Using Business Simulation Games to Help Students Prepare for Survival in the Workplace

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Abstract

Business professions seek workplace entering graduates with integrated knowledge and soft skills that are not sufficiently taught at universities. Students have an innate propensity for learning through play and exploration. We do not know how business simulation and games can prepare students across the performance spectrum for the workplace, and which learning domains play a role. A mixed methods exploration was conducted on 108 first year and 601 third-year students.

First-year Accounting Science students new to the subject, with lower marks, playing a board game on the accounting cycle benefitted more from the knowledge components of the subject compared to students with higher marks, who gained more soft skills, valued making the acquaintance with other students and far transfer to the real profession.

Senior Auditing students across all grade categories who participated in an online auditing simulation benefited most from engaging with a real-life scenario. The lower performing students learnt slightly more theory and developed more skills as the top- performing students and their affect due to the simulation was higher than the others. Simulations provided motivation and interest that helped novice students master theory and skills, while experts gained soft skills and far transfer into solving complex workplace problems.

Abstract in Afrikaans

Die sakewêreld verwag van nuwe professionele graduandi om geïntegreerde kennis en vaardighede te bemeester, wat nie voldoende aandag by universiteite geniet nie. Studente is gretig om deur spel en verkenning te leer. Ons weet egter nie hoe simulasies en bordspeletjies studente met verskillende prestasie vaardighede die studente vir die werksplek voorberei of watter leer-aspekte ‘n rol speel nie. Deur gebruik te maak van ‘n gemende metode benadering, is terugvoer van 108 eerstejaarstudente en 601 derdejaarstudente ontleed.

Eerstejaar rekeninkundige wetenskap-studente met meestal lae punte, het ‘n rekeningkunde bordspel in groepe gespeel, en hulle het veral baat gevind uit die vakkenniskomponente van die spel. Dit kontrasteer met studente met hoër punte wat dit nuttig gevind het om klasmaats te ontmoet, en die verband met die professie te verken.

Senior Ouditkunde studente oor die hele spektrum van punte wat aan ‘n aanlyn oudit simulasie deelgeneem het, het baie geleer van die binnewerking van ‘n werklike praktyk. Die studente met laer punte het effe meer teorie en vaardighede bemeester in vergeleke met dié met hoër punte. Hulle het ook meer positief oor die simulasie gevoel. Die simulasie het die laer-presterende studente dus geïnteresseer en aangemoedig om die vakteorie en vaardighede te bemeester. Beter presterende studente daarenteen, het mensvaardighede asook die oplos van komplekse toegepaste problem, soos in die werkplek verlang, bemeester.

Keywords: accounting education, auditing education, board game, online simulation, performance levels

Introduction

Watching young mammals in the wild romp and play, it is easy to recognise that children also develop skills, physical strength and social cohesion through play, imitation and role play. People have been learning new things without books or lectures since the dawn of civilisation. The key to their survival is practicing the necessary skills in a secure environment. Human survival today has a new face, it is called the workplace. But the characteristics of those learning activities are as relevant today as before.

Games and simulations are increasingly incorporated into higher education and corporate training, and are particularly popular in the business disciplines (Clarke, 2009). Blended learning allows the enrichment of lecture-based courses through physical face-to-face, computer-based and web-based games and simulations that make unique contributions to the learning process. As with many new technologies, the hype or novelty effect sometimes conceals the real learning value, and causes teachers to view games and simulations with suspicion. Considering the cost and trouble of rolling out such activities, average increase in class grades do not hold enough promise. In this study, students in different academic years in the same B Com degree participated in two simulations of professional practice in the Accounting sciences. We explored the perceived value such simulations held for students with dissimilar learning proficiencies.

Literature

Learning

From jungle to the present

From the earliest times people learnt important things necessary for survival through play (Montagu, 2017), and remembered their history for hundreds of years through oral traditions (Laylander, 2006). Stories help shape information into coherent wholes called schemata that help the learner remember complex related information (Hill & Hannafin, 1997). Learning new things is more effective if they are anchored in a familiar context, or relate to something that is already known, which is defined as pre-knowledge (Merrill, 2002). There is neurocognitive evidence for how people learn. "The brain, a pattern-finding organ, seeks to create meaning through establishing or refining existing neural net-works; this is learning" (Wolfe, 2006; p.35).

The best and most natural way of learning how to do something is by active experience (Kolb, Boyatzis, & Mainemelis, 2000; Papert, 1993). The activities needed for experiential learning differ by disciplines in Higher Education (HE) (Drake, 2011; Gosen & Washbush, 2004; Miettinen, 2000). Papert (1993; p.141) observed that the best learning takes place when the learner takes charge, stating that "you can learn without being taught and often learn best when taught least". Unfortunately, experiential learning by doing, though highly desirable and more effective than passive instruction, is hard to implement in a classroom (Kolb et al., 2000; Schank, 2001), often limiting its use. As it is difficult to implement meaningful class activities in short periods of contact time, activities are limited to knowledge acquisition. Simulations and games are closer to how people really learn.

Learning taxonomies

Bloom (1956) taxonomy of the cognitive domain formulated in 1956 is still popular in HE, describing the levels of achievement of learning outcomes (Huitt, 2004). Later revisions extended the taxonomies to three domains (Carter, 1985; Ferris & Aziz, 2005; Huitt, 2004), namely:

- Cognitive learning: mental skills or knowledge (*knowing*)
- Psychomotor: manual or physical skills (*doing*)
- Affective learning: feelings or emotional areas, motivation, attitude (*being*).

Universities have been describing learning outcomes mainly in the cognitive domain, as what the student should *know*. With the advent of outcomes-based education,

descriptions changed to what students should be able to do, combining *knowing* and *doing*, suggesting that domains are not separate and independent, raising questions about the value of the affective domain.

Learning in the affective domain means internalising and organising values into a system or philosophy that can be applied in life (Krathwohl, 2002). As students' *being* changes, so does learning in the other domains, because emotion affects what is learned and what is retained (Wolfe, 2006). Affect also underlies the enjoyment of learning, helping students retain concentration and motivating them to engage and persist with activities (Wojciechowski & Cellary, 2013). Learners are usually intrinsically motivated to learn when they are actively engaged in the learning process, because they find the experience intellectually exciting and joyful (Papert, 1993; Yang, 2017), but selected activities should also align with the learning outcomes.

Alignment in learning outcomes

Constructive alignment between intended learning outcomes, teaching and assessment ensure that the outcomes can be achieved by everyone (Biggs, 2014). Aligning course outcomes with qualification standards make sure that students are not overloaded with tasks, because that discourages deep approaches to learning (Boud, Cohen, & Sampson, 1999). Learning is about what the student does, not what the teacher does. As learning progresses it becomes more complex, while learning outcomes could also prepare students for the workplace.

Outcomes for the workplace

The rapidly changing environment of business professions requires new skills while workers should also be able to execute more complex activities (Neelen & Kirschner, 2018). However, HE is not preparing graduates to survive in this jungle. Transfer of knowledge from textbook to the workplace is crucial, but formal education does not integrate those skills sufficiently for workplace application. Salomon (1992) distinguishes near transfer (to closely related contexts and performances) from far transfer (to rather different contexts and performances), which is the sought-after workplace skill. Authentic experiences for students, however, is hard to find, and often quite dangerous (Schank, 2001). Students need to experience the effects of their actions, but in a safe environment, where they can fail without dire consequences, and learn from mistakes. Such an environment is created in a game or simulation that represents reality.

Game-based learning

Board games

Adults have been playing board games in the Middle East for more than 3500 years and dice for at least 5000 years, using painted stones, bones, flat sticks and later dice made from more durable materials like brass, ivory, marble. Games about military tactics and strategy hail from about 13th century BC, and some resembled modern chess in certain characteristics (Attia, 2016). The Romans played a game similar to today's popular Backgammon, while Monopoly, whose precursor dates from 1904, still teaches players today about rentals, real estate and becoming rich. What these games have in common is the intended learning outcomes of understanding abstract principles and developing strategic thinking (Attia, 2016). Today, both new and old table-top games are based on the original principles and represent a multi-million-dollar industry. Technology allows board games to be played real-time, online and world-wide, with players building communities and sharing strategies (Attia, 2016). Such games have the potential of enhancing formal learning situations in HE. The essential attributes of educational games include: "player or players, conflict [or cooperation], rules, predetermined goal of the game … artificial ... pedagogical nature" (Sauvé, Renaud, Kaufman, & Jean-Simon, 2007; p.248) and the development of specific skills.

Simulations

In the literature simulations have various definitions. Kindley (2002; p.2) sees simulations as "dynamic, moving learning events in which you actually perform a job and experience the results as if you were really there". Sauvé et al. (2007; p.253) concluded that a "simulation is a simplified, dynamic and precise representation of reality defined as a system". Thavikulwat (2004) added the dimension of technology creating an artificial environment with the participants inside. Therefore, a simulation requires a dynamic and simplified model of reality that should be perceived as true, valid and precise by the user and the purpose thereof is to improve the understanding of the reality by the user (Kindley, 2002; Maier & Größler, 2000; Milrad, 2002; Sauvé et al., 2007).

The advantages of simulations have been well documented, and except for bridging the gap between theory learned and the practical application thereof (Bradley, 2006; Weller, 2004), they allow for critical thinking and a deeper learning approach (Beckem II & Watkins, 2012; Clarke, 2009) giving students a visual glimpse of the practical scenario (Clarke, 2009). Later research defined the purpose of a simulation as enabling

students to experience how the theoretical knowledge plays out in real life, which allows for bridging the gap that educators have struggled with for decades, especially in accounting education (Anderson & Lawton, 2009; Beckem II & Watkins, 2012; Bradley, 2006; Carmichael & Willingham, 1969; Siegel, Omer, & Agrawal, 1997; Silvia, 2012). When the simulation is based on the identified skills, work challenges, activities and scenarios encountered in reality, scenario-based training can be effective to develop complex skills that are needed in the workplace (Carenys, Moya, & Perramon, 2017; Saurin, Wachs, Righi, & Henriqson, 2014), making simulations a more attractive option compared to games.

Autonomous training interventions like business simulations mimic a real environment and characters, while integrating the needed knowledge, skills and attitudes. Such simulations also facilitate the transfer of those skills to new situations (Alessi & Trollip, 2001; Asiri, Greasley, & Bocij, 2017; Saurin et al., 2014). An overview of research on business simulations and gaming confirm their importance as powerful teaching tools, their flexibility to teach diverse subjects and skills, and their relationship to performance (Faria, 2001) and with advancements in technology, simulations are moving online.

Digital online simulations

A fully online simulation can provide simulated experiences that allow students to learn by doing in ways never possible before and to immerse themselves into the role-play of the simulation (Schank, 2001; Silvia, 2012). Online simulations, like games, generate high levels of engagement (Carenys et al., 2017) and serves as an antidote to the resources and capital required to use instructors to monitor and steer the scenarios. Online simulations have become more popular and include activities such as videos, student manuals and case studies, all of which are developed from real-life experiences (Siddiqui, Khan, & Akhtar, 2008; Wynder, 2004). The benefits of an online simulation are that it is not limited to time and space and it allows for instant feedback on decisions (Siddiqui et al., 2008; Wynder, 2004). It offers the same hands-on experience to all students, thus making it possible to accommodate large classes (Buckless, Krawczyk, & Showalter, 2014); it allows for asynchronous learning and students are allowed to "fail fast, fail often, but fail safely" (Kindley, 2002; p.1). In addition, a computerised simulation allows participants to visualise (Clarke, 2009) and obtain a holistic understanding, because information is not compartmentalized by chapters or lectures (Anderson & Lawton, 2009). Three prominent drivers in an effective educational game are skills development, motivation and fidelity.

Skills development

Playing games let participants practice skills, build knowledge and develop fluency and mastery (Papert, 1993). Games are also strong motivators to achieve perfection through practice, making games attractive options for preparing students for the workplace. Both teachers and students believe that game-based learning strongly improves ICT skills. Teachers also believe that motor skills, declarative knowledge and cognitive skills are strong outcomes, whilst their students beg to differ and rate social skills (collaboration and communication) as the next best outcome (Pivec, 2009). Collaboration inside and the social environment outside the game, encourage students to engage in activities. In some learning games, the surrounding meta-game contributes strongly to the learning, leaning towards role-plays, which can contribute to procedural and strategic knowledge (Pivec, 2009). Due to real-world knowledge and skills outcomes, role-play, however, is closer to a simulation than a game.

Motivation

Game motivational techniques include competition, goal setting, scoring, fantasy, surprise, uncertainty and relevance (Alessi & Trollip, 2001). Added motivation is the gathering of tokens or virtual money that the player must use to execute procedures, which lead to the development of decision making and critical thinking skills.

"Simulation makes it possible to maintain learner enthusiasm, like with games, and support real performance change" (Kindley, 2002). A computerised simulation also allows for the creation of a new learning culture that better corresponds with students' current technological habits and interest and thus meets them in their familiar surroundings (Justice & Ritzhaupt, 2015; Rosen, Carrier, & Cheever, 2010). Students rather engage with computer-based augmented reality environments that they enjoy and find useful. The design of the interface contributes to the ease of using the environment, but is not the strongest determinant of their enjoyment (Wojciechowski & Cellary, 2013).

Pelser-Carstens and Blignaut (2018) found that students engaging with a board game enjoyed the social aspect of the board game most, followed by gaining subject knowledge, soft or technical skills, whereas group work with effective functioning was last. Carenys et al. (2017) found that accounting students enjoyed playing a videogame about particular content more than engaging with a comparable simulation. More important is the finding that the cognitive learning gains from the videogame and the simulation were equal (Carenys et al., 2017).

Fidelity

"Essential attributes of simulations include a model of reality defined as a system; a dynamic model; a simplified model; and a model that has fidelity, accuracy and validity" (Alessi & Trollip, 2001). Fidelity refers to how closely a simulation imitates reality, and affects the learner's performance during the simulation as well as the application of knowledge to new situations. Fidelity provides context and aids understanding.

When distinguishing between students with different academic orientation, novice learners initially learn better from lower fidelity simulations that are less overwhelming, avoiding excessive stimuli (Alessi & Trollip, 2001; Huang, Johnson, & Han, 2013). An experienced learner or expert learns most during a simulation with higher fidelity, or a simplified model that is still perceived to be similar to the performance environment in key aspects. Such advanced learners achieve better transfer of learning if the perceived fidelity is high enough and they are suitably motivated, see Figure 1 (Alessi & Trollip, 2001).

