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Instructors' Perceptions of the Development of Work-readiness through Simulations

Full research paper

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Abstract

The global ERP software market is expected to reach $117.09 billion by 2030 (Biel, July 12, 2022). To boost graduate work-readiness, Australian institutions are adopting new pedagogical strategies by familiarising Information systems (IS) students with this highly sought-after software. One of these techniques is simulation games that provide students with a risk-free, real-world simulation of popular software to develop soft and hard skills needed by the IS industry. This exploratory study employed the Grounded Theory approach to evaluate instructors' perceptions of the influence of simulation games on the work-readiness of information systems students. We conducted semi-structured interviews with (Enterprise Resource Planning Simulation) ERPsim game laboratory instructors. The authors utilised Work Readiness Integrated Competency Model to map the three learning outcomes from the interviews' analysis: abilities, knowledge, and attitudes. The mapping demonstrated that simulation games could support the development of specific skills and attitudes needed by the information systems sector.

Keywords
Simulation game, graduate work-readiness, information systems, grounded theory

1 Introduction

Graduate work-readiness gaps have been widely recorded in both developing and developed countries, resulting in graduate underemployment and unemployment (Kadir, Naghavi, & Subramaniam, 2020). Australia is one of the advanced economies where graduates face challenges in their professions (Griffin, Johnson, Valli, & Vernon, 2021). According to the Australia Institute's Centre for Future Job (CFFW), just 73% of recent university graduates have found work, down from 83% shortly before the 2008 global financial crisis. Underemployment and unemployment among recent graduates have climbed from roughly 10% in 2008 to over 20% presently (Standford, 2019). In the context of the fourth industrial revolution (4IR), a challenge for higher education institutions (HEIs) is to prepare students for a constantly changing labour market by assessing their pedagogical practises and curricula (Matthews, McLinden, & Greenway, 2021). Higher education was found to be the critical source for creating graduates with work-ready abilities that are readily transferable to these new professions. Depending on how many graduates find work in their fields and how happy the students are with the quality of instruction, the government will provide an additional $80 million to higher education institutions.

This increased collaboration between universities and businesses has emphasised teaching strategies that are both successful and relevant to today's workplace (Suleman, 2018). One of the ways to prepare Information Systems (IS) students for the industry is to expose them to industry-relevant software and give them hands-on experience with it, which is vital in preparing them for employment (Gatti et al. 2019). Enterprise Resource Planning (ERP) is one example of such a programme. Businesses use ERP systems to streamline their operations and procedures. An annual growth rate of 10.0 percent is predicted between 2021 and 2030 for the worldwide enterprise resource planning market, which is expected to reach $117.09 billion by 2030 (Keshav Kumar, Feb 2022). Despite this growth, a lack of trained ERP specialists limits the expansion of the ERP business. Adopting ERP systems in higher education courses, particularly information systems disciplines, might benefit students. This would help students prepare for their future careers. Higher education institutions (HEIs) are addressing the issue of preparing students for future professions by using several pedagogical strategies to expand students' learning options. One of the ways is experiential learning (Koivisto & Hamari, 2019). Experiential learning immerses students in an experience before inviting reflection on the event to stimulate the development of new skills, attitudes, and ways of thinking (Lewis & Williams, 1994). Simulation games, which built their premises on experiential learning, have been proven to develop and enhance learning outcomes, motivation and engagement (Mohsen, Abdollahi, & Omar, 2018). By simulating real-world circumstances, simulation games enable students to explore in a life-like yet risk-free setting actively. This fundamental world replication fills graduate skill gaps by building industry-required hard and soft skills (Narayanan & Turner, 2019). ERPsim game is the exact replication of real ERP systems used by organizations. It helps students develop and practice their practical skills in running these highly complex systems (Faisal, Chadhar, Stranieri, & Gorris-Hunter, 2021).

To far, most of the research on the relationship between experiential learning and work-readiness has focused on the impact of internships and job shadowing on employability/work-readiness, disregarding simulations as an experiential learning tool (Foster & Pierce, 2021). This paper's contribution is exploring the effects of simulations on the work-readiness of IS graduates. This paper is part of a broader study that the researchers are doing to investigate the impact of simulation games on the work-readiness of IS graduates in Australia (Faisal, Chadhar, Goriss-Hunter, & Stranieri, 2019). The research looks at the views of three primary stakeholders (students, industry experts, and instructors) on the usefulness of simulation games in promoting work-readiness among IS graduates. This study focuses on the viewpoints of teachers. During the simulation, the teacher serves as a facilitator, giving the students a defined list of guidelines and expectations (Wedig, 2010). By participating passively in the experiential learning process, instructors are often better positioned to evaluate students' skill gains and behavioural changes during simulations, as students perceived outcomes could often be biased (Certo, 1976). Despite being an essential component of the learning process, significant gaps in the simulation games literature were discovered while exploring instructors' viewpoints on the impact of these games on students' learning. This paper addresses a gap in the literature by empirically analysing instructors' perspectives on the impacts of employing simulation games to enhance students' work-readiness. It serves as the primary motivation for the researcher to undertake this study. We used grounded theory methods (Strauss & Corbin, 1990) to investigate this under-researched subject. The overarching research question is:

