EXTENSION OF INFORMATION SYSTEMS SUCCESS MODEL FOR THE GAMIFICATION E-LEARNING SYSTEM

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EXTENSION OF INFORMATION SYSTEMS SUCCESS MODEL FOR THE GAMIFICATION E-LEARNING SYSTEM

by

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LIST OF ABBREVIATIONS

LCS   Login Career System

IS   Information Systems

MIS   Management Information Systems

SEM   Structural Equation Modelling

PLS-SEM   Partial Least Squares Structural Equation Modelling

CMV   Common Method Variance

LVs   Latent Variables

CV   Convergent Validity

DV   Discriminant Validity

AVE   Average Variance Extracted

PFE   Perceived Future Employability

IQ   Information Quality

SQ   System Quality

SERQ   Service Quality

COLLQ   Collaboration Quality

SAT   User Satisfaction

NETB   Net Benefits

PFS   Perceived Future Skills

PFPC   Perceived Future Personal Characteristics

PFLMK   Perceived Future Labour Market Knowledge

GDP   Goal-Drive Persistence

RR   Reward Reactivity

LIST OF APPENDICES

PELUASAN MODEL KEJAYAAN SISTEM MAKLUMAT UNTUK SISTEM E-PEMBELAJARAN GAMIFIKASI

ABSTRAK

Kepustakaan yang wujud mengambarkan bahawa jurang kemahiran siswazah-siswazah dengan jangkaan industri dan persediaan akademik telah menjadi fenomena yang sohor kini di seluruh dunia. Universiti telah diminta untuk memainkan peranan penting dalam memupuk kemahiran yang dicari di kalangan pelajar dalam mengharungi abad ke-21 ini. Oleh itu, ini mengisyaratkan bahawa sistem inovatif yang baru perlu dicadangkan untuk meningkatkan kemahiran pelajar serta mengkaji faedah bersih sistem ini dan peramal faedah bersih di kalangan pelajar universiti. Sehubungan itu, penyelidikan ini mencadangkan Sistem Log Masuk Kerjaya, iaitu satu sistem e-Pembelajaran gamifikasi untuk meningkatkan kemahiran pelajar melalui penggabungan kedua ciri gamifikasi dan kursus e-Pembelajaran yang diperakui. Oleh kerana itu, kajian ini telah membina sebuah model teori yang menghubungkait penyelidikan kualiti maklumat, kualiti sistem, kualiti perkhidmatan dan kualiti kolaboratif sebagai peramal faedah bersih, penggunaan sistem dan kepuasan pengguna berdasarkan integrasi Model Kejayaan Sistem Maklumat DeLone & McLean yang dikemas kini dengan falsafah teori jangkaan. Tambahan pula, model ini dibina untuk menyiasat penggunaan serta kepuasan pengguna sebagai peramal faedah bersih, manakala penggunaan sistem juga diperiksa sebagai satu faktor peramal bagi kepuasan pengguna. Model penyelidikan telah diperluaskan untuk memasukkan kemahiran masa depan yang teranggar, ciri-ciri peribadi masa depan yang teranggar dan pengetahuan pasaran buruh masa depan yang teranggar sebagai tiga faktor hasil yang dijana daripada faedah bersih. Selain itu, dedikasi pemacu matlamat dan kereaktifan ganjaran adalah dua pemboleh ubah

penyederhanaan yang disatukan ke dalam model kajian ini. Seramai 434 orang pelajar sarjana muda di Universiti Sains Malaysia telah menyertai dalam penyelidikan ini. Data yang diperoleh telah dianalisis menggunakan Partial Least Squares-Structural Equation Modeling. Berdasarkan analisis, keputusan menunjukkan bahawa sejumlah 16 hipotesis daripada 20 hipotesis cadangan telah disokong. Hasil kajian ini bermanfaat kepada para penyelidik, pihak pengurusan universiti, dan pembuat dasar yang ingin mendalami ramalan faedah bersih dari sistem yang dicadangkan ini agar faedah bersih yang dihasilkan dari sistem ini dapat dikendalikan dan dimaksimumkan.

EXTENSION OF INFORMATION SYSTEMS SUCCESS MODEL FOR THE GAMIFICATION E-LEARNING SYSTEM

ABSTRACT

The existing literature depicts that graduates' skills gap between industry expectations and academic preparation has become a trending phenomenon worldwide. Universities have been called to play a vital role to instil in these students the most sought skills in surviving this 21st Century. Hence, it signals the need to propose a new innovative system to enhance students' skills and examine the net benefits of this system and the predictors of net benefits among university students. Accordingly, this research proposes the Login Career System, a gamification e-learning system, to improve students' skills by integrating gamification features and certified e-learning courses. Besides, based on the integration of the updated DeLone & McLean Information Systems Success Model and the philosophy of expectancy theory, this study builds a theoretical model to govern the investigation of information quality, system quality, service quality, and collaboration quality as predictors of net benefits, use, and user satisfaction. Additionally, the model is built to investigate the use and user satisfaction as predictors of net benefits, whereas the use of the system is also examined as a predictor of user satisfaction. The research model was extended to include perceived future skills, perceived future personal characteristics, and perceived future labour market knowledge as the three outcome factors generated from the net benefits. Besides, goal-drive persistence and reward reactivity are the two moderating variables integrated into this study's research model. A total of 434 Universiti Sains Malaysia undergraduate students participated in this research. The obtained data were analysed using partial least squares structural equation modelling. Based on the analysis, the results showed that a total of 16 hypotheses were supported out of a total of 20 proposed hypotheses. The findings of this study are beneficial to researchers, university management, and policymakers who wish to apprehend the predictors of net benefits of the

