their decision (Anderson, 2008). This results in potential further learning.

Finally, simulations need to create a challenging and a fast paced team environment. Students need to be actively involved in undertaking tasks to meet team outcomes (Kolb, 1984). In the finance simulation the three negotiation rounds determined the pace. The outcomes of the negotiation produced unexpected results for both teams. Each team needed to work with the new complexities when revising their strategy for the next round of negotiations. In this way further opportunities are created for learning (Anderson, 2003).

Simulation tasks and learning

In this study, the effectiveness of the simulation task to enhance learning is evaluated by applying the SOLO Taxonomy (Biggs & Tang, 2007). The SOLO Taxonomy is based on the constructivist theory of learning. As students learn about a concept their understanding of the particular concept increases in complexity and the student's 'schema' is modified on a quantitative and qualitative dimension. The quantitative dimension relates to the amount of detail or facts that are remembered. Learning at this stage is classified as *pre-structural* (Level 1) with no understanding or *unistructural* and *multistructural*, (Levels 2 or 3) where increasingly discrete aspects are named or listed. As the level of understanding increases, it changes not only quantitatively but also qualitatively through the integration and application of this new understanding. Learning at this stage is classified as *relational* (Level 4) or *extended abstract* (Level 5), if extended to a higher level of abstraction.

The simulation encourages students to progressively move to higher levels of understanding in order to improve the team's performance at the next round of negotiations. The extent that learning is enhanced through the simulation is investigated in this study by assessing student interview responses pre and post simulation against the SOLO Levels 1-5.

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Developing graduate capabilities through simulations

Biggs & Tang (2007), Huba & Freed (2000) and Race (2000) assert that when students are immersed in authentic learning experiences, they not only develop discipline specific knowledge and skills but also generic skills such as teamwork and communication. These generic skills, also known as employability skills, are defined by Australian universities as:

> *… interdisciplinary skills, knowledge and attitudes that equip students to live and work in a rapidly changing and complex world* (Macquarie University, 2016).

Employers subsequently evaluate a candidate's capacity to demonstrate the development and application of graduate capabilities at job interviews (Clark, 2013).

There is some scepticism of how well integrated graduate capabilities really are in university coursework tasks (Norton, 2012). The Business Industry and Higher Education Collaboration Council (BIHEC, 2007) also reports that the graduates' employability skills are under-developed and that there is concern from employers that universities are providing students with a *'strong knowledge base but without the ability to intelligently apply that knowledge in the work setting'* (BIHEC, 2007, p. 2). Similarly in 2013, The Business Council of Australia (2013, p.81) recommended action for an *'increased focus in tertiary education on employability skills'*.

This study investigates whether the current simulation requires students to develop graduate capabilities and whether the graduate capabilities developed are extended to the graduate workplace.

The next section describes the study's research objectives, the methodology applied, the findings and the conclusion.

Research objectives of the study

The effectiveness of the simulation task is investigated in terms of three research questions. These address whether, and in what ways, the simulation activity:

1. enhances learning as described by the SOLO Taxonomy Levels.
2. promotes the development of graduate capabilities
3. fosters long-term application of graduate capabilities as developed by the 2013 graduates now in the workplace.

Should the findings be positive, then the simulation activity is validated as a useful pedagogical tool for the teaching of the topic 'Mergers and Acquisitions' in finance education.

The methodology for gathering and interpreting the data will now be outlined.

Methodology

The simulation task design

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Students enrolled in a subject titled Mergers and Acquisitions, a final-year, third-year elective subject, took part in a three hour acquisition negotiation scenario. The students were from a range of disciplinary backgrounds including Law, Social Sciences, Accounting, Economics and Finance. It, therefore, created a classroom context where students could be allocated into multidisciplinary teams of six students per team to plan and execute the negotiated sale of a business. Teams either represented the Buyer or Seller party.

