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Enhancing graduate employability – exploring the influence of experiential simulation learning on life skill development

Florian Scheuring ^a and Jamie Thompson ^b

^aEdinburgh Business School, Heriot-Watt University, Edinburgh, UK; ^bThe Business School, Edinburgh Napier University, Edinburgh, UK

ABSTRACT

Skills and knowledge which increase the likelihood of university graduates finding employment is an increasingly important factor for higher education institutions. Even though subject matter expertise remains a primary objective, supporting students to build life skills that are desired by employers is essential to enhance graduate employability. Firstly, we draw on consultative interviews with 11 graduate recruiters to build a life skill ability scale. Through these interviews, we identify two constructs worth measuring (resilience and adaptability) not yet represented in extant life skill ability scales. Thereby contributing to life skills measures and their link to graduate employability. Secondly, this paper explores the influence of a team-based business simulation on the development of life skills at two higher education institutions in the UK for first- and fourth-year undergraduate students. Through a pre-survey and post-survey, this paper empirically finds that experiential learning by means of a team-based business simulation has an overwhelmingly positive influence on first-year students' self-assessed life skill development as well as their course-specific subject matter expertise. Yet, the findings show less significant results for fourth-year students. This contributes to our understanding of business simulations as a pedagogical practice and its benefits for students beyond their education.

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Graduate employability; life skills; experiential learning; business simulation; gamification

Introduction

In 2023, graduate employment and employability are perhaps the metrics receiving the greatest scrutiny within the UK Higher Education (HE) sector (Dunbar-Morris and Lowe 2023). Due to increasing costs associated with HE, universities are under pressure to enable graduates to achieve their employment goals (Healy, Hammer, and McIlveen 2022) and thus employability is being used as a key measure of value within HE (Ross 2023).

Accordingly, graduate skills are increasingly important to institutional reputation (Jack 2022) and students cannot just rely on their graduate certificate but must also demonstrate life skills that can be applied to a range of contextual circumstances (Succi and Canovi 2020). Thus, Cheong, Leong, and Hill (2021) claim curriculums need to move away from textbook learning to experiential pedagogical practices that incorporate essential life skills on top of subject-related knowledge. Such an outcome is mutually beneficial as improved life skills and graduate employment outcomes

CONTACT Florian Scheuring  F.Scheuring@hw.ac.uk  Edinburgh Business School, Heriot-Watt University, Edinburgh EH14 4AS, UK

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benefit graduates economically and socially but also benefit universities reputationally in league tables (Donald, Baruch, and Ashleigh 2019).

Our empirical study draws upon 11 consultative interviews with graduate recruiters to build upon a life skill ability scale by Cronin et al. (2021). We then deploy this scale in a pre-survey and post-survey to students participating in a web-based business simulation to assess how this classroom activity supports their self-assessed perceptions of employability-linked competencies and subject-related knowledge, thereby answering the following research question:

How do students' self-assessed subject matter knowledge and life skill ratings change throughout the trimester as a result of an experiential simulation learning activity?

Graduate employability

Governments are increasingly putting pressure on universities to increase the employability of graduates (Donald, Baruch, and Ashleigh 2019; Small, Shacklock, and Marchant 2018; Suleman 2018). Thus, the employability of university graduates has received increasing academic attention, often illuminating disparities between employers' and graduates' perceptions of what it actually constitutes (Cheong, Leong, and Hill 2021; Clarke 2017; Griffiths et al. 2018; Succi and Canovi 2020).

Employability is defined by Yorke (2006, 8) as 'a set of achievements – skills, understanding and personal attributes – which make graduates more likely to gain employment and be successful in their chosen application'. Yet rather than a clear definition of employability, it is generally deconstructed into a range of crucial competencies and skills that produce overall employability (Healy, Hammer, and McIlveen 2022; Small, Shacklock, and Marchant 2018). Thus, researchers must first catalogue the skills they include within the overall concept of 'employability' (Suleman 2018).

Scholars suggest education has the objective of providing life skills that prepare students for the workplace (Cheong, Leong, and Hill 2021) and Succi and Canovi (2020) suggest HE needs to increase students' awareness of transferable life skill development and its relevancy to employment. Yet, the role of HE institutions and their employed pedagogical approaches (e.g. experiential learning) for enhancing life skills and graduate employability are under-explored in the extant literature (Tan et al. 2023), which this paper aims to address.

