Are ERP Simulation Games Assisting Students to be Job-Ready? An Australian Universities' Perspective

Research in Progress

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Abstract

Deep and rapid changes in digital enterprise technology exceed the ability of traditional teaching methods to prepare students for challenges encountered in modern enterprises. Researchers proposed different pedagogical approaches to teach ERP (Enterprise Resource Planning) concepts such as ERPsim games to enhance students' learning and job-readiness. Although the ERPsim studies verified the role of these games in enhancing students' learning, whether these games contribute to student's job readiness still needs to be explored. Using the mixed-method approach, this research-in-progress is designed to fill this gap by investigating the role of ERPsim game in increasing skills, learning levels, and job-readiness among university students in Australia. The findings from this study can contribute to the improvement of ERP pedagogical techniques. In addition, this research-in-progress will provide a concrete mapping to align learning outcomes/skills with ICT industry competencies standards as defined in SFIA (Skills framework for Information Age) and AQF (Australian Qualifications Framework).

Keywords: ERP simulation games, Learning outcomes, Job-readiness

1 INTRODUCTION

According to(Bolger 2019), a revised model of the Melbourne Declaration on Education Goals for Young Australians was released on 7th July 2019 and will be implemented next year by the Ministry of Education. The government plans to invest an extra $80 million in tertiary education institutes which will be tied to the number of graduates who are employed after graduation in their respective fields and their satisfaction with teaching standards.

With these recent developments in higher education, there is a closer engagement between academia and industry resulting in more focus on graduates' job-readiness skills and effective instructional methods (Suleman 2018). These skills involve, but are not limited to, higher-level thinking skills, inter and intra-personal skills, generic and social skills, technical skills and critical decision-making skills (Misra and Khurana 2017). On this score, there is a stream of studies showing that the skill acquisition of IS graduates is below the industry required standards. This scenario not only affects the students' chances of employability but also has a negative effect on organizations and ultimately, on the economy (Moore and Morton 2017). IS (Information system) schools in universities are addressing this dilemma by employing diverse pedagogical approaches to enrich students' learning experiences. One approach involves experiential learning. Especially, in IS and business curriculum, this approach is gaining in popularity as it can foster future employability skills and job readiness in students (Goi 2018).

An important way to increase job-readiness of IS students is to expose them to software useful to industry and provide them with practical experience in using these software applications (Gatti et al. 2019). One of these software applications is ERP (Enterprise Resource Planning) which automates different business functions in a single database resulting in enhanced organizational efficiency and error free transactions (Nwankpa 2019). Familiarity with this software has been shown to enhance students' job-readiness (Chauhan and Jaiswal 2016). As organizations' ERP usage become more complex and widespread, the need to prepare students for the rapidly evolving software environment increases. Universities that incorporate ERP into their curriculum faced many challenges; one of which involved the selection of a suitable pedagogical method (Gatti et al. 2019). ERP simulation games provide students an experiential learning experience resulting in effective and long lasting learning valuable for companies. They equipped students with the necessary skills to enter the labour market and to contribute to the organization from day one (Chauhan and Jaiswal 2016).

There is an abundance of studies on the learning outcomes of ERP simulation games in term of higher engagement (Charland et al. 2016), higher skill levels (Lohmann et al. 2019), and motivation and positive behavioral shift in students (Chadhar and Daneshgar 2018). However, there is only one study so far that briefly addresses the effect of this approach on student future employability skills and job readiness (Goi 2018). In that study, Goi reviewed three main aspects of business simulation games, one of which was future employability. After the related literature review, he presented 30 reasons impacting the significance of business simulation games in increasing the job-readiness of students. He condensed these reasons into 12 categories; experience, competition, decision making, analytical exercise, teamwork, motivation, theory application, active learning, enjoyment, and integration of ideas. According to Goi, these reasons led to the sustainable teaching and learning experience which ultimately fosters future employability skills in students.

Due to the scarcity of research in this area, there is a need to fill this gap for two main reasons. Firstly, job-readiness and employability are crucial deciding factors for students while deciding about their undergraduate and graduate study path (Burgess et al. 2017). Secondly, IS education providers are struggling to find a balance between employers' demand for a skilled workforce and the skill-set of their graduates, resulting in shift of focus amongst IS providers in order to fill this long-standing deficit (Ortiz and MacDermott 2017). The proposed research objective of this research-in-progress is to discover: In what ways do ERP simulation games assist IS students in increasing their learning and skill levels to be job-ready?

This paper is structured as follows: in the literature review section, similar studies in the field of experiential learning methods, especially business simulation games methods and their effect on the job-readiness of students are presented. Subsequently, a quick description of the proposed methodology is given. The paper is concluded with the expected contributions, discussion and limitations of this research-in-progress.

