



**FACTORS INFLUENCING CONTINUANCE OF USAGE INTENTION
TOWARDS A GAMIFIED E-QUIZ MOBILE APPLICATION AMONG
MALAYSIAN HIGHER LEARNING STUDENTS**

By

ROSFUZH BINTI ROSLAN

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia,
in Fulfilment of the Requirements for the Degree of Doctor of Philosophy**

September 2023

FPP 2023 1

All material contained within the thesis, including without limitation text, logos, icons, photographs, and all other artwork, is copyright material of Universiti Putra Malaysia unless otherwise stated. Use may be made of any material contained within the thesis for non-commercial purposes from the copyright holder. Commercial use of material may only be made with the express, prior, written permission of Universiti Putra Malaysia.

Copyright © Universiti Putra Malaysia

DEDICATION

All praise be to Almighty Allah for sparing my life to witness this day. I am dedicating this thesis to my beloved mother, father, sisters, brothers and my loving daughter, Dhiya Damia. My supervisory committee, Dr. Norliza Binti Ghazali and Dr. Nurul Nadwa Binti Zulkifli under the chairmanship of Prof. Dr. Ahmad Fauzi Bin Mohd Ayub, and all the staff of Faculty of Education, UPM. Finally, to Universiti Tun Hussein Onn Malaysia (UTHM) and friends who had supported and encouraged me throughout this research journey. Thank you and may Allah S.W.T reward them with Aljannatul Firdaus.

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy

**FACTORS INFLUENCING CONTINUANCE OF USAGE INTENTION
TOWARDS A GAMIFIED E-QUIZ MOBILE APPLICATION AMONG
MALAYSIAN HIGHER LEARNING STUDENTS**

By

ROSFUZAH BINTI ROSLAN

September 2023

Chairman : Professor Ahmad Fauzi bin Mohd Ayub, PhD
Faculty : Educational Studies

It is expected that gamification in education will be the luring factor and be able to sustain the interest of the current generation. Previous studies have identified various factors that influenced individuals' decisions when accepting mobile technology. However, studies related to factors influencing post-acceptance of a gamified mobile technology are scarce. Therefore, this study aims to produce a fitting structural model consisting of factors influencing the continuance usage intention among the Malaysian higher learning students towards a gamified e-quiz mobile application. The research integrated the Expectation Confirmation Model (ECM) with the Extended Unified Theory of Acceptance and Use of Technology (UTAUT2), along with two additional constructs, trust and consumer engagement that were derived from Mcknight et al.'s (2011) Trust in Technology Theory and Service-Dominant (S-D) Logic Theory, respectively. Following that, 10 variables were investigated in which eight are the exogenous variables namely, (i) confirmation of expectation, (ii) perceived enjoyment, (iii) perceived ease of use, (iv) social influence, (v) facilitating condition, (vi) consumer engagement and (vii) trust. On the other hand, the other three variables are the endogenous variables that comprises (i) satisfaction, (ii) perceived usefulness and (iii) continuance usage intention. Construct satisfaction, as a mediator towards continuance usage intention, between (i) trust, (ii) perceived usefulness and (iii) perceived enjoyment, was also investigated. The study implemented the correlational research design conducted on the Malaysian higher learning students. With the total population of 560 first-year students who are the existing users of the technological product, 269 sample sizes managed to be retained for further analysis. Based on the analysis conducted, the 'in-sample' predictive power (i.e., explanatory power) of the model indicates substantial predictive accuracy. More importantly, the model exhibits higher value (i.e., predictive power) by proving that it could predict future dataset (i.e., 'out-of-sample'). In conclusion, the significant integration was proven by some of UTAUT2 explanatory variables (i.e., perceived enjoyment, perceived ease of use and perceived usefulness), as well as construct trust derived from the Trust in Technology Theory, with the ECM

constructs (i.e., satisfaction, confirmation, perceived usefulness). In the end, the study managed to provide a theoretical basis in explaining the continuance use intention towards a gamified e-quiz mobile application. Additionally, these findings emphasise the importance of improving the gamification aspects of the technological product based on the factors studied, in order to secure the longevity of an educational application, produced by the higher learning institute.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

**FAKTOR – FAKTOR YANG MEMPENGARUHI HASRAT PENGGUNAAN
BERTERUSAN TERHADAP APLIKASI MUDAH ALIH E-KUIZ
BERASASKAN GAMIFIKASI DI KALANGAN PELAJAR PENGAJIAN
TINGGI MALAYSIA**

Oleh

ROSFUZH BINTI ROSLAN

September 2023

Pengerusi : Profesor Ahmad Fauzi bin Mohd Ayub, PhD
Fakulti : Pengajian Pendidikan

Gamifikasi dalam pendidikan akan menjadi faktor tarikan dan akan mampu mengekalkan minat generasi kini. Kajian-kajian terdahulu membuktikan pelbagai faktor motivasi telah memberi impak terhadap penerimaan seseorang individu terhadap teknologi mudah alih (mobile). Walaubagaimanapun, kajian berkaitan faktor yang mempengaruhi pasca-penerimaan aplikasi mudah alih berasaskan gamifikasi yang berterusan adalah sukar ditemui. Maka, tujuan utama kajian ini adalah untuk menghasilkan model struktur yang mengandungi faktor-faktor yang mempengaruhi hasrat penggunaan berterusan di kalangan pelajar pengajian tinggi di Malaysia terhadap aplikasi mudah alih e-kuiz berasaskan gamifikasi. Kajian ini menintegrasikan Expectation Confirmation Model (ECM) dan Extended Unified Theory of Acceptance and Use of Technology (UTAUT2) bersama-sama dengan dua konstruk tambahan iaitu (i) kepercayaan, yang terbit daripada teori Mcknight et al. (2011) Trust in Technology, dan (ii) keterlibatan pengguna, yang terbit daripada teori Service-Dominant (S-D) Logic. Susulan dari itu, 10 pembolehubah dikaji, yang mana lapan daripadanya adalah pembolehubah exogenous iaitu, (i) pengesahan jangkaan, (ii) persepsi keseronokan, (iii) persepsi kemudahan dalam penggunaan, (iv) pengaruh sosial, (v) keadaan yang memudahkan, (vi) keterlibatan pengguna, dan (vii) kepercayaan. Sebaliknya, tiga lagi pembolehubah adalah berjenis endogenous yang terdiri daripada (i) kepuasan, (ii) persepsi kebergunaan, dan (iii) hasrat penggunaan berterusan. Konstruk kepuasan, sebagai perantara kepada hasrat penggunaan berterusan, antara tiga pembolehubah yang lainnya iaitu (i) kepercayaan, (ii) persepsi kebergunaan, dan (iii) persepsi keseronokan, turut dikaji. Kajian ini mengimplementasi rekabentuk kajian korelasi yang dijalankan terhadap pelajar pengajian tinggi di Malaysia. Dengan jumlah populasi seramai 560 pelajar tahun satu yang juga pengguna semasa produk teknologi kajian, hanya 269 data sampel berjaya dikekalkan bagi tujuan analisis selanjutnya. Berdasarkan analisis yang dijalankan, kekuatan ramalan 'dalam sampel' bagi model kajian ini menunjukkan ketepatan ramalan yang kuat. Paling utama adalah model kajian ini mempamerkan nilai

yang tinggi (kuasa ramalan) dengan pembuktian bahawa ia boleh meramalkan kumpulan data yang lain (baru) pada masa akan datang iaitu ramalan 'luar sampel'. Kesimpulannya, integrasi yang ketara dibuktikan oleh sebahagian dari pembolehubah UTAUT2 (persepsi keseronokkan, persepsi kemudahan dalam penggunaan dan persepsi kebergunaan), termasuk juga konstruk kepercayaan yang terbit daripada teori Trust in Technology, bersama konstruk-konstruk ECM (kepuasan, pengesahan, kemudahan dalam penggunaan). Pada akhirnya, kajian ini berhasil menyediakan teori dasar bagi menjelaskan hasrat penggunaan berterusan terhadap aplikasi mudah alih e-kuiz yang berasaskan gamifikasi. Hasil penemuan kajian juga menunjukkan penekanan terhadap kepentingan menambahbaik produk teknologi dari aspek gamifikasi berdasarkan faktor-faktor kajian, dalam memastikan aplikasi pembelajaran yang dihasilkan oleh sesebuah institut pengajian tinggi akan kekal lama.

ACKNOWLEDGEMENTS

First and foremost, I thank Almighty Allah for letting me live to see this research work through. I am forever indebted to my supervisory committee, Dr. Norliza Binti Ghazali and Dr. Nurul Nadwa Binti Zulkifli under the chairmanship of Prof. Dr. Ahmad Fauzi Bin Mohd Ayub for their unwavering assistance, support, encouragement and patience throughout this research work. I am very grateful to all the staff of Universiti Putra Malaysia (UPM) for their support and assistance and also to my colleagues in the Faculty of Education (FPP), UPM may Almighty Allah bless all of you. I owed so much to my whole family for their underlying support, especially my daughter, Dhiya Damia who was always praying for my success. I am also grateful to Universiti Tun Hussein Onn Malaysia (UTHM) and the Dean of the Centre for Diploma Studies (CeDS). Alhamdulillah.

This thesis was submitted to the Senate of the Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Doctor of Philosophy. The members of the Supervisory Committee were as follows:

Ahmad Fauzi bin Mohd Ayub, PhD

Professor
Faculty of Educational Studies
Universiti Putra Malaysia
(Chairman)

Norliza binti Ghazali, PhD

Senior Lecturer
Faculty of Educational Studies
Universiti Putra Malaysia
(Member)

Nurul Nadwa binti Zulkifli, PhD

Senior Lecturer
Faculty of Humanities, Management and Science
Universiti Putra Malaysia Bintulu Sarawak Campus
(Member)

ZALILAH MOHD SHARIFF, PhD

Professor and Dean
School of Graduate Studies
Universiti Putra Malaysia

Date: 14 December 2023

TABLE OF CONTENTS

	Page
ABSTRACT	i
ABSTRAK	iii
ACKNOWLEDGEMENTS	v
APPROVAL	vi
DECLARATION	viii
LIST OF TABLES	xiii
LIST OF FIGURES	xv
LIST OF APPENDICES	xvii
LIST OF ABBREVIATIONS	xviii
 CHAPTER	
1 INTRODUCTION	1
1.1 Introduction	1
1.2 Malaysian Educational Policy	1
1.3 Infusion of Gamification in Teaching and Learning Tool	2
1.4 Gamified Mobile Application Usage among Students of Malaysian Higher Education Institution	2
1.5 Influence to Continuously Use a Technology	3
1.6 Statement of the Problem	4
1.7 Objectives of the Study	6
1.8 Research Hypotheses	7
1.9 Significance of the Study	8
1.9.1 Theoretical Significance	8
1.9.2 Practical Significance	9
1.10 Limitation of the Study	10
1.11 Definition of Key Terms	11
1.12 Organisation of Thesis	13
1.13 Chapter Summary	14
 2 LITERATURE REVIEW	 15
2.1 Introduction	15
2.2 Mobile Learning (M-Learning) in Malaysia	15
2.3 Gamification in Education	16
2.4 Gamified e-Quiz	18
2.5 Gamified e-Quiz Research in Malaysian Higher Education Institutions	20
2.6 Kingdom Quizzes	21
2.7 Constructs of the Study	24
2.8 Relation Between the Variables and Gamification Elements	40
2.9 Theories Related to the Study	44
2.9.1 Expectation Confirmation Model (ECM)	44
2.9.2 Extended Unified Theory of Acceptance and Use of Technology (UTAUT2)	47

	2.9.3	Trust in Technology	50
	2.9.4	Service-Dominant (S-D) Logic	51
2.10		Theoretical Framework	53
2.11		Conceptual Framework	55
2.12		Chapter Summary	58
3		METHODOLOGY	59
3.1		Introduction	59
3.2		Location of the Study	59
3.3		Population of the Study	60
3.4		Research Design	61
3.5		Sample of the Study	61
3.6		Sampling Technique	63
3.7		Instrumentation	63
	3.7.1	Demographic Information	65
	3.7.2	Perceived Usefulness	65
	3.7.3	Perceived Ease of Use	66
	3.7.4	Social Influence	67
	3.7.5	Facilitating Condition	68
	3.7.6	Perceived Enjoyment	68
	3.7.7	Satisfaction	69
	3.7.8	Confirmation	70
	3.7.9	Trust	71
	3.7.10	Consumer Engagement	72
	3.7.11	Kingdom Quizzes Continuance Usage Intention	73
3.8		Processes of Translation	74
3.9		Validity of the Instrument	74
3.10		Reliability of the Instrument	75
3.11		Pilot Study	76
3.12		Exploratory Factor Analysis	77
3.13		Research Procedure	80
	3.13.1	Kingdom Quizzes Usage Procedure by Student	82
	3.13.2	Ethical Consideration	90
3.14		Data Collection	90
3.15		Data Examination	91
	3.15.1	Data Screening and Cleaning	91
	3.15.2	Outliers	91
	3.15.3	Normality Test	92
	3.15.4	Common Method Variance	93
3.16		Data Analysis Technique	94
3.17		Rationale for Selecting PLS-SEM Approach	94
3.18		Specification of Measurement in PLS-SEM	96
	3.18.1	Evaluation of Measurement Model	96
	3.18.2	Evaluation of Structural Model	98
	3.18.3	Evaluation of Mediating Effect	102
	3.18.4	Evaluation on Constructs' Importance Performance	103
3.19		Chapter Summary	104