Life skills

Key, core, transferable, employability, generic, and soft skills are terms that have been used interchangeably to refer to the competencies which enable students to behave positively, adapt, and effectively deal with challenges (Cronin et al. 2021; Mtawa, Fongwa, and Wilson-Strydom 2021; Succi and Canovi 2020; Tan et al. 2023). Such skills are in contrast to 'hard skills' which describe subject matter expertise or knowledge (Sin and Neave 2016). In this paper, we use the term 'life skills' as this captures soft and employability skills that are of integral importance for success in life (Cronin et al. 2021). Within Cronin et al.'s (2021) scale, they include teamwork; goal setting; time management; emotional skills; interpersonal communication; social skills; leadership; and problem-solving and decision-making. Cronin et al. (2021) state that through this scale, it is possible to explore and measure life skill development achieved through different pedagogical practices.

Developing students' life skills in the form of social (Nelis et al. 2011), emotional (Segrin and Taylor 2007), and time management (Hailikari, Katajavuori, and Asikainen 2021) have been shown to positively influence students' psychological well-being. Further, time management skills have been positively linked with students' academic achievement (Broadbent and Poon 2015) and their physical health (Claessens et al. 2007). The importance of these skills for graduate employability is widely accepted (Cronin et al. 2021; Schech et al. 2017; Steptoe and Wardle 2017; Succi and Canovi 2020). Thus, there is a duty of care for universities to afford students' opportunities to develop such life skills (Griffiths et al. 2018) and more research is needed on the integration of life skills into education (Alt, Naamati-Schneider, and Weishut 2023).

Research to date has shown the value of HE institutions facilitating opportunities for students to participate in extra-curricular activities (i.e. sports, paid work, and volunteering) as this builds the self-assessed life skills of students and alumni (Clark et al. 2015; Jackson and Bridgstock 2021). Further, Donald, Ashleigh, and Baruch (2018) have called for universities to provide tailored support to students to engage them in skill-enhancing activities whilst utilising alumni networks to facilitate these opportunities. Yet, research still emphasises curriculum design and pedagogical practices as a key support mechanism for building student competencies and life skills (Römgens, Scoupe, and Beausaert 2020). Dean et al. (2020) have shown that building integrative learning activities into classroom teaching can enhance students' professional development, resulting in work-ready graduates. Further, Ornellas, Falkner, and Stålbbrandt (2019) have evidenced the importance of practically applying knowledge to solve real-world problems to re-produce professional settings, and thus enhancing graduates' life skills.

Approaches to tracking as well as measuring students' life skill development are increasing (Zlatkin-Troitschanskaia, Pant, and Coates 2016). However, the measurement of learning activities' influence on their development through the application of established life skills scales is limited. Moreover, pedagogical practices actually aimed at enhancing life skills among students are limited due to a lack of competency-based and real-world learning activities integrated within HE curriculums (Alt, Naamati-Schneider, and Weishut 2023) to which a web-based business simulation may address.

Business simulations and life skills development

Simulations are a web-based software tool, which facilitates a form of gamified learning, where (usually) groups of students participate within a simulated organisation to make important business decisions (Subhash and Cudney 2018). Business simulations such as those in this study require students to develop their own company within the simulation software. The simulation forces students to make decisions on inventory management, purchasing, marketing, sales, pricing, HR, recruitment, R&D, investment, and re-investment all within their own individual organisation. Then, when students process their decisions, they receive results and data on things such as sales, costs, finances, market research, and employee morale. Students are expected to maximise the chances of their organisation being profitable by reflecting on bottom-line numbers and competing with other students via leaderboards (Huang, Silitonga, and Wu 2022). Such business simulations are an increasingly popular learning tool as they support teamwork, collaboration, and capture students' attention due to fun and enjoyable competitive tasks (Bitrián, Buil, and Catalán 2020; Lohmann et al. 2019). Table 1 presents the extant literature on Business Simulations within HE institutions.

Table 1. Literature on business simulations used in HE.

Author(s)	Findings
Angolia and Reed (2019)	Business simulation was found to be positive for learning experiences. The authors suggest that start-of or mid-trimester simulations may fit better with Kolb's learning cycle
Bitrián, Buil, and Catalán (2020)	Business simulations can enable students to experience a state of flow, associated with deep immersive engagement. Students in flow experience higher levels of absorption, enjoyment, and motivation
Buil, Catalán, and Martínez (2019)	Business simulation fosters intrinsic motivation among students. More autonomous and competent students are more intrinsically motivated within the simulation
Gatti, Ulrich, and Seele (2019)	A sustainability-focussed simulation was found to be positive for students' learning experiences and attitudes towards sustainability
Huang, Silitonga, and Wu (2022)	The business simulation had a positive impact on engagement and learning
Lohmann et al. (2019)	Business simulations were found to support authentic team-based learning and enhance student enjoyment and satisfaction
Zulfqar et al. (2019)	Through participating in a business simulation students are found to gain a positive attitude towards entrepreneurial activities