proposed system so that the net benefits generated from the system can be managed and maximised.

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

With the global world of work changing rapidly, universities worldwide have a critical role to perform in guaranteeing that their students are workplace ready and equipped for whatever career path they choose to follow (Yoong, Don, & Foroutan, 2017; J. Lee, 2021). Minimising the skills gap between industry expectations and academic preparation is always the concern of universities and the government. Nowadays, universities are required to play an essential role not only to prepare the graduates with specific areas of specialisation, but more importantly, to develop university students skills that are most required in the 21st Century (Hamid, Islam, & Hazilah, 2014; Singh, Thambusamy, & Ramly 2014; A. Y. T. Tan, Chew, & Kalavally, 2017; Ismail, 2018; Ithnin, Sahib, Eng, Sidek, & Harun, 2018; Chamorro-premuzic & Frankiewicz, 2019; Lam, 2021). These demanded skills can be a combination of hard and soft skills. Hard skills (technical skills) refer to the skills linked with the technical aspects of obtaining the knowledge to carry out a job (Matsouka & Mihail, 2016), while soft skills refer to the skills related to personal interaction and are considered as behavioural in nature (Andrews & Higson, 2008). These soft skills support the hard skills in the work environment. Several industries today are seeking these skills in a potential candidate (Hamid et al., 2014; Ghazali & Bennett, 2017; A. Y. T. Tan et al., 2017; J. Lee, 2021; Fadhil, Ismail, & Alnoor, 2021).

The United Kingdom National Committee of Enquiry into Higher Education Report, published in 1997, linked the issues of skills development and employment (Bridges, 2000). The report stated that ''learning should be increasingly responsive to

the employment needs and include the development of general skills, widely valued in employment'' (Bridges, 2000, p. 44). A survey conducted by the Confederation of British Industry (CBI) and Pearson (2016) concluded that with the increasing worldwide demand for employees with high-level skills, it was noticed that the graduates' recruiters declare their needs for employees who have accurate attitudes and aptitudes for work and who own work-relevant or employability skills (CBI & Pearson, 2016). Besides that, economic stability and sustainability would be the desired ideals of any nation, and universities have a role in producing advanced knowledge and skilled manpower that could meet these desired ideals. Therefore, the productivity of the labour market can be increased via the improvements in the quality and quantity of education and training for university students, including continuous skill upgrading and lifelong learning (Chevaillier, 2002).

The article titled *Does Higher Education Still Prepare People for Jobs ?* which is published in Harvard Business Review (7 Jan 2019) mentioned that it is very hard to judge if the knowledge provided to the universities' students is still relevant in the era of unpredictable job evolution (Chamorro-premuzic & Frankiewicz, 2019). Besides, the article revealed that each candidate who can do any duty that machines cannot accomplish is becoming the more valued candidate. Thus, the importance of soft skills is in the growing trend recently as these skills are hard to emulate by machines (Chamorro-premuzic & Frankiewicz, 2019). Moreover, the article stated that "We often hear employers and business leaders lament the unfortunate gap between what students learn in college and what they are actually expected to know in order to be job-ready" (Chamorro-premuzic & Frankiewicz, 2019). Thus, it was suggested that universities could increase the value of their degree if they focus more on developing the soft skills required by recruiters and employers (Chamorro-premuzic & Frankiewicz, 2019).

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The CNBC (31 Oct 2018) with its article entitled "*The future of work won't be about college degrees, it will be about job skills*" reported there is a need for "New, non-traditional education options" as no one school even Harvard "can ever insulate us from the unpredictability of technological progression and disruption" (Kasriel, 2018). Therefore, many companies emphasised the importance of learnability, considering it as a key indicator of career potential. Thereby, a curious individual with a hungry mind considers a potential candidate (Chamorro-premuzic & Frankiewicz, 2019).

Regarding the Malaysian context, the news of "*Employers face skill and talent shortage challenge*" published in The Star Online (11 Mar 2017) revealed that 97% of the employers in Malaysia were still facing huge difficulties to find the required skilled people, and 69% of employers are worried they do not have the right talent to attain the existing business objectives. It also stated that 48% of employers believe that skill deficiency has likely to restrain effective business operations. Besides, the Malaysian Economic Report (2018) mentioned that the main challenge in advancing the productivity of Malaysia is the skills shortage (Lin, 2017). Hence, it can be concluded that the graduates' skills gap between industry expectations and academic preparation leads to impact the productivity growth of Malaysia negatively. Therefore, improving the productivity growth of Malaysia will only be achieved by equipping university students with the competency skills required in the labour market. Skills like English proficiency, technical fields skills, people-to-people skills, and problem-solving skills are considered some of the most demanded skills by employers (Malaysian Productivity Corporation, 2017).