How are simulation games assisting IS students in achieving better levels of learning and competence to be more work-ready?

The rest of this paper is organised as follows: Section 2 presents a short survey of the literature on learning outcomes of simulations and discusses the gaps in the extant IS work-readiness literature. Section 3 describes the research methodology and the in-depth Straussian Grounded Theory implementation. Section 4 presented the results, qualitative analysis findings in Section 5, discussion in Section 6, and conclusion in Section 7.

2 Literature Review

Experience has long been recognised as important in promoting efficient individual learning processes by educators and academics (Verma et al., 2018). In higher education, the experiential learning approach has found widespread use and met with considerable success (Kolb & Kolb, 2005). Since its effectiveness in overcoming the shortcomings of traditional methods and meeting the needs of industry has grown over time, experiential learning has been integrated into the IS curriculum in various forms, such as simulations, work-ready learning, student-run businesses, and internship programs and job shadowing. It has been widely popular (Spanjaard, Hall, & Stegemann, 2018). According to the research on experiential learning, students who have the chance to develop and test their critical decision-making skills while going through the experiential learning cycle are more likely to be prepared for work than students who study conventionally (Mavodza, 2017). Many studies have demonstrated the efficacy of this learning strategy in improving students' job preparedness. However, most of the research focused on work-integrated learning (internships, job shadowing, and so on) as a kind of experiential learning (Marie-Jeanne, 2020). For example, Kapareliotis, Voutsina, and Patsiotis (2019) surveyed business graduates at a Spanish institution to ascertain their perspectives on using internships to improve job preparedness. The findings supported previous studies by demonstrating the favourable impact of internships on future employability. Patil and Meena (2018) studied the effect of an experiential learning approach (spoken tutorial activity) on students' practical or technical topic knowledge. The findings revealed that active learning attained via experiential methodologies improves students' employability.

Despite their strong linkages to experiential learning (Towne, De Jong, & Spada, 2012), simulation games are often overlooked in the literature to empirically examine the benefits of experiential learning strategies on graduate work-readiness. Most research investigating the impact of simulations on learning is either quantitative or looks at the subject entirely from the students' point of view. Table 1 summarises the most current significant research on the influence of simulation games on student learning outcomes.

References	Methodology	Learning outcomes
(Bitrián, Buil, & Catalan, 2020)	Two-wave longitudinal study with a sample of 430 students' surveys	Perceived learning, satisfaction and skill outcomes
(Meltzer, 2021)	3 years study conducting surveys with 120 students	Student engagement, motivation, higher self-esteem, critical thinking and problem solving, cognitive learning outcomes
(Paulet & Dick, 2019)	Quantitative Study, survey from 170 students In Management Decision Making at one institution.	Effectively describe and analyse problems, Integrating internal and external business analysis, Generating alternatives

(Scholtz & Hughes, 2019)	Full year long case study on two groups of BBA students. One using ERP simulation game and other Practice Enterprise Model to assess the learning outcomes for both models	Integration between systems, Business processes understanding, Teamwork, Cognitive, effective and psychomotor learning
(Nisula & Pekkola, 2019)	Full year long case study on 117 first year business students who were taught ERP system by practice Enterprise Model (ERPsim). The study focussed on the assessment of the learning results pre and post-game.	Learning outcomes in the three domains of Bloom Taxonomy Cognitive outcomes: Effective Domain: Business process understanding, teamwork, motivation Psychomotor domain: Efficiency, accuracy, and response magnitude
(Gatti, Ulrich, & Seele, 2019)	A case study on two universities in Switzerland using a before and after quasi-experimental design	successfully generate cognitive (knowledge and understanding) and affective learning outcomes (values, attitudes, and behavioral intentions)
(Dick, Akbulut, & Paulet, 2019)	Empirical study using only quantitative study design	Improve managerial decision making skills and student satisfaction