2 LITERATURE REVIEW

2.1 ERPsim game

ERPsim game, based on experiential learning approach, was developed by a team of ERP experts and instructors in Montreal, Canada in 2004 to provide students a real-time risk-free environment to improve their knowledge of business processes and ERP systems (Angolia and Pagliari 2018b; Léger et al. 2012). Previous studies on ERP simulation games have predominantly focused on students' perspective and their reaction to this pedagogical tool. Generally, they perceive that this method helps to instil a mix of hard and soft skills that are in high demand in the industry(Buil et al. 2018). Few more studies, taking into account just students perspective, generally supported the idea that there are added benefits of using ERP simulation games in term of motivation, developing critical thinking skills, practicing higher decision-making skills and problem-solving(Bhuiyan et al. 2018; Paulet and Dick 2019; Rajšp et al. 2018; Wang 2018). Although students perceived outcomes are important while investigating the efficiency of any pedagogical techniques, students' responses can be biased and report just learner's point of view. In an effective experiential learning cycle, learner and instructor play an equally important part (Kolb et al. 2005). There are only a couple of studies which discussed instructors' point of view regarding the benefit of using this teaching tool. One of that studies presented evidence from instructors teaching operation management through the same game, ERPsim game, that we are going to target for this study. The results reported that students learn ERP, business process and transactions while playing ERP simulation games (Nightingale 2019). Another study was done in 2012 by Cronan and Douglus, which compared the self-assessed perception of learning reported by students with the objective measure of knowledge reported by instructors during an ERP simulation game workshop. By taking into account both perspectives, researchers were able to eliminate biases as much as possible. For our research, we will use this mixed-method technique to eliminate the biases of results as well as validate the results.

2.2 IS Pedagogical Techniques and Job-Readiness of Graduates

In information system (IS) education, an appropriate teaching design can yield enhanced learning outcomes, greater satisfaction among students and higher skill levels which ultimately support students' job-readiness or work preparedness (Chayakonvikom et al. 2016). Authors categorized IS pedagogical methods into two groups, traditional and experiential methods. The most used traditional methods are lectures, lab exercises, case studies and group discussion (Arasti et al. 2012). These traditional methods present many shortcomings in terms of less student engagement, low motivational level, insufficient learning outcomes and less focus on developing soft skills (Nisbet and Shucksmith 2017). To cope with these shortcomings, there is a need to shift focus from traditional practises to innovative practices (Misra and Khurana 2017).

The experiential learning pedagogy has a broad range of application in higher education and has received great success (Kolb et al. 2005). The popularity of experiential learning has grown over the years due to its efficiency to overcome the shortcoming of traditional methods as well as to meet the needs of industry and has been embedded in IS curriculum in various forms such as simulations, work-ready learning, student-run businesses, internship programs and job shadowing (Spanjaard et al. 2018). These innovative styles focus on job-ready skills which include a mix of hard and soft skills (Martin and Management 2019). Especially in ERP (Enterprise Resource Planning) education, which is an important part of business and IT curriculum in universities, experiential learning helps to foster job-ready skills in students such as problem-solving, critical thinking, analytical reasoning, creativity, interpersonal skills, leadership and teamwork which are essential part of employability (Leong and Kavanagh 2013). Using a Simulation game is a learning approach which is built on experiential learning method as it provides hands-on experience and opportunities for students to make and test their decisions in a safe environment which resembles with the real-world situation (Loon et al. 2015). In 2016, a group of researchers discussed how experiential learning methods facilitate job-readiness of students but he didn't explain the effect of different forms of experiential method individually, especially of simulation games. This research-in-progress is aiming to focus on simulation games and their effect on students' job-readiness (Smith et al. 2016).

2.3 ERPsim and Job-Readiness of students

Evidences in experiential learning literature suggest that students who are given a chance to test their ability to make and test critical decision while going through experiential learning cycle are more likely to be job-ready than the students who are only exposed to the traditional learning methods (Mavodza 2017; Spanjaard et al. 2018). ERPsim game has strong links with experiential learning as it allows active

learning by involving students in performing complex transactions and decision making on ERP systems followed by the feedback and then modification of their decisions (Loon et al. 2015). This doing, discussing, reflecting and experimenting reflect the four stages of Kobl's Experiential learning cycle which are concrete experience, reflective observations, active experimentation and abstract conceptualisation (Kolb et al. 2005). Although, there is no research explaining effects of this particular simulation game on the job readiness of university graduates, the link between ERPsim and experiential learning suggests a relationship which needs to be addressed.

3 METHODS

The purpose of this research-in-progress is both confirmatory and exploratory, and hence the researchers decide to use a mixed-method approach (Creswell 2009) to answer the following questions:

1. What is the impact of using ERP simulation games on the development of students' job-ready skills?

2. How do ERP Simulation games help or hinder students to achieve higher learning and skill levels to be more job-ready?

The quantitative component will confirm whether there is an impact of this teaching method on students' job-readiness and by doing so will answer the first question. The qualitative component will answer the second question by exploring how this approach effects job-readiness of students by helping students to achieve higher learning and skill levels.

The researchers intend to conduct this study on multiple universities and institutes in Victoria who are using the HEC Montreal ERP simulation game (Léger et al. 2012) to teach ERP system to students. Developed by ERPSim Lab in HEC Montreal in 2004, the ERPsim game is an innovative learning method which provides students a real-time, risk-free environment to improve their knowledge of business processes and ERP systems (Léger et al. 2012). This ERPsim game runs on SAP HANA, the latest version of SAP as it provides an in-memory database which facilitates rapid processing and analysis of big data in real time. This in-memory database provides students instant results of the decisions they have made (Welz and Rosenberg 2018). This business simulation game has been used in more than 150 universities worldwide (Caya et al. 2011) and a few universities in Australia including Melbourne University, RMIT University, Victoria University, and Federation University, to teach Enterprise System concepts.

The data collection will be done through concurrent triangulation design due to its ability to provide cross validity and confirmation of the results (Alavi and Hąbek 2016) where surveys from students and semi-structured interviews from instructors will be concurrently conducted using purposive sampling. This data collection method was used in a study on ERPsim game to find out students' actual learning outcome by comparing perceived outcomes of the students and reported outcomes by the instructors to reduce biases of results (Cowan and George 2013).

The pre-post survey questionnaires will be five-point Likert scale measuring actual learning outcomes of students who take part in the ERPsim game. As of now, around 1700 students are enrolled in Victorian universities where this ERP simulation game (ERPSim) is a part of Supply Chain course. To answer the part of the research question which is related to skill levels and job readiness of students, researchers will conduct in-depth face to face interviews with instructors who are using this method. Researches are expecting to get at least 20 interviews. Invitation will be sent to all the students and instructors who are taking part in ERPsim game in these universities and their participation will be voluntarily.

The multi-method approach will be used for the analysis of data where, for quantitative analysis, researchers are planning to use paired-comparison T-test in SPSS to analyze the change in learning outcomes pre and post-game. Based on the previous literature, pre-post surveys and interviews will be conducted as it is a reliable and easy way to measure whether an instructional method has an impact on learning or not (Lieber and Research 2009). The proposed research design is similar design to the study by Cronan and Douglus (2012) in which they compared the learning and IS acceptance of students prior to and after participating in ERP simulation game.

The interviews from the instructors will be thematically analyzed. The learning outcomes and skill levels of students derived from these analyses will be then mapped against two educational frameworks; AQF (Australian Qualification Framework) and SFIA (Skill Framework for Information Age). AQF has been used by the academia to design curriculum to produce industry-ready graduates (Lake and Holt 2019), while since last two decades, SFIA has been acting as the global IS competencies framework acting for the career planning of ICT students (Harmse 2018; Palmer et al. 2018). This mapping may help the

researchers to investigate if and to what extent students using simulation games are achieving learning and skill levels required by the ICT industry.

4 EXPECTED OUTCOMES OF THE RESEARCH-IN-PROGRESS

The objective of this research-in-progress is to justify the use of this teaching method by exploring whether ERP simulation games are helping students to achieve higher learning and skill levels and in the process assisting them to be job-ready. To our best knowledge, most of the studies done on learning outcomes of ERP simulation games focused on students' perspective (Gatti et al. 2019; Lohmann et al. 2019; Nisula et al. 2019) and there is just single study so far who took into account the instructors' perspective (Léger et al. 2012). This study, therefore, will use mixed-method approach to find out the learning outcomes and job-ready skills from both student and instructor perspectives as in experiential or problem-based learning method, teacher and students play collaborative roles (Angolia and Pagliari 2018a).

This study will then map these learning outcomes and skills with the learning levels and skills defined in two frameworks (AQF and SFIA) to find out whether the students, who are exposed to this experiential learning method, are achieving learning and skill levels required by academia and ICT industry and by doing so may provide a concrete mapping to align Learning outcomes of ERP simulation games with the skills required by ICT industry. As the instructors' point of view will be included in the study, it may also help ERP simulation experts in universities to make improvements in pedagogical techniques to fill the learning gaps to match the skill levels of these frameworks. That may give the justification of integrating ERP simulation into business and IS curriculum in universities as it will try to establish that teaching ERP by traditional teaching method usually does not meet the benchmarks set in these qualification frameworks and ERP simulation can help achieve these benchmarks. The findings of this study will be presented to the ICT professionals and academia in the form of alignment analysis to verify the result and discuss the implication in academia.

As the sample of the study will be taken from just one university and its affiliated institutes, it limits the scope of the study. In the future, another study can be done using a wider range of the sample. Furthermore, different types of simulation games can be used in future studies. As the use of ERP simulation games is relatively new in Australian Universities, in future alumni and HR managers can provide additional insight whether the use of this instructional method is yielding positive results in terms of increased employment and promotion.

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