The subject coordinator stated that, the multidisciplinary nature offered advantages including the adoption of team roles that suited students' discipline strengths, proactive engagement with team members in team decision-making, experiencing a range of interdisciplinary perspectives and experiencing and responding to novel situations as a result of a range of unique requests from the opposing party. In this way, the educational experience for students was challenging, enriching and provided opportunities to extend student learning.

The scenario, designed by the subject coordinator, was aimed to simulate a real-world authentic work task. It was based around the Australian Federal Government (the Seller) deciding to sell the National Broadband Network (NBN) project to a private operator to ease its Budget pressures, with the identified potential buyer being a consortium group comprising a listed Australian construction company (at the time Leighton Holdings Limited, now CIMIC Group Limited) and a private equity firm. The student teams were given authentic background information about the project, sets of key buyer and seller requirements (wish-list items to be negotiated as part of the process), valuation parameters reflecting their respective roll-out and operational expectations of the NBN Project and a spreadsheet valuation model that they could manipulate as part of their planning and decision-making.

Following an initial planning session, the teams came together for three separate negotiation rounds, with intermediate planning sessions including injections of new information along the way, to see if they could negotiate a deal based on terms and conditions suitable for both parties. The simulation activity was planned for three hours.

Each group was given a set of specified requirements to be negotiated, as well as non-negotiable requirements unless financial compensation or additional financial incentives were to be offered in return. Each group was provided with a Corporate Plan for the NBN Project with assumptions and targets which each group could manipulate for managerial decision-making. During the planning and negotiation mode, two news alerts were announced. These were a class action law suit on behalf of the NBN installation contractors and a media release relating to potential reputational effects associated with Leighton Holdings Limited. These news alerts caused each group to reconsider their strategy and negotiation price.

In the end, negotiated deal outcomes were reached across all four of the scenarios undertaken, with the price and sale conditions negotiated proving to be surprisingly similar. At the conclusion of the simulation activity, a debriefing session was built into the activity and students were asked to reflect on and evaluate the consequences of their decisions.

The final aspect was for the teams to write a report to their respective Buyer or Seller agent outlining the outcomes of the negotiation exercise and key elements of the negotiation process, major decisions

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made and challenges faced. This was designed as a reflective assessment element associated with involvement in the simulation activity.

Case Study Design

The strategy of inquiry used in collecting data and its interpretation was a case study design. Yin (2003) and Sturman (1999, p. 103) state that a case is 'analogous to a single experiment'. It investigates an individual group or phenomenon and in this case, a simulation task in a finance subject is evaluated. The case study also extends the theory of the effectiveness of the simulation tasks in bringing about learning, developing graduate capabilities and whether these are extended to the graduates' workplace. Qualitative and quantitative data are used where appropriate to present the findings. Thomson & Dass (2000), as cited by Blackford & Shi (2015), assert that many studies that measure the outcomes of simulations do not use a pre-test/post-test methodology or sufficient measures of outcomes to support their claims. This study addresses these concerns.

Sample selection and interview schedule

Two groups of respondents were interviewed for the study. The first group included 2014 students enrolled in the subject. All enrolled students were invited to participate in the study (60 students). Ten students self-selected to be interviewed and participated in both the pre and post simulation interviews. The pre-simulation interviews were held one week before the simulation and the post-simulation interviews were held within a week of the conclusion of the simulation.

The second group included 2013 students who had graduated in 2013. All students enrolled in the subject in 2013 and who had passed the Mergers and Acquisitions subject (56 students) were contacted by email and asked to be part of the study on the condition that they:

- were employed in 2014 at the time the study was conducted
- had participated in the identical acquisition negotiation simulation activity in 2013.

Nine students self-selected and each person was interviewed once via telephone at the same time as the 2014 respondents.

The interview questions that related to each research question are presented in Table 1. All interviews and coding were conducted by the same two researchers not involved in teaching in the subject. This avoided a teacher-learner power relationship that could exist and influence the outcomes of the study. Both interviewers set up the same interview conditions and asked the same questions in the same sequence. All interviews were audio recorded and transcribed by the same two researchers.