Table 1. Summary of literature on learning outcomes of simulation games

2.1 Motivation of the Study

Despite significant advances in simulation-based learning research in recent years, many essential gaps remain. Most simulation studies concentrated primarily on their impact on learning outcomes, but they neglected to explain how to transfer these learning outcomes into work-readiness. Second, less emphasis has been paid to determining instructors' judgments of simulation efficacy. Most simulation research concentrated on students' perspectives and ignored the instructor's vital role in learning (Alutu, 2006). Third, there is a shortage of empirical data about the use of simulation to educate students for future jobs in the information technology industry. The majority of the research is in the medical or business fields (Teng, Ma, Pahlevansharif, & Turner, 2019; Яценко). The dynamics of the IT industries are vastly different and must be investigated. Finally, there has been no study exploring the instructors' perspectives on the influence of simulation on the employability of IS graduates in the Australian educational system. Given these constraints, the primary purpose of our research is to investigate the effectiveness of simulation in preparing students for future employment in the information technology sector. The following section describes the research methodologies utilised to achieve the study's objectives.

3 Methodology

3.1 Research Context

Most HEIs have traditionally taught ERP systems using traditional learning approaches (lectures and lab tutorials). Conventional ERP pedagogical practices concentrate on specialised skills and knowledge in various functional areas ignoring critical decision making or self-analysis skills. Previous research on ERP integration into business and IT curricula have also shown that conventional pedagogical

techniques have several flaws, particularly in learning outcomes and engagement, as well as industry preparedness (Léger, Lyle, Babin, Charland, & Pellerin, 2013). Undergraduate and graduate students sometimes have little commercial or professional experience when they join the classroom. Some of the topics in the classroom, particularly management education, are difficult to grasp without such knowledge (Dick, Akbulut, & Paulet, 2018). To address the drawbacks of traditional teaching techniques, researchers and facilitators emphasised the need to introduce extra and more sophisticated pedagogical approaches that may increase students' learning experiences (Letourneau, Hart, & MacMaster, 2017). One of these techniques is ERPsim game. The ERP simulation game allows students to improve their understanding and get real-world experience with information-based decision-making. This technique is centred on experiential learning or learning by doing (Goi, 2018; Nightingale, 2019). In the ERPsim game, students run fictional virtual businesses by making business choices and managing day-to-day operations. The game's strength is its similarity to the decision-making process necessary in a real-world organisation using an ERP system (Seethamraju, 2011). Students must engage directly with ERP software in the ERPsim game (SAP HANA). This game offers students a practical learning setting in which they may practice and learn from the repercussions of their business actions (Utesch, Heininger, & Krcmar, 2016).

3.2 Study Design

This qualitative research was part of a broader project evaluating the ERPsim game's impact on IS students' work-readiness. The study gathered information from three key stakeholders in the education process: recruiters, teachers, and students. This paper focused on the project's second stage, which investigated instructors' thoughts on utilising ERPsim at Australian institutions. We adopted a grounded theory-based qualitative research approach for this paper. This section will describe and justify the research design strategy that was used in this study.

3.3 Justification for using Grounded Theory

Although Social researchers developed Grounded Theory (Strauss & Corbin, 1990), it has become a popular qualitative research approach across many fields (Almarzooqi, Jones, & Howley, 2016). It was deemed a suitable approach for this study due to its capacity to analyse a social phenomenon from the viewpoint of the individuals involved. Furthermore, Grounded Theory is recognised as an appropriate strategy when little is known about the topic under investigation (Birks & Mills, 2015). The lack of research on ERPsim efficacy, particularly from instructors' standpoint, justifies the use of Grounded Theory for this investigation. We utilised the Straussian GT technique (Strauss & Corbin, 1990) for this article because it permits researchers to conduct research with preconceived assumptions, a predetermined issue statement, a comprehensive literature evaluation, and an interview protocol (Bryant & Charmaz, 2007). Before collecting data, the researchers completed all of these activities.

3.4 Participants and Data Collection

Using purposive sampling, we employed semi-structured interviews because they enabled us to get greater insight, identify and grasp points of view, clarify points of view, and obtain more information with greater flexibility (Yin, 2018). In line with the university ethics approval guidelines, participants were selected by using the following preset qualifying criteria: (1) The instructors must be presently or previously running ERPsim labs in Australian HEIs, and (2) they must have at least one year of experience running the labs. The researchers' professional network was used to contact participants. Around thirty instructors are running ERPsim games labs in different HRIs in Australia.. Twelve of the instructors accepted the interview invitations, with experience ranging from one to four years conducting these labs. Subsequent interviews with the instructors were also conducted to get more perspectives. There were fifteen interviews in all. The interviews were conducted until the data became saturated, at which time no new insights emerged from the interviews. Before taking part, all individuals gave signed informed permission. Interviews were conducted online between 30 and 70 minutes between September and November 2021. With the participants' agreement, audio recordings of interviews were made and subsequently verbatim transcribed. The following questions guided the discussion:

- Have you witnessed any good behavioural changes in pupils while playing simulations?
- Do simulations help students conceptual and factual understanding of the topics they are studying?
- What skills might simulation games help IT graduates build or improve?
- Do you believe that experiential learning approaches may help IS graduates prepare for the industry?