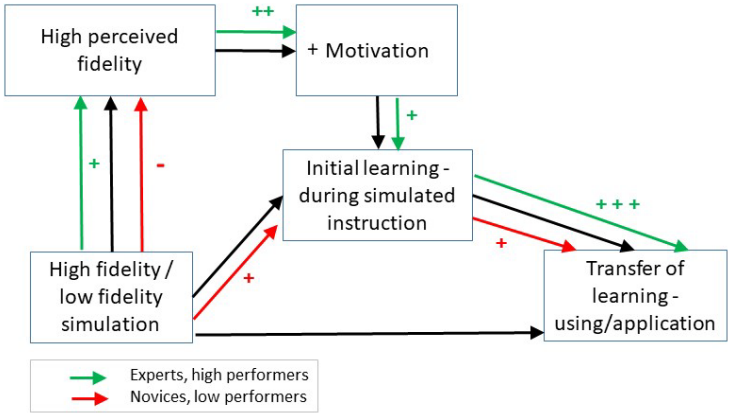


Figure 1. Transfer of learning through educational games and simulations: the relationship between fidelity and performance. Adapted from Alessi & Trollip (2001; p.235)

The enhanced Figure 1 shows the pathways for transfer to learning in a simulation. We superimpose the pathways for students with different skills and performance levels, with high performers marked in green (left of original direction arrow) and novices in red (right of original direction arrow).

Simulation games

A combined category (simulation games) display some characteristics of both games and simulations like competition, rules, winning and losing. Table-top board games are a good way of incorporating workplace (like accounting or tax) skills and learning the application of theory in the workplace in an undergraduate business course (Fouché, n.d.; Pelser-Carstens & Blignaut, 2018). Such learning games encompass real-world activities that enrich the classroom environment by supporting experiential and problem-based learning activities and encouraging learner-centred approaches and motivation to learn (Pelser-Carstens & Blignaut, 2018). In many simulation games student groups function as if in a real work situation rather than as competing teams. The main characteristics of a simulation game is presented in Table 1.

Table 1: Characteristics of Business simulation games

Characteristic	Business simulation game
Drill and practice, repetition	no /yes
Entertaining, fun	no / yes
Participants	collaboration and competition
Endpoint	sometimes / yes
Setting	realistic
Characters	real, role play
Motivation	fidelity & performance
Transfer of learning	more/ far

Student proficiency

Even though students have different preferences in learning (as also in music, food, etcetera), the most efficient way to learn is often not the one they prefer (Kirschner, 2017). We will argue that learning efficiency is a function of previous learning.

Vygotsky (1978), in studying how children learn, defined the zone of proximal development as those functions that have not yet matured, but are in the process of maturation. Vygotsky (1978) reasoned that the maturation process is enhanced when instruction involves *interaction* with peers and others who can help the learner proceed to the next developmental zone, as well as focus on learning that is just *ahead* of the developmental level of the learner.

Interaction in learning: Papert (1993) confirmed both points namely that children play together and learn together (point 1), and that children's motivation to persist in a difficult new game is due to their interest and the challenge it poses (point 2). Children quickly lose interest in games that are too easy and when tasks are boring, rewards will not increase self-motivation either (Deci, Koestner, & Ryan, 2001). Peer

learning in small group activities enable positive learning outcomes that can be observed and assessed (Biggs, 2014; Boud et al., 1999). Students who need support progress better with help forthcoming. Mastery learning based on the two sigma phenomenon (Bloom, 1984) confirms that one-on-one tutoring is the most effective way of learning and improving grades and using technology allows for targeted individual feedback, which is equally effective. Computer-based personalised learning pathways and adaptive learning tap into this principle.

Learning challenges: Like Papert, Boud argues for learning activities where students are in control. "Students gain more practice in communicating in the subject area than is typically the case in learning activities when staff are present. They are able to articulate their understanding" (Boud et al., 1999; pp.415-416). The difference in students who perform well and those who don't, should be considered. The increasing numbers and diversity in university students require more non-academic support like learning the language of instruction, social integration and adjustment. Students also display diversity of academic commitment. Biggs and Tang (2011) describe this diversity. Academically committed students are motivated, knowledgeable and learn actively, which manifests in high grades. Non-academic students, often first-generation university entrants, might be unsure of goals, not interested in the subjects and taking a passive attitude to learning, resulting in poor grades (Biggs & Tang, 2011), and do just enough for a passing grade. Grades, however, is a poor motivator for learning (Deci et al., 2001). Biggs and Tang (2011) propose a change in teaching to reduce the performance gap, because when actively engaging the low performers in suitable learning activities, it will change their attitude and grades.

Are students with non-academic orientation doomed to perform poorly and not survive the workplace jungle? According to Vygotsky (1978) and Bloom (1984), no. The key is active learning, learning by doing (Schank, 2001), because it develops skills, adds to pre-knowledge (Merrill, 2002), which causes a student to progress on the continuum towards academic orientation and commitment (Biggs & Tang, 2011), and increases motivation for learning (Deci et al., 2001). Games contain all the characteristics needed to improve the performance of non-academic college students. They provide positive feedback and unexpected rewards that enhance perceived competence and thus enhance intrinsic motivation (Deci et al., 2001), while repeat playing increase skills and tacit procedural knowledge (Nickols, 2000-2001).

The value of simulations in education has also been contested. Wolfe (2006) believed that simulation games appear to be valid, but their effectiveness has not been proven.

Many claims for/against usefulness of simulations to achieve learning outcomes are based on affective perceptions of learning by participants and not on objective cognitive learning assessment (Clarke, 2009; Gosen & Washbush, 2004). Schank (2001), however, believes that the educational value of simulations has been proven.

Student and teacher perceptions were also at loggerheads with each other about what students benefited from simulations or games (Pivec, 2009). Empirical research consists mostly of examining student marks obtained in summative assessment, which in turn is designed to measure the stated, mostly cognitive learning outcomes. The grades therefore also reflect how well the teachers taught towards the stated outcomes. Such an approach therefore limits insight into what real value particular learning activities had for students with diverse personal learning goals. While exit level students need to develop different skills required by their future workplace (Neelen & Kirschner, 2018), the dots between those skills and the simulations are seldom connected.

- We *know* that the business professions require new integrated knowledge and skills outcomes that are not sufficiently taught at universities.
- We *know* that humans have an innate propensity for learning through play and exploration.
- We *do not know* how business simulation and games can prepare students across the performance spectrum for the workplace.

This brings us to the main research question for this paper:

- How do students with different levels of academic orientation perceive the learning resulting from the business simulation games, and how do those reflect the intended learning outcomes?

Context of study

The simulations were deployed in the Economic and Management Sciences faculty at the University of Pretoria, a large contact university that encourages blended learning. Both the first and third-year students were in the more challenging chartered accountancy / auditing stream of the bachelor of commerce. Selection criteria for this program are high, based *inter alia* on grades in mathematics and languages. Although recommended, accounting is not a prerequisite for selection, as many schools do not offer the subject.

The table-top board game, Commercium[tm] (Fouché, n.d.) was developed in this country and simulated the roles and transactions performed by a professional accountant. The game aimed to familiarise first-year students with the practical context of the accounting profession, and was strongly recommended for the approximately 165 students who enrolled for this programme without having the necessary accounting knowledge. Most of these students participate voluntarily in this annual event on a Saturday two months into the academic year.

Each board could accommodate four teams of two students each playing against the other three teams, accompanied by a banker (a tutor). Each team received two inventory items to the amount of C$10 000 each. The money and the inventories were their capital with which to begin their business. The game simulated real life transactions and the capital contribution was the first transaction to be recorded. The banker had to keep a bank statement for each team (consisting of two players). Students played for 12 rounds, competing with other teams in an effort to make the most profit. Afterwards students had to complete an assignment consisting of accounting documentation for marks. Table 2 presents the objectives of the board game.

Table 2: Board game objectives

Outcomes: classification	Intended learning outcomes
knowing	Describe the accounting cycle as a whole; Give a broad description of the functioning of the business environment and the general economic environment;
doing	Analyse transactions and be able to record them on source documents from practical scenarios; Record source documents in the subsidiary journals; Post subsidiary journals to the general ledger; Prepare a trial-balance, Statement of Comprehensive Income and Statement of Financial Position from the general ledger;
being	Communicate in a business environment; Work effectively in groups.

(Source: http://simentertraining.co.za/Commercium/)

The web-based audit simulation was a compulsory component of the blended learning for the 601 third-year auditing major students. The simulation was developed and hosted overseas, and used per licence. The simulation has been designed to help students grasp various aspects of financial auditing by actually going through the audit process – learning by doing. Students play the parts of audit team members, working for a firm called AG Financial Services. They had to conduct an audit of a company named Sheridan AV. This required performing audit procedures on the financial

documents of the business, going through processes similar to the work of real-life auditors. GM, the virtual auditor team manager provides tasks, documents and other resources at appropriate points in the simulation. Students could find any relevant information on their client on the simulation website. The simulation activities were rolled out at the beginning of the academic year and continued over several weeks. Students were awarded marks for completing key documents.

Only 20% of these students indicated that they play computer games, which does not echo student profiles elsewhere in the world (Huang et al., 2013).

Figure 2 shows the spread of students across academic performance in the two groups.

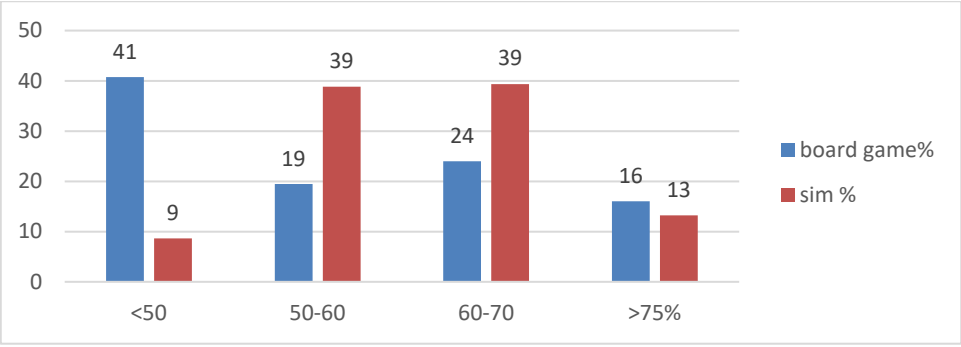


Figure 2. Distribution of student academic performance in the two classes

Methodology

A mixed methods study was performed on data collected using two electronic surveys hosted in Qualtrics[tm] and linked in the students' online classroom. A hundred and eight first-year students who participated in the board game completed the survey in the year of the study, containing two questions that were analysed. In the first question they could select any one or more of five given statements. An open-ended question also invited them to describe the single most important benefit of the game. Responses were grouped into self-reported performance brackets, the distribution in the two courses is shown in Figure 2. Content analysis using Atlas.ti[TM] was applied to the anonymous qualitative board game feedback, coding and grouping codes according to themes.

From the 601 third-year students, 371 completed the questions in this study. Responses were grouped according to student grades in the subject prior to doing the simulation. Descriptive statistics are presented of the responses that were weighted

according to the 5-point Likert scale (1 = *strongly disagree* – 5 = *strongly agree*). Ethics clearance to use the data for research was obtained by the respective lecturers of the courses.

Findings and discussion

Board game played by first-year accounting students

Board game itemised question

The question was the following: Please tick all the boxes that describe your experience of the Accounting Board game – (you can tick more than one). Responses were grouped according to the student grades they reported at the time. Figure 3 shows the percentage of students in these groups who selected each statement.

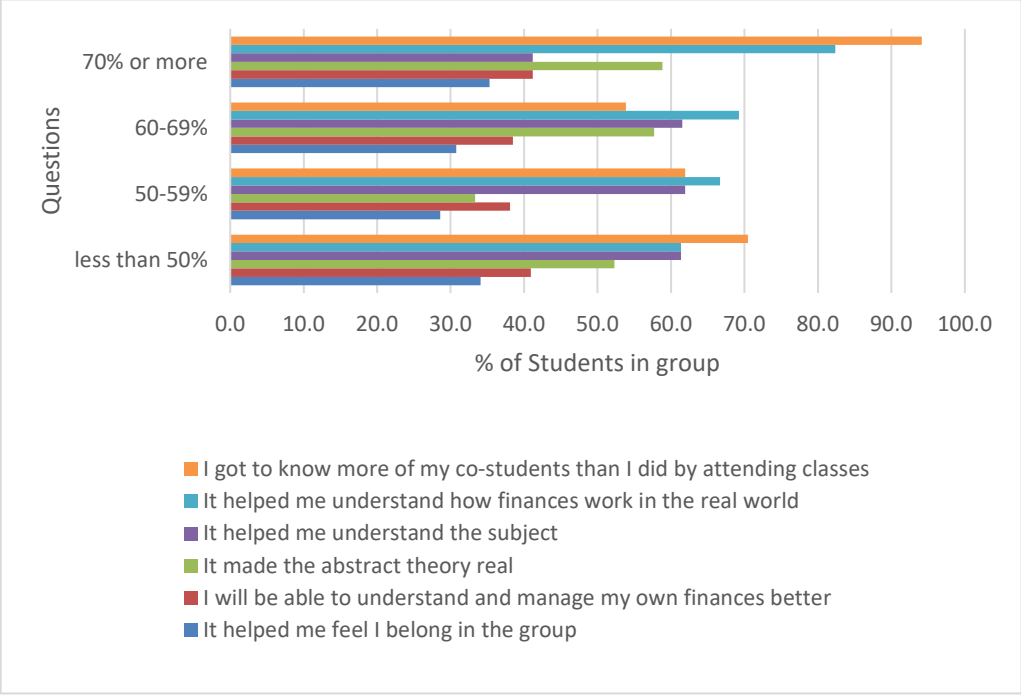


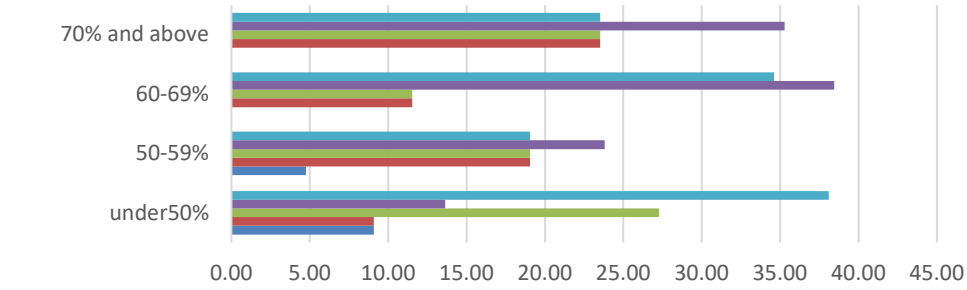
Figure 3. Experience of the Accounting Board game by academic performance: statements chosen.