Table 1: Research Questions and interview schedule

Research question	Interview questions
1. In what ways does the simulation activity enhance learning as described by Biggs and Tang's SOLO	Interview questions for the 2014 participants - pre and post simulation 1) What challenges might you face in an acquisition? 2) What are the key strategies to achieve acquisition success? 3) What skills and attributes do you think are important in a negotiation

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Taxonomy?	process? From an overall perspective? From a buyer's perspective? From a seller's perspective? 2013 participants 1) What are the hallmarks of a good acquisition process? 2) What do you perceive to have learnt from the activity in 2013? 3) In what ways have you applied this learning in your current employment?
2. In what ways does the simulation activity enhance graduate capabilities and thereby develop work ready students?	Interview questions for the 2014 participants during pre and post simulation. 1) What challenges might you face in an acquisition? 2) What are the key strategies to achieve acquisition success? 3) What skills and attributes do you think are important in the negotiation process? From an overall perspective? From a buyer's perspective? From a seller's perspective? Interview questions for the 2013 participants 1) What are the hallmarks of a good acquisition process? 2) What do you perceive to have learnt from the activity in 2013? 3) In what ways have you applied this learning in your current employment?
3. In what ways does the simulation activity foster long term application of graduate capabilities as evidenced by the 2013 graduates now in the workplace?	Interview questions for the 2013 participants 1) What are the hallmarks of a good acquisition process? 2) What do you perceive to have learnt from the activity in 2013? 3) In what ways have you applied this learning in your current employment?'

Coding of interview responses

The NVivo software was used to import the interview transcriptions for coding. The coding procedure is outlined next.

1. Coding of Graduate Capabilities

At the time of this study, the LTU Business School embedded eight graduate capabilities into its subjects (see Table 2 for their definitions).

Each respondent's statement per interview question was analysed sentence by sentence and the textual segments compared to the LTU University graduate capabilities definitions. Selective coding was applied to identify the core categories of text data (Cohen, Manion et al., 2011). The relationship between each code was made clear by each code category referring to a separate graduate capability definition.

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Table 2: Graduate Capabilities as defined by La Trobe University

Graduate Capability	Definition at final undergraduate year level
Writing	Write developed, focused and sustained arguments appropriate for professional and academic contexts.
Speaking	Effectively offer opinions which account for the outcomes of the discussion and the ability to deliver informative presentations with clear objectives that demonstrate the emergence of a professional voice.
Inquiry/research	Reflect critically upon research processes for the discipline.
Critical Thinking	Consider assumptions, classify and explore perspectives and formulate an integrated and insightful response.
Problem solving	Construct convincing and novel recommendations based on the identification of the elements of a problem and the application and evaluation of problem solving approaches.
Teamwork	Participate responsively in diverse teams to complete complex team projects in academic and professional contexts.
Ethical Awareness	Formulate a considered position in relation to the diversity and complexity of values, norms and behaviours in professional, societal or global contexts.
Information Literacy	Use applications to meet outcome requirements and integrate information to develop insights for disciplinary contexts.

Reliability of the coding process

Two researchers worked together when coding to ensure consistency in their interpretation of the text and its alignment with the graduate capability definition. Where unanimity was not achieved, the researchers referred back to the graduate capability definitions to discuss and achieve unanimity to accepting or reject to code the text for a specific category. Each respondent's interview text was coded before moving to the next respondent's text. To avoid losing the context of the response, the whole sentence in which the graduate capability was embedded was coded. Some longer sentences may have had more than one graduate capability embedded. Therefore, some text was coded more than once but for a different graduate capability each time. At the conclusion of coding, the residual data not highlighted by the coding was examined to ensure that it did not contain additional text for coding. Further, a comparison of textual segments which had the same codes ascribed were checked for internal consistency.

Following the coding, a second level of analysis involved examining the frequency of the responses for each graduate capability at the pre and post simulation stages for the 2014 and the 2013 respondents. In this way a body of evidence was extracted, both qualitative and quantitative, and relationships and patterns in the data were examined, analysed and findings generated.

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2. Coding of learning against the SOLO Taxonomy

The subject expert designed an assessment rubric based on the SOLO Taxonomy Levels 1-5. The subject expert assessed each respondent's transcribed interview responses against this rubric.

First the 2014 pre-simulation responses were assessed, followed by the 2014 post-simulation responses. Each participant's whole response per interview question was allocated a SOLO Level from 1 to 5. When all responses had been assessed against the rubric, an average cohort Level grading per interview question and an overall average mark per cohort for each interview question were determined (see Table 3). The same rubric was applied to the interview responses for the 2013 respondents.

The results, findings and discussion for each research question are now described.

Research question 1: In what ways does the simulation activity enhance learning as described by Biggs and Tang's SOLO Taxonomy?

Results

In Table 3, the cohort average SOLO Level of the interview responses are shown for pre and post simulation. An overall average is also shown.

Table 3: Summary results for SOLO Taxonomy Analysis for 2014 participants

Interview question number	Pre-simulation Average SOLO Level for cohort	Post-Simulation Average SOLO Level for cohort
1. What challenges might you face in an acquisition?	2.10	3.00
2. What are the key strategies to achieve acquisition success?	2.00	3.20
3. What skills and attributes do you think are important in a negotiation process? From an overall perspective? From a buyer's perspective? From a seller's perspective?	2.30	2.70
Overall average	2.13	2.97

Findings and discussion

For the first question, prior to involvement in the simulation activity, the 2014 respondents exhibited limited comprehension of the likely challenges that might result in a negotiation setting. Nine out of the ten students were assessed to exhibit the unistructural level (Level 2) of comprehension. Only one student demonstrated a higher level of comprehension detail, resulting in an average SOLO level score

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across the interview cohort of 2.10 or unistructural. For the post-simulation evaluation, 7 out of the 10 students were assessed to have shown improved learning and comprehension, at either quantitative or qualitative levels or both in the case of three students, following participation in the simulation activity. For the post-simulation to pre-simulation comparison, the average SOLO level increased by approximately one dimension from 2.10 to 3.00 or multistructural (Level 3) with three students' responses being grouped in the relational category (Level 4).

In terms of Question 2 relating to appreciation of the key strategies important to acquisition success, the range of pre-simulation SOLO levels was assessed to be at Level 1 to Level 3, with an average SOLO competency Level of 2.0 or unistructural. Again, there is evidence of increased comprehension from the post-simulation interview analysis, with 8 out of the 10 students' competency being assessed at Levels 3 to 4 or multistructural to relational. Similarly, from the comparison of post-simulation and pre-simulation level scores, 8 out of 10 students were assessed to have enhanced their degree of learning from the simulation activity. The average student SOLO competency level increased by 1.20 to 3.20 (Level 2 to Level 3) following simulation activity involvement.

Based on the broader nature of Question 3 regarding what skills and attributes do you think are important in a negotiation process, students had generally more to contribute. The increased discussion is also correlated, in general, with more elements or aspects being identified, with or without greater detail being provided, resulting in slightly higher assessed pre-simulation SOLO levels for the students, although 6 out of the 10 students were still assessed to be at Level 2 or unistructural. With four students receiving Level 3 or multistructural competency assessments, the average Level across the participant cohort was 2.30 or unistructural. At the post-simulation stage, there is evidence of learning in association with participating in the simulation activity, however, the assessed magnitude is lower compared with Questions 1 and 2 with the post-simulation average SOLO competency level increasing by 0.40 to 2.70, but remained within the Level 2 (unistructural) dimension. Interestingly, there were two students whose level of comprehension was assessed to have increased two levels from Level 2 (unistructural) to Level 4 (relational) in relation to the identification of important negotiation-related skills and attributes, whereas the largest individual student change for the previous questions was one level.

Overall, the SOLO Taxonomy analysis results for the 2014 student cohort indicated that involvement in the simulation activity has resulted in enhanced comprehension and learning of information relating to the business acquisition and negotiation process, with SOLO Taxonomy Levels increasing by marginally less than one level of competency, on average. Much of this enhanced learning is in the form of greater quantitative comprehension, however, there is also evidence of greater qualitative competency, particularly at the relational level.

The 2013 respondents completed the Mergers and Acquisitions subject in the previous year and a valid comparison between the two cohorts cannot be made. However a similar assessment was applied to their responses for questions 1-3 (see Table 1) and it is notable that the mean assessed SOLO Taxonomy comprehension level across the interviewed cohort was 3.44 (between the multi-structural and relational dimensions). This shows that the simulation encourages long term retention of key aspects related to a negotiation process (Erselcan, 2015; Hertel & Mills, 2002).

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From the perspective of student learning, based on the SOLO Taxonomy, the simulation task enhances student understanding and the simulation is therefore determined to be a useful tool to integrate in finance education to further learning that is long lasting or representative of deep learning.

Research question 2: In what ways does the simulation activity enhance graduate capabilities and thereby develop work ready students?

Results

The results of the graduate capabilities which were important to the negotiation process are outlined in Table 4. In Columns (2) and (3), the 2014 respondents' pre and post simulation results are shown and the 2013 respondents' results are shown in Column (4).

Table 4: Graduate capabilities which are seen as important in the negotiation process

Graduate Capability	(2) 2014 respondents Pre-Simulation Frequency of the graduate capability	(3) 2014 respondents Post-Simulation Frequency of the graduate capability	(4) 2013 respondents who were employed Frequency of the graduate capability
Problem solving	63 or 38.4%	75 or 30.24%	23 or 22.11%
Teamwork	52 or 31.7%	76 or 30.64%	46 or 44.23%
Speaking	26 or 15.85%	56 or 22.58%	20 or 19.23%
Enquiry or research	18 or 10.97%	18 or 7.25%	2 or 1.92%
Critical Thinking	5 or 3.04%	20 or 8.06%	10 or 9.61%
Ethical awareness	0	2 or 0.80%	2 or 1.92%
Information Literacy	0	0	1 or 0.96%
Writing	0	1 or 0.40%	0
Frequency of overall comments	164 or 100%	248 or 100%	104 or 100%

Findings and discussion

2014 responses pre-simulation

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The pre-simulation responses by the 2014 respondents show that they perceived that problem solving (38.4%) and teamwork (31.7%) are most important to achieve a successful negotiation. Problem solving was considered more important than teamwork by approximately 7%. This was followed by speaking (15.85%), enquiry or research (10.97%) and critical thinking (3.04%).

2014 responses post-simulation

Post-simulation responses indicate that the students thought that teamwork (30.64%) and problem solving (30.24%) to be of almost equal importance in achieving acquisition success. This differed to the pre-simulation responses where problem solving was perceived to be more important than teamwork by approximately 7%. Therefore the simulation required students to engage in a high level of teamwork in meeting acquisition success. A study by Burdett (2003) on 110 final year business students revealed that students valued group work for generating ideas, building friendships, improved learning processes and sharing of workload. In this scenario students needed to generate new ideas or solutions to achieve an acceptable purchase/sale price of the company during the negotiation phase. Secondly, the teams needed to generate collective input to develop a team strategy to obtain a better financial deal at the next round of negotiations. As one participant stated …*'it was a group centred task which allowed us to effectively split much of the planning activities'.*

In respect to problem solving demands of the simulation, students were required to construct convincing and novel recommendations based on the purchase/sale of a business (La Trobe University, 2012). As stated by Wilson (1996), problems in authentic activities are complex and rarely have one solution. The current simulation required students to engage in evaluating alternative solutions to problems and test these out during the negotiation phase with the opposing party. As one participant stated, …*'we had extra information coming in from the newsflashes and we had to think on our feet.'*

Speaking ranked third (22.58%) as it did in the pre-simulation interview, but was now perceived as having a greater impact on the simulation outcome by approximately 7%. During the simulation students offered opinions which contributed to the outcomes of the negotiation. In a team, they integrated the different points of view into the strategy plan. They also delivered three negotiation sessions with clear objectives discussed and decided upon by the team. An example of a response showing the importance of speaking included, …'*being able to market your own strategy and market your own conditions in a way that is convincing to the other party being persuaded'.*

Critical thinking was perceived as having a bigger impact on the simulation outcome by approximately 5% post-simulation to pre-simulation. Therefore the simulation engaged students to 'consider assumptions, classify and explore perspectives and formulate an integrated and insightful responses' (La Trobe University, 2012). As one participant stated, …'*you got to be able to process information first and foremost.'*

Enquiry or research was perceived to have less of an impact post-simulation to pre-simulation by approximately 4%. Student feedback during the interview showed that they had wanted to engage more in inquiry research by researching 'live data on the company' and incorporate this in the negotiation process. They recommended this as an enhancement to the activity next time it is run.

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Ethical awareness was not mentioned during the pre-simulation activity but was mentioned twice during the post-simulation interview or approximately 1% of all responses, indicating that the simulation had involved at least some students identifying and/or discussing an ethical issue during the simulation. One participant stated, …*'we focussed on getting the lowest price possible but at no expense of core values.'*

Information Literacy was not mentioned during the pre-simulation interview and only once in the post-simulation interview (0.40%). Writing was also not mentioned pre-simulation and with very low frequency post-simulation (0.40%). These findings are understandable given that the simulation did not require students to write or use information literacy.

The perceived impact of the importance of each graduate capability on reaching an effective outcome shifted somewhat from pre to post simulation. The biggest shift occurred in students perceiving teamwork and problem solving to be almost of equal importance post-simulation.

The simulation not only developed a range of graduate capabilities, but it also had an effect in changing the students' understanding in relation to the importance of some graduate capabilities, especially teamwork, problem solving, speaking and critical thinking in a negotiation process.

Responses of the 2013 respondents

The responses of the 2013 respondents followed the trend of the 2014 post-simulation responses (see Table 4). However, the 2013 respondents emphasised that teamwork (44.23%) was the most important capability by approximately 14% when compared to the 2014 post-simulation responses. The respondents mentioned teamwork twice more often than problem solving (22.11%), the next most mentioned graduate capability. The latter was considered 8% less important than the 2014 post-simulation responses. Speaking (19.23%), critical thinking (9.61%) and enquiry or research (approximately 2% of responses) were the next most frequently-mentioned capabilities with similar frequency to that of the 2014 post-simulation respondents. Ethical awareness was also mentioned by the 2013 cohort (approximately 2%) and with similar frequency to that of the 2014 post-simulation respondents. Information literacy (approximately 1%) and writing (0%) had similar low response frequency as to the 2014 post-simulation responses. The responses of the 2013 graduates suggests that the simulation activity had a powerful, long-lasting effect on students in appreciating the value of generic skills for this activity.

These findings suggest that the concerns described by Norton (2012) and BIHEC (2007), relating to graduate capabilities not being effectively integrated in university courses, could potentially be overcome by integrating effectively developed classroom-based simulations, especially in final year business-related subjects, to better prepare work-ready students.

Research question 3: In what ways does the simulation activity foster long term application of graduate capabilities as evidenced by the 2013 graduates now in the workplace?

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Results

The graduate capabilities that the 2013 respondents developed during the simulation, and which they currently apply in their work environment, are reported in Table 5.

Table 5: 2013 cohort application of the graduate capabilities applied in their current workplace.

2013 Cohort Graduate capabilities applied in their current employment	Frequency of responses
Negotiation with customers	11 or 30.56%
Team work	10 or 27.78%
Speaking	9 or 25.00%
Problem solving	4 or 11.11%
Reflection	1 or 2.78%
Technical skills	1 or 2.78%
Total responses	36 or 100%

Findings and discussion

The capabilities developed and currently applied in their jobs include skills in negotiation (30.56%), teamwork (27.78%) speaking (25%) and problem solving (11.11%). Students also mentioned that they apply reflection (2.78%) and technical skills (2.78%). All of these capabilities are important in dealing with the work demands as described by Baard, Rench et al. (2014). A sample of three responses from the nine 2013 respondents provide an insight into how students apply the graduate capabilities in the workplace.

Respondent 1: Negotiation, problem solving and communication

> I'm a supervisor at a retail company. Sometimes I have to say no to customers because they are trying to do a refund that is outside the policy and actually finding a compromise– trying to negotiate with the customer around the issue that they have presented and trying to compromise with them and, at the end of the day, get the best result for them.

Respondent 2 Speaking and teamwork

> The negotiation skills I didn't realise I had, have come in handy. …I found that the experience I had in discussing with another team, complete strangers to me, about things that we had to come to a conclusion about and that was fair for all parties, is what I also apply in the workplace.

Respondent 3 Speaking, reflection

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> In the negotiation you had to listen to what other people in the team and opposing team had to say and what their thoughts were and I carried that through to how I work now in my team.

The analysis of the 2013 student responses show it is not necessarily the technical skills related to finance that graduands carry through to their new workplace (2.78%), but more importantly it is the graduate capabilities that are transferred to the workplace which assist graduates in their new profession (approx. 97%).

This finding also supports the claim that effectively constructed simulations immerse students in deep learning which is not only long lasting but also transferable to the workplace (Erselcan, 2015; Lambert et al., 2008; Hertel & Mills, 2002; Huba & Freed, 2000; Kolb, 1984; Lambert et al., 2008). This finding supports the case that simulations in undergraduate courses provide a bridge between classroom teaching and professional practice in finance and should be implemented in the finance classroom. Today's employees are faced with work-tasks that present novelty, unpredictability and complexity. The analysis of the 2013 student responses suggests that the simulation task, at least partly, aided in developing the graduate capabilities that graduates apply in the workplace.

Limitations

As a case study, the research is not without limitations. Case studies are a single experiment and, therefore, not necessarily transferable to other discipline contexts. Further, the nature of the non-random sample, as well as the small sample size, may have skewed the results. However, Denzin & Lincoln (2000, p.452) explain that it is often common in research that the budget or time does not allow a high number of observations. The primary criterion is opportunity to learn.

Finally, the time gap between when the 2013 cohort graduated and when they were interviewed may have influenced the 2013 interview results. During the 12 month period the graduate capabilities that students now apply in the workplace may also have been reinforced through other experiences. The indicative findings however, may provide a strong reason for the formalisation of a wider research study in this area.

Conclusions

This research has contributed to evidence-based research around classroom simulations in the finance discipline where few research studies have been conducted into authentic learning.

The study provides evidence that the simulation activity, based on a constructivist approach, was effective in enhancing student learning by at least one level on the SOLO Taxonomy. The simulation was also effective in developing some of the graduate capabilities especially teamwork, problem solving, speaking and critical thinking. The analysis of the 2013 graduate findings suggests that the simulation task, at least partly, aided in developing the graduate capabilities that graduates apply in the workplace.

Government, industry and professional associations are requiring that the university curricula include authentic experiences and graduate capabilities that ultimately facilitate the work readiness of students

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upon graduation. The simulation activity described and evaluated in this study has been validated as a particularly useful tool to better prepare work-ready students. The findings are important for the university in which the study was conducted, as its reputation partly depends on its graduates being work-ready. The inclusion of simulation tasks at the final year level should be encouraged as one of the ways to enhance the employability of its students.

Next steps: The impact that simulations have on developing generic skills and the extent these are also transferred to the workplace, is worthy of further investigation with a larger sample size and comparative cases involving other disciplines.

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