3.5 Grounded Theory Implementation

The Straussian grounded theory approach is divided into three steps: (a) open coding, (b) axial coding, and (c) selective coding. As the first phase in data analysis, open coding identifies relevant phrases and words in the data and classifies them accordingly. We utilised the QSR Nvivo tool for open coding in several iterations in this study. Line-by-line or microanalysis of the first two interview transcripts was performed in order to find common themes and develop preliminary codes. The constant comparison approach was utilised to code following interviews iteratively to examine, modify, and find further codes to achieve data and theoretical saturation. Concurrently with the data gathering, coding, and continuous comparison procedure, a memo writing process was carried out. Constant memo writing aided in identifying codes and their related categories. Secondly, axial coding was done, which helped researchers to make connections between categories and subcategories. We began the axial coding procedure by aggregating open codes into axial codes, then categorising and subcategorising axial codes based on their features. The next portion of this article discusses axial codes and their characteristics.

4 Results

The following results are presented within the framework of the grounded theory method. For open coding, the researcher went through multiple iterations. Consistent with prior research employing the GT technique (Kinnunen & Simon, 2010), which generates a significant number of open codes in the first pass, this analysis discovered 79 free nodes of learning outcomes of ERPsim game reported by the instructors. The axial coding technique yielded three types of learning outcomes: attitudes, skills, and knowledge. Within each axial code, many properties were determined. These characteristics are what distinguish the major categories. Table 2 shows the axial codes used to define the categories and their definitions and features.

Categories	Axial codes	Descriptions	Properties
Attitudes	Self-efficacy	Students' judgments of their abilities to organise and perform set of actions	Self-awareness, Confidence, Driven, Self-directed learning
	Willingness to learn	Desire or readiness to gain new knowledge and develop skill sets	Enthusiastic to learn new skills, striving for improvement
	Creativity	Ability to think out of the box and transform new ideas into reality	Neuro diversity, Out-of-box thinking
Skill sets	Cognitive skills	Mental ability to reason, plan, solve problems, and think abstractly.	Decision making, problem solving, analytical Reasoning,
	Interactive skills	Ability to effectively interact with each other	Communication, teamwork, networking, building trust
	Technical	Ability to perform technical tasks	Basic navigations with systems and basic IT knowledge
Knowledge levels	Conceptual knowledge	Knowledge of principals and theories	Knowledge of professional subjects and basic business processes
	Factual knowledge	Knowledge of basic terminologies, specific facts and tools	Business and project management and subject specialist knowledge

Table 2. Coding Process

Selective coding involves selecting a broad category that encompasses all axial codes. Work-readiness was chosen as the selection code as a phenomenon. The researcher's theoretical saturation, i.e., a period in which no new insights and ideas are formed, provides the basis for refining the codes and constantly examining the theory (Nascimento et al., 2018).

Individual quotes from the data are used to illustrate the three main categories of learning outcomes of simulation games. The instructors were asked what generic and specific skills students gained by playing simulation games. Most of the instructors agreed with the positive effects of simulation on teamwork skills.

> *One of the most important skills it has fostered is teamwork. The majority of the pupils were assigned to groups at random. And it makes a tremendous impact*

> *because they had no idea with whom they would work, which is precisely like the real job. They engage with individuals from various backgrounds with whom they must get along.*

Communication skills are the second most often cited skill among instructors. According to the instructors, students learn not just to communicate with one another but also to listen to and then act on instructions, which is a crucial part of effective communication.

> *Because the students are assigned to various areas within a corporation, they must successfully interact with one another. The individual in charge of logistics must communicate information to the purchasing department on time. Similarly, information processing and communication skills are essential if a student is acting as a sales manager. As a result, the game teaches students how to communicate successfully.*

Based on the findings, the researcher classified knowledge into two subcategories: conceptual and factual knowledge. Conceptual knowledge refers to an understanding of a domain's core principles. In contrast, factual knowledge refers to the essential components that students must understand to solve problems and complete tasks. The qualitative response in this area was favourable since it is likely that the simulation promotes improved understanding and grasp of the subject matter. Commented on by instructors:

> *If a student has a better grasp of the business process and can describe it better in the interview, they will have more confidence than others who have not taken this course. The games educate students on how actual corporations work and how various departments integrate, which may offer them an advantage over a student without any practical experience with this.*

We questioned instructors' thoughts on the positive effects of simulations on students' attitudes. The instructors were aware of the importance of confidence in possibly doing better in job interviews. They suggested that active, hands-on experience with operating software via simulation gives students an advantage in answering questions confidently during job interviews.