4	RESULTS AND DISCUSSION	105
4.1	Introduction	105
4.2	Assessment of Reflective Measurement Model	105
	4.2.1 Assessment of Internal Consistency	105
	4.2.2 Assessment of Convergent Validity	106
	4.2.3 Assessment of Discriminant Validity	108
4.3	Descriptive Analysis	109
4.4	Assessment of Structural Model	110
	4.4.1 Assessment of Multicollinearity	110
	4.4.2 Assessment of Path Coefficient	111
	4.4.3 Assessment of Coefficient of Determination	114
	4.4.4 Assessment of Effect Size	117
	4.4.5 Assessment of Predictive Relevance	117
	4.4.6 Assessment of Mediation Effect	119
	4.4.7 Assessment on Constructs' Importance and Performance	119
4.5	Overall Result for Hypothesis Conclusion	120
4.6	Evaluation on the Open-Ended Questions' Responses	122
4.7	Chapter Summary	123
5	DISCUSSION, CONCLUSION AND RECOMMENDATION	125
5.1	Introduction	125
5.2	Discussion on Key Findings	125
	5.2.1 Influence of Confirmation on Perceived Usefulness	127
	5.2.2 Influence of Confirmation, Perceived Usefulness, Trust and Perceived Enjoyment on Satisfaction	127
	5.2.3 Antecedents of Continuance Usage Intention	130
	5.2.4 Mediating Effect of Satisfaction	138
	5.2.5 Predictive Model of Continuance Usage Intention	140
5.3	Theoretical Contributions	143
5.4	Practical Contributions	145
	5.4.1 Institutions' Digital Learning Management	145
	5.4.2 Institutions' Information Technology (IT) Management	146
	5.4.3 Institutions' Academic Development Management	146
	5.4.4 Malaysian Ministry of Higher Education (MOHE)	147
5.5	Direction for Future Research	147
5.6	Conclusion	148
	REFERENCES	150
	APPENDICES	197
	BIODATA OF STUDENT	278
	LIST OF PUBLICATIONS	279

LIST OF TABLES

Table		Page
2.1	Most encountered gamification items in literature	17
2.2	Gamification items in Kingdom Quizzes	23
2.3	Relations between Kingdom Quizzes gamification items and variables based on literature reviews	43
2.4	UTAUT2 constructs in the proposed model	57
3.1	Information on users for cohort 2021/2022	60
3.2	Distribution of Kingdom Quizzes's users according to programmes	63
3.3	Component of the questionnaire	64
3.4	Items and source of information	65
3.5	Items for measuring perceived usefulness (PU)	66
3.6	Items for measuring perceived ease of use (PEOU)	67
3.7	Items for measuring social influence (SI)	67
3.8	Items for measuring facilitating condition (FC)	68
3.9	Items for measuring perceived enjoyment (PENJ)	69
3.10	Items for measuring satisfaction (S)	70
3.11	Items for measuring confirmation (C)	71
3.12	Items for measuring trust (T)	72
3.13	Items for measuring consumer engagement (CE)	73
3.14	Items for measuring continuance usage intention (CI)	73
3.15	Cronbach's Alpha (α) range value and description	75
3.16	Cronbach's Alpha (α) analysis based on the pilot study	76
3.17	Exploratory factor analysis of the research items	78
3.18	Details activities that were conducted in one semester (14 weeks)	82
3.19	Distribution of sample size according to programmes	92
3.20	Normality test result (univariate & multivariate)	93

3.21	Result of full collinearity	94
3.22	The guidelines for the assessment of reflective measurement model	98
3.23	The guidelines for the assessment of structural model	102
4.1	Internal consistency results	106
4.2	Convergent validity results	107
4.3	Discriminant validity result (HTMT Criterion)	109
4.4	Result of descriptive analysis	109
4.5	Result of inner VIF values for multicollinearity assessment	110
4.6	Path coefficient result for supported hypotheses	114
4.7	Coefficient of determination (R^2)	116
4.8	Effect size (f^2)	117
4.9	Assessment of the PLSPredict	118
4.10	Assessment of mediation effect	119
4.11	IPMA results for the target construct (continuance usage intention)	120
4.12	Summary of all hypotheses results	121
4.13	Category of responses for open-ended questions	123

LIST OF FIGURES

Figure		Page
2.1	Kingdom Quizzes Interfaces	22
2.2	Constructs of the Study with Supporting Literatures	39
2.3	Expectation Confirmation Theory	45
2.4	Expectation Confirmation Model	46
2.5	The Unified Theory of Acceptance and Use of Technology (UTAUT)	48
2.6	The Extended Unified Theory of Acceptance and Use of Technology (UTAUT2)	49
2.7	Theoretical Framework	54
2.8	Conceptual Framework	56
3.1	UTHM, Pagoh Campus, Johor	59
3.2	Flow Chart of Research Procedure	81
3.3	First Display, Registration and Login Button	83
3.4	Registration Form	83
3.5	Login Page	84
3.6	Profile Page	84
3.7	Code Registration	85
3.8	Course List Display	85
3.9	Status, Score and Ranking Display	86
3.10	Starting of Quiz	86
3.11	Question Display	87
3.12	Answer Submission	87
3.13	Score Display	88
3.14	Leaderboard	88
3.15	Reward Display	89

3.16	Inventory System	89
3.17	Tower Defence Gameplay	90
3.18	Importance-Performance Map of the Target Construct Y ₄	104
4.1	PLS-SEM Model with Outer Loadings Values and Constructs' AVE	108
4.2	PLS-SEM Model with Path Coefficient (t-value)	112
4.3	PLS-SEM Model with Path Coefficient (p-value)	113
4.4	PLS-SEM Model with R ² (Original ECM)	115
4.5	PLS-SEM Model with R ² and f ² (Research Model)	116
4.6	IPMA Chart as Applications' Improvement Indicator	120
4.7	Summary of Hypotheses Result on the Proposed Model	122

LIST OF APPENDICES

Appendix		Page
A	Survey Instrument	197
B	Permission to Use Instrument	212
C	Document Related to Translation Process	222
D	Document Related to Instrument Validation Process	231
E	Instrument Amendment based on Experts' Comment	242
F	Pilot Study: Quizzes and Execution	255
G	Ethics Approval	259
H	Request and Approval to Conduct Research	262
I	Actual Study: Quiz Slots and Execution	263
J	Circulars Related to the Research Location	266
K	Google Meet Survey Sessions	269
L	Example of Tool Improvement Plan (TIP) Document	275

LIST OF ABBREVIATIONS

IT	Information Technology
ICT	Information Communication & Technology
IS	Information System
M-Learning	Mobile Learning
D-Learning	Digital Learning
LMS	Learning Management System
MOOC	Massive Open Online Course
MALL	Mobile-Assisted Language Learning
MOHE	Ministry of Higher Education
HEI	Higher Education Institution
CeDS	Centre for Diploma Studies
UTHM	Universiti Tun Hussein Onn Malaysia
DAA	Diploma of Civil Engineering
DAT	Diploma of Information Technology
DAG	Diploma of Animation
JTM	Department of Information Technology
JSM	Department of Science & Mathematics
JKA	Department of Civil Engineering
TIP	Tool Improvement Plan
MCQs	Multiple-Choice Questions
ECT	Expectation Confirmation Theory
ECM	Expectation Confirmation Model
S-D Logic	Service-Dominant Logic
TAM	Technology Acceptance Model
UTAUT	Unified Theory of Acceptance and Use of Technology

UTAUT2	Extended Unified Theory of Acceptance and Use of Technology
CFA	Confirmatory Factor Analysis
EFA	Exploratory Factor Analysis
EDA	Exploratory Data Analysis
SPSS	Statistical Package for Social Science
MSA	Measure of Sampling Adequacy
KMO	Kaiser-Meyer-Olkin
IPMA	Importance-Performance Map Analysis
f^2	Effect Size
IV	Independent Variable
DV	Dependent Variable
Q^2	Predictive Relevance
R^2	Coefficient of Determination
SEM	Structural Equation Modeling
SD	Standard Deviation
VIF	Variance Inflation Tolerance
HTMT	Heterotrait – Monotrait Ratio
AVE	Average Variance Extracted
CB-SEM	Co-variance Based Structural Equation Modeling
PLS-SEM	Partial Least Square Structural Equation Modeling
CI	Continuance Usage Intention
S	Satisfaction
C	Confirmation
PU	Perceived Usefulness
PEOU	Perceived Ease of Use
PENJ	Perceived Enjoyment
SI	Social Influence

FC	Facilitating Condition
T	Trust in Technology
CE	Consumer Engagement
e-Quiz	Electronic/Online Quiz
CR	Composite Reliability
CMV	Common Method Variance

CHAPTER 1

INTRODUCTION

1.1 Introduction

The purpose of this study is to investigate the factors that influence the gamified e-quiz mobile application continuance usage intention among Malaysian higher learning students. The first chapter starts by discussing the mobile learning based on Malaysian Educational Policy, infusion of gamification in teaching and learning tools, gamified mobile application usage among students of Malaysian higher education institutions, followed by an overview on influence to continuously use a technology. Next, the statement of the problems is discussed. Then, both research objectives and research hypotheses are developed based on the problem statement, followed by the significance and limitation of the study. Lastly, the definition of the terms is presented, organisation of the thesis and concludes with the summarization of this chapter.

1.2 Malaysian Educational Policy

The Fourth Industrial Revolution (4IR) has managed to trigger the Higher education community to upgrade its mastery of utilising digital technology. This has stimulated the development of e-learning modes such as Learning Management System (LMS), Massive Open Online Courses (MOOCs) as well as assessment tools to aid lecturers in conducting their classes. In the e-Learning Guideline for Malaysian Higher Education Institution, published by the Department of Higher Education, Ministry of Education Malaysia (MOE Publication, 2019), it highlighted the development of mobile learning content, as mobile and personal technology is increasingly being acknowledged as an important delivery platform. On the other hand, the Malaysian Communications and Multimedia Commission (MCMC) report shows that smartphones are the most popular devices to access the Internet due to the pandemic situation, showing a near saturation usage level at 98.7% in the year 2020 (MCMC, 2020). Meanwhile, The Internet Users Survey (IUS) which is an annual survey conducted by the MCMC in 2018, showed that 56.8% of Malaysia's population aged between 15-29 years old are smartphone users. The study proved that today's generation of learners are engaged with mobile applications as they are considered as 'tech-savvy'. Therefore, most students in the higher learning institute are familiar with technology and expect to use them as part of their learning process. In addition, studies by Teong and Ang, (2016) and Al-Emran et al. (2020b) agreed on the fact that Malaysian higher learning institute students spend a major portion of their time in accessing the Internet, for academic and extracurricular purposes.

The e-Learning Guideline for Malaysian Higher Education Institution (MOE Publication, 2019) encouraged the use of gamification as one of the contemporary approaches in the learning content development. Gamification in teaching and learning is one of the approaches to diversify the content and structure of the programme. This approach is also parallel with the governments' Policy in Malaysia Education Blueprint

Plan 2015 – 2025 (MEB, 2015) and Malaysia Higher Education 4.0 in transforming the teaching and learning delivery, to improve the students' performance. Most of the gamification studies are implemented in educational contexts in order to stimulate a positive learning behaviour by aiding the engagement and motivational problems using game-based mechanics and game thinking (Kapp, 2016). Consequently, educators can extend the impact of experiential learning through play and gamification as a creative, emphatic and inclusive pedagogical practice in Malaysia towards Education 4.0.

1.3 Infusion of Gamification in Teaching and Learning Tool

There has been growing research suggesting the acceptance of gamification as an impactful learning strategy implemented to produce engaging learning experiences (Zainuddin et al., 2020a). Gamification refers to a game-like experience brought to users by applying gamification elements or mechanisms (Koivisto & Hamari, 2019). The foundation of gamification is the distribution of 'external reward' for the purpose of intensifying a specific behaviour (Dimitriadou, 2017). According to Werbach and Hunter (2015), the design of gamification focuses on rewards as the main source of 'pleasure'. This means that the game designers will need to keep providing more frequent and bigger rewards in order to maintain the players' motivation. A players' competence can be confirmed through external reward such as a 'badge', this will create a positive manner to generate intrinsic motivation. Meanwhile, Park and Kim (2021) confirmed that 'leaderboard', which is also an assessment towards students' interaction and achievement, contributes to users' exposure with goal setting, competition and feedback. 'Leaderboard' influences learners' motivation more than other game mechanics such as progress bars, end prizes, and awarded badges. Hence, one of the reasons for gamification implementation in teaching and learning tools is to encourage the students to return to the tool. It is also an attractive way to strengthen relations between the tool and the users.