Mohd Salleh, Mapjabil, and Legino (2019) reported that Malaysian graduates lack the demanded market skills. Besides, Verma et al. (2018) confirmed the existence

of graduates' skills gap in Malaysia between industry expectations and academic preparation. In addition, they stated that employers, universities, and the government were aware of the importance to ensure that all future graduates need to be equipped with the demanded market skills. If those students are equipped with the required skills, this will lead to an increase in the productivity of Malaysia. Furthermore, they mentioned that the deficit of industry training and development systems, the negative attitudes of the graduates, and the poor relations between employers and university are represented the noteworthy challenges for the graduates' work-readiness in Malaysia. Hence, Malaysian universities have now a moral and critical role in ensuring that their graduates meet the work requirements and are well-prepared (Yoong et al., 2017; Ithnin et al., 2018; J. Lee, 2021).

Additionally, Ibrahim and Mahyuddin (2017) cite a 2014 survey by the World Bank and TalentCorp, which found that 90% of companies believe that university graduates should have more training, and 81% of companies rate communication skills as the major skill deficit among graduates. Furthermore, 80% of companies reveal that universities' curriculum does not inculcate the demanding skills for the market, leading the graduates to face a deficiency in their skills. This finding is consistent with Verma et al. (2018) and Mohd Salleh et al. (2019) research findings. Moreover, The New Straits Times (3 Oct 2018) with its article titled "*Graduate skills gap*" reported that employers in Malaysia mentioned a remarkable skills gap among graduates. Employers emphasised that the deficiency of soft skills are among the main reasons for unemployed graduates (Aziz, 2018).

Malaysian employers want job-ready graduates with communication, critical thinking, problem-solving, innovation, teamwork, creativity, and leadership skills, as

recent graduates will be employed based on competency and skills (Ismail 2018; J. Lee, 2021; Lam, 2021). Besides, it is stated that if industries cannot obtain graduates with the needed specifications, the universities are blamed for not providing relevant education (Ismail, 2018). Additionally, it is urged that universities need to put more effort to suit the continuous needs of industries (Ismail, 2018). However, universities in Malaysia generally revealed that their collaboration with industries considers weak, and that affects their students negatively as they cannot offer the right opportunity to them to develop the skills which the employers need (Mohd Salleh et al., 2019; Verma et al., 2018). Furthermore, universities mentioned that they can only offer short-term development for their students as they now struggle to find sufficient internship places since the industries contact them only when they need employees (Mohd Salleh et al., 2019; Verma et al., 2018). Moreover, it was, unfortunately, to declare that less than 10% of companies have a collaboration channel with universities to develop their curriculum (Shanmugam, 2017; Ibrahim & Mahyuddin, 2017).

Remarkably, new graduates require extra time to gain new skills to become independent workers, and employers may need to provide them with additional training. Hence, when excessive training and retraining are needed, this will add to the production cost and make the industries less competitive (Abdullah, 2013). For this reason, providing training would be unfavourable to the employers (Bennett, Dunne, & Carré, 2000). From the Malaysian industries' perspectives, employing fresh graduates may boost business expenses, as all costs related to training and mentorship may impact their balance sheet, particularly during the downturn (Malaysian Industrial Development Finance, 2017). Mohd Salleh et al. (2019) reported that industries are reluctant to invest in training because of budgetary constraints. In return, this will lead to more difficulty in preparing graduates for the world of work. Malaysian Companies

prefer to pay more to attract skilled workers rather than spending money on fresh graduates who need to be trained (S. Tan, 2019). For this reason, there is a need to find an innovative way to solve this problem and to help all stakeholders (i.e., employers, universities, and students).

In a nutshell, in today's era of neck-to-neck competition, a blend of skills, abilities, and knowledge is a prerequisite to survive in the current world of work (J. Lee, 2021; Lam, 2021). The need for knowledgeable graduates with high skill levels will continuously increase. Thus, university students should be constantly equipped with these required skills. Malaysia Education Blueprint (Higher Education) 2015-2025 has emphasised that Malaysia Higher Education Institutions should actively pursue technologies and innovations that address students' needs and enable greater personalisation of the learning experience. Therefore, since the graduates' skills gap between industry expectations and academic preparation is widening day by day depending on the reviewing literature, an innovative research-based solution needs to be proposed to minimise the existing skills gap via enhancing university students' skills, knowledge, and attitudes.

1.2   Problem Statement

The skills gap between industry expectations and academic preparation is a global phenomenon across the countries and is not limited to Malaysia (Aziz, 2018). In the global context, several studies were conducted and revealed the existence of the gap (Trauth, Farwell, & Lee, 1993; S. Lee, Koh, Yen, & Tang, 2002; Taylor, 2012; Kapil, 2014; CBI & Pearson, 2016; Senapathi, 2016; Kolding et al., 2018; Kasriel, 2018; Chamorro-premuzic & Frankiewicz, 2019; Okolie, Nwosu, & Mlanga, 2019). In Malaysia, employers revealed an existing skills gap as they noticed a major lack in the

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graduates' skills (Lin, 2017; Aziz, 2018). Employers stated that universities could not provide enough opportunities for students to develop the skills critical to the labour market (Lin, 2017; Aziz, 2018). Similarly, the Malaysia Education Blueprint (Higher Education) 2015-2025 reports a mismatch in the supply and demand of graduates as employers revealed that graduates lack the demanded skills, knowledge, and attitudes.

Said, Jamaludin, Ismail, Nor, and Yong (2021) reported that nowadays, university's students should not rely simply on the learning process in the classroom but should also grab any opportunities offered by universities or other institutions to enhance their soft skills, since improving their skills will help them be more employable in the future. Besides, The Star Online (21 Aug 2021) with its article titled "*Matched for the job*" reported that universities must begin training their undergraduate students with both hard and soft skills in order to better prepare them for future careers (J. Lee, 2021). Hence, universities in Malaysia are now expected to apply multiple initiatives to assure that their graduates meet the work requirements by providing them with the demanded skills. At that point, universities will produce graduates who are more employable and thus generating returns for both individuals and the national economy (Becker, 2009; Yoong et al., 2017).

Unfortunately, many research and online news articles revealed that Malaysian graduates were not career-ready as they were incapable of meeting the demands of the labour market yet. Besides, their performance fails to meet the employers' perceptions, and this confirms the serious existence of the graduates' skills gap between industry expectations and academic preparation (Daud, Abidin, Sapuan, & Rajadurai, 2010; Singh, Narasuman, & Thambusamy, 2012; Hanapi & Nordin, 2014; Cheong, Hill, Fernandez-chung, & Leong, 2016; Ibrahim & Mahyuddin, 2017; Ismail, 2017; A. Y. T.

Tan et al., 2017; Lin, 2017; Malaysian Productivity Corporation, 2017; Yin, 2018; Ismail, 2018; Verma et al., 2018; Cheong, Hill, Leong, & Zhang, 2018; Aziz, 2018; Ghani, Rappa, & Gunardi, 2018; Malaysian Economic Report, 2018; Mohd Salleh et al., 2019; J. Lee, 2021). Furthermore, these studies and news articles revealed that the existing skills gap needs to be addressed and filled by many efforts.

Recently, Malaysian university students have faced significant challenges to become work-readiness. One of the major challenges is the lack of industry training and skills development systems, which expresses the urgent need to improve the graduates' work-readiness skills (Verma et al., 2018). As several studies mentioned that Malaysian graduates lack different skills required in the 21st Century, such as English language proficiency, technical skills, positive character, creativity, problem-solving, critical thinking, communication, teamwork, independence, lifelong learning, appropriate attitudes, decision-making, and analytical skills (Singh et al., 2012; Hanapi & Nordin, 2014; Ibrahim & Mahyuddin 2017; A. Y. T. Tan et al., 2017; Verma et al., 2018; Aziz, 2018; J. Lee, 2021; Lam, 2021; Fadhil et al., 2021), so it is important to help in addressing the graduates' skills gap in Malaysia by focusing more on developing university students' skills (Mohd Salleh et al., 2019).

As the graduates' skills gap is still a major issue in the local context, there is a need to propose an innovative research-based solution to minimise the existing skills gap in Malaysia. Consequently, the current research takes the required steps by proposing and applying a new e-learning system that incorporates gamification features and certified e-learning courses as an initiative that aims to enhance university students' skills. Besides, this study interests as well as in understanding the net benefits of the new proposed system on students and linking the net benefits of this gamification e-learning system to their success drivers, as the examination of the success drivers for

the e-learning system is an important issue that needs to be addressed as suggested by Cidral, Oliveira, Di Felice, and Aparicio (2018).

The process of incorporating game design elements into non-game contexts is known as gamification (Deterding, Dixon, Khaled, & Nacke, 2011). Gamification in an e-learning system can motivate learners to put more effort into using the system to improve their skills (Zainuddin, Shujahat, Haruna, & Chu, 2020). Furthermore, it can encourage students to take proactive steps toward achieving their goals by allowing them to track their learning progress and document their learning successes (Ding, 2019). The most frequently used game elements are points, badges, leaderboards, levels, and certificates of achievement.

In literature, it is noted that there are only a few studies conducted to investigate the net benefits of e-learning systems that incorporated gamification features (e.g., points, badges, certificates, etc.) (Ramírez-Correa, Rondan-Cataluña, Arenas-Gaitán, & Alfaro-Perez, 2017; Chopra, Madan, Jaisingh, & Bhaskar, 2019). Therefore, the present study believes that it is beneficial to investigate the net benefits of the new gamification e-learning system and its determinant factors. The investigation of information systems (IS) success is done in literature through applying one of the most well-known models to assess IS success which is the DeLone and McLean (D&M) model of information systems success (1992, 2003). The updated D&M model comprises distinct, interrelated, and interdependent success factors, namely, information quality, system quality, service quality, use/intention to use, user satisfaction, and net benefits (DeLone & McLean, 2003).

DeLone and McLean (2003) invited researchers to develop further and extend their model to contribute more to the evolving body of knowledge. In literature, it was

found that only a few studies examined the collaboration quality as a success factor within the D&M model (Urbach, Smolnik, & Riempp, 2010; Cidral et al., 2018; Saghapour, Iranmanesh, Zailani, & Goh, 2018; Cidral, Aparicio, & Oliveira, 2020). Thus, further research incorporating collaboration quality needs to be conducted to contribute more to the growing literature, especially within the context of gamification e-learning systems, which is scarcely found in the existing literature. Urbach et al. (2010) suggested that collaboration quality can be a key factor of success, which can enhance the satisfaction and the usage of the system. According to the explanation above, and because the newly proposed gamification e-learning system is meant to provide numerous collaborative features to its members in order to facilitate their communication and information sharing. Hence, the current study believes that the D&M IS success model can be extended by adding collaboration quality as an additional success factor. This study further believes that collaboration quality can positively increase the level of usage, satisfaction, and net benefits of the new proposed system among students.

The positive relationship between quality success factors (information quality, system quality, service quality, and collaboration quality) and net benefits (the dependent variable of the present study) is only examined in a few previous studies (J.-H. Wu & Wang, 2006; Cidral et al., 2018; Martins et al., 2019). Thus, in the present study, it is interesting to examine if these quality success factors positively possess an effect on the net benefits of the new proposed gamification e-learning system.

According to the inconsistent relationship between system quality and use in the literature (Petter, DeLone, & McLean, 2008), one's can contribute to the body of knowledge by incorporating potential moderators to investigate their influences on the relationship mentioned above. For example, Ramírez-Correa et al. (2017) heeded the

call and investigated the moderator effect on the relationship between system quality and use. Thus, in relation to the above discussion, it triggers the interest of the current research to investigate goal-drive persistence and reward reactivity as two potential moderators that could moderate the relationship between system quality and use.

Recently, students have been required to develop their capabilities (represented by the integration of knowledge, skills, and personal qualities) to better deal with the various changes in the labour market (Stephenson, 2012). Therefore, by incorporating certified e-learning courses and gamification features into the proposed gamification e-learning system, the system can aid in motivating and facilitating students' learning. Moreover, this system can assist in the development of students' skills, which are desperately needed in the twenty-first century. Sequentially, the benefits obtained from the proposed system will steadily raise students' positive feelings, making them more confident in perceiving their future skills, personal characteristics, and labour market knowledge.

However, to the researcher's knowledge, the perceived future skills, perceived future personal characteristics, and perceived future labour market knowledge, which are the dimensions of perceived future employability, are yet to be explored with the D&M IS success model. Therefore, this needs to be further investigated in the future research to fill the existing gap in the literature. In conjunction with that, the present study extends the updated D&M model with these three factors depending on the philosophy of the expectancy theory (1964, 1995) and following the earlier-mentioned suggestions of the DeLone and McLean (2003). Besides, these three aforementioned factors are suggested as the three outcomes' factors produced from the net benefits (i.e., the dependent variable of the current study and the major key factor to assess the success of the new proposed system). Previous studies have found that when people acquire the

necessary knowledge and skills, their confidence in their abilities increases, making them more employable in the future (Veld, Semeijn, & Van Vuuren, 2015; Gu, Zhao, & Wu, 2018). Furthermore, Quek (2005) stated that students who have acquired the necessary skills have an advantage in terms of employability. In line with previous scholars' assertions, the current study proposes that the anticipated benefits gained from the new proposed system can aid in improving students' perceived future skills, future personal characteristics, and future labour market knowledge level.

In a nutshell, the present research intends to understand the net benefits of the new proposed system as the benefits perceived from the system could help in minimising the skills gap issue. Hence, the present research proposes that the high level of system quality, information quality, service quality, collaboration quality, use, and user satisfaction can increase the anticipated benefits gained from the proposed system. In addition, this study suggests that the high level in system quality, information quality, service quality, and collaboration quality of the proposed system can increase the level of usage and satisfaction among students. Besides, the present study intends to examine the relationship between use and user satisfaction. Proposing and applying the gamification e-learning system and investigating the predictors of the use of the system, user satisfaction, and net benefits will help answer the current study's first and second research questions. Furthermore, the researcher of the present study believes that the anticipated benefits from the new proposed system can enhance the perceived future skills, future personal characteristics, and future labour market knowledge level of students. The investigation of the relationship between net benefits and perceived future skills, perceived future personal characteristics, and perceived future labour market knowledge will help in answering the third research question of the current study. Lastly, the present study also sheds light on both goal-drive persistence and reward

reactivity through investigating their effects as potential moderators on the relationship between system quality and use. The investigation of the moderating effects of both goal-drive persistence and reward reactivity on the relationship between system quality and use will help in answering the fourth research question of the current study.

1.3   Research Questions

This research aims to answer the research questions below:

1. What are the factors that significantly contribute to increasing the use, user satisfaction, and net benefits of a gamification e-learning system?

2. How to apply the identified factors into a gamification e-learning system that suits the students?

3. How does net benefits positively correlate with perceived future employability factors?

4. How does goal-drive persistence and reward reactivity moderate the relationship between system quality and use?

1.4   Research Objectives

The objectives of this research are:

1. To examine the relationships between the quality success factors (information quality, system quality, service quality, and collaboration quality) and the use of the system, user satisfaction, and net benefits.

2. To propose and apply a new gamification e-learning system that aims to benefit students and suit their needs.

3. To examine the relationship between net benefits and perceived future employability (perceived future skills, perceived future personal characteristics, and perceived future labour market knowledge).

4. To examine the moderating impact of goal-drive persistence and reward reactivity on the relationship between system quality and use.

1.5 Scope of the Study

The investigation of the net benefits of the new proposed system that aims to minimise the skills gap between industry expectations and academic preparation is the major interest of the current study. The critical need to have an innovative research-based solution intending to minimise the existing skills gap in Malaysia motivated the researcher of the current study to conduct this research aiming to present valuable findings to the scholars, university management, policymakers, and the developer of the system. The research model of the present study is constructed based on both the updated DeLone and McLean IS success model (2003) and the philosophy of expectancy theory. The main research contributions of this study will be the application of the proposed system and the development of the research model.

Moreover, this study was conducted at the USM university-main campus as the proposed gamification e-learning system is under copyright protection with USM university (see Appendix A) and has been awarded the Gold Medal on 16 October 2018 at the Innovations in Teaching and Learning Competition (ITLC) from Universiti Sains Malaysia (see Appendix B). Respondents are the USM undergraduate students from the School of Management who are full-time undergraduate students and registered in the ATW116 and ATW251 courses. Those students participated in the testing of the

proposed system throughout Semester I 2020/2021. Justifications for employing the system among a sample of undergraduate students from the School of Management derive from the school's prior acceptance, support, and facilitation of this research to test the proposed system on a sample of its students. Furthermore, the currently conducted research is self-funded, so it could not be expanded to have many participants because it would include additional cost and time. Therefore, this could be a limitation of the current study.

Appendix C contains definitions for key terms that appear frequently throughout this study. In addition, Appendix D provides an overview of the proposed gamification e-learning system titled Login Career System.

1.6   Significance of the Study

The current study is significant from theoretical, practical, and methodological perspectives.

1.6.1   Theoretical Significance

The current study helps to add to the present knowledge and enrich the literature on net benefits in the context of gamification in e-learning systems. In literature, only a few empirical studies were carried out to investigate the net benefits of e-learning systems, which consists of gamification features (e.g., points, badges, certificates, etc.) (Ramírez-Correa et al., 2017; Chopra et al., 2019). Hence, this research takes the initiative to examine the net benefits level among students regarding the new proposed gamification e-learning system. Different success factors are used in this study as the

predictors of net benefits level among students. Therefore, the literature on net benefits in the context of gamification e-learning systems is embellished with new perspectives.

Since the newly applied gamification e-learning system provides several collaborative features to its members, adding collaboration quality in the research model for this study may add theoretical significance to the body of knowledge. As a result, this study suggests that collaboration quality be added as an additional quality success factor to the D&M IS success model (2003). This study follows the recommendations of Urbach et al. (2010), Cidral et al. (2018), and Saghapour et al. (2018) to include collaboration quality as an IS success factor within the D&M model.

The current study broadens the investigation of relationships within the D&M IS success model (2003) by adding direct effects from the four quality success factors to net benefits. Some researchers studied these suggested paths in their research model (J.-H. Wu & Wang, 2006; Cidral et al., 2018; Martins et al., 2019). However, these paths were not studied before in the context of gamification in e-learning systems. Therefore, this study could add another theoretical significance to the literature after investigating these direct relationships between the four quality success factors and net benefits.

Moreover, investigating the net benefits of the gamification e-learning systems may provide future researchers with a good idea and a better understanding of the mechanisms that enhance the net benefits level among students. Specifically, when employing such a system that intends to minimise the skills gap between industry expectations and academic preparation by integrating well-designed and certified e-learning courses, gamification features, and other beneficial content. Therefore,

inevitably, the findings of this study could serve as a guideline and reference to other scholars interested in this net benefits-related issue.

Additionally, this research employs the updated DeLone and McLean model (2003) with the philosophy of expectancy theory to investigate the net benefits and the outcomes of the gamification e-learning system in a comprehensive research framework. DeLone and McLean (2003) invited researchers to develop their model further to contribute more to the evolving body of knowledge. This study therefore heeds the call by extending the updated D&M (2003) model with the philosophy of expectancy theory, as well as incorporating novel IS- and user-related factors to examine the net benefits and outcomes of the gamification e-learning system in a more comprehensive and contemporary research framework. Consequently, the present study could shed light on gaining a better understanding of each hypothesised relationship in the model.

Lastly, this research could add to the evolving body of knowledge by examining the moderating roles of goal-drive persistence and reward reactivity on the relationship between system quality and use. According to Petter et al. (2008) findings and the suggestions of the DeLone and McLean (2003), the moderating effects of both goal-drive persistence and reward reactivity on the aforementioned relationship are investigated in this study. Petter et al. (2008) reported the inconsistent relation between system quality and use in literature. Besides, DeLone and McLean (2003) encouraged scholars to further develop and add a new perspective to their model to contribute more to the evolving body of knowledge in different contexts. Hence, this study employs both goal-drive persistence and reward reactivity as moderators on the relationship between

system quality and use. As a result, a better understanding can be obtained about these relationships.

1.6.2   Practical Significance

This research seeks to propose and apply a supporting initiative system that aims to enhance university students' skills towards minimising the graduates' skills gap between industry expectations and academic preparation which is registered as a major issue in Malaysia (Aziz, 2018). Hence, in the present study, the main practical significance can be achieved via proposing and applying the gamification e-learning system. University management and policymakers would be interested in finding the best way to enhance university students' knowledge and skills levels, which eventually ensures the production of well-prepared graduates who can meet industry expectations. It is thus practically substantial to investigate the predictors of the net benefits of the new proposed system so that policymakers and university management can enact effective interference and efficient policies to increase the net benefits level of the system among students.

Moreover, the current study is expected to provide insights to the university management and developers on how the four quality success factors influence use, user satisfaction, and the net benefits of the system. Besides, how the level of usage and satisfaction can impact the level of perceived benefits among students, as well as how the level of usage can affect user satisfaction. All these provided insights could help the university management and the developers of the system to execute the required improvement actions to the system.

Additionally, the proposed system aims to facilitate and enrich students' knowledge and skills. This has been proven as the students from the pilot study commented that they liked the system and looked forward to seeing it come true (see Section 4.8). Hence, it is practically essential and beneficial to investigate the net benefits and the outcomes of the new proposed system to provide more insights. In conjunction with that, the university management and policymakers can be aware of the factors that could enhance the net benefits level and hence allowing them to take the required steps in order to preserve the benefits of the system leading to generate the desired outcomes. Hence, this study could serve as a guide for USM university and other Higher Education Institutions.

To the knowledge of the researcher, the three outcome factors, which are the dimensions of the perceived future employability, have yet to be explored with the D&M IS success model, and therefore, this needs to be further examined to fill the existing gap in the literature. Hence, this study is anticipated to give insights to university management and policymakers on how the net benefits gained from the new proposed system can ultimately enhance the perceived future skills, future personal characteristics, and future labour market knowledge level of students.

Moreover, this study also provides insights to the university management and developers on the role of both goal-drive persistence and reward reactivity as moderators on the relationship between system quality and use. As it is suggested that if students have high goal-drive persistence and reward reactivity traits, this could lead to strengthening the relationship between system quality and use. Therefore, the findings from the present study may help the university management and developers of the system to get insights related to the effect of goal-drive persistence and reward

reactivity. These insights could allow university management and the developers of the system to suggest additional rewards, activities, content, and features that could be integrated into the current gamification e-learning system as well as enhance the previous one.

1.6.3　　Methodological significance

This research also has methodological significance because it uses partial least squares structural equation modelling (PLS-SEM) and the bootstrapping approach to test the hypothesised relationships in this study research model.

First and foremost, PLS-SEM is regarded as a good choice for statistical analysis due to its capacity to maximise the explained variance in the dependent variable, function flawlessly with complicated models such as those consisting of numerous constructs and indicators with multiple structural model links, assess models that include moderating effects, and impose fewer restrictions on data normality as well as have more statistical power (Hair, Ringle, & Sarstedt, 2011).

Furthermore, PLS-SEM may also show unique results. PLS-SEM exhibited greater benefits than multiple regression as a second-generation method, including higher prediction accuracy (Hair, Hult, Ringle, & Sarstedt, 2014) and lower chance correlation risks (Cramer, 1993). As a result, the application of PLS-SEM is expected to give not only additional methodological significance to the net benefits level of the proposed gamification e-learning system among students but also intriguing new findings.

1.7   Organisation of the Thesis

This thesis is made up of six chapters. Chapter 1 presents the background of the study, problem statement, research questions, research objectives, and the significance and the scope of this study. Chapter 2 presents an overview related to e-learning in higher education and gamification in e-learning, then reviews DeLone and McLean's information systems success model, the expectancy theory, and the prevailing theoretical and empirical literature relating to the study variables, which includes information quality, system quality, service quality, collaboration quality, use, user satisfaction, net benefits, goal-drive persistence, reward reactivity, and perceived future employability. Chapter 3 comprises the research model and the development of hypotheses. Chapter 4 covers the research methodology employed for this study, including the research philosophy and the research design followed by population and sample. After that, the research instruments of this study are presented. The pre-test and pilot test conducted for the study questionnaire are detailed. Next, the data collection procedure, common method bias, and the statistical analyses used for the research are outlined. Chapter 5 presents the statistical results of this research. Lastly, Chapter 6 discusses the findings, contributions of the current study, limitations, and suggestions for future research.

CHAPTER 2

LITERATURE REVIEW

2.1   Introduction

This chapter presents an overview related to e-learning in higher education and gamification in e-learning. Next, the chapter discusses the DeLone and McLean (D&M) information systems success model and the expectancy theory, the two main underlying theories that lay the foundation of this present research. Following that, the chapter reviews the literature relating to information quality, system quality, service quality, collaboration quality, use, user satisfaction, net benefits, moderating variables, and the outcome variables. The dependent variable of this study is net benefits. The moderating variables are goal-drive persistence and reward reactivity. The outcome variables are the three dimensions of perceived future employability.

2.2   E-learning in Higher Education

Education, learning, and teaching methods have all been dramatically changed by technological advancements (Al-Fraihat, Joy, Masa'deh, & Sinclair, 2020). Nowadays, e-learning has become widely used in the education sector, particularly in higher education (Al-Fraihat et al., 2020). E-learning is an information system that can incorporate a wide range of material employed to spread knowledge and information for training and educational purposes (Cidral et al., 2018). The success of an e-learning system is regarded as information system success (Al-Fraihat et al., 2020). E-learning has evolved as a new paradigm for modern education, displacing the prior concept of traditional education (Sun, Tsai, Finger, Chen, & Yeh, 2008). Many individuals now

use e-learning systems, which allow them to access materials through the internet and learn from any location at any time (Zamfiroiu & Sbora, 2014).

Learning has shifted in recent years from being centred on the instructor to being centred on the student (Cidral et al., 2018). In addition, the fact that e-learning systems can provide learners with flexible and tailored learning opportunities makes e-learning systems a highly desired system among students (Clayton, Blumberg, & Anthony, 2018). Therefore, as a result of the unquestionable importance of e-learning in higher education, there has been a tremendous increase in the number of e-learning courses and systems that provide a variety of various services. Hence, evaluation of e-learning system is essential to guarantee successful delivery, effective use and beneficial effects on learners (Al-Fraihat et al., 2020). As a result, a significant amount of study has been conducted on the quality of e-learning systems, and a huge number of researchers have tried to identify e-learning success factors in order to enhance the effectiveness of these systems (Al-Fraihat et al., 2020).

2.3   Gamification in E-learning

Technology's presence in classrooms has prompted a change from traditional lectures to digital learning environments. These interactive learning environments provide a chance to enhance the teaching process through the integration of game elements into the e-learning systems (Subhash & Cudney, 2018). The incorporation of these game elements into the e-learning systems has been found to attract user attention, encourage towards goals, and foster competition and communication (Subhash & Cudney, 2018). Gamification is the process of incorporating game design elements into non-game contexts (Deterding et al., 2011). Furthermore, gamification can be defined as the design of information systems to provide similar experiences and motivations to

those found in games, with the goal of influencing user behaviour (Koivisto & Hamari, 2019). In addition, according to Kasurinen and Knutas (2018), gamification refers to the introduction of game-like aspects in a system to increase user participation, motivation to continue using the system, or the retention rate for current users. Gamification has been used successfully in business and education to influence consumer and learner behaviour and may be employed in a variety of scenarios to impact the behaviour of individuals and group members (Subhash & Cudney, 2018).

Nowadays, educational systems incorporate gamification elements in order to excite students and, more broadly, to leverage the competitive nature of the majority of them in order to promote successful behaviours (Valsamidis, Kazanidis, Petasakis, Kontogiannis, & Kolokitha, 2014). As a result, gamification has been used chiefly in educational environments to boost students' engagement within e-learning systems (Hamari, Koivisto, & Sarsa, 2014; De-Marcos, Garcia-Cabot, & Garcia-Lopez, 2017). Furthermore, it is vital to highlight that when applying gamification in the educational environment, actual games are not required to be employed; rather, game design elements from games are utilised instead (Subhash & Cudney, 2018). Students' satisfaction, motivation, and engagement in the learning process can all be improved with the suitable integration of gamification in online learning into higher education (Domínguez et al., 2013; Urh, Vukovic, Jereb, & Pintar, 2015). The incorporation of gamification into an online learning system may also inspire learners to put more effort into using the system to improve their skills (Zainuddin et al., 2020). Furthermore, it encourages students to take proactive steps toward achieving their goals by providing them with the capacity to track their progress in learning and document their learning successes (Ding, 2019).