> *Confidence is necessary for job interviews. If there is a logistics job interview and students are fairly confident about how logistics management is done using the SAP RP system. They would feel quite comfortable coming to an interview and explaining the business process and logistics and how it is done in the SAP system.*

Simulation games, according to instructors, simulate creativity by encouraging students to employ creative strategies to win the game.

> *ERPsim fosters creativity by requiring students to reflect on their decisions after each round and devise strategies to improve their performance and defeat the other teams. They must sometimes think outside the box. The game presents students with an atmosphere where they may manage their actions and confront the consequences.*

5 Findings and Discussion

The goal of this research was to investigate instructors' perspectives on the usage of simulation games to improve IS students' work-readiness. Our results highlight the distinct advantages of simulation games for teaching certain skills and attributes. The qualitative data indicates three primary categories of learning outcomes: skills, knowledge, and attitudes, as well as eight sub-categories (Table 2).

According to instructors, the dynamic and cross-functional character of the simulations employed in this study created interdependence and encouraged regular and meaningful communication between team members. This enables students to explore and learn from their colleagues' perspectives, supporting forming an integrated learning community based on practice. Drake, Goldsmith, and Strachan (2006)) conducted qualitative research in which they gathered data from students and instructors to assess the influence of a simulation on group dynamics and collaboration. According to the results, simulations build not only collaborative abilities but also essential skills such as communication, analytical, decision-making, and strategic thinking.

Instructors acknowledged that the simulations' authentic nature, which replicated various management and operational choices made in real-world firms, also allowed them to gain or enhance their understanding of business processes. Seethamraju (2011) discovered that simulations help deep learning by significantly enhancing students' enterprise integration and business process expertise.

Students learn self-regulation skills throughout the simulation game, according to instructors. Such as the ability to make and evaluate decisions, set goals, and persist in action in the face of adversity. Self-efficacy increased their willingness to act in the face of uncertainty, chaos, and unpredictability, resulting in desired results. Numerous studies on simulation games have shown that they have a positive impact on students' self-efficacy, resulting in enhanced confidence and a willingness to learn new abilities (Dumblekar & Dhar, 2020).

We matched the learning outcomes retrieved from these interviews with the work-readiness integrated competencies model (WRICM) (Prikshat, Kumar, & Nankervis, 2019). This model includes four major components of work-ready skills: intellectual, personality, meta-skill, and job-specific. Several studies have used this methodology to measure graduates' employment preparedness (Clark, 2013; Hossain, Alam, Alamgir, & Salat, 2020; Prikshat, Montague, Connell, & Burgess, 2019). The mapping revealed that the learning results obtained through simulation games are comparable to the industry-recognised skills. This mapping illustrates simulations' beneficial influence on students' work-readiness abilities (Figure 2).

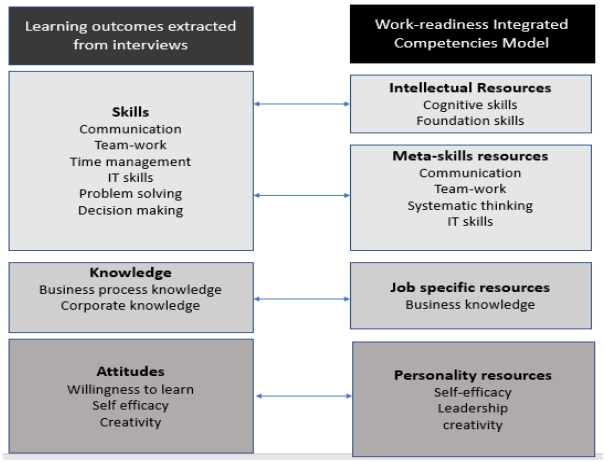

Figure 1. Mapping of study results with Work-readiness Integrated Competencies Model (Prikshat et al. 2019a)

6 Conclusion

A growing number of higher education institutions (HEIs) are using computer simulation games. Despite this, empirical research on the influence of this phenomenon on IS students' work-readiness has been lacking. Using the Grounded Theory methodology, researchers conducted semi-structured interviews with instructors to bridge the gap. ERP concepts are being taught to students at several Australian institutions via a simulation game called ERPsim. The data analysis shows that students' work-readiness is improved due to playing this game. Learning outcomes include good collaboration, communication and analytical abilities, eagerness to learn, confidence, growth in factual and theoretical understanding of ERP systems, time management, and problem-solving. Mapping with the Work Readiness Integrated Competency Model demonstrated the game's success in preparing students for the workforce.