The literature summarised in [Table 1](#) has shown significant support for business simulations as a pedagogical tool to support students' engagement and motivation (Bitrián, Buil, and Catalán 2020; Buil, Catalán, and Martínez 2019; Huang, Silitonga, and Wu 2022), enjoyment (Bitrián, Buil, and Catalán 2020; Lohmann et al. 2019), and module-focussed outcomes such as positive attitudes towards sustainability and entrepreneurship (Gatti, Ulrich, and Seele 2019; Zulfiqar et al. 2019). Yet, such outcomes are often driven by interests internal to HE institutions as they support students' performance within modules and students' internal evaluations. Our paper extends this research by exploring the role of a business simulation in developing the portfolio of life skills that are of greatest value to post-university graduates and their future employability beyond HE.

Method (phase one)

Participants

Our 11 research participants were all graduate recruiters or in the field of recruitment (i.e. recruitment consultants). There was an almost equal split of gender amongst the participants (6 male, 5 female). These recruiters were sampled via the researchers' own personal networks on LinkedIn. Participants were approached with an initial introductory informative email informing them about the project aims and asking them to confirm they were actively involved in the recruitment of new graduates. We received informed consent from each participant prior to participation in the interview.

Instrument

Cronin et al.'s (2021) scale for life skill competencies was developed based on past literature which surveyed graduates for the skills they perceived as of greatest importance. Yet, the literature suggests a disparity between employers' and graduates' perceptions of what life skill competencies are of greatest value (Cheong, Leong, and Hill 2021; Clarke 2017; Griffiths et al. 2018; Succi and Canovi 2020). Therefore, to ensure our survey was fit for measuring life skills valued for employability, we conducted 11 consultive interviews with recruiter graduates. Interviews were conducted synchronously via the instant messenger chat function on LinkedIn. Such an approach to interviewing provided greater convenience and comfort to the recruiter and allowed them to be more deliberate, thoughtful, and reflective in their responses (Hinchcliffe and Gavin 2009).

We adopted a pragmatic epistemological position to interviews and the research as a whole, aiming to gain an overall understanding of 'what works' in terms of building employable life skills amongst graduates (Gross 2009). We started each interview by defining our understanding of life skills to each recruiter. Then, interview questions asked recruiters exploratory questions to discuss the competencies they look for in possible graduate candidates beyond role-specific knowledge and capabilities. Further, from the feedback recruiters receive from employers, we probed on what life skills successful graduate candidates were most likely to possess.

Procedure

We analysed the interview data using template analysis, whereby the data was analysed with comparison to an a priori template of Cronin et al.'s (2021) life skill scale. In the first round of coding, we picked out instances where interviewees mentioned eight of the life skill competencies outlined by Cronin et al. (2021) and coded these accordingly. In the second round of coding, we explored whether there was potential to revise, change, sublimate, or re-categorise any of the themes from the a priori template based on our research findings whilst also exploring the potential for new themes to emerge organically from the data (King 1998; 2004).

Table 2. Recruiter interview findings.

Life skill competences	Prevalence (n) ^a	Also included within Cronin et al's (2021) life skills scale
Teamwork	11	✓
Goal setting	7	✓
Time management	10	✓
Emotional skills	8	✓
Interpersonal communication	9	✓
Social skills	8	✓
Leadership	10	✓
Problem-solving and decision-making	10	✓
Adaptability	8	
Resilience	7	

^aOut of a maximum of 11 interviews.

Data analysis

Table 2 presents the ten life skill competencies recruiters found to be of greatest importance for employable graduates. We found we reached replicatory saturation after just six interviews, where all ten competencies had been discovered and repetition of each competency was occurring (Morse 2015). Yet, we continued with our 11 sampled participants for greater validity. No additional competency (outside of our 10 thematic findings) was mentioned more than once in any of the interviews. The interviews validated the eight competencies used in Cronin et al.'s (2021) life skills scale as each competency was mentioned in at least seven of the eleven interviews (Table 2), meaning we maintained the competencies used in the a priori template. However, we found two further life skills which were considered significantly important to recruiters in assessing graduate employability: *Adaptability* and *Resilience*, which were also discussed in at least seven of the eleven interviews (Table 2). We add these competencies to our measurement of students' life skills as a posteriori theme whilst also adding subject-related knowledge to the list of items which is deployed in the next research phase.

Method (phase two)

Participants and background

We use two business simulations as case studies to explore how effective business simulations were at enhancing life skill competencies amongst students. Both simulations are integrated into assessed modules in UK institutions. All participants were students enrolled on one of the two modules that have integrated the business simulation into classroom teaching.