In the table-top board game, getting to know their co-students obtained the highest mean rating by the class, selected by 68% of all participant students. Understanding how finances worked in the real world, was the second most popular statement of how students experienced the board game. Chosen by 94% and 82% of the 70+ students,

those two were by far their top statements. Between 54% and 70% of the rest of the class chose the first item and 61% – 69% the second one. With 58% of the whole class selecting *better understanding* of the subject as overall third, it only attracted 41% of the 70+ students, while around 60% of the other students ticked this box. The simulation made abstract theory real, according to 51 % of students. There was likewise no great variation among groups (mean 39.8%) in how they learnt to understand and manage their own finances. The lowest rating was found in how the games *helped them feel they belonged in their groups*, varying between 28% and 35%. Considering the diversity of the class, not choosing their own team mates, and competitiveness between teams could contribute to this lower rating, in spite of students getting to know everybody.

Board game open-ended question

The responses of students with different levels of academic performance were coded qualitatively into 25 codes, and grouped into five themes, as shown in Figure 4. Some of the general comments made by students about the game day include: interesting, extremely fun, exciting, informative, a summary or overview of how enterprises operate. They "got experience of actual transactions. It made accounting seem real". About working in groups: "since we were competing with the other group one had to always be on point by strategising, learning from the other group and assisting each other where needed. Since we had never spoken to each other it has increased our network of friends". They mentioned competition, team spirit, rewards. Unintended outcomes included: "now I am assured that I chose the right course". The open question was: In one sentence, what was the most important thing that the Accounting board game helped you with?



	under50%	50-59%	60-69%	70% and above
subject -accounting cycle	38.10	19.05	34.62	23.53
soft skills, team	13.64	23.81	38.46	35.29
praxis	27.27	19.05	11.54	23.53
people	9.09	19.05	11.54	23.53
affect	9.09	4.76	0.00	0.00

Figure 4. Describing the most beneficial outcome of the board game: Themes from content analysis in performance layers represented as percentages

Figure 4 shows the performance segments on the vertical axis and the % of first-year students nominating benefits of the board game on the horizontal axis. Those codes were grouped into the five themes as shown in Figure 4. There was great variation in how students experienced the benefit of the accounting content or how it related to the real world represented in the board game. The under 50% students (the largest group) found the content-learning aspects most beneficial, and more so than any other group, showing how effective a representation of an unfamiliar, though real concept is to establish a knowledge base. The importance of application in practice varied greatly between groups, but its salience was either similar to subject content, or lower, showing that their working life was still distant in the future. The combined soft skills, that encompassed workplace related skills, teamwork, understanding people and affect for the subject, shows an increasing trend as marks increased, with nearly 60% of the top-performing students describing one of those skills as the greatest value gained from the board game. This is consistent with students with academic orientation already displaying intrinsic motivation including affect of learning.

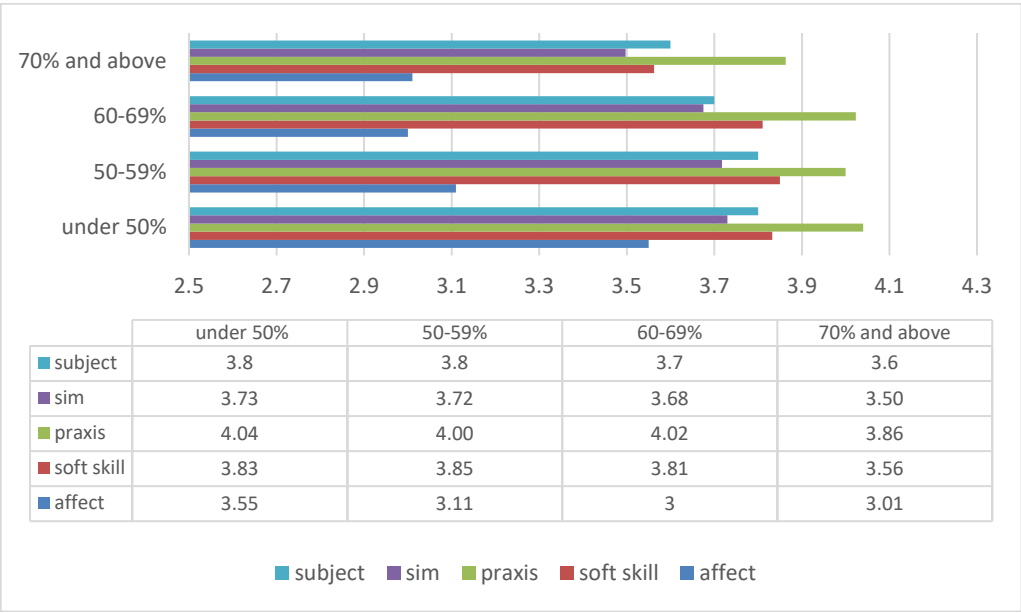
Comparing the findings from the quantitative and qualitative questions, confirmed the importance of the social and subject content themes. While the lower performing students found all aspects of the board game valuable in the quantitative items, they

singled out understanding content as the most beneficial to them in the qualitative feedback. Conversely, the highest performing students did not find the content related facets (*understanding*) particularly valuable, signifying a better pre-knowledge of the subject. The social and soft-skills aspects of the board game that was unique to the delivery mode, was important to the whole class, and this became more pronounced the higher the students' marks were, strongly evident in qualitative and also suggested in the quantitative question about getting to know their peer students. Notably, group and team-related activities were seldom rated as the most beneficial aspect of the game, possibly showing that most students did not know anybody well at this early stage.

Audit simulation – findings by knowledge levels

Simulation – responses to scaled questions grouped by five themes, compared by academic performance

After the online audit simulation, students completed the questionnaire containing thirteen questions that directly related to the online simulation. The questions were grouped into five themes and the average rating for each calculated (maximum rating being 5), broken out into the same performance categories used for analysis of the board game data. The s*ubject* knowledge theme had a high average rating that increased among the lower performing students. Figure 5 shows that most elements of the simulation were perceived more positively by lower-performing students than particularly the highest performing ones, particularly affect (enjoyment of the simulation) and subject understanding, increasing with lower grades. The lower performers were also more positive about the simulation, a multifaceted theme unique to the online delivery mode (online feedback, clear presentations, appropriate media and learning more than in traditional classes). Contributing to the simulation theme, students rated the use of media as highly appropriate. *Praxis* (learning about the audit process, insight into real life audit, putting classroom theory into practice) was overall the most beneficial contribution of the simulation, as was the intended objective of the simulation. *Soft skills* referred to professional skills, discussions with the group, decision making and open discussion, and were well and uniformly represented. The *praxis* and *soft skills* themes represent transfer of learning that could have been affected by perceived fidelity of the simulation and resulting motivation (Alessi & Trollip, 2001; Huang et al., 2013).



	under 50%	50-59%	60-69%	70% and above
subject	3.8	3.8	3.7	3.6
sim	3.73	3.72	3.68	3.50
praxis	4.04	4.00	4.02	3.86
soft skill	3.83	3.85	3.81	3.56
affect	3.55	3.11	3	3.01

Figure 5. Themes grouped from scaled items on simulation, portrayed by performance levels

Comparing themes across simulations

The board game in a face-to-face setting was above all successful in allowing students to know each other and developing soft skills and teamwork, particularly among the top-performers. Transfer of knowledge to be used in real-life practice was second for all students, with better understanding of the subject being important for lower performing students. In the web-based simulation the subject knowledge component was generally only third in importance. The transfer of knowledge to workplace practice was the top affordance of the simulation for all students, falling in line with research by Carenys et al. (2017), finding that online simulations are more effective than games in transferring skills to the professional world. This is not surprising, considering the higher fidelity perceived in the online environment that could increase motivation to participate and increase learning during the simulation that could lead to higher transfer of learning (Alessi & Trollip, 2001). The affect increased in lower performance groups in both the board game and the online simulation, and was more prominent in the online simulation (Figure 5) than in the board game (Figure 4). Affect could have had a positive effect on motivation and hence transfer of knowledge, making this an important component of an online simulation, therefore the relationships between performance and fidelity on Figure 1 (shown earlier) is relevant to this study.

Conclusions

In a holistic picture of two simulations in the same field, some tentative generalisations can be made. For students on the lower performing layer of a class, it seems that both the board game simulation, as well as the online simulation was valuable in understanding the subject better, more so than for students who were already performing well. This confirms the importance of pre-knowledge on subsequent learning and performance (Merrill, 2002). The higher performing students gained valuable acquaintance with peer students in the board game, a unique affordance of the face-to-face mode of interaction, in line with the report by Pivec (2009), that students perceived gaining social and communication outcomes from games. The lower performing students enjoyed the online simulation more than the high-performers, confirming the higher levels of affective learning in a game that resulted in better motivation. They also evaluated the web-components more positively than the higher performers, also tied up with affect.

The third-year students as a group found the most value in the theory-praxis aspect and learning about the professional process, signifying far transfer of learning. The praxis in the board game was not perceived as vividly, having a lower fidelity, but was more enjoyable, affect and motivation being one of the strongest characteristics of a game. Transferring learning to the workplace, was achieved equally well for lower performing, *novice* and expert, high performing students, signifying that the simulation's fidelity was pitched at an appropriate level, and were sufficiently motivational to aim at far transfer of learning.

Incorporating simulations have benefits for educators. "The majority of students, irrespective of ICT adoption profiles, their gender or population groups agreed that the learning value of an online simulation was more beneficial than traditional teaching methods" (Beukes, Kirstein, Kunz, & Nagel, 2017). Both simulations, one containing game elements, and an online simulation of practice, successfully achieved their respective aims regarding the subject and theory-praxis bridge, while also achieving extra-curricular outcomes emanating from their delivery mode (contact or online), and were suitable for the respective academic stage of the students. Both simulations particularly supported the lower-performing students with understanding subject concepts and motivation, paving the way towards a more academic approach to learning that will prepare them better for the jungle called the workplace.

After running for several years, a new Accounting board game on the same principles is now being played, as compulsory activity for every student in the class.

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