6.1 Theoretical and practical contributions

This study made two significant theoretical contributions. While past research on game-based learning has shown that it improves learning outcomes (Subhash & Cudney, 2018), few studies have examined work-readiness in simulation games. Therefore, this study contributes to the body of knowledge by mapping learning outcomes of simulation games to the Work Readiness Integrated Competency Model. (Prikshat, Kumar, et al., 2019) to propose a framework for instructors to focus more on the attributes required by the industry. In particular, this study overcomes the limitations of earlier research by exploring the learning outcomes related to the positive attitude changes in students. Second, past research analysing learning outcomes has relied mostly on quantitative data. Thus, this study adds to the literature by examining instructors' perceptions using a qualitative research approach that yielded

rich insights, identified and understood opposing opinions, clarified points of view, and gathered supplemental material.

Additionally, this research makes practical recommendations for developing learning activities that use business simulation games to place more emphasis on the learning outcomes, which can enhance work-readiness in students. Our findings have shown that, although all of the participants confirm the benefits of using the games on the learning outcomes, the labs are designed to focus more on teaching skills rather than positive attitudes. Therefore, considering that positive attitudes like self-efficacy, willingness to learn, and creativity are the most sought-after attributes by employers (insert citation), it would be worthwhile to design the activities to simulate students' learning and practising these attributes. In addition, this study has demonstrated the potential benefits of using these games to make students more work-ready if the labs are designed to focus more on the desirable attributes of the industry. One approach to doing this is to develop the game to provide students with pertinent information, such as the expected outcomes. That way, they can progressively reorient their strategies to focus on creating positive attitudes, as they are often ignored by students in pursuit of winning the competition from other teams.

6.2 Limitations and future research

The study's limitations suggest future research areas. Firstly, the study's conclusions are solely based on instructors' perceptions of the learning outcomes. Although Instructors are an essential part of the learning process, it's crucial to remember that there are other critical stakeholders in work-readiness process, including current students and industry (Borg, Scott-Young, & Turner, 2019). Secondly, this study describes work-readiness regarding students' skills, attributes and knowledge. Although these factors have been used in the previous literature, they are not the only factors affecting work-readiness. The extrinsic factors can affect the learning process and need to be considered. It would be interesting for future studies to use these factors too. A second limitation is the use of instructors' perceptions as learning outcomes assessment, leading to biases. Therefore, another route for future study may be to include other measures of learning performance, such as application exams, memory retention, or transfer learning, to investigate simulation games' effect on work-readiness further. Finally, the limited demographic context of this study presents another limitation as the selected instructors are conducting labs in a single, developed nation. However, mapping the learning outcomes with the work-readiness integrated competency model provides a basis for other scholars to generalise the findings. More research in different geographical regions is recommended to improve the findings' generalizability further.

7 References

Almarzooqi, A., Jones, A., & Howley, R. (2016). Applying grounded theory methods to digital forensics research.

Alutu, A. N. (2006). The guidance role of the instructor in the teaching and learning process. *Journal of Instructional Psychology, 33*(1), 44.

Biel, J. (July 12, 2022). 60 Critical ERP Statistics: 2022 Market Trends, Data and Analysis. Retrieved from https://www.netsuite.com/portal/resource/articles/erp/erp-statistics.shtml

Birks, M., & Mills, J. (2015). *Grounded theory: A practical guide*: Sage.

Bitrián, P., Buil, I., & Catalan, S. (2020). Flow and business simulation games: A typology of students. *The International Journal of Management Education, 18*(1), 100365.

Borg, J., Scott-Young, C. M., & Turner, M. (2019). Smarter education: Leveraging stakeholder inputs to develop work ready curricula. In *Smart Education and e-Learning 2019* (pp. 51-61): Springer.

Bryant, A., & Charmaz, K. (2007). *The Sage handbook of grounded theory*: Sage.

Certo, S. C. (1976). The experiential exercise situation: A comment on instructional role and pedagogy evaluation. *Academy of Management Review, 1*(3), 113-116.