On the other hand, the implementation of 'testing effect' or 'retrieval practices' among students is highly sought-after as it also serves as a medium of formative assessment among students. Educators nowadays opted for a more convenient way of assessing their students, for instance using another form of teaching and learning tool such as an e-quiz application. Infusing the gamification elements into the e-quiz tool may enhance the students' interest and motivation to excel in the learning course. The success of the gamification towards students' engagement and motivation depends on the design of the gamified system (Dimitriadou, 2017). This notion is later confirmed by de la Peña et al. (2021) where they concluded that gamification can have a constructive effect on students' motivation, sense of fun and commitment, provided that it is appropriately designed.

1.4 Gamified Mobile Application Usage among Students of Malaysian Higher Education Institution

Mobile applications refer to software or a set of programs that are able to execute tasks or functions for the user and operate on a mobile device. It is easy, user friendly, inexpensive, downloadable and executable in most mobile phones. Based on the 2019

EDUCAUSE Horizon Report by Alexander et al. (2019), almost every student owns a mobile device and 95% of them are the undergraduate students. Additionally, Malaysia has a solid wireless network infrastructure which benefited the university students with easy access to a variety of mobile services (Al-Rahmi et al., 2022). Four different Malaysian public universities were studied by Thang et al. (2016), and they concluded that the Malaysian students like the idea of technology adoption into the classroom, however they are unwilling to invest much time and energy in it and this is attributed to the manner in which the technology is used or selected. Hence, Lin et al. (2018) proposed the gamification elements or gaming platforms as a solution to effectively grab the Malaysian students' attention and motivate them towards learning, as well as encourage sustained learning. Later on, Kumar et al. (2020) confirmed that the majority of the Malaysian higher education institutions' students consider the mobile applications to be influential for the purpose of teaching and learning.

Ishaq et al. (2021) had also mentioned that it is a trend nowadays in mobile learning (m-learning) application development to include gamification concepts that incorporate play and fun elements in which the product is called a 'gamified mobile application'. Among the gamified mobile applications that had been applied in the teaching and learning of Malaysian higher education institutions are; e-quiz (Lin et al., 2018; Ismail et al., 2019), Mobile-Assisted Language Learning (MALL) (Ishaq et al., 2021), course learning (Ramle et al., 2020a; Zakaria et al., 2020) and Learning Management System (LMS) mobile version such as the Moodle app (Annamalai et al., 2021) and the Edmodo app (Suka & Hamid, 2020). The usage of these gamified m-learning applications had resulted in an increase of students' intrinsic and extrinsic motivation in using the learning tools which eventually fostered and reinforced their learning. Specifically, the usage of those applications in Malaysian higher education institutions had helped the students significantly in terms of knowledge reinforcement and retention.

1.5 Influence to Continuously Use a Technology

Scholars have investigated the circumstances that nurture new technologies' acceptance and diffusion (Balapour et al., 2019; Patil & Naqvi, 2020). However, the initial acceptance does not constantly guarantee its commercial accomplishment or lasting utilisation. Continued usage of information technology (IT) or information system (IS) products is said to be far more important than its initial adoption, based on prior literature (Xavier & Zakkariya, 2021). Meanwhile, in the literature reviews done by Yan et al. (2021), prior to year 2011, studies on continuance usage intention were mostly engrossed in websites, although by the year 2019 the amounts of studies related to mobile devices which included mobile applications (e.g., Cao et al., 2018; Kim et al., 2019) grew to the extent of surpassing website-based studies. Continuance usage intention explains the users' decisions to keep on using a specific IT or IS that an individual has already been using. User retention has become an imperative goal for related industries, for instance, services as retaining existing users is more cost-effective than inviting new ones. By understanding how continuance usage intentions are being triggered among users, developers are later able to effectively provide new or upgraded applications that better suit the users' need and expectation (Albashrawi & Motiwalla, 2019).

Acknowledging the emergence of gamification in teaching and learning tools whether it is online, offline, desktop, web or mobile based tools, many educational institutions are infusing it among their students. Although technological acceptance for newly enrolled higher education institutions' students is easier to achieve, as they seem to understand that the new educational institution will require them to learn and adapt to new approaches. However, retaining their interest in the usage of certain applications, where an abundance of choices is available, is quite difficult to do. The influence to use any type of IT or IS and the retention rate of the users on the particular product may be driven by many factors. For example, trust in technology based on Mcknight et al. (2011) represents the users' confidence in the technology abilities such as; (i) delivering the functionality promised, (ii) offers adequate, effective, and responsive help, (iii) consistency, and (iv) accuracy and reliability of the input and output. They also suggested that post-adoption technology use is influenced by an individuals' encounters with a specific technology build knowledge-based. On the other hand, confirmation of expectations is referred to as users' expected benefits gained based on their experiences with the IT (Lee, 2010). Users' confirmation of expectations or called confirmation is positively associated with satisfaction with IS usage because it suggests realisation of the anticipated benefits of IS usage (Bhattacharjee, 2001a). In Brown and Venkatesh (2005) research, they implied that the complexity of an innovation will lower the adoption rate or intention to use it again. This is related to the perceived ease of use factor.

Meanwhile, research from Kim (2011) informed that users' intention to continue using social-networking services can be anticipated by perceived usefulness and perceived enjoyment derived from the motivation theory by Deci (1971). The two primary constructs reflecting motivation are (i) intrinsic, referring to the observation of pleasure from executing a behaviour, and (ii) extrinsic, referring to operating goal-driven tasks in achieving numerous rewards. Meanwhile, social influence is said to be a strong influence towards product usage, as the sense of being influenced will naturally impact individuals' manners. This idea has also been confirmed in earlier studies by Lee (2010) and Chen et al. (2012). In addition, facilitating conditions could operate as an adoption and post-adoption enabler if available facilities and resources are sufficient. Individuals may then display positive attitudes toward the use of the technological products (Venkatesh et al., 2012). Lastly, consumer engagement may secure the longevity of the product, displayed through the users' affection and activation (i.e., frequent usage) as Vitkauskaitė and Gatautis (2018) had proven the existence of positive relation between gamification and consumer engagement. The effectiveness of gamification implementation in an e-quiz tool in terms of generating students' continuance usage intention should be studied based on the relevant aforementioned influencing factors. The results will shed some insights into developing a better gamified teaching and learning tool.

1.6 Statement of the Problem

COVID-19 outbreak has greatly impacted the teaching and learning sessions in all educational institutions. Nearly all teaching activities had rapidly transitioned to distance education in compliance with social distancing (Johnson et al., 2020) including Malaysia for more than two years from year 2020 until early of year 2022. During that period,

Malaysian educators faced the challenge of higher education institutions' students (Chung et al., 2020; Roslan et al., 2021a; Mohd Adam et al., 2021) losing their enthusiasm towards lessons (Sunarti et al., 2022). Other problems that the educators had to endure due to performing online and distance learning in Malaysia and globally are; lack of social interaction, motivation and engagement (Ramle et al., 2019a; Ahmad, 2021; Bacca-Acosta & Avila-Garzon, 2021; D'Aniello et al., 2020; Areed et al., 2021), difficulties in coping with different learning styles (Ramle et al., 2020a; Areed et al., 2021), incapable of retrieving relevant information based on their needs (Missaoui & Maalel, 2021; Suka & Hamid, 2020; Sahak et al., 2021) and low participation in the usage of e-learning products (e.g., Jo et al., 2021; Tan et al., 2020; Sahak et al., 2021; Alam et al., 2021), which contributed to low task or course completion rate. In recent years, many universities in Malaysia have been producing their own m-learning resources (e.g., Zakaria et al., 2020; Ismail et al., 2018; Muslimin et al., 2017; Taha & Mohamad, 2021; Hamid et al., 2017; Ramle et al., 2019a; 2019b; 2020a; 2020b). In the case of performing summative and formative assessments, the implementation of quizzes was traditionally done through paper-based. This means that the summation of scores has to be calculated manually by the educators, and students have to wait to receive their scores. Paper-based quiz also hinders the process of identifying students' participation and students' profiling (Jo et al., 2021). As quizzes are supposed to act as a quick assessment that is performed daily or weekly, it is inconvenient to be operated through paper-based. Hence, the online method for conducting formative assessment was proposed (e.g., Suka & Hamid, 2020; Alam et al., 2021) based on its successful execution in other Malaysian higher education institutions (Devisakti & Muftahu, 2022).

Meanwhile, the higher education learners in Malaysia tend to discontinue the use of online learning tool as they lose interest on continuance usage (Devisakti & Ramayah, 2019; 2021). Study by Ahmad (2020a) reported that low rates of usage among the students effected the receptiveness of education stakeholders in investing or maintaining the educational applications. Therefore, it is necessary for educational institutions tools' developers to be aware of the application design that suit their users' expectations even before the development phase and constantly upgrading existing products. Lack of sustained usage on an application leads to difficulties for the developers to solicit users' responses to eventually improve the particular technology (Chiu et al., 2020) as well as gaining financial benefits, for example revenue that comes from various sources (e.g., advertisements, 'in-app' purchases, subscriptions, sponsorship, etc) (Higgins, 2016). Meanwhile, from the students' outlook, lacking continued usage of m-learning application may negatively affect their academic-related tasks and performance. Hence, it is essential to understand critical factors that lead to the users' continued use of gamified e-quiz application, considering that most previous researches mainly concentrated on recognising the effect on students' performance, engagement, motivation (e.g., Zainuddin et al., 2020b; Aýun & Irwansyah, 2022) as well as the acceptance of the product (e.g., Lestari & Nugraha, 2021; Md Yunus et al., 2021). Studies related to 'continuance usage intention' on product use of e-learning (e.g., Muqtadiroh et al., 2019; Al Amin et al., 2023), Massive Open Online Course (MOOC) (e.g., Daneji et al., 2019; Al-Mekhlafi et al., 2022), Learning Management System (LMS) (e.g., Guoyan et al., 2021; Nair, 2022) and m-learning application (e.g., Al-Emran et al., 2020a; Alrawabdeh et al., 2023) were already done, however studies on continuance usage intention mainly on a gamified e-quiz mobile application is scarce (Wirani et al., 2022), making this a critical literature gap.

To summarise, the present research builds upon four literature gaps. First, it can be seen that the research on continuance usage intention in gamified e-quiz mobile application, have not been explored much when most of the research focused more on other type of learning resources (e.g., LMS, MOOC, e-learning, m-learning) or merely examined the adoption or acceptance of the gamified e-quiz mobile application (e.g., Kahoot, Quizziz). Second, although there are already other researches that included factors from well-known acceptance models (e.g., UTAUT, UTAUT2) into their continuance intention model for mobile application usage (i.e., Tam et al., 2020; Singh, 2020), the technological products used in those researches were not a type of educational application, as well as not mentioning the product as being a gamification-based product. Therefore, it is unclear whether those factors will give the same influence towards a gamified m-learning application. Third, the majority of online learning research does not investigate trust as one of the influencing factors, although literature reviews conducted by Harja et al. (2019), revealed that students' lack of trust in the online learning platforms contributed to technology rejection. Most importantly for formative assessment platforms, 'trust in technology' is seen as essential to be included as it involves confidential data, and is associated with producing students' scores and grades upon task completion. Lastly, Simon and Tossan, (2018) confirmed that consumers would not retain a system/application unless they are engaged with it. This means that it is important to have the students' engagement through 'interaction' with the learning platform (Leslie, 2019). As consumer engagement is said to be a valuable predictor of future service and performance (Brodie et al., 2011; 2013), which also determined the users' loyalty and retention on a product, therefore it is also embedded as one of the explanatory factors. Gaining a thorough understanding of the determinants of the continuance intention of users toward the gamification-based mobile application will help the higher education institution's developers and management to grasp the factors that contribute to students' retention on the 'in-house' m-learning resources.

1.7 Objectives of the Study

The main focus of this research is to develop a prediction model on factors that might influence the continuance usage intention of Malaysian higher learning students in using a gamified e-quiz mobile application, namely Kingdom Quizzes. Therefore, the objectives are as follows:

1. To determine the influence of confirmation (C) on perceived usefulness (PU) of the gamified e-quiz mobile application.
2. To determine the influence of confirmation (C), perceived usefulness (PU), trust (T) and perceived enjoyment (PENJ) on satisfaction (S) in the usage of a gamified e-quiz mobile application.
3. To determine the influence of perceived enjoyment (PENJ), perceived ease of use (PEOU), perceived usefulness (PU), facilitating condition (FC), social influence (SI), trust (T), satisfaction (S), and consumer engagement (CE) on continuance intention in using gamified e-quiz mobile application.
4. To investigate the role of satisfaction (S) as a mediator between perceived usefulness, perceived enjoyment, and trust with continuance intention in using gamified e-quiz mobile application.

5. To develop a model that predicts factors that influence Kingdom Quizzes mobile application continuance usage intention.

1.8 Research Hypotheses

The study formulated the following alternative hypotheses based on the objectives;

Objective 1

To determine the influence of confirmation (C) on perceived usefulness (PU) of the gamified e-quiz mobile application.

- H₄: Confirmation (C) has a significant influence on perceived usefulness (PU) of gamified e-quiz mobile application.

Objective 2

To determine the effects of confirmation (C), perceived usefulness (PU), trust (T) and perceived enjoyment (PENJ) on satisfaction (S) in the usage of a gamified e-quiz mobile application.

- H₂: Trust (T) has a significant influence on satisfaction (S) in using gamified e-quiz mobile application.
- H₃: Confirmation (C) has a significant influence on satisfaction (S) in using gamified e-quiz mobile application.
- H₅: Perceived usefulness (PU) has a significant influence on satisfaction (S) in using gamified e-quiz mobile application.

Objective 3

To determine the influence of perceived enjoyment (PENJ), perceived ease of use (PEOU), perceived usefulness (PU), facilitating condition (FC), social influence (SI), trust (T), satisfaction (S), and consumer engagement (CE) on continuance intention in using gamified e-quiz mobile application.

- H₁: Trust (T) has a significant influence on gamified e-quiz mobile application continuance usage intention.
- H₆: Perceived usefulness (PU) has a significant influence on gamified e-quiz mobile application continuance usage intention.
- H₇: Perceived enjoyment (PENJ) has a significant influence on satisfaction (S) in using gamified e-quiz mobile application.
- H₈: Perceived enjoyment (PENJ) has a significant influence on gamified e-quiz mobile application continuance usage intention.

- H₉: Perceived ease of use (PEOU) has a significant influence on gamified e-quiz mobile application continuance usage intention.
- H₁₀: Facilitating condition (FC) has a significant influence on gamified e-quiz mobile application continuance usage intention.
- H₁₁: Social influence (SI) has a significant influence on gamified e-quiz mobile application continuance usage intention.
- H₁₂: Consumer engagement (CE) has a significant influence on gamified e-quiz mobile application continuance usage intention.
- H₁₃: Satisfaction (S) has a significant influence on gamified e-quiz mobile application continuance usage intention.

Objective 4

To investigate the role of satisfaction (S) as a mediator between perceived usefulness, perceived enjoyment, and trust with continuance intention in using gamified e-quiz mobile application.

- H₁₄: Satisfaction (S) has a significant mediating role in the relationship between perceived usefulness (PU) and continuance usage intention in using gamified e-quiz mobile application.
- H₁₅: Satisfaction (S) has a significant mediating role in the relationship between trust (T) and continuance usage intention in using gamified e-quiz mobile application.
- H₁₆: Satisfaction (S) has a significant mediating role in the relationship between perceived enjoyment (PENJ) and continuance usage intention in using gamified e-quiz mobile application.

1.9 Significance of the Study

This research attempts to provide insights regarding the factors that influence the continuance usage intention of gamified e-quiz application which eventually lead to a development of two main outputs; (i) a continuance usage intention model and (ii) a reliable survey instrument. Although the technological product used in this research is an e-quiz application, the proposed model may be applied to any other types of gamified m-learning application. The significance of the study can be seen from two aspects which are; (i) theoretical and (ii) practical.

1.9.1 Theoretical Significance

This study adds value to academic perspectives threefold. First, the present study contributes to the existing literature by integrating both technology pre-adoption and post-adoption models, to comprehend gamified mobile application continuance use intention. The study is in response to Tam et al.'s (2020), who stated that technology

pre-adoption variables can give greater explanatory power to the essential constructs of a post-adoption model. Apart from that, Venkatesh et al. (2012) and Bhattacharjee (2001b) had also suggested that their models should be applied to different technologies or there should be attempts to identify other relevant factors for extension. Therefore, the Expectation Confirmation Model (ECM) by Bhattacharjee (2001b) and the variables from Extended Unified Theory of Acceptance and Use of Technology (UTAUT2) of Venkatesh et al. (2012), were selected to be incorporated. Second, taking into account the aforementioned suggestion by Venkatesh et al. (2012) and Bhattacharjee (2001b) regarding the extension of factors, this study also adopts the Trust in Technology theory and Service-Dominant Logic theory in understanding how the mechanisms (i.e., trust and consumer engagement) may influence the gamified mobile application continuance use intention. Lastly, this study will be adding values to the body of knowledge by providing the end result of a predictive continuance usage intention model for gamified m-learning application. Fellow researchers may benefit from this study by using the findings for reference purposes on an equal footing.

1.9.2 Practical Significance

In terms of the research practical significance, the stakeholders involving Malaysian higher education institutions in general, specifically the institutions' management, educators and students, also the Ministry of Higher Education (MOHE) policy makers, will gain the benefits. The benefits for educators and students involved are; they are able to use future mobile learning resources that are competent and effective in performing their main functions as well as enjoyable to the extent of generating engagement and motivation in their courses. This is due to thorough consideration by the institutions' management in the m-learning products' development based on the information gathered from this study. Prior to that, the institutions' m-learning developers (e.g., programmers, application analyst, database administrator, designer) and upper management may gain benefits from the gamification-based educational application guidelines, for future product development as this study will make a discovery on the factors that influence students' continuance usage, which also unveils the gamification items that are associated with those factors. Based on the survey result, they could design the appropriate intervention plan that suits the needs of their self-developed gamified m-learning applications, for instance from the perspective of the applications' technical features such as the inclusion of badges, real-world reward usage and push notification.

An example of an intervention plan is demonstrated through the proposed Tool Improvement Plan (TIP) document (see Appendix L), generated from the result of the research findings. The TIP document acts as a guideline or reference in upgrading a gamification-based m-learning application, which is the type of technological product used in this study. Tool Improvement Plan also known as Process Improvement Plan, is an actionable document that outlines the necessary steps to enhance the overall performance, effectiveness and efficiency of processes and procedures, in this case the m-learning application/tool. It serves as a roadmap or guideline to identify areas of improvement, address issues, bottlenecks, workflows, and optimise resource utilisation. Through the recommendation of the TIP document, ultimately, the upper management will have the insights on whether to sustain and upgrade their existing gamified mobile resources and make future plans, as all of these are associated with the institutions'

investment (e.g., money, resources, time, labour). The result of this study could show the MOHE, the significance of gamification-based m-learning resources in support of teaching and learning of Malaysian higher education. Following that, it will benefit their policy makers in terms of information on the appropriate fund allocation for Malaysian higher education institutions associating with m-learning research, as well as information on the service and infrastructure needed (e.g., reliable high-speed internet/network coverage) in support of the m-learning implementation. In conclusion, the results of this study will be informative for researchers and institutions that develop their own m-learning application. Considering users' diversified demands for gamified interaction, those institutions should focus on constantly improving gamified tool design.

1.10 Limitation of the Study

The current study is constrained by a few limitations; first, the findings of this study cannot be generalised to all e-quiz applications. The structure of the gamified e-quiz involved in this study may possibly be different with other e-quiz platforms or applications offered by private developers or by other education institutions. Secondly, the population of this research is limited to UTHMs' diploma students which represents the Malaysian higher learning students. Moreover, the participants only consist of the first-year students from three programmes (i.e., civil engineering, animation and information technology). Therefore, the findings should not be generalised to all higher education institutions, from all years of studies and programmes. The decision of taking the first-year diploma students as participants for this study is because the second years' courses consist more of structural questions, while there is a wider selection of suitable courses in the first year which is more suitable to be implemented as Multiple-Choice Questions (MCQs) using the Kingdom Quizzes application. The other reason is that, this continuance usage intention research will identify the first-year students' intention to keep using this product until the second year which also happens to be the last academic year of their diploma studies.

Third, the study was carried out at the times of the pandemic COVID-19 occurrences, when most teaching and learning sessions are being done virtually and at the respondents' own home without the support of the university's infrastructure (e.g., internet connectivity, network, hardware devices) or even physical (i.e., face-to-face) guidance from the lecturer. The factors or level of influences that may affect the continuance usage intention to use Kingdom Quizzes are predicted to be different compared to; if this study was conducted in the opposite circumstances (e.g., physical classroom environment, hardware device, network and reliable speed of internet connectivity that are supported by the institution). The fourth limitation is the technological product itself, as the product was only published as an android mobile application (apk format) with web function support for educators' accounts (i.e., insert, update, delete questions) for the first stage of its implementation. Kingdom Quizzes application does not support IOS-based mobile devices for now. This limitation may influence the facilitating condition factor for those with hardware devices other than android operating system. Other option on conducting the e-quiz on Kingdom Quizzes aside from executing it using mobile devices (e.g., phone, tablet) is by using personal computer (e.g., desktop, notebook or laptop) through the installation of 3rd party software, for instance Windows operating system notebook has the option for emulators

such as MEmu, KOplayer, Bluestacks and other free software. These procedures may be a hindrance on some participants as they might feel a burden to perform pre-installation of other software (i.e., 3rd party software or emulator) before being able to download and install Kingdom Quizzes application in their notebook.

The fifth limitation would be adopting a correlational survey that is cross-sectional which means that all measurement items are collected at the same time. This may limit the outcomes due to the respondents' opinion which do not always remain unaffected over time. The sixth limitation is regarding the execution of the survey, initially the plan was to perform face-to-face survey sessions by distributing the paper-based survey instrument to each respondent, unfortunately it had to be executed online using the Google Form method, due to the unceasing pandemic in Malaysia. This may lead to inconsistencies of feedback by the respondents, whether it is due to problems associated with computer devices, network, or lack of comprehension of the survey items. Lastly, the constructs used in the research are another limitation of this study. Other additional constructs or factors aside from those included in this study that are influencing continuance usage intention are not able to be studied. This study only limits nine independent variables, namely trust (T), perceived enjoyment (PENJ), perceived usefulness (PU), facilitating condition (FC), confirmation of expectation (C), social influence (SI), perceived ease of use (PEOU), satisfaction (S) and consumer engagement (CE). Hence, the results of this research cannot be generalised to other gamified e-quiz applications implemented in other universities, which may have included other variables for instance, perceived security, perceived user interface quality or self-efficacy.

1.11 Definition of Key Terms

For mutual understanding, some of the key terms used in this research need to be conceptually, and operationally defined based on the study context for clear understanding.

Trust (T)

Arpaci (2016) described trust as users' views on the trustworthiness and reliability of the system, whereas Alalwan et al. (2017) described it as the collection of trust beliefs that embodies ability, integrity and benevolence of the specific product. The trust beliefs are also based on Mcknight et al.'s (2011) Trust in Technology Theory reflecting functionality as the ability, helpfulness as the benevolence, and reliability as the integrity. In this research, trust refers to the higher learning students' specific belief that the Kingdom Quizzes application has the ability/functionality, integrity/reliability, and benevolence/helpfulness in providing its service.

Perceived Usefulness (PU)

Davis (1989) has described perceived usefulness as the degree to which an individual believes that by using a technology, it would improve his or her work performance. Meanwhile, Liao et al. (2007) stated that perceived usefulness is the salient belief of a person that using a technology will boost their job performance. In this research, the

perceived usefulness indicates the degree to which the higher learning students believe that by using Kingdom Quizzes application, it will help increase their academic task performance. In other words, the degree to which the users believe that using Kingdom Quizzes application will help them to achieve gains in job performance.

Perceived Enjoyment (PENJ)

Davis et al. (1992) defined perceived enjoyment as the extent to which the task of using the technology is successfully performed as expected, as well as perceived to be enjoyable in its own right. On the other hand, Chao (2019) mentioned that perceived enjoyment, which is a basic intrinsic motivation, postulates the extent to which enjoyment can be triggered from using the IT or IS. This research refers to perceived enjoyment as the extent to which enjoyment can be stimulated from the usage of Kingdom Quizzes application as well as delivering a fun experience among the higher learning students.

Social Influence (SI)

Social influence is the force that may contribute to the motivation of an individual to use a technology believing that the people who are important to them already use it or will support them in using it (Ghandalari, 2012). Meanwhile, Venkatesh et al. (2003) mentioned social influence is the degree to which an individual notices important people such as subordinates, peers and relatives believe they should use the technology. In this research, social influence means the degree to which the higher learning students decide to use Kingdom Quizzes application when they think that the people who are important to them are already using it or will support them in using the product.

Facilitating Condition (FC)

Facilitating condition is defined as the degree to which the individual perceives the existence of necessary resources and support in using certain technology (Venkatesh et al., 2003; Venkatesh et al., 2012), whereas Zhou (2011) refers it as users, who have the knowledge and resources necessary to operate the IT or IS. In this research, facilitating condition is referred to the higher learning students, perceiving the existence of resources and support (e.g., operating system, network, technical support, guidance manual) to use Kingdom Quizzes application whenever necessary.

Confirmation (C)

Confirmation refers to the extent to which individuals are aware of their expected benefits from their past experience, which means that the actual experience has confirmed the individuals' initial expectations (Oghuma et al., 2016). Meanwhile, Lee (2010) defined confirmation of expectations as the users' expected benefits gathered during their experiences using the IT. In this research, confirmation indicates the higher learning students' opinion on the congruence between the expectation of the Kingdom Quizzes application use and its actual performance.

Satisfaction (S)

Satisfaction is described as a positive emotional state arising from a given activity or task that has been measured (Joo et al., 2017). Meanwhile, Deng et al. (2010) described satisfaction as the response related to pleasurable fulfilment based on their evaluation on how well the utilisation of an item or service meets a need or an objective. In this research, satisfaction with Kingdom Quizzes application usage refers to the higher learning students' subjective evaluation (i.e., positive or negative response) in using the application.

Perceived Ease of Use (PEOU)

Specifically, perceived ease of use which is also referred to as effort expectancy, is the degree of belief that using a specific technology will be free of effort (Davis, 1989). Venkatesh et al. (2003) described perceived ease of use as the degree of ease related to the usage of a system. This research refers to perceived ease of use as higher learning students' involvement in using Kingdom Quizzes application, which is effortlessly easy to use.

Consumer Engagement (CE)

Hollebeek et al. (2014) defined consumer engagement as a consumers' positively valenced brand-related cognitive, behavioural and emotional actions throughout or associated with the focal consumer/brand interactions. This research employed only the emotional and behavioural aspects hence, the operational definition of consumer engagement refers to the higher learning students' positively valenced product-related emotion and behaviour, which reflect their "passion" and activation (e.g., level of effort, energy and time spent) towards the Kingdom Quizzes application.

Continuance Usage Intention (CI)

Continuance usage intention is defined as the intention of the person to continue using or repurchasing the service technology (Bhattacharjee, 2001a). On the other hand, it had been said that continuance usage intention is the feeling associated with users' intention to continue using a specific service or technological product in the post-adoption phase, and it is not the same with the intention to use the service or technological product throughout the pre-adoption phase (Montazemi & Qahri-Saremi, 2015; Zhou, 2013). In this study, continuance usage intention in using Kingdom Quizzes application defines the higher learning students voluntarily pursuing or continuing the usage of the application.

1.12 Organisation of Thesis

This thesis is divided into five chapters. In Chapter One, the researcher has discussed the research background and the problem statement for the study. Sixteen research hypotheses were laid out to correspond to the research objectives, as well as the significance of the study, are presented. In Chapter Two, researcher provides a

comprehensive review of the literature relating to the theories and prior research in the context of technology. The section is followed by reviewing the concept of gamification, influencing factors and the relations of these two concepts in educational application. Besides that, this study also provides an in-depth review regarding the theoretical and conceptual frameworks. In Chapter Three, the researcher draws attention to the research methodology, which includes the instrumentation used, pilot study and data collection procedure. Next, findings and analysis are presented in Chapter Four. Finally, discussion, contributions (i.e., theoretical and practical), and direction for future research are concluded in Chapter Five.

1.13 Chapter Summary

In summary, this study focuses on understanding the features that impact the higher education institutions' student continuance usage intention concerning a gamified e-quiz mobile application in the Malaysia context. Sections included in this chapter started with a few topics related to this study, statement of the problem, research objectives, research hypotheses, significance and limitation of the study. Lastly the chapter concludes with the conceptual and operational definition of terms for the constructs that will be implemented. Before moving to the next chapter, the organisation of the thesis was explained.

REFERENCES

- Adejo, O. W., Ewuzie, I., Usoro, A., & Connolly, T. (2018). E-learning to m-learning: Framework for data protection and security in cloud infrastructure. *International Journal of Information Technology and Computer Science (IJITCS)*, 10(4), 1-9.
- Agyei, J., Sun, S., Abrokwah, E., Penney, E. K., & Ofori-Boafo, R. (2020). Influence of trust on customer engagement: Empirical evidence from the insurance industry in Ghana. *SAGE Open*, 10(1). <https://doi.org/10.1177/2156244019899104>
- Ahmad, W. F. W., Ermawati, I. R., Astuti, S., Kurniasih, M. D., & Hassan, M. H. (2021). Comparative study on the readiness of Mobile Learning Application in Learning. *Proceedings of the International Conference on Computer & Information Sciences (ICCOINS)*, 191-194.
- Ahmad, T. (2020). Student perceptions on using cell phones as learning tools. *PSU Research Review*, 4(1), 25-43.
- Aini, Q., Rahardja, U., & Hariguna, T. (2019). The antecedent of perceived value to determine of student continuance intention and student participate adoption of ilearning. *Procedia Computer Science*, 161(1), 242-249.
- Akdim, K., Casaló, L. V., & Flavián, C. (2022). The role of utilitarian and hedonic aspects in the continuance intention to use social mobile apps. *Journal of Retailing and Consumer Services*, 66(2022), 102888.
- Akel, G., & Armağan, E. (2021). Hedonic and utilitarian benefits as determinants of the application continuance intention in location-based applications: The mediating role of satisfaction. *Multimedia Tools and Applications*, 80(5), 7103–7124. <https://doi.org/10.1007/s11042-020-10094-2>
- Akter, S., D'Ambra, J. & Ray, P. (2011). An evaluation of PLS based complex models: the roles of power analysis, predictive relevance and GoF index. *Proceedings of the 17th Americas Conference on Information Systems (AMCIS2011)*, USA, 1-7.
- Al-Adwan, A. S., Al-Adwan, A., & Berger, H. (2018). Solving the mystery of mobile learning adoption in higher education. *International Journal of Mobile Communications*, 16(1), 24-49.
- Al Amin, M., Razib Alam, M., & Alam, M. Z. (2023). Antecedents of students' e-learning continuance intention during COVID-19: An empirical study. *E-learning and Digital Media*, 20(3), 224-254.
- Al-Bashayreh, M., Almajali, D., Altamimi, A., Masa'deh, R. E., & Al-Okaily, M. (2022). An empirical investigation of reasons influencing student acceptance and rejection of mobile learning apps usage. *Sustainability*, 14(7), 4325.
- Albers, S. (2010). PLS and success factor studies in marketing. In *Handbook of partial least squares* (pp. 409-425). Springer, Berlin, Heidelberg.

- Al-Dwairi, R., Abu-Shanab, E., & Daradkeh, M. (2018). A framework for antecedents of trust in social commerce. *International Journal of Enterprise Network Management*, 9(3-4), 333-351.
- Al-Dwairi, R., & Al-Ali, O. (2022). The role of trust and satisfaction as mediators on users' continuous intention to use mobile payments: Empirical study. *Journal of Theoretical and Applied Information Technology*, 100(9), 3035-3047.
- Al-Gahtani, S. S. (2016). Empirical investigation of e-learning acceptance and assimilation: A structural equation model. *Applied Computing and Informatics*, 12(1), 27-50.
- Al-Emran, M., Mezhuyev, V., & Kamaludin, A. (2018). Students' perceptions towards the integration of knowledge management processes in m-learning systems: A preliminary study. *International Journal of Engineering Education*, 34(2), 371-380.
- Al-Emran, M., & Mezhuyev, V. (2019). Examining the effect of knowledge management factors on mobile learning adoption through the use of importance-performance map analysis (IPMA). *Proceedings of International Conference on Advanced Intelligent Systems and Informatics*, 449-458. Springer, Cham.
- Al-Emran, M., Arpaci, I., & Salloum, S. A. (2020a). An empirical examination of continuous intention to use m-learning: An integrated model. *Education and Information Technologies*, 25(1), 2899-2918.
- Al-Emran, M., Mezhuyev, V., & Kamaludin, A. (2020b). Towards a conceptual model for examining the impact of knowledge management factors on mobile learning acceptance. *Technology in Society*, 61, 101247.
- Al-Mamary, Y. H. S. (2022). Understanding the use of learning management systems by undergraduate university students using the UTAUT model: Credible evidence from Saudi Arabia. *International Journal of Information Management Data Insights*, 2(2), 100092.
- Al-Mekhlafi, A. B. A., Othman, I., Kineber, A. F., Mousa, A. A., & Zamil, A. M. (2022). Modeling the impact of massive open online courses (MOOC) implementation factors on continuance intention of students: PLS-SEM approach. *Sustainability*, 14(9), 5342.
- Al-Rahmi, A. M., Al-Rahmi, W. M., Alturki, U., Aldraiweesh, A., Almutairy, S., & Al-Adwan, A. S. (2022). Acceptance of mobile technologies and M-learning by university students: An empirical investigation in higher education. *Education and Information Technologies*, 1-22.
- Al-Samarraie, H., Teng, B. K., Alzahrani, A. I., & Alalwan, N. (2018). E-learning continuance satisfaction in higher education: a unified perspective from instructors and students. *Studies in Higher Education*, 43(11), 2003-2019. <https://doi.org/10.1080/03075079.2017.129808>
- Alzaidi, M. S., & Shehawy, Y. M. (2022). Cross-national differences in mobile learning adoption during COVID-19. *Education + Training*, 64(3), 305-328.

- Alalwan, A. A., Dwivedi, Y. K., & Rana, N. P. (2017). Factors influencing adoption of mobile banking by Jordanian bank customers: Extending UTAUT2 with trust. *International Journal of Information Management*, 37(3), 99–110. <https://doi.org/10.1016/j.ijinfomgt.2017.01.002>
- Alam, M. N. H., Othman, R., & Yunus, S. N. M. M. (2021). Assessment on Learning Management Systems for open and distance learning of engineering courses. *Asean Journal of Engineering Education*, 5(1), 44-50.
- Albashrawi, M., & Motiwalla, L. (2019). Privacy and personalization in continued usage intention of mobile banking: An integrative perspective. *Information Systems Frontiers*, 21(5), 1031–1043. <https://doi.org/10.1007/s10796-017-9814-7>
- Alexander, B., Ashford-Rowe, K., Barajas-Murphy, N., Dobbin, G., Knott, J., McCormack, M., Pomerantz, J., Seilhamer, R., & Weber, N. (2019). *EDUCAUSE horizon report: 2019 higher education edition*. Retrieved from <https://library.educause.edu/media/files/library/2019/4/2019horizonreport.pdf?la=en&hash=C8E8D444AF372E705FA1BF9D4FF0DD4CC6F0FDD1>
- Alhumaid, K. (2021). Developing an educational framework for using mobile learning during the era of COVID-19. *International Journal of Data and Network Science*, 5(3), 215.
- Alkhwadi, A. F., & Abdulmusin, A. (2021). Crisis-centric distance learning model in Jordanian Higher Education: Factors influencing the continuous use of distance learning platform during COVID-19 pandemic. *Journal of International Education in Business*, 2046-469X. <https://doi.org/doi: 10.1108/JIEB- 01-2021-0001>.
- Almaiah, M. A. (2018). Acceptance and usage of a mobile information system services in University of Jordan. *Education and Information Technologies*, 23(5), 1873–1895. <https://doi.org/10.1007/s10639-018-9694-6>
- Almaiah, M. A., Alamri, M. M., & Al-Rahmi, W. (2019). Applying the UTAUT model to explain the students' acceptance of mobile learning system in Higher Education. *IEEE Access*, 7, 174673–174686. <https://doi.org/10.1109/ACCESS.2019.2957206>
- Almazroa, M., & Gulliver, S. (2018). Understanding the usage of mobile payment systems-The impact of personality on the continuance usage. *Proceedings of 2018 4th International Conference on Information Management (ICIM)*, 188-194. IEEE. <https://doi.org/10.1109/INFOMAN.2018.8392833>
- Alrawad, M., Lutfi, A., Alyatama, S., Elshaer, I. A., & Almaiah, M. A. (2022). Perception of occupational and environmental risks and hazards among mineworkers: A psychometric paradigm approach. *International Journal of Environmental Research and Public Health*, 19(6), 3371.
- Alsawaier, R. S. (2018). The effect of gamification on motivation and engagement. *International Journal of Information and Learning Technology*, 35(1), 56–79. <https://doi.org/10.1108/IJILT-02-2017-0009>

- Alsharhan, A., Salloum, S. A., & Aburayya, A. (2022). Technology acceptance drivers for AR smart glasses in the middle east: A quantitative study. *International Journal of Data and Network Science*, 6(1), 193-208.
- Alshurideh, M., Al Kurdi, B., & Salloum, S. A. (2020). Examining the main mobile learning system drivers' effects: A mix empirical examination of both the Expectation-Confirmation Model (ECM) and the Technology Acceptance Model (TAM). *Advances in Intelligent Systems and Computing*, 1058, 406–417.
- Alrawabdeh, W., Abbad, M., Jaber, F., Alalawneh, A., & AlBarghouthi, M. (2023). The nexus between student satisfaction and continuance intention to use mobile learning. *International Journal of Management Practice*, 16(3), 390-406.
- Amalia, F. (2019). The used of modified UTAUT 2 model to analyse the continuance intention of travel mobile application. *Proceedings of 7th International Conference on Information and Communication Technology (ICoICT)*, 1-6. IEEE.
- Ambalov, I. A. (2021). An investigation of technology trust and habit in IT use continuance: a study of a social network. *Journal of Systems and Information Technology*, 23(1), 53-81.
- Anwar, M. (2021). Supporting privacy, trust, and personalization in online learning. *International Journal of Artificial Intelligence in Education*, 31(4), 769–783. <https://doi.org/10.1007/s40593-020-00216-0>
- Annamalai, N., Ramayah, T., Kumar, J. A., & Osman, S. (2021). Investigating the use of Learning Management System (LMS) for distance education in Malaysia: A mixed-method approach. *Contemporary Educational Technology*, 13(3), ep313.
- Apandi, A. M. (2022). Gamification meets mobile learning: Soft-skills enhancement. In *Research Anthology on Developments in Gamification and Game-Based Learning* (pp. 1280-1299). IGI Global.
- Aparicio, M., Oliveira, T., Bacao, F., & Painho, M. (2019). Gamification: A key determinant of massive open online course (MOOC) success. *Information & Management*, 56(1), 39–54. <https://doi.org/10.1016/j.im.2018.06.003>.
- Areed, M. F., Amasha, M. A., Abougalala, R. A., Alkhalaf, S., & Khairy, D. (2021). Developing gamification e-quizzes based on an android app: The impact of asynchronous form. *Education and Information Technologies*, 26(4), 4857–4878. <https://doi.org/10.1007/s10639-021-10469-4>
- Aries, S., Younghoon, C., & Youngwook, H. (2016). Determinants of continuance intention to use the smartphone banking services: An extension to the expectation-confirmation model. *Industrial Management and Data Systems*, 116(3), 508-525.
- Arpaci, I. (2016). Understanding and predicting students' intention to use mobile cloud storage services. *Computers in Human Behavior*, 58, 150–157.

<https://doi.org/10.1016/j.chb.2015.12.067>

- Arora, S., Ter Hofstede, F., & Mahajan, V. (2017). The implications of offering free versions for the performance of paid mobile apps. *Journal of Marketing* 81(6), 62–78. <https://doi.org/10.1509/jm.15.0205>
- Ary, D., Jacobs, L. C., & Razavieh, A. (2009). *Introduction for Research in Education*. 8th ed. Belmont, CA: Wadsworth.
- Ashrafi, A., Zareravasan, A., Rabiee Savoji, S., & Amani, M. (2020). Exploring factors influencing students' continuance intention to use the learning management system (LMS): A multi-perspective framework. *Interactive Learning Environments*, 1–23. <https://doi.org/10.1080/10494820.2020.1734028>
- Ashfaq, M., Yun, J., Waheed, A., Khan, M. S., & Farrukh, M. (2019). Customers' expectation, satisfaction, and repurchase intention of used products online: Empirical evidence from China. *Sage Open*, 9(2), 2158244019846212.
- Attali, Y., & Arieli-Attali, M. (2015). Gamification in assessment: Do points affect test performance? *Computers and Education*, 83, 57–63. <https://doi.org/10.1016/j.compedu.2014.12.012>
- Awang, Z. (2015). *SEM made simple: A gentle approach to learning Structural Equation Modeling*. MPWS Rich Publication.
- Awang, Z., Wan Afthanorhan, W. M. A., & Asri, M. A. M. (2015). Parametric and non-parametric approach in Structural Equation Modeling (SEM): The application of bootstrapping. *Modern Applied Science*, 9(9), 58–67. <https://doi.org/10.5539/mas.v9n9p58>
- Awang, Z. (2018). *Pendekatan Mudah SEM (Structural Equation Modeling)*. MPWS Rich Resources.
- Aýun, Q., & Irwansyah, I. P. (2022). Students' perceptions of the use quizizz as an online learning media for biology. *Biosfer: Jurnal Pendidikan Biologi*, 15(1), 147–158.
- Azlan, C. A., Wong, J. H. D., Tan, L. K., Huri, M. S. N. A., Ung, N. M., Pallath, V., Tan, C. P. L., Yeong, C. H., & Ng, K. H. (2020). Teaching and learning of postgraduate medical physics using Internet-based e-learning during the COVID-19 pandemic—A case study from Malaysia. *Physica Medica*, 80, 10-16.
- Baabdullah, A. M. (2018). Consumer adoption of Mobile Social Network Games (M-SNGs) in Saudi Arabia: The role of social influence, hedonic motivation and trust. *Technology in Society*, 53, 91–102. <https://doi.org/10.1016/j.techsoc.2018.01.004>
- Babin, B. J., Griffin, M., & Hair Jr, J. F. (2016). Heresies and sacred cows in scholarly marketing publications. *Journal of Business Research*, 69(8), 3133-3138.
- Bacca-Acosta, J., & Avila-Garzon, C. (2021). Student engagement with mobile-based assessment systems: A survival analysis. *Journal of Computer Assisted*

Learning, 37(1), 158-171.

- Bagaskara, B., Yohana, C., & Fidhyallah, N. F. (2021). The effect of perceive ease of use and satisfaction to continuance intention Learning Management System. *International Journal of Current Economics & Business Ventures*, 1(2).
- Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, 16(1), 74-94.
- Bagozzi, R. P., Yi, Y., & Phillips, L. W. (1991). Assessing construct validity in organisational research. *Administrative Science Quarterly*, 421-458.
- Bai, H. (2019). Pedagogical practices of mobile learning in K-12 and Higher Education settings. *TechTrends*, 63(5), 611–620. <https://doi.org/10.1007/s11528-019-00419-w>
- Bai, S., Hew, K. F., & Huang, B. (2020). Does gamification improve student learning outcome? Evidence from a meta-analysis and synthesis of qualitative data in educational contexts. *Educational Research Review*, 30, 100322. <https://doi.org/10.1016/j.edurev.2020.100322>
- Baird, L. L. (1985). Do grades and tests predict adult accomplishment?. *Research in Higher Education*, 23(1), 3–85. <https://doi.org/10.1007/BF00974070>
- Balapour, A., Reyshav, I., Sabherwal, R., & Azuri, J. (2019). Mobile technology identity and self-efficacy: Implications for the adoption of clinically supported mobile health apps. *International Journal of Information Management*, 49, 58–68.
- Bani-Khalid, T., Alshira'h, A. F., & Alshirah, M. H. (2022). Determinants of tax compliance intention among Jordanian SMEs: A focus on the Theory of Planned Behavior. *Economies*, 10(2), 30.
- Banyte, J., & Dovaliene, A. (2014). Relations between customer engagement into value creation and customer loyalty. *Procedia-Social and Behavioral Sciences*, 156, 484-489.
- Bartlett, J. E., Kortlik, J. W., & Higgin, C. C. (2001). Organisational Research: Determining appropriate sample size in survey research. *Information Technology Learning Performance Journal*, 19(1), 43 – 50. <http://doi.org/10.1.1.486.8295>
- Bartholomew, D. J., Knott, M., & Moustaki, I. (2011). *Latent variable models and factor analysis: A unified approach*. John Wiley & Sons.
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173-1182.
- Baydas, O., & Cicek, M. (2019). The examination of the gamification process in undergraduate education: A scale development study. *Technology, Pedagogy and Education*, 28(3), 1–17. <https://doi.org/10.1080/1475939X.2019.1580609>.

- Benben, V. Y., & Bug-os, M. A. A. C. (2022). Physics students' academic achievement and motivation in a gamified formative assessment. *American Journal of Educational Research*, 10(6), 385-390.
- Becker, J. M., Klein, K., & Wetzels, M. (2012). Hierarchical latent variable models in PLS-SEM: guidelines for using reflective-formative type models. *Long Range Planning*, 45(5-6), 359-394.
- Bhattacharjee, A. (2001a). Understanding Information Systems Continuance: An Expectation-Confirmation Model. *MIS Quarterly*, 25(3), 351. <https://doi.org/10.2307/3250921>
- Bhattacharjee, A. (2001b). An empirical analysis of the antecedents of electronic commerce service continuance. *Decision Support Systems*, 32(2), 201–214.
- Bhattacharjee, A. (2002). Individual trust in online firms: Scale development and initial test. *Journal of Management Information Systems*, 19(1), 211–241
- Bhattacharjee, A., & Lin, C. P. (2015). A unified model of IT continuance: Three complementary perspectives and crossover effects. *European Journal of Information Systems*, 24(4), 364–373. <https://doi.org/10.1057/ejis.2013.36>
- Bhattacharjee, A., & Premkumar, G. (2004). Understanding changes in belief and attitude toward information technology usage: A theoretical model and longitudinal test. *MIS quarterly*, 28(2), 229-254
- Brodie, R. J., Hollebeck, L. D., Jurić, B., & Ilić, A. (2011). Customer engagement: Conceptual domain, fundamental propositions, and implications for research. *Journal of Service Research*, 14(3), 252-271.
- Brodie, R. J., Ilic, A., Juric, B., & Hollebeck, L. (2013). Consumer engagement in a virtual brand community: An exploratory analysis. *Journal of Business Research*, 66(1), 105-114.
- Brown, S., & Knight, P. (1994). *Assessing Learners in Higher Education* (1st ed.). Routledge. <https://doi.org/10.4324/9780203062036>
- Brown, S. A. & Venkatesh, V. (2005) Model of Adoption of Technology in the Household: A Baseline Model Test and Extension Incorporating Household Life Cycle. *Management Information System Quarterly*, 29, 399-426. <https://doi.org/10.2307/25148690>
- Bryman, A., Becker, S., & Sempik, J. (2008). Quality criteria for quantitative, qualitative and mixed methods research: A view from social policy. *International Journal of Social Research Methodology*, 11(4), 261-276.
- Bollen, K. A. (1989). *Structural equations with latent variables*. New York, NY: Wiley
- Boud, D. (1990). Assessment and the promotion of academic values. *Studies in Higher Education*, 15(1), 101-111. <https://doi.org/10.1080/03075079012331377> 621

- Bouchrika, I., Harrati, N., Wanick, V., & Wills, G. (2021). Exploring the impact of gamification on student engagement and involvement with e-learning systems. *Interactive Learning Environments*, 29(8), 1244-1257.
- Bufquin, D., DiPietro, R., Orlowski, M., & Partlow, C. (2017). The influence of restaurant co-workers' perceived warmth and competence on employees' turnover intentions: The mediating role of job attitudes. *International Journal of Hospitality Management*, 60, 13–22. <https://doi.org/10.1016/j.ijhm.2016.09.008>
- Burton-Jones, A. (2009). Minimizing method bias through programmatic research. *MIS Quarterly*, 33(3), 445–471.
- Byrne, B. M. (2013). *Structural equation modeling with AMOS: Basic concepts, applications, and programming*. Routledge.
- Cain, M. K., Zhang, Z., & Yuan, K. H. (2017). Univariate and multivariate skewness and kurtosis for measuring nonnormality: Prevalence, influence and estimation. *Behavior research methods*, 49(5), 1716-1735.
- Campus, M. I. T., & Adyar, M. (2018). Measuring the effect size of coefficient of determination and predictive relevance of exogenous latent variables on endogenous latent variables through PLS-SEM. *International Journal of Pure and Applied Mathematics*, 119(18), 39-48.
- Cao, X., Yu, L., Liu, Z., Gong, M., & Adeel, L. (2018). Understanding mobile payment users' continuance intention: a trust transfer perspective. *Internet Research*, 28(2), 456-476. <https://doi.org/10.1108/IntR-11-2016-0359>
- Cardador, M. T., Northcraft, G. B., & Whicker, J. (2017). A theory of work gamification: Something old, something new, something borrowed, something cool? *Human Resource Management Review*, 27(2), 353–365. <https://doi.org/10.1016/j.hrmr.2016.09.014>
- Carrión Candel, E., & Colmenero, M. J. R. (2022). Gamification and mobile learning: innovative experiences to motivate and optimise music content within university contexts. *Music Education Research*, 1-16.
- Carter, T. (2008). Customer engagement and behavioral considerations. *Journal of Strategic Marketing*, 16, 21–26
- Castanha, J., Pillai, S. K. B., & Indrawati. (2021). What influences consumer behavior toward information and communication technology applications: A systematic ICT Systems and Sustainability. *Advances in Intelligent Systems and Computing*, 1270. Springer, Singapore. https://doi.org/10.1007/978-981-15-8289-9_30
- Chang, S. J., Van Witteloostuijn, A., & Eden, L. (2010). From the editors: Common method variance in international business research. *Journal of International Business Studies*, 41(2), 178–184.

- Chang, Y. P., & Zhu, D. H. (2012). The role of perceived social capital and flowexperience in building users' continuance intention to social networking sites in China. *Computers in Human Behavior, 28*(3), 995-1001.
- Chang, J. W., & Wei, H. Y. (2016). Exploring engaging gamification mechanics in massive online open courses. *Journal of Educational Technology & Society, 19*(2), 177–203. <https://eric.ed.gov/?id=EJ1097207>.
- Chao, C. M. (2019). Factors determining the behavioral intention to use mobile learning: An application and extension of the UTAUT model. *Frontiers in Psychology, 10*, 1–14. <https://doi.org/10.3389/fpsyg.2019.01652>
- Cheah, J. H., Sarstedt, M., Ringle, C. M., Ramayah, T., & Ting, H. (2018). Convergent validity assessment of formatively measured constructs in PLS-SEM: On using single-item versus multi-item measures in redundancy analyses. *International Journal of Contemporary Hospitality Management, 30*(11), 3192-3210.
- Chen, H. Y., & Boore, J. R. (2010). Translation and back-translation in qualitative nursing research: Methodological review. *Journal of clinical nursing, 19*(1-2), 234-239. <https://doi.org/10.1111/j.1365-2702.2009.02896.x>
- Chen, Z., Huang, Y., & Sternquist, B. (2011). Guanxi practice and Chinese buyer-supplier relationships: The buyer's perspective. *Industrial Marketing Management, 40*(4), 569–580. <https://doi.org/10.1016/j.indmarman.2010.12.013>
- Chen, S. C., Yen, D. C., & Hwang, M. I. (2012). Factors influencing the continuance intention to the usage of Web 2.0: An empirical study. *Computers in Human Behavior, 28*(3), 933-941.
- Chen, J. (2022). Adoption of M-learning apps: A sequential mediation analysis and the moderating role of personal innovativeness in information technology. *Computers in Human Behavior Reports, 8*(1), 100237.
- Cheng, Y. M. (2022). Which quality determinants cause MOOCs continuance intention? A hybrid extending the expectation-confirmation model with learning engagement and information systems success. *Library Hi Tech, (ahead-of-print)*.
- Cheng, S., Liu, L., & Li, K. (2020). Explaining the factors influencing the individuals' continuance intention to seek information on weibo during rainstorm disasters. *International Journal of Environmental Research and Public Health, 17*(17), 1–16. <https://doi.org/10.3390/ijerph17176072>
- Cheng, M., & Yuen, A. H. K. (2018). Student continuance of learning management system use: A longitudinal exploration. *Computers & Education, 120*, 241-253.
- Chicco, D., Warrens, M. J., & Jurman, G. (2021). The coefficient of determination R-squared is more informative than SMAPE, MAE, MAPE, MSE and RMSE in regression analysis evaluation. *PeerJ Computer Science, 7*, e623.

- Child, D. (2006). *The essentials of factor analysis. (3rd ed.)*. New York, NY: Continuum International Publishing Group.
- Childers, T. L., Carr, C. L., Peck, J., & Carson, S. (2001). Hedonic and utilitarian motivations for online retail shopping behaviors. *Journal of Retailing*, 77(4), 511–535. [http://doi.org/10.1016/S0022-4359\(01\)00056-2](http://doi.org/10.1016/S0022-4359(01)00056-2)
- Chin, W.W. (2010) *How to Write Up and Report PLS Analyses*. In. *Esposito Vinzi, V., Chin, W.W., Henseler, J. & Wang, H., (Eds)*. Handbook of Partial Least Squares: Concepts, methods and applications (pp. 655-690). NY: Springer, Berlin, Heidelberg.
- Chin, W. W. (1998). The partial least squares approach to structural equation modeling. *Modern methods for Business Research*, 295(2), 295-336.
- Chin, W. W., & Newsted, P. R. (1999). Structural equation modeling analysis with small samples using partial least squares. *Statistical Strategies for Small Sample Research*, 1(1), 307-341.
- Chiu, S.-M., Kuo, T., Yang, W.-H., & Lu, I.-Y. (2019). Understanding customer experiences and continuance intention in mobile shopping. 4. <http://www.iasas.org/iasas/journals/ijems>
- Chiu, W., Cho, H., & Chi, C. G. (2020). Consumers' continuance intention to use fitness and health apps: an integration of the expectation–confirmation model and investment model. *Information Technology & People*, 34(3), 978-998.
- Chuang, S. H., Lin, S., Chang, T. C., & Kaewmeesri, R. (2017). Behavioral intention of using social networking site: A comparative study of Taiwanese and Thai Facebook users. *International Journal of Technology and Human Interaction*, 13(1), 61–81. <https://doi.org/10.4018/IJTHI.2017010104>
- Chung, E., Subramaniam, G., & Dass, L. C. (2020). Online learning readiness among university students in Malaysia amidst COVID-19. *Asian Journal of University Education*, 16(2), 45-58.
- Clarísó, R., Arnedo Moreno, J., Bañeres Besora, D., Caballé Llobet, S., Conesa, J., & Gañán Jiménez, D. (2017). Gamification as a service for formative assessment e-learning tools. In *1 st Workshop on Gamification and Games for Learning (GamiLearn'17)*. Universidad de La Laguna. https://riull.ull.es/xmlui/bitstream/handle/915/4768/GAMILEARN17_paper_3.pdf?sequence=1
- Cochran, W. G. (1977). *Sampling techniques (3rd ed.)*. New York: John Wiley & Sons.
- Cohen, L. & Holliday, M., (1982). *Statistics for Social Sciences*. Harper & Row, London.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences (2nd ed.)*. New York, NY: Academic Press.
- Cohen, L., Manion, L. & Morrison, K. (2000). *Research Methods in Education. 5th Edition*. Routledge Falmer, London. <http://dx.doi.org/10.4324/9780203224342>

- Cohen, L., Manion, L., & Morrison, K. (2013). *Research methods in education (7th ed.)*. London: Routledge.
- Creswell, J. W. (2018). *Educational research planning conducting and evaluating quantitative and qualitative research (6th ed.)*. Upper Sadle River: Pearson Education Inc.
- Cronbach, L. J. (1971). *Test Validation*. In R. Thorndike (Ed.), *Educational Measurement* (2nd ed., p. 443). Washington DC: American Council on Education.
- D’Aniello, G., De Falco, M., Gaeta, M., & Lepore, M. (2020). A situation-aware learning system based on fuzzy cognitive maps to increase learner motivation and engagement. *Proceedings of IEEE International Conference on Fuzzy Systems*, 1-8. IEEE. <https://doi.org/10.1109/FUZZ48607.2020.9177590>
- Dai, H. M., Teo, T., & Rappa, N. A. (2020). Understanding continuance intention among MOOC participants: The role of habit and MOOC performance. *Computers in Human Behavior*, *112*, 106455. <https://doi.org/10.1016/j.chb.2020.106455>
- Dall’Olmo Riley, F., & De Chernatony, L. (2000) The service brand as relationships builder. *British Journal of Management*, *11*(2), 137-150. <https://doi.org/10.1111/1467-8551.t01-1-00156>
- Dalvi-Esfahani, M., Wai Leong, L., Ibrahim, O., & Nilashi, M. (2020). Explaining students’ continuance intention to use Mobile web 2.0 learning and their perceived learning: An integrated approach. *Journal of Educational Computing Research*, *57*(8), 1956-2005.
- Damberg, S., Schwaiger, M., & Ringle, C. M. (2022). What’s important for relationship management? The mediating roles of relational trust and satisfaction for loyalty of cooperative banks’ customers. *Journal of Marketing Analytics*, *10*(1), 3-18.
- Daneji, A. A., Khambari, M. N. M., & Mohd Ayub, A. F. (2018). Influence of students’ perceived ease of use, perceived usefulness and time spent towards students’ continuance intention using MOOC among public university students. *Proceedings of ICCE International Conference on Computers in Education, Workshop Proceedings*, *115*(Icems 2017), 576–581. <https://doi.org/10.2991/icems-17.2018.50>
- Daneji, A. A., Ayub, A. F. M., & Khambari, M. N. M. (2019). The effects of perceived usefulness, confirmation and satisfaction on continuance intention in using massive open online course (MOOC). *Knowledge Management & E-Learning*, *11*(2), 201–214. <https://doi.org/10.34105/j.kmel.2019.11.010>
- Dash, G., & Paul, J. (2021). CB-SEM vs PLS-SEM methods for research in social sciences and technology forecasting. *Technological Forecasting and Social Change*, *173*, 121092.
- Daud, A., Farida, N., Andriansah, A., & Razak, M. (2018). Impact of customer trust toward loyalty: The mediating role of perceived usefulness and satisfaction. *Journal of Business and Retail Management Research*, *13*(2), 235-242.

- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340. <https://doi.org/10.5962/bhl.title.33621>
- Davis, Fred D, Bagozzi, R. P., & Warshaw, P. R. (1992). Extrinsic and intrinsic motivation to use computers in the workplace. *Journal of Applied Social Psychology*, 22(14), 1111–1132.
- Deci, E. (1971). Effects of externally mediated rewards on intrinsic motivation. *Journal of Personality and Social Psychology*, 18 (1), 105–115.
- De Coninck, K., Hambly, K., Dickinson, J. W., & Passfield, L. (2018). Measuring the morphological characteristics of thoracolumbar fascia in ultrasound images: an inter-rater reliability study. *BMC Musculoskeletal Disorders*, 19(1), 1-6.
- Denden, M., Tlili, A., Essalmi, F., Jemni, M., Chen, N. S., & Burgos, D. (2021). Effects of gender and personality differences on students' perception of game design elements in educational gamification. *International Journal of Human-Computer Studies*, 154, 102674.
- Deng, L., Turner, D. E., Gehling, R., & Prince, B. (2010). User experience, satisfaction, and continual usage intention of IT. *European Journal of Information Systems*, 19(1), 60-75.
- de la Peña, D., Lizcano, D., & Martínez-Álvarez, I. (2021). Learning through play: Gamification model in university-level distance learning. *Entertainment Computing*, 39, 100430. <https://doi.org/10.1016/j.entcom.2021.100430>
- Devisakti, A., & Muftahu, M. (2022). Does online assessments support of students in higher education? The moderating role of IT experience. *The International Journal of Information and Learning Technology*, 39(4), 305-318.
- Devisakti, A., & Ramayah, T. (2021). Sense of belonging and grit in e-learning portal usage in higher education. *Interactive Learning Environments*, 1-15.
- Devisakti, A., & Ramayah, T. (2019). E-Learning Usage Outcomes among University Learners: A Pilot Study. *Journal of Education and e-learning Research*, 6(3), 149-155.
- Diamantopoulos, A., & Winklhofer, H. M. (2001). Index construction with formative indicators: An alternative to scale development. *Journal of Marketing Research*, 38(2), 269-277.
- Diamantopoulos, A., & Siguaw, J. A. (2006). Formative versus reflective indicators in organisational measure development: A comparison and empirical illustration. *British Journal of Management*, 17(4), 263-282.
- Diamantopoulos, A., Riefler, P., & Roth, K. P. (2008). Advancing formative measurement models. *Journal of Business Research*, 61(12), 1203-1218.
- Díaz-Méndez, M., Paredes, M. R., & Saren, M. (2019). Improving society by improving education through service-dominant logic: Reframing the role of students in

- higher education. *Sustainability*, 11(19), 5292.
- Diaz-Mendez, M., & Gummesson, E. (2012). Value co-creation and university teaching quality: Consequences for the European. *Journal of Service Management*, 23, 571–592.
- DiCiccio, T. J., & Efron, B. (1996). Bootstrap confidence intervals. *Statistical Science*, 11(3), 189-228.
- Dimitriadou, S. (2017). Designing and implementing a gamified system based on SDT in the Moodle Learning Platform. In *Proceedings INTED2017, 1*, 3707–3714. <https://doi.org/10.21125/inted.2017.0904>
- Ding, L., Er, E., & Orey, M. (2018). An exploratory study of student engagement in gamified online discussions. *Computers and Education*, 120, 213–226. <https://doi.org/10.1016/j.compedu.2018.02.007>
- Ding, L. (2019). Applying gamifications to asynchronous online discussions: A mixed methods study. *Computers in Human Behavior*, 91, 1-11.
- Dinsmore, J. B., Swani, K., & Dugan, R. G. (2017). To “free” or not to “free”: Trait predictors of mobile app purchasing tendencies. *Psychology & Marketing*. 34(2), 227–44. <https://doi.org/10.1002/mar.20985>
- Doherty, S., Palmer, E., & Strater, L. (2017). Gamification: Current research and applications. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, 61(1), 2096–2099. <https://doi.org/10.1177/1541931213602006>
- Doney, P. M., Cannon, J. P., & Mullen, M. R. (1998). Understanding the influence of national culture on the development of trust. *Academy of Management Review*, 23, 601-620.
- Dorobăț, I., Corbea, A. M. I., & Muntean, M. (2019). Integrating student trust in a conceptual model for assessing learning management system success in higher education: An empirical analysis. *IEEE Access*, 7, 69202-69214.
- Double, K. S., McGrane, J. A., & Hopfenbeck, T. N. (2020). The impact of peer assessment on academic performance: A meta-analysis of control group studies. *Educational Psychology Review*, 32(2), 481–509. <https://doi.org/10.1007/S10648-019-09510-3>
- Dwivedi, Y. K., Rana, N. P., Jeyaraj, A., Clement, M., & Williams, M. D. (2019). Re-examining the unified theory of acceptance and use of technology (UTAUT): Towards a revised theoretical model. *Information Systems Frontiers*, 21(3), 719-734.
- Einig, S. (2013). Supporting students’ learning: The use of formative online assessments. *Accounting Education*, 22(5), 425–444. <https://doi.org/10.1080/09639284.2013.803868>

- Ejdys, J. (2018). Building technology trust in ICT application at a university. *International Journal of Emerging Markets*, 13(5), 980-997.
- Elnagar, A., Alnazzawi, N., Afyouni, I., Shahin, I., Nassif, A., & Salloum, S. (2022). An empirical study of e-learning post-acceptance after the spread of COVID-19. *International Journal of Data and Network Science*, 6(3), 669-682.
- Falk, R. F., & Miller, N. B. (1992). *A primer for soft modelling*. Akron: University of Akron Press.
- Farrell, A. M. (2010). Insufficient discriminant validity: a comment on Bove, Pervan, Beatty, and Shiu (2009). *Journal of Business Research*, 63(3), 324–327.
- Fathema, N., Shannon, D., & Ross, M. (2015). Expanding the Technology Acceptance Model (TAM) to examine faculty use of Learning Management Systems (LMSs) in Higher Education Institutions. *MERLOT Journal of Online Learning and Teaching*, 11(2), 210–232.
- Faqih, K. M. (2022). Factors influencing the behavioral intention to adopt a technological innovation from a developing country context: The case of mobile augmented reality games. *Technology in Society*, 69, 101958.
- Filieri, R., Algezau, S., & McLeay, F. (2015). Why do travelers trust TripAdvisor? Antecedents of trust towards consumer-generated media and its influence on recommendation adoption and word of mouth. *Tourism Management*, 51, 174-185. <https://doi.org/10.1016/j.tourman.2015.05.007>
- Fornell C. & Larcker, D. F (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–50, <https://doi.org/10.1177/002224378101800104>
- Fraenkel, J., Wallen, N., & Hyun, C. (2016). *How to design and evaluate research in education* (9th. ed.). New York: McGraw Hill Companies Inc.
- Franque, F. B., Oliveira, T., & Tam, C. (2022). Continuance intention of mobile payment: TTF model with Trust in an African context. *Information Systems Frontiers*, 1-19.
- Gaonkar, D. S., Khan, D. D., & Manisha, A. S. (2022). Impact of gamification on learning and development. *Journal of Advances in Education and Philosophy*, 6(2), 63-70.
- García-Fernández, J., Fernández-Gavira, J., Sánchez-Oliver, A. J., Gálvez-Ruiz, P., Grimaldi-Puyana, M., & Cepeda-Carrión, G. (2020). Importance-performance matrix analysis (IPMA) to evaluate servicescape fitness consumer by gender and age. *International Journal of Environmental Research and Public Health*, 17(18), 6562.
- Garcia-Sanjuan, F., Jurdi, S., Jaen, J., & Nacher, V. (2018). Evaluating a tactile and a tangible multi-tablet gamified quiz system for collaborative learning in primary education. *Computers & Education*, 123,65–84. https://doi.org/10.1016/j.comp_educ.2018.04.011.

- Garson, G. D. (2016). *Partial least squares: Regression and structural equation models*. Asheboro, NC: *Statistical Associates Publishers*.
- Gay, L. R., Mills, G. E., & Airasian, P. W. (2012). *Educational research: Competencies for analysis and applications* (10th ed.). New York: Prentice Hall.
- Ge, Z. G. (2018). The impact of a forfeit-or-prize gamified teaching on e-learners' learning performance. *Computers & Education, 126*, 143–152. <https://doi.org/10.1016/j.compedu.2018.07.009>.
- Gefen, D., Straub, D., & Boudreau, M. C. (2000). Structural equation modeling and regression: Guidelines for research practice. *Communications of the Association for Information Systems, 4*(1), 7.
- Gefen, D. (2002). Customer loyalty in e-commerce. *Journal of the Association for Information Systems, 3*(1), 27–53. <https://doi.org/10.17705/1jais.00022>
- Gefen, D., Karahanna, E., & Straub, W. D. (2003). Trust and TAM in online shopping: An integrated model. *MIS Quarterly, 27*(1), 51–90.
- Gefen, D. (2004). What makes an ERP implementation relationship worthwhile: Linking trust mechanisms and ERP usefulness. *Journal of Management Information Systems, 21*(1), 263-288.
- Geisser, S. (1975). The predictive sample reuse method with applications. *Journal of the American Statistical Association, 70*(350), 320-328.
- George, D., & Mallery, P. (2003). *SPSS for Windows step by step: A simple guide and reference. 11.0 update* (4th ed.). Boston: Allyn & Bacon.
- Ghandalari, K. (2012). The effect of performance expectancy, effort expectancy, social influence and facilitating conditions on acceptance of e-banking services in Iran: The moderating role of age and gender. *Middle-East Journal of Scientific Research, 12*(6), 801-807. <https://doi.org/10.5829/idosi.mejsr.2012.12.6.2536>
- Goi, M. T., Kalidas, V., & Yunus, N. (2022). Developing and testing a customer value co-creation model of higher education institutions. *Journal of Marketing for Higher Education, 1-25*. <https://doi.org/10.1080/08841241.2022.2076275>
- Göksün, D. O., & Gürsoy, G. (2019). Comparing success and engagement in gamified learning experiences via Kahoot and Quizizz. *Computers and Education, 135*(1), 15–29. <https://doi.org/10.1016/j.compedu.2019.02.015>
- Gold, A., Malhotra, A., & Segars, A. (2001). Knowledge management: An organisational capabilities perspective. *Journal of Management Information Systems, 18*, 185-214.
- Gong, X., Lee, M. K., Liu, Z., & Zheng, X. (2020). Examining the role of tie strength in users' continuance intention of second-generation mobile instant messaging services. *Information Systems Frontiers, 22*, 149-170.

- models using the partial least squares (PLS) approach. In V. E. Vinzi, W. W. Chin, J. Henseler & H. Wang (Eds.), *Handbook of partial least squares* (pp. 691-711). Springer. https://doi.org/10.1007/978-3-540-32827-8_30
- Groening, C., & Binnewies, C. (2019). "Achievement unlocked!" - The impact of digital achievements as a gamification element on motivation and performance. *Computers in Human Behavior, 97*, 151–166. <https://doi.org/10.1016/j.chb.2019.02.026>
- Guner, H., & Acarturk, C. (2020). The use and acceptance of ICT by senior citizens: a comparison of technology acceptance model (TAM) for elderly and young adults. *Universal Access in the Information Society, 19*(2), 311-330.
- Guoyan, S., Khaskheli, A., Raza, S. A., Khan, K. A., & Hakim, F. (2021). Teachers' self-efficacy, mental well-being and continuance commitment of using learning management system during COVID-19 pandemic: a comparative study of Pakistan and Malaysia. *Interactive Learning Environments*, 1-23.
- Gupta, A., Yousaf, A., & Mishra, A. (2020). How pre-adoption expectancies shape post-adoption continuance intentions: An extended expectation-confirmation model. *International Journal of Information Management, 52*(102094). <https://doi.org/10.1016/j.ijinfomgt.2020.102094>
- Gutiérrez-Santiuste, E., Gámiz-Sánchez, V. M., & Gutiérrez-Pérez, J. (2015). MOOC & B-learning: Students' barriers and satisfaction in formal and non-formal learning environments. *Journal of Interactive Online Learning, 13*(3), 88–111.
- Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice, 19*(2), 139-152.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2014). *Multivariate Data Analysis (7th ed.)*. New Jersey: Prentice-Hall.
- Hair, J. F., Sarstedt, M., & Ringle, C. M. (2019). Rethinking some of the rethinking of partial least squares. *European Journal of Marketing, 53*(4), 566-584.
- Hair, J. F., Howard, M. C., & Nitzl, C. (2020). Assessing measurement model quality in PLS-SEM using confirmatory composite analysis. *Journal of Business Research, 109*, 101–110. <https://doi.org/10.1016/j.jbusres.2019.11.069>
- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2021). *A primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)* (3rd ed.). Sage. <https://doi.org/10.1007/978-3-030-80519-7>
- Hair Jr, J. F., Sarstedt, M., Hopkins, L., & Kuppelwieser, V. G. (2014). Partial least squares structural equation modeling (PLS-SEM). *European Business Review, 26*(2), 106-121.
- Hair Jr, J. F., Matthews, L. M., Matthews, R. L., & Sarstedt, M. (2017). PLS-SEM or CB-SEM: Updated guidelines on which method to use. *International Journal of Multivariate Data Analysis, 1*(2), 107-123.

- Hair Jr, J. F., agett, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2021). *Partial Least Squares Structural Equation Modeling (PLS-SEM) Using R: A Workbook*. Springer Nature.
- Hamari, J., Shernoff, D. J., Rowe, E., Coller, B., Asbell-Clarke, J., & Edwards, T. (2016). Challenging games help students learn: An empirical study on engagement, flow and immersion in game-based learning. *Computers in Human Behavior*, *54*, 170–179. <https://doi.org/10.1016/j.chb.2015.07.045>
- Hamid, A. A., Razak, F. Z. A., Bakar, A. A., & Abdullah, W. S. W. (2016). The effects of perceived usefulness and perceived ease of use on continuance intention to use E-Government. *Procedia Economics and Finance*, *35*, 644–649. [https://doi.org/10.1016/s2212-5671\(16\)00079-4](https://doi.org/10.1016/s2212-5671(16)00079-4)
- Hamid, M. A., Bahrudin, I. A., Roslan, R., Kamal, N. A. I., Jofri, M. H., Surip, M., ... & Kasim, N. (2017). Embedding interactive multimedia learning in Data Structure course. *Proceedings of the International University Carnival on E-Learning (IUCEL)*, *1*(1), 41-49.
- Hamidi, H., & Chavoshi, A. (2018). Analysis of the essential factors for the adoption of mobile learning in higher education: A case study of students of the University of Technology. *Telematics and Informatics*, *35*(4), 1053-1070.
- Hmoud, B. I., & Várallyai, L. (2020). Artificial intelligence in human resources information systems: Investigating its trust and adoption determinants. *International Journal of Engineering and Management Sciences*, *5*(1), 749-765.
- Han, M., Wu, J., Wang, Y., & Hong, M. (2018). A model and empirical study on the user's continuance intention in online China brand communities based on customer-perceived benefits. *Journal of Open Innovation: Technology, Market, and Complexity*, *4*(4), 46.
- Han, J., & Conti, D. (2020). The use of UTAUT and post acceptance models to investigate the attitude towards a telepresence robot in an educational setting. *Robotics*, *9*(2), 34. <https://doi.org/10.3390/robotics9020034>
- Hardesty, D. M., & Bearden, W. O. (2004). The use of expert judges in scale development: Implications for improving face validity of measures of unobservable constructs. *Journal of Business Research*, *57*(2), 98-107. [https://doi.org/10.1016/S0148-2963\(01\)00295-8](https://doi.org/10.1016/S0148-2963(01)00295-8)
- Harja, Y. D., Irawan, M. I., & Ambarwati, R. (2019). Measure the significance of learning value and trust factors for online learning technology acceptance in Indonesia. *IPTEK The Journal for Technology and Science*, *31*(2), 188-200.
- Hayashi R, Garcia M, Maddawin A, et al. (2020). *Online Learning in Sri Lankas Higher Education Institutions during the coVId-19 Pandemic*. DOI: 10.22617/BRF200260-2

- Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. *Communication Monographs*, 76(4), 408-420. <https://doi.org/10.1080/03637750903310360>
- Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford Press
- Hayes, A. F., & Scharkow, M. (2013). The relative trustworthiness of inferential tests of the indirect effect in statistical mediation analysis does method really matter? *Psychological Science*, 0956797613480187.
- Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford publications.
- Hennigs, N., Wiedmann, K. P., & Klarmann, C. (2013). Consumer value perception of luxury goods: a cross-cultural and cross-industry comparison. In *Luxury marketing* (pp. 77-99). Gabler Verlag, Wiesbaden.
- Henseler, J., & Fassott, G. (2010). Testing moderating effects in PLS path models: An illustration of available procedures. In *Handbook of partial least squares* (pp. 713-735). Springer, Berlin, Heidelberg.
- Henseler, J., Dijkstra, T. K., Sarstedt, M., Ringle, C. M., Diamantopoulos, A., Straub, D. W., Ketchen, D. J., Hair, J. F., Hult, G. T. M., & Calantone, R. J. (2014). Common Beliefs and Reality About PLS: Comments on Rönkkö and Evermann (2013). *Organisational Research Methods*, 17(2), 182–209. <https://doi.org/10.1177/1094428114526928>
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115-135.
- Henseler, J., Hubona, G., & Ray, P. A. (2016). Using PLS path modeling in new technology research: updated guidelines. *Industrial Management & Data Systems*, 116(1), 2-20.
- Hepola, J., Leppäniemi, M., & Karjaluoto, H. (2020). Is it all about consumer engagement? Explaining continuance intention for utilitarian and hedonic service consumption. *Journal of Retailing and Consumer Services*, 57(102232). <https://doi.org/10.1016/j.jretconser.2020.102232>
- Hernandez, B., Montaner, T., Sese, F. J., & Urquizu, P. (2011). The role of social motivations in e-learning: How do they affect usage and success of ICT interactive tools? *Computers in Human Behavior*, 27(6), 2224e2232. <http://dx.doi.org/10.1016/j.chb.2011.07.001>.
- Hew, J. J., Leong, L. Y., Tan, G. W. H., Lee, V. H., & Ooi, K. B. (2018). Mobile social tourism shopping: A dual-stage analysis of a multi-mediation model. *Tourism Management*, 66, 121-139.
- Higgins, J. P. (2016). Smartphone applications for patients' health and fitness. *The American Journal of Medicine*, 129(1), 11-19.

- Hollebeek, L. D. (2011a). Demystifying customer brand engagement: Exploring the loyalty nexus. *Journal of Marketing Management*, 27, 7–8, 785–807.
- Hollebeek, L. D. (2011b). Exploring customer brand engagement. *Journal of Strategic Marketing*, 19(7), 555–573.
- Hollebeek, L. D., Glynn, M. S., & Brodie, R. J. (2014). Consumer brand engagement in social media: Conceptualisation, scale development and validation. *Journal of Interactive Marketing*, 28(2), 149–165. <https://doi.org/10.1016/j.intmar.2013.12.002>
- Hollebeek, L. D., Srivