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From case studies to experiential learning. Is simulation an effective tool for student assessment?

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RESEARCH ARTICLE

From Case Studies to Experiential Learning. Is Simulation an Effective Tool for Student Assessment?

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Abstract

With the fast changes enforced by the COVID-19, many business schools found themselves streamed into using new technology and platforms to safeguard the academic year 2020−2021. The introduction of business simulation for student assessment before graduating from the undergraduate program has always presented a challenge in terms of approach to use. Today, business simulation is introduced, not only to enhance students' learning experience but also to satisfy the assessment institutional requirement of closing the gap.

This comparative quantitative study uses feedback from students of two cohorts assessed during the same academic year, one using the case method and the second using a capstone simulation. The results show that the students who used the simulation reflect a higher level of satisfaction.

Keywords: Education, Simulation, Business school, Undergraduate, Assessment, Experiential learning

1. Introduction

Four decades since the introduction of experiential learning with computer-based simulations to the education and teaching environment, yet both administrators and educators are still looking for efficient and effective teaching strategies (Hayden et al., 2014). Technology dissemination and its ever decreasing cost and pervasive use are driving the integration of simulated activities beginning from teaching languages to practical sciences such as management, project management, nursing, medicine, and other fields. Today, with the advent of the COVID-19 pandemic and the restrictions enforced on mobility as a result, the growing snow-ball of relying on the internet and electronic educational tools, has saved the educational sector, providing it with an existential solution, that of using available experiential learning tools. Simulation, online, and simulated learning are invading all different sectors and cycles of education, from elementary to graduate, built around the gaming theory empowered by the United Nation's Sustainable Development Goals, to "develop interdisciplinary approaches to enhance education for sustainable development" (Sierra, 2020, p.1). Business colleges, being leaders of innovation, are testing new grounds for student learning and assessment before their graduation from the undergraduate programs, using numerous venues, among which are business simulations as applied to the latter of Bloom's (1956) stages of learning. These new tools are driving the change from case study to experiential learning.

Minimizing didactic learning and increasing cognitive learning by integrating experiential learning through business simulation in the curriculum was not necessarily smooth. This introduction to stakeholders such as students, rather caught them by surprise, exactly as the pandemic's worldwide spread has forced behavioural changes. Their adaptation and embracing of the technology and new approach reflect their positive correlation to the technology drive, but their learning experience might say otherwise. As part of the on-going pivotal discussion (Prado et al., 2020), this study investigates

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the effectiveness of applying the experiential approach through business simulation as an assessment of learning tool, by comparing the learning experience of students using experiential simulation to those following the case study approach. For this purpose, an experiment is conducted, whereby students are exposed to both teaching approaches, and then divided into two groups, each group using one approach. The experiment is concluded by self-evaluating of both groups' learning experience.

The study contributes to the business education body of knowledge by highlighting the difference in the actual learning experience and the effectiveness of both approaches, from the beneficiaries' perspective, the students, which is most often overlooked (Aragon-Correa et al., 2017). It also contributes to our general knowledge about the Saudi Arabia students, a market segment which is not often analysed for many geo-social reasons.

2. Literature review

The constantly evolving trend to use more modern teaching approaches cannot stop. Today, business schools, along with other sectors are confronted with added contextual complexity relating to the COVID-19 pandemic and its effect on their operations and teaching processes and outcomes. This trend is not new to the world of education. Education approach has shifted along time from didactic learning where the teacher is a mere source presenting information to passive receivers, to cognitive learning where the receivers are involved in the rationalization and acceptance of the information. At a later stage, and at a speed slower than the business world (Moratis et al., 2006), business education developed to integrate the use of the case study method, providing added value through critical thinking, and more recently the advent of simulations, starting with brick-and-mortar business games and developing into electronic platforms integrated simulations. In this context it is important to differentiate between games and simulations that are game-based tools (Wiggins, 2016). While games and gamification refer to using games for the purpose of educating, simulations use replicated reality to apply theory in a risk-free environment (de Freitas, 2006; Wiggins, 2016).