Clark, H. (2013). Work Readiness Standards and Benchmarks: The Key to Differentiating America's Workforce and Regaining Global Competitiveness. *ACT, Inc.*

Dick, G., Akbulut, A. Y., & Paulet, G. (2018). *Taking the ERPsim games into management education.* Paper presented at the Proceedings of the 2018 Association for Information Systems Special Interest Group for Education (AIS SIGED) Annual International Conference on Education and Research.

Dick, G., Akbulut, A. Y., & Paulet, G. (2019). TAKING THE ERPSIM GAMES INTO MANAGEMENT EDUCATION.

Drake, R., Goldsmith, G., & Strachan, R. (2006). A novel approach to teaching teamwork. *Teaching in Higher Education, 11*(1), 33-46.

Dumblekar, V., & Dhar, U. (2020). Perceived self-efficacy of students in a business simulation game. *The Irish Journal of Management, 40*(1), 61-73.

Faisal, N., Chadhar, M., Goriss-Hunter, A., & Stranieri, A. (2019). *Are ERP Simulation Games Assisting Students to be Job-Ready? An Australian Universities' Perspective*. Paper presented at the Australasian Conference on Information Systems.

Faisal, N., Chadhar, M., Stranieri, A., & Gorris-Hunter, A. (2021). Rethinking IS Graduates Work-readiness: Employers' perspectives.

Foster, S. B., & Pierce, D. A. (2021). Improving Experiential Learning in Sport Management Through Work-Integrated Learning. *Sport Management Education Journal, 15*(2), 117-126.

Gatti, L., Ulrich, M., & Seele, P. (2019). Education for sustainable development through business simulation games: An exploratory study of sustainability gamification and its effects on students' learning outcomes. *Journal of Cleaner Production, 207*, 667-678.

Goi, C.-L. (2018). The use of business simulation games in teaching and learning. *Journal of Education for Business*, 1-8.

Griffin, A. J., Johnson, N. F., Valli, C., & Vernon, L. (2021). The Impact of Twenty-first Century Skills and Computing Cognition Cyber Skills on Graduates' Work Readiness in Cyber Security. In *Advances in Security, Networks, and Internet of Things* (pp. 213-221): Springer.

Hossain, M. M., Alam, M., Alamgir, M., & Salat, A. (2020). Factors affecting business graduates' employability–empirical evidence using partial least squares (PLS). *Education+ Training*.

Kadir, J. M. A., Naghavi, N., & Subramaniam, G. (2020). Unemployment among graduates-Is there a mismatch? *International Journal of Asian Social Science, 10*(10), 583-592.

Kapareliotis, I., Voutsina, K., & Patsiotis, A. (2019). Internship and employability prospects: assessing student's work readiness. *Higher education, skills and work-based learning*.

Keshav Kumar, P. B., Vineet Kumar. (Feb 2022). *Enterprise Resource Planning (Erp) Market Statistics: 2027*. Retrieved from https://www.alliedmarketresearch.com/ERP-market

Kinnunen, P., & Simon, B. (2010). *Building theory about computing education phenomena: a discussion of grounded theory*. Paper presented at the Proceedings of the 10th Koli Calling International Conference on Computing Education Research.

Koivisto, J., & Hamari, J. (2019). The rise of motivational information systems: A review of gamification research. *International Journal of Information Management, 45*, 191-210.

Kolb, A. Y., & Kolb, D. A. (2005). Learning styles and learning spaces: Enhancing experiential learning in higher education. *Academy of management learning & education, 4*(2), 193-212.

Léger, P.-M., Lyle, D., Babin, G., Charland, P., & Pellerin, R. (2013). Scope Management: A Core Information System Implementation Project Pedagogy. *International Education Studies, 6*(3), 55-65.

Letourneau, N. L., Hart, J. M., & MacMaster, F. P. (2017). Association Between Nonparenting Adult's Attachment Patterns and Brain Structure and Function:A Systematic Review of Neuroimaging Studies. *3*, 2377960816685572. doi:10.1177/2377960816685572

Lewis, L. H., & Williams, C. J. (1994). Experiential learning: Past and present. *New directions for adult and continuing education, 1994*(62), 5-16.

Marie-Jeanne, J. P. J. (2020). *Exploring the relationship between internship and employability*.

Matthews, A., McLinden, M., & Greenway, C. (2021). Rising to the pedagogical challenges of the Fourth Industrial Age in the university of the future: an integrated model of scholarship. *Higher Education Pedagogies, 6*(1), 1-21.

Mavodza, J. (2017). Integrating Experiential Learning Into Information Literacy Curriculum. In *The Experiential Library* (pp. 3-14): Elsevier.

Meltzer, L. (2021). *Experiential Learning and Student Engagement Through a Stock Market Simulation Game*. Paper presented at the Developments in Business Simulation and Experiential Learning: Proceedings of the Annual ABSEL conference.

Mohsen, K., Abdollahi, S., & Omar, S. (2018). Evaluating the educational value of simulation games: Learners' perspective. *Innovations in Education and Teaching International*.

Narayanan, E., & Turner, J. J. (2019). Perceptions of simulation games and the role they play in creating an enterprising and employable graduate. *International Journal of Education, Psychology and Counseling, 4*(30), 179-196.

Nascimento, L. d. C. N., Souza, T. V. d., Oliveira, I. C. d. S., Moraes, J. R. M. M. d., Aguiar, R. C. B. d., & Silva, L. F. d. (2018). Theoretical saturation in qualitative research: an experience report in interview with schoolchildren. *Revista brasileira de enfermagem, 71*, 228-233.

Nightingale, J. (2019). Using a Simulation Game to Teach the Concept of ERP. In *Smart Technologies and Innovation for a Sustainable Future* (pp. 457-463): Springer.

Nisula, K., & Pekkola, S. (2019). ERP based business learning environment as a boundary infrastructure in business learning. *Education and Information Technologies, 24*(4), 2547-2566. doi:10.1007/s10639-019-09889-0

Patil, M., & Meena, M. (2018). Effect of practicing experiential learning (Like online learning-ICT) in engineering education. *Journal of Engineering Education Transformations, 31*(3), 95-101.

Paulet, G., & Dick, G. (2019). *ERPsim Games in Management Higher Education*. Paper presented at the Developments in Business Simulation and Experiential Learning: Proceedings of the Annual ABSEL conference.

Prikshat, V., Kumar, S., & Nankervis, A. (2019). Work-readiness integrated competence model: Conceptualisation and scale development. *Education+ Training*.

Prikshat, V., Montague, A., Connell, J., & Burgess, J. (2019). Australian graduates' work readiness–deficiencies, causes and potential solutions. *Higher education, skills and work-based learning*.

Scholtz, F., & Hughes, S. (2019). A systematic review of educator interventions in facilitating simulation based learning. *Journal of Applied Research in Higher Education*.

Seethamraju, R. (2011). Enhancing student learning of enterprise integration and business process orientation through an ERP business simulation game. *Journal of Information Systems Education, 22*(1), 19.

Spanjaard, D., Hall, T., & Stegemann, N. (2018). Experiential learning: Helping students to become 'career-ready'. *Australasian marketing journal, 26*(2), 163-171.

Standford, A. P. a. J. (2019). *The Future of Work for Australian Graduates: The Changing Landscape of UniversityEmployment Transitions in Australia*. Retrieved from https://d3n8a8pro7vhmx.cloudfront.net/theausinstitute/pages/3083/attachments/original/1571640129/Future_of_Work_for_Australian_Graduates_GCA_Final_Formatted.pdf?1571640129

Strauss, A., & Corbin, J. (1990). *Basics of qualitative research*: Sage publications.

Subhash, S., & Cudney, E. A. (2018). Gamified learning in higher education: A systematic review of the literature. *Computers in Human Behavior, 87*, 192-206.

Suleman, F. J. H. E. (2018). The employability skills of higher education graduates: insights into conceptual frameworks and methodological options. *76*(2), 263-278.

Teng, W., Ma, C., Pahlevansharif, S., & Turner, J. J. (2019). Graduate readiness for the employment market of the 4th industrial revolution: The development of soft employability skills. *Education+ Training*.

Towne, D. M., De Jong, T., & Spada, H. (2012). *Simulation-based experiential learning* (Vol. 122): Springer Science & Business Media.

Utesch, M., Heininger, R., & Krcmar, H. (2016). *Strengthening study skills by using ERPsim as a new tool within the Pupils' Academy of Serious Gaming*. Paper presented at the 2016 IEEE Global Engineering Education Conference (EDUCON).

Verma, P., Nankervis, A., Priyono, S., Salleh, N. M., Connell, J., & Burgess, J. (2018). Graduate work-readiness challenges in the Asia-Pacific region and the role of HRM. *Equality, Diversity and Inclusion: An International Journal*.

Wedig, T. (2010). Getting the most from classroom simulations: Strategies for maximizing learning outcomes. *PS: Political Science & Politics, 43*(3), 547-555.

Yin, R. (2018). Case study research and applications-design and methods, SAGE Publication. In: Inc.

Яценко, И. *SPECIFICS OF USING BUSINESS GAMES IN TRAINING OF FUTURE SPECIALISTS*. Paper presented at the Организационный комитет конференции.

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