As is usual in a business simulation, student participants are tasked with designing their own organisation within the constraints of the simulation, making decisions on inventory management, purchasing, marketing, sales, pricing, HR, recruitment, R&D, investment, and re-investment. After decisions have been inputted, students 'Run' or 'Process' a year of their company. Following the processing, students are given comprehensive data on how their simulated organisation performed including data on sales, finances, marketing, and HR. Students were not assessed nor awarded any credits for their organisation's bottom-line numbers, but a key part of learning and assessment was students' reflection on their organisation's performance.

For the two cohorts, Table 3 shows the complete and valid responses that were achieved for the surveys sent out pre – and post-simulation. In the pre-simulation survey, 226 students completed the survey ($n = 105$ male and $n = 121$ female) (Table 3). In the post-simulation survey 326 students completed the survey ($n = 174$ male and $n = 152$ female) (Table 3).

Instrument

This research has been designed to empirically measure the change in student's self-assessed subject matter knowledge and life skill rating using the life skill competency measures listed in Table 2.

Table 3. Participant demographic data at both institutions pre- and post-simulation.

Final-year cohort (total $n = 140$)			
Participants (pre-simulation): 87		Participants (post-simulation): 45	
Gender identity		Gender identity	
Male	Female	Male	Female
32	55	17	28
Age distribution	Age distribution		
20	5	20	1
21	41	21	12
22	25	22	20
23	7	23	8
24	5	24	2
25 or older	4	25 or older	2
First-year cohort (total $n = 445$)			
Participants (Pre-Simulation): 139		Participants (Post-Simulation): 281	
Gender Identity		Gender Identity	
Male	Female	Male	Female
73	66	157	124
Age distribution		Age distribution	
17	4	17	12
18	76	18	151
19	31	19	66
20	13	20	27
21 or older	15	21 or older	25

Following Gatti, Ulrich, and Seele (2019), we adopt a pre-game survey conducted before the commencement of the first guided classroom simulation session and a post-game survey at the end of the trimester and after the business simulation has been completed. We thereby are able to identify significant changes in life skill aggregate and activity level over the course of an entire trimester at both institutions.

The Qualtrics surveys were shared with first- and fourth-year undergraduate students at both institutions in the first lecture session of the trimester (pre-survey) and at the recap/revision lecture at the end of the trimester (post-survey) using a QR code on the lecture slides. Students were given time to complete the survey in class. All students were informed that their responses would be completely anonymous, and no credits or benefits were afforded to students who chose to take part. Ethical approval was granted from Ethics Committees at both institutions to undertake this research.

In the first section of the survey, questions focussed on establishing the extent of students' subject matter knowledge on the four core subject areas most closely linked to activities in the business simulation and the declared learning outcomes of the course (marketing, staff management, inventory management, and product design). These items were measured on a five-point scale from 1 = Very Limited to 5 = Very Good. The second half of the survey measured students' self-assessed life skills. Teamwork; goal setting; time management; emotional skills; interpersonal communication; social skills; leadership; and problem-solving and decision-making were measured using Cronin et al.'s (2021) life skills survey. Resilience (Mueller 2023) and adaptability (Martin et al. 2012) were adapted from existing scales used in HE literature. All life skill items were measured on a five-point scale from 1 = Strongly Disagree to 5 = Strongly Agree.

Hypotheses development

We develop and test the hypotheses shown in Figure 1. The business simulation at both institutions tasks students to make effective decisions on marketing, staff management, inventory management, and product design. Such experiential learning activities have been shown to develop subject-specific competencies by placing students into an experimental context where they can apply