2.1. Case study

Case study analysis is the most common approach used in teaching business education today (Farashahi & Tajedin, 2018). With the development of globalization and information and communication tools (ICT), educators and researchers benefited from the access to firms across the globe, writing and exchanging data and information to write new case studies. Moreover, the internet use in business, being a novelty, generated a new business sector, that of internet business firms. These are a new specialized breed including search engines, e-commerce, customer-to-customer, business-to-customer, and other services. Being successful, these new business firms are presenting new materials to analyse, thus case studies are written about them. These case studies are invading the business education areas, especially in strategy teaching.

The use of case studies in business education helps focus on specific aspects of the teaching process (Farashahi & Tajedin, 2018). From simple instruction to critical thinking through the use of the case study method (Prado et al., 2020), instructors provide learners with real-world knowledge and professional analytical skills (Baldwin et al., 2011), while joining the debate on the advantages and disadvantages of the approach itself (Farashahi & Tajedin, 2018). The empirical results show that business education is focused on using case studies that provide practical analysis and professionalism to learners (Bennis & O'Toole, 2005), relying on "theory, separate disciplines, quantitative analysis, tools and models, short-term performance and corporate goals; but the least attention to execution, integrative problem-solving, qualitative thinking, complex trade-offs and creativity, long-term success and interpersonal relationships" (Farashahi & Tajedin, 2018, p. 132).

2.2. Simulations

Students perceive simulation as the most effective teaching method (Farashahi & Tajedin, 2018), and an efficient one in integrating multiple learning outcomes in business education (Sierra, 2020). With the use of simulations, educators are becoming facilitators of learning through hands-on discovery known as the experiential approach (Carson & Harder, 2016). This modality has proven its effectiveness (Hayden et al., 2014) as it provides students with structured opportunities to learn skills, attitudes, and knowledge within a realistic and believable framework, in the process of preparing them for their work roles (Meakim et al. 2013) within a sustainable, dynamic, and multidimensional environment. Although simulation as a learning tool relies on multiple learning objectives tailored to help students in "connecting the dots" and in achieving intended outcomes (Kardong-Edgren

et al., 2015; Merriman et al., 2014; Sierra, 2020), still today "most professors at business schools rely on lectures or case methods to teach these complex concepts" (Prado et al., 2020, p.303). First, the increasing pressure from employers to prepare employable graduates (Giroux, 2010), second, the gap highlighted between teaching and learning (Seaton & Boyd, 2008; Wiggins, 2016), and third, the previous misalignment of the intended and the actually taught (Cohen, 1987), have led the Association to Advance Collegiate Schools of Business (AACSB) to revisit its accreditation standards to increase pressure on business schools to adopt faster-paced integration of educational tools and activities that reflect "Innovation, impact, and engagement" such as simulations (AACSB International, 2013). This experiential approach has helped intensify the shift from teaching to learning focused paradigm (Devasagayam et al., 2012) relying on digital channels (Tolks et al., 2020) that are game-based. These rely on simulations, digital/non-digital games to achieve specific/multiple learning objectives (Wiggins, 2016).

As rooted in the theoretical foundation of Kolb's "Theory of Experiential Learning" (Dewey, 1938; Kolb, 1984), learning is "enhanced when students are actively involved in gaining knowledge through experience with problem solving, decision-making, and active reflection" (Carson & Harder, 2016, p.430). The interaction of the five interrelated constructs identified by Jeffries (2005, 2012) plays an important role in enhancing students' learning experience through mental involvement (Zyda, 2005). These five constructs are (1) the teacher; (2) the educational practices/tools used and/or applied, (3) the students, (4) the design of the simulation itself, and (5) the clarity and achievability of the intended outcomes. This holistic pedagogical approach engages students in the hands-on experiential learning process and interaction (Prado et al., 2020). Its use results in improved classroom management and learning, enhanced instructional self-efficacy and locus of control, and higher motivation and connection between the teacher and the learner (Girod & Girod, 2006, 2008). Using it encourages students to think, behave, speak, and write in a professional way mimicking the work environment (Mansour & El-Said, 2008), and proves to be beneficial to students (Milkova, 2008, pp. 704–709), enhancing "collaborative learning" and "learning outcomes", as well as developing interpersonal and functional skills (Lohmann et al., 2019). Moreover, using simulations allows for timely feedback and integrated functional learning and teamwork skill development (Seaton & Boyd, 2008).

The use of electronic tools and devices in education and higher education is not new. Zhao and Okamoto (2009) report the use of novel adaptive frameworks such as emails as an opportunity for diversifying teaching techniques. Later, Prasad, Beg and Chan (2014, pp. 18–22) reported the positive effect of using software simulators in teaching. Yet, and despite the two decades of their inception, the adoption of these new tools of technology did not become pervasive, with many reasons reported to cause this lag (Maamari & Naccache, 2022; Pow & Lai, 2021) including the educational process that limits creativity (Boronat & Choueiry, 2022). However, the contextual changes implied by the COVID-19 forcing social distancing and the pure reliance on these tools, with maximized parting from face-to-face or physical interaction, have left a deep impact on teaching-learning abilities and outcomes. In most settings, neither students, nor teachers or administrators were ready for full distant learning. Many of the contributors' skills and abilities were not ready. The technological tools themselves were not readily pervasive or available for all. Faculty members, students, and parents were not mentally ready to work purely with remote access. These changes increased the need for fast action in fear of losing the academic year, resulting in the massive introduction of electronic tools for distant teaching purposes. The use of meeting/teaching/classroom electronic platforms became a necessity that all constituents needed to adopt and learn how to use. Assignment and testing platforms were immediately needed for remote assessment administration, and teacher-student-parent communication tools to replace the classic 'agenda/diary' process and daily interaction and replacing office hours and access to teacher support, were lacking.

Although the younger generation is better adapted and more involved in the use of electronic platforms and tools, the move from classical face-to-face teaching/learning to online has created a change in attitude. Business schools have indulged in this change process, with associated resistance and implementation issues that come with novel information technology's adoption (Azouri et al., 2022), hoping that students' embracing of the change would help achieve the intended learning objectives (Alsaati et al., 2020). These include "(1) academic/professional environment linkage; (2) equifinality in the approach; (3) action learning; and (4) autonomy of learning processes" (Seaton & Boyd, 2008, p.111). However, were they successful? To assess the

success level, we put forth the following research questions:

Which assessment approach is more effective in assessing graduating students from undergraduate programs, the case method or simulation?

To answer this research question, a comparative quantitative research is unfolded at the College of Business Administration (COBA) at Prince Mohamad Bin Fahd University (PMU), in Saudi Arabia, and a number of hypotheses are postulated.

H0: *There is no difference in the assessment of learning effectiveness of both approaches.*

H1: *There is a difference in the assessment of learning effectiveness of both approaches.*

3. Methodology

Universities in Saudi Arabia are diverse; there are thirty state universities and thirteen private, in addition to many higher education colleges in cities and villages. The higher education in Saudi Arabia is monitored by the Ministry of Education, which relies on the National Center for Academic Accreditation & Evaluation, and the Education and Training Evaluation Commission (ETEC), using the national Saudi Arabia Qualification Framework (SAQF). All universities are expected to align their program missions, goals and learning outcomes with the national strategic plan (currently Vision 2030).

The study was conducted in one university, Prince Mohammad Bin Fahd University (PMU) in the Eastern Province, where the oil and gas industry is based. PMU has many colleges and two campuses, male and female, with over 5000 students in total. PMU is the first private university in the Eastern Province established in 2006, which reflects an environment similar to western universities. The university has five colleges; Business, Engineering, Computer engineering and science, Law, and College of Sciences and Human Studies, and within each college there are multiple programs and disciplines.

To measure the effectiveness of the transition of the course from case study to an experiential approach, the content of the capstone course at COBA was changed accordingly. The college administration decided to introduce the Capstone Simulation (CAPSIM) which is a global leader in developing and delivering business simulations that prepare participants to apply learnt knowledge and run profitable businesses. A survey using a self-administered questionnaire was conducted between April 2021 and May 2021 b y distributing the survey to all graduating students of the College of Business Administration at Prince Mohammad Bin Fahd University, who have to take this required course in either of its forms (case method or simulation) as part of their graduating criteria.

3.1. Research sample

With the diversity of programs within the College of Business Administration, the survey targeted students who finished the capstone course from all five programs of the college. As the primary language used and the medium of study at PMU is English, the survey is generated in English. The plan was to target students who have completed the graduation requirements taking either a project-based or a simulation-based capstone course with a total population of 346. The survey collection was closed at 253 responses, although many reminders were sent and an extended time was given to reach this number.

The possible reason why responses did not reach 346 is that students were not actively present on campus due to the COVID-19 pandemic and local lockdown. Moreover, some students do not respond to surveys due to short attention span and disinterest in voluntary information sharing. The survey has a voluntary nature, the study was confidential, and the survey were completed anonymously.

3.2. Instrument

The survey was not only distributed for data collection for research, rather it has an educational aspect where investigating whether the learning outcomes of the capstone course were met or not was actually embedded in the questionnaire. The questionnaire was distributed to all college students who already completed the capstone (research-based) course and capstone (CAPSIM) course.

The questionnaire was designed to have general to more specific questions to evaluate the effectiveness of introducing Capsim to the capstone course. Most of questions were adopted from the course learning outcomes (CLOs) of the capstone course and other questions were developed by the authors through brainstorming and expertise based on the study objectives.

The survey is divided into three sections with 49 questions. The purpose of the first section, which

Table 1. Survey tool testing.

Variable	Cronbach's Alpha	N	KMO	Approx. Chi-square	df	Sig.
Capsim Assessment	.900	22	.929	1954.264	231	.000
Classic Assessment	.885	22	.952	4099.501	231	.000

includes five questions, was to collect the general demographic information about the responding students. In this section, the students were asked about their email address (to control for response duplication), gender, age, major of study (specialization), and finally the version of the course that the respondent has taken (case study or simulation). Each category of respondents had a different set of survey items, both measuring whether the students have gained the desired knowledge, skills, and competencies of the respective course or not. Respondents were automatically directed to the respective set of scale items based on their response to the fifth question in the demographic section.

The questionnaire's questions were quantitative in nature, to measure and investigate the level of knowledge the students have gained from the capstone course with its different contents and objectives, and also to determine whether the decision of introducing CAPSIM to the capstone course was an effective and efficient decision. The types of questions include multiple choices and are measured using a 5-Likert-scale, "Strongly Disagree = 1" and "Strongly Agree = 5".

Before conducting the survey, the questionnaire was reviewed by two colleagues, faculty members in the COBA at PMU for any comments to improve the instrument. Moreover, a pilot survey was conducted on a small sample consisting of twelve students, to check the readability and validity of the questionnaire before being administered on a larger scale. The response to the survey started to increase in the first two weeks from the starting date of the survey as it reached about 150 respondents. The response after that became slower in early May, and by the end of May it reached 253 when the survey was closed.

3.3. Data collection

The survey was distributed to students across all the departments of COBA in both male and female campuses at PMU, using Google Forms. The targeted students were notified through emails and reminder/follow-up messages. To make it official, the questionnaire link was forwarded to students through the Career Services Office by email.

3.4. Data processing and analysis

The collected data was downloaded from Google Forms in Excel format and coded and transferred to the Statistical Package for Social Sciences (SPSS 26.0) for analysis. The researchers conducted data cleaning and found a number of responses to be incomplete, thus decided to remove them. The final dataset was 246 participants. The data was analysed for reliability and validity of the tool, frequencies, cross-tab, correlation, and ANOVA. The results show that the survey tool used is highly reliable with Cronbach's alpha ranging between 0.885 and 0.900, which is considered highly acceptable, whereas KMO ranges between 0.929 and 0.952, which reflects a valid value of the tool for this study (see Table 1), with a Sig. = 0.000.

Moreover, the descriptive statistics of the sample data showed that the mean of the gender analysis were 1.6463 and the standard deviation was 0.47908. For the age analysis, the mean was 2.0569, and the standard deviation was 0.67371, on the other hand, the mean for the major analysis was 3.3130 and the standard deviation 1.19335 and if the students were offered CAPSIM or not the mean was 1.5691 and the standard deviation was 0.49621 (see Table 2).

4. Results

The survey started by asking participants if they were offered CAPSIM (simulation) for the capstone course or case method. 140 (56.9%) of the participants were offered CAPSIM for their capstone course while 106 (43.1%) were not.

Next, participants were asked about their gender, the total number of participants was 246 with 87 (35.4%) of participants being males and 159 (64.6%) being females. A total of 106 participants were not offered CAPSIM, among them 39 (36.8%) were males, where 67 (63.2%) were females. On the other hand, 140 participants were offered CAPSIM for their capstone course, among those participants 48 (34.3%) were males, and 92 (65.7%), (see Table 3).

Next, participants were asked for their age, among the total participants, 106 were not offered CAPSIM, where 6 (5.7%) aged between 20 and 22 years, 60 (56.6%) aged between 23 and 25 years, and 40

Table 2. Descriptive statistics of the sample.

	N	Minimum	Maximum	Mean	Std. Deviation
Gender	246	1.00	2.00	1.6463	.47,908
Age	246	1.00	3.00	2.0569	.67,371
Major	246	1.00	5.00	3.3130	1.19335
Capsim Offered	246	1.00	2.00	1.5691	.49,621

(37.7%) aged 26 years and above. On the other hand, among the 140 participants who were offered CAPSIM, 43 (30.7%) were aged between 20 and 22 years, 74 (52.9%) aged between 23 and 25 years, and 23 (16.4%) aged 26 years and above (see Table 4).

Next, participants were asked about their major, 106 of the overall participants who were not offered CAPSIM capstone course 10 (9.4%) were in the accounting major, 16 (15.1%) in the business administration major, 32 (30.2%) in the finance major, 19 (17.9%) in the human resource major, and 29 (27.4%) in the management information systems major. On the other hand, among the total of 140 of the participants who were offered CAPSIM, 10 (7.1%) in the accounting major, 22 (15.7%) in the business administration major, 51(36.4%) in the finance major, 36 (25.7%) in the human resource major, and 21 (15.0%) in the management information systems major (see Table 5).

A one-way between-subjects ANOVA was conducted to compare the responses of the two groups to the different scale-item questions. There was a significant difference between the responses of the two groups, those who took the simulation and those who used the case method. The results at $p < .05$ are summarized in Table 6 below. All results are larger than the F Critical Value of 2.439. The difference between the two groups ranges between 9.799 and 50.812.

The results of the ANOVA suggest the existence of significant differences between the two groups of respondents, namely, those who followed the case study method and those who used the simulation. The researchers analysed for the Levene test using and the independent *t*-test. The results of the Levene F-test show that Q5 (harmful); Q13 (identify international and external forces); Q14 (relevant forces) and Q15 (explain the significance and effect of social and cultural dimensions) are not significant, while all the rest are significant, indicating a difference in the variances among the two different groups of participants.

Moreover, the independent *t*-test results show that the satisfaction of the students who took the simulation is higher than that of those who took the case study. Thus, the study concludes that, in line with the previous research, students who take part in simulations exert higher satisfaction than those who take part in case studies.

De-spite the above results, it is worthwhile mentioning that some of the participating students could not link the simulation to reality. For some of them, completing the course did neither provide them with the ability to identify the environmental forces that shape the organization's performance, nor the ability to explain relevant economic theories or social and cultural dimensions of the business environment.

5. Discussion

The above-mentioned results highlight the higher level of student satisfaction in their studies at PMU

Table 3. Capsim offered/gender.

Crosstab			Gender		Total
			Male	Female	
Capsim Offered	No	Count	39	67	106
		% within Capsim Offered	36.8%	63.2%	100.0%
		% within Gender	44.8%	42.1%	43.1%
		% of Total	15.9%	27.2%	43.1%
	Yes	Count	48	92	140
		% within Capsim Offered	34.3%	65.7%	100.0%
		% within Gender	55.2%	57.9%	56.9%
		% of Total	19.5%	37.4%	56.9%
Total		Count	87	159	246
		% within Capsim Offered	35.4%	64.6%	100.0%
		% within Gender	100.0%	100.0%	100.0%
		% of Total	35.4%	64.6%	100.0%

Table 4. Capsim offered/age.

Crosstab			Age			Total
			20–22	23–25	26+	
Capsim Offered	No	Count	6	60	40	106
		% within Capsim Offered	5.7%	56.6%	37.7%	100.0%
		% within Age	12.2%	44.8%	63.5%	43.1%
		% of Total	2.4%	24.4%	16.3%	43.1%
	Yes	Count	43	74	23	140
		% within Capsim Offered	30.7%	52.9%	16.4%	100.0%
		% within Age	87.8%	55.2%	36.5%	56.9%
		% of Total	17.5%	30.1%	9.3%	56.9%
Total		Count	49	134	63	246
		% within Capsim Offered	19.9%	54.5%	25.6%	100.0%
		% within Age	100.0%	100.0%	100.0%	100.0%
		% of Total	19.9%	54.5%	25.6%	100.0%

when their final course includes a simulation, compared to those whose coursework includes case study. In line with what Farashahi & Tajedin, 2018 reported, the students perceive simulation as the most effective teaching method. These results may be due to a number of factors. First, the general trend in the society to switch to online activities is supported by many social and professional initiatives like smart books, electronic pads, smart phones, to name a few. Second, throughout the last few years, we have witnessed many educational services activities being bridged toward electronic platforms, such as soft-copy books, book publisher websites, etc. Third, the bridging is further expedited by the spread of the Covid-19 pandemic. This pandemic has forced the move toward online remote teaching, through which a massive infiltration of online activities is witnessed. Among these new invaders of the educational arena are online simulations, real-time communication tools (such as blobs and chat rooms, etc.), online examination tools and applications, integrated video use for remote teaching, conferencing, meetings, etc. Fourth, the novelty of the matter. As the younger generation is thirsty to follow world trends, the proposal to apply simulation is probably more accepted at the faculty level, but more importantly, it is more than simply welcome at the students' level. Moreover, and according to Meakim et al. (2013), using the simulation provides students with structured opportunities to learn skills, attitudes, and knowledge within a realistic and believable framework. Fifth, the convenience provided for participants through the use of online simulation platforms allows each individual to test their own ideas, strategies, and perspectives within a business decision-making

Table 5. Capsim offered/major.

Crosstab			Major					
			Accounting	Bus.Admin	Finance	HRMT	MIS	Total
Capsim Offered	No	Count	10	16	32	19	29	106
		% within Capsim Offered	9.4%	15.1%	30.2%	17.9%	27.4%	100.0%
		% within Major	50.0%	42.1%	38.6%	34.5%	58.0%	43.1%
		% of Total	4.1%	6.5%	13.0%	7.7%	11.8%	43.1%
	Yes	Count	10	22	51	36	21	140
		% within Capsim Offered	7.1%	15.7%	36.4%	25.7%	15.0%	100.0%
		% within Major	50.0%	57.9%	61.4%	65.5%	42.0%	56.9%
		% of Total	4.1%	8.9%	20.7%	14.6%	8.5%	56.9%
Total		Count	20	38	83	55	50	246
		% within Capsim Offered	8.1%	15.4%	33.7%	22.4%	20.3%	100.0%
		% within Major	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	8.1%	15.4%	33.7%	22.4%	20.3%	100.0%

Table 6. Results of ANOVA tests.

#	Variable	Result	df between	df within	F	Sig.
1	I enjoyed the course	Significant	4	135	44.151	.000
2	After completing it I found the course to be Rewarding	Significant	4	135	30.443	.000
3	After completing it I found the course to be Punishing	Significant	4	135	21.285	.000
4	After completing it I found the course to be Useful	Significant	4	135	9.799	.000
5	After completing it I found the course to be Harmful	Significant	4	135	24.308	.000
6	After completing it I found the course to be Beneficial	Significant	4	135	32.231	.000
7	After completing it I found the course to be Boring	Significant	4	135	18.382	.000
8	After completing it I found the course to be Exciting	Significant	4	135	44.283	.000
9	The instructors very well qualified to deliver the course	Significant	4	135	47.442	.000
10	Completing the course gave me the ability to distinguish and analyse ethical problems that occur in business and society.	Significant	4	135	27.549	.000
10	Completing the course gave me the ability to illustrate how current technologies and decision-support tools can be utilized to the advantage of business operations.	Significant	4	135	31.402	.000
11	Completing the course gave me the ability to demonstrate an understanding of the major functional areas of Business.	Significant	4	135	31.272	.000
12	Completing the course gave me the ability to identify major forces in the internal and external business environment and explain their effect on the performance of an organization.	Significant	4	135	27.720	.000
13	Completing the course gave me the ability to explain relevant theories associated with the economic and political environments of business.	Significant	4	135	44.855	.000
14	Completing the course gave me the ability to explain the significance and effects of social and cultural dimensions in the context of a global business environment.	Significant	4	135	50.812	.000
15	Completing the course gave me the ability to explain theoretical concepts and practical approaches designed to improve organizational performance.	Significant	4	135	46.699	.000
16	Completing the course gave me the ability to communicate effectively in both English and Arabic in professional and social situations.	Significant	4	135	32.369	.000
17	Completing the course gave me the ability to use modern technologies to acquire information, to communicate, solve problems, and produce intended results.	Significant	4	135	31.492	.000
18	Completing the course gave me the ability to reason logically and creatively to make informed and responsible decisions and achieve intended goals.	Significant	4	135	30.127	.000
19	Completing the course gave me the ability to perform professional responsibilities effectively.	Significant	4	135	48.253	.000
20	Completing the course gave me the ability to work effectively with others to accomplish tasks and achieve group goal	Significant	4	135	34.488	.000
21	Completing the course gave me the ability to be an informed, effective, and responsible leader in family, community, and the Kingdom	Significant	4	135	43.210	.000