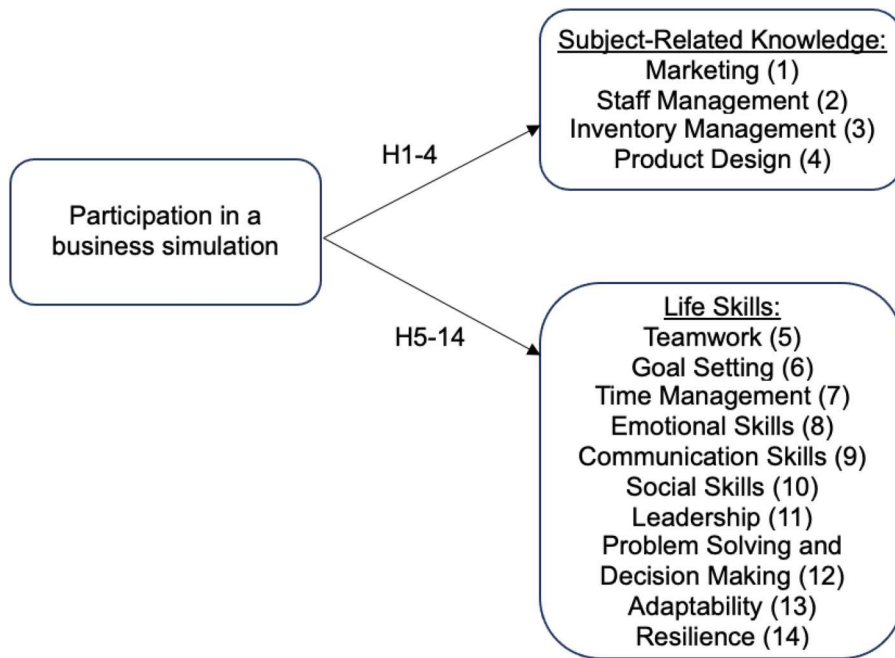


Figure 1. Conceptual model.

their learned knowledge and theory (Morris et al. 2013). Indeed, scholars have discussed how business simulations allow students to experiment with and apply subject knowledge in a practical but risk-free contextual organisation (Huang, Silitonga, and Wu 2022; Zulfqar et al. 2019) whilst building subject-related theoretical understanding (Gatti, Ulrich, and Seele 2019; Zulfqar et al. 2019). Thus, we hypothesise that:

H1–H4: Students’ participating in a Business Simulation will display significantly higher scores on their self-assessed subject knowledge of Marketing (1); Staff Management (2); Inventory Management (3); and Product Design (4).

To the best of our knowledge, no study has explored how business simulations impact the life skill development of students. Yet, studies have shown that when students have the opportunity to practically apply their skills in a business environment, this can play a significant role in shaping the following life skills: leadership, problem-solving, and adaptability (Collins-Nelsen et al. 2022), resilience, empathy, cooperation, and communication (Keskin, Alagül, and Gürsel 2022), and teamwork and emotional skills (Jackson, O’Brien, and Richards 2023). Indeed, studies have shown a positive relationship between experiential learning and practical curricular activities with the development of work-ready and employable students (Heyler and Lee 2014; Pitan and Muller 2019). In fact, when Pitan and Muller (2019) asked their sample of students what the university could do to enhance their employability skills, 75% of responses stressed the need for experiential learning activities. Thus, we propose our final hypotheses that make-up Figure 1:

H5–14: Students’ participating in a Business Simulation will display significantly higher scores on their self-assessed life skills of: Teamwork (5); Goal Setting (6); Time Management (7); Emotional Skills (8); Interpersonal Communication (9); Social Skills (10); Leadership (11); Problem Solving and Decision-Making (12); Adaptability (13); and Resilience (14).

Procedure

Following the completion and return of both the pre- and post-simulation survey results, the responses were reviewed with regard to participants having completed the entire survey as well as having indicated their self-assessed score for each of the subject matter knowledge and life skill criteria as well as their sub-criteria. Only fully completed survey responses were selected for subsequent analysis.

To allow for an initial comparison of both cohorts of undergraduate students, the mean values for each criterion and participant were established. This was carried out for both the pre- and post-simulation responses of each cohort in order to assess their improvement on both the subject matter knowledge and life skill self-assessment scores.

Testing the statistical significance of observed changes between the two cohorts from pre- to post-simulation, a two-tailed independent Student's *t*-test (Student 1908) was conducted with a statistical significance threshold of $*p < 0.05$. Given the differences in sample sizes between pre- and post-simulation responses and requiring a comparison of means between only two individual groups, Student's *t*-test was considered most appropriate.

Data analysis

Step 1: Pre-simulation analysis

Following the collection of responses from both first- and fourth-year undergraduate students at both institutions, the initially gathered dataset was analysed in regards to existing knowledge and life skills prior to the commencement of the simulation. For this purpose, the mean and standard deviation for each measure and category were determined across the full range of the sample population. Pre-simulation means of each category for year 1 and year 4 as displayed in Table 4 indicate that on average year 4 students of the respective business management programme perceive themselves as more knowledgeable and skilled in all but one category (Inventory Management). Categories displaying the greatest disparity in perceived knowledge were Marketing, Social Skills, Staff Management, and Communication.

Step 2: Post-simulation analysis

Learners of both cohorts reported an increase in all life skill development and subject matter experience aside from one category (Year 4, adaptability) as illustrated in Table 5. However, following testing of self-assessed learner subject matter knowledge and life skill proficiency with Student's *t*-test (Student 1908) regarding the statistical significance of observed changes, a significant disparity

Table 4. Survey findings of pre-simulation subject matter knowledge and life skills.

Factor	Pre-Cmean Y1	Pre-Cmean Y4	Prog-Diff Mean
Marketing	3.065	3.510	0.445
Staff Management	3.278	3.610	0.332
Inventory Management	2.763	2.365	-0.397
Product Design	3.223	3.313	0.091
Teamwork	3.996	4.229	0.233
Goal Setting	3.684	3.916	0.231
Time Management	3.478	3.630	0.153
Emotional Skills	3.715	3.817	0.102
Communication	3.918	4.235	0.318
Social Skills	3.868	4.249	0.381
Leadership	3.891	4.086	0.194
Problem Solving and Decision Making	3.893	4.077	0.184
Adaptability	3.649	3.899	0.251
Resilience	3.806	3.996	0.190

Table 5. Survey findings of post-simulation subject matter knowledge and life skills with significance levels (p -values) for observed changes.

Factor	Post-Cmean Y1	Post-Cmean Y4	Cmean-Diff Y1	Cmean-Diff Y4	p -value Y1	p -value Y4
Marketing	3.918	3.872	0.853	0.362	*** p < .001	.0032
Staff Management	4.013	3.763	0.735	0.153	*** p < .001	.298
Inventory Management	3.603	3.269	0.840	0.904	*** p < .001	*** p < .001
Product Design	4.028	4.064	0.805	0.751	*** p < .001	*** p < .001
Teamwork	4.330	4.421	0.334	0.193	*** p < .001	.344
Goal Setting	4.084	3.938	0.400	0.022	*** p < .001	.862
Time Management	3.858	4.032	0.380	0.402	*** p < .001	.0075
Emotional Skills	4.003	4.077	0.288	0.260	*** p < .001	.044
Communication	4.328	4.385	0.410	0.149	*** p < .001	.644
Social Skills	4.136	4.395	0.268	0.146	*** p < .001	.232
Leadership	4.143	4.271	0.251	0.185	*** p < .001	.600
Problem Solving and Decision Making	4.158	4.205	0.265	0.128	*** p < .001	.161
Adaptability	3.973	3.868	0.324	-0.031	*** p < .001	.691
Resilience	4.136	4.088	0.330	0.092	*** p < .001	.489

between the year 1 and year 4 cohorts emerged. While almost all assessed measures across both cohorts appeared to have improved over the course of progressing through the business simulation, only subject matter areas of Marketing; Inventory Management; and Product Design as well as the life skills Time Management and Emotional Skills displayed a statistical significance of $*p < .01$ for the year 4 cohort (Table 5). All other assessed factors displayed significantly lower p -values and indicate low likelihoods of these developments being attributable to the business simulation alone and cannot be assumed as closely linked to year 4 students' self-assessed development. In case of the year 1 cohort though, all conducted t-tests for observed changes showed p -values of $***p < .001$ (Table 5), indicating statistical significance. Thereby indicating distinct learner progression of the period of business simulation regarding self-assessed subject matter knowledge and life skill proficiency. Thus, for the year 1 cohort, there is strong evidence for the acceptance of H1–4 as well as H5–14 with learners displaying significantly higher scores on their self-assessed subject matter knowledge and life skill proficiency at the post-simulation stage.

For the year 4 cohort according to this study's findings only H1, H3, H4 as well as H7 and H8 are accepted with confidence as t-test results indicated a statistical significance of $*p < .01$ for Marketing, Time Management, and Emotional Skills, providing evidence for the acceptance of H1, H7 and H8 and p -values for H3 and H4 at $***p < .001$ provided strong evidence for their acceptance.

Step 3: Analysis of learner progression

The full range of survey results describing the development can be seen in Table 6. In all but two categories (Inventory Management and Time Management), learners in the year 1 cohort appear to indicate a stronger development in life skills and subject knowledge than is the case for year 4 learners. Most profound impacts were recorded for the subject matter expertise in the categories

Table 6. Survey findings summary.

Factor	Pre-Cmean Y1	Pre-Cmean Y4	Prog-Diff Mean	Post-Cmean Y1	Post-Cmean Y4	Prog-Diff Sdev	Cmean-Diff Y1	Cmean-Diff Y4	Prog-Cmean Diff
Marketing	3.065	3.510	0.445	3.918	3.872	-0.046	0.853	0.362	-0.491
Staff management	3.278	3.610	0.332	4.013	3.763	-0.250	0.735	0.153	-0.582
Inventory management	2.763	2.365	-0.397	3.603	3.269	-0.333	0.840	0.904	0.064
Product design	3.223	3.313	0.091	4.028	4.064	0.037	0.805	0.751	-0.054
Teamwork	3.996	4.229	0.233	4.330	4.421	0.091	0.334	0.193	-0.142
Goal setting	3.684	3.916	0.231	4.084	3.938	-0.147	0.400	0.022	-0.378
Time management	3.478	3.630	0.153	3.858	4.032	0.175	0.380	0.402	0.022
Emotional skills	3.715	3.817	0.102	4.003	4.077	0.074	0.288	0.260	-0.027
Communication	3.918	4.235	0.318	4.328	4.385	0.057	0.410	0.149	-0.261
Social skills	3.868	4.249	0.381	4.136	4.395	0.259	0.268	0.146	-0.122
Leadership	3.891	4.086	0.194	4.143	4.271	0.128	0.251	0.185	-0.066
Problem solving and decision making	3.893	4.077	0.184	4.158	4.205	0.048	0.265	0.128	-0.137
Adaptability	3.649	3.899	0.251	3.973	3.868	-0.105	0.324	-0.031	-0.355
Resilience	3.806	3.996	0.190	4.136	4.088	-0.048	0.330	0.092	-0.238

of Marketing and Staff Management in which year 1 students' progression was recorded to have been ~0.5 and ~0.6 points higher than that of the year 4 cohort, respectively (Table 6).

The increase in self-assessed subject matter expertise and like skills proficiency increased markedly in several categories. Particularly, subject matter expertise across all four assessed subject areas increased by 0.7–0.85 on the five-point Likert scale when compared to pre-simulation survey results (Table 6). Inventory Management (the subject both cohorts perceived to be their weakest area in terms of prior knowledge), represents the 2nd highest improvement for year 1 learners and the first for learners of the year 4 cohort (Table 6).

While the standard deviation for learner development of Inventory Management knowledge is the most significant among all categories, Product Design which displays similarly high increases of learner knowledge per cohort between 0.75 and 0.8, displays the lowest standard deviation across all categories of only 0.037 which indicates a rather homogenous development of learners' subject matter knowledge (Table 6).

Discussion and contributions

To the best of our knowledge, all attempts at life skill scale development have used data gathered from graduates (Cronin et al. 2021). However, given that there are disparities between graduates and employers about the skills they perceive as valuable for securing employment (Cheong, Leong, and Hill 2021; Clarke 2017; Griffiths et al. 2018; Succi and Canovi 2020), we conducted interviews with recruiters to validate a life skills survey. Our results validate the competencies used in Cronin et al's (2021) life skill scale but we also add two additional competencies: Resilience and Adaptability. At the outset of this project, we aimed to answer the following Research Question: 'How do students' self-assessed subject matter knowledge and life skill rating change throughout the trimester as a result of an experiential simulation learning activity?' Our expanded life skill scale has enabled us to answer this research question effectively. We argue that future research should use this higher order (10 competencies) life skills scale in future research if the goal is to measure students' life skills development from an employability perspective.

Previous research has shown support for business simulations as a pedagogical tool with positive outcomes for students' understanding of the module-focused outcomes (Gatti, Ulrich, and Seele 2019; Zulfikar et al. 2019). Our student data had mixed results. For the Year 1 cohort, we found support for all hypotheses, evidencing the positive and significant impact the simulation had on

first-year students' subject-related knowledge (H1-4) and students' self-assessed life skills (H5-14). For the Year 4 cohort, we found that while students perceived that their subject-related knowledge and life skills had increased to an extent, we only had statistical support for the increase in fourth-year students' self-assessed Marketing, Inventory Management, Product Design, Time Management, and Emotional Skills.

Therefore, we find the positive influence of the business simulation was more significant among year 1 students. These results are unsurprising in a higher education context, as the majority of year 1 students have very limited experience with university education and, accordingly, their learning curve is steeper (Callinan 2005). In contrast, Year 4 students had more experience with university presentations, teamwork tasks, assessments, learning etc., which may have resulted in the weaker statistical increases in life skill enhancement. Yet, the fourth-year students still perceived that the simulation supported their learning of key subject-related knowledge in Marketing, Inventory Management, and Product Design.

Therefore, our results indicate that a business simulation in Year 1 of students' learning may represent a more significant learning experience for students to enhance their key life skill competencies and subject knowledge. In contrast, the integration of a business simulation in fourth year may be better focussed on learning outcomes related purely to subject-related knowledge. Overall, we suggest that the integration of a simulation at both first and final-year degree stages may allow students to demonstrate their life skill enhancement and feel more confident that they have developed knowledge throughout their time at university.

All student participants were simultaneously engaged in other teaching activities and modules at the same time as the business simulation modules which were used as the study's independent variable. Therefore, as is the case in many higher education studies, it was impossible to isolate the effect the business simulation had on students' self-assessed life skills as learning and teaching settings with enrolled students cannot be placed into a controlled and artificial laboratory environment (Daniel and Harland 2017; Kyburz-Graber 2004). Yet, we deliberately designed the business simulation activities to overlap with the survey's life skill measures which had little overlap with the other modules students were enrolled on. Thus, higher education studies may still examine the results as statistically valid but 'the claims are based on the most likely or best explanation of cause and effect' (Daniel and Harland 2017, 64). Therefore, our findings answer our paper's research question by providing significant evidence for a cause-and-effect relationship between first-year students' engagement with a business simulation and the enhancement of students' self-assessed life skills. Yet, we do not have the same statistical support for the enhancement of fourth-year students' life skill enhancement.

Given the value of life skills for students' academic achievement, employability, and health (Broadbent and Poon 2015; Claessens et al. 2007; Cronin et al. 2021; Schech et al. 2017; Steptoe and Wardle 2017; Succi and Canovi 2020), we argue for further integration of business simulations in student learning (particularly at early stages) as there is a duty of care amongst HE institutions to afford students opportunities to develop such life skills (Griffiths et al. 2018). Though this is the first study to assess the influence of a business simulation activity on students' self-assessed life skill development, we join a growing number of studies that have discovered benefits from integrating experiential and practical learning activities within the curriculum to develop students' employability (Dean et al. 2020; Ornellas, Falkner, and Stålbbrandt 2019; Römgens, Scoupe, and Beusaert 2020).

Finally, we found that the business simulation was particularly valuable at filling learners' perceived knowledge gaps. In the pre-simulation survey, students reported low knowledge and understanding of inventory management whilst in the post-simulation survey, inventory management had the highest overall improvement across both cohorts. We find this practical, real-world, and risk-free simulation context (Huang, Silitonga, and Wu 2022; Zulfqar et al. 2019) allows learners to feel confident to learn skills that they may have previously perceived as weak as they learn through practical employment.

Limitations

As noted in the discussion of our results, our study could not control for other effects on students' skill development and knowledge such as the influence of other modules, teaching activities, and the fourth-year cohorts' undergraduate dissertation which will all have had some impact on students' knowledge and skills. Yet, much of the life skill development and subject knowledge had little overlap with other modules on students' programmes. Given the deliberate overlapping of the survey constructs with the specific learning outcomes of the business simulation, we are confident of the business simulation's significant cause-and-effect relationship on students' enhanced life skills.

Further, as is often the case with many student-participant studies, there were some challenges related to sampling. Firstly, as previously seen in [Table 3](#), there was a significant increase in participation between the pre- and post-simulation for the first-year cohort whereas interest in participation across the final-year cohort declined. Finally, due to the essential need to ensure the anonymity of participants given our role as their lecturers and assessors, it was not possible to guarantee that the same students completed both the pre- and post-survey. However, we received a significant response rate from students ensuring we captured the development of the student cohorts as a whole.

Conclusions and further research

Based upon interviews with 11 recruiters, our paper has built a life skill scale survey that can be used in future research with the goal of measuring students' life skill development. These interviews largely validated the eight-competency life scale survey by Cronin et al. (2021) who developed the scale based on the perceptions of students themselves. However, we also add two additional measures (adaptability and resilience) that recruiters found to be of importance in evaluating graduates when making decisions on employability. Research on competency-based and real-world learning activities is lacking in HE curriculums (Alt, Naamati-Schneider, and Weishut 2023). Thus, future research may benefit from adopting our expanded life skills scale to measure learners' employability skill development from pedagogical activities.

Our results show a positive relationship between students' engagement in the business simulation and an improved evaluation of their life skill competencies. These results are particularly significant among first-year university students. While previous research has supported the use of business simulations as a positive pedagogical tool for improving student experience (Bitrián, Buil, and Catalán 2020; Buil, Catalán, and Martínez 2019; Huang, Silitonga, and Wu 2022), we have shown evidence for the benefits beyond the immediate setting of higher education, with the simulation impacting students' evaluation of their life skills that translate into employable and work-ready students. Therefore, much greater attention is needed for business simulations in higher education research to see what additional impacts such a pedagogical activity can have as well as improvements that can be made to enhance additional student competencies beyond self-assessed life skills. Finally, while this study found significant positive results from the business simulation for first-year students, we only measured students' self-assessed life skills. Therefore, future studies would add enhanced reliability to research on student skill development by adopting a methodological procedure that conducts tests to measure students' life skills pre- and post-simulation.

Disclosure statement

No potential conflict of interest was reported by the author(s).

ORCID

Florian Scheuring  <http://orcid.org/0000-0003-3415-3649>

Jamie Thompson  <http://orcid.org/0000-0001-5508-4780>

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