environment, without the pressure exercised by peers in normal case study groups which engages the students with real-world knowledge and professional analytical skills (Baldwin et al., 2011), providing a motivator to drive satisfaction. Finally, the availability of countless online resources supporting simulation platform operations (how-to-do) presents an added encouragement for those who are reluctant to try novel tools.

5.1. Implications

As a result of the above, the researchers recommend the deeper use of applications and hands-on tools that provide students with a chance to actually test their knowledge with the ability to see the immediate potential results and effects. In this context, simulations for classes of business education are abundant, diverse, and multidisciplinary. The

availability of these online simulations and their cost in time and money increase their advantage. These tools are proving to add value to education, as much as providing hands-on learning and application.

On the one hand, university administrators, especially those involved in business education, need to work in parallel to first increase the integration of such innovative tools in their curricula, and second, prepare their faculty to use/apply such tools. The business world is receptive and appears to welcome such educational experiences that provide students with the application of the learnt knowledge. On the other hand, faculty members are invited to search for and seek to integrate such tools in their courses. They may initiate the process by recommending appropriate tools, simulations, or other applications that they deem useful in their respective courses.

5.2. Recommendations for future research

Future research should dwell deeper into the application of such electronic tools and how to improve student satisfaction levels through them, as well as on how to best prepare the faculty for using such tools. Moreover, future research may focus on identifying the most effective way of administering simulations, such as whether it is better to integrate them within a specific course work, or separate them into hands-on courses similar to the currently applied laboratory logic. Finally, the students' satisfaction assessment may also seek to analyse the students' teamwork, communication, and other soft skill, and their effect on the success of the use of a simulation.

5.3. Limitations

In this study, a number of limitations are acknowledged. First, the sample is limited to one university in the Eastern Region of the Kingdom of Saudi Arabia. Second, the number of respondents is limited to 246; 106 using the simulation and 140 using the case study method. Third, the researcher did not have enough data to compare for differences in satisfaction among age-groups and genders.

6. Conclusion

This study measures the effectiveness of applying simulation as an assessment tool compared to the case study experiential learning is done in KSA. The sample is drawn from the PMU university which is leading change and application of simulation in its business education. A sample of 246 students split into two categories, namely, those who used the simulation and those who used the case study method, is drawn following the census approach. The collected data were analysed using SPSS 26. The results presented and discussed clearly tip the balance and favour the use of simulation in the student learning assessment of business students who express higher levels of satisfaction with the course than their counterparts who used the case study method. The students enjoyed the simulated environment and the social freedom context of decision-making and team meetings outside the class supervision. The level of satisfaction of those using the simulation is higher than their case method counterpart. The different factors seem to intertwine to help shape a positive perception about the simulation, allowing the youth to favour the hands-on electronic simulations to cognitive theoretical/hypothetical exercise of case-study analysis and discussion. Academic administrators should seek further integration of simulation tools, requiring faculty willingness and readiness for such tools, in addition to adapting the course specification and grading distribution.

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The author certify that they did and continue to abide by the COPE standards for research ethics.

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Conflict of interest

The authors declare having no conflict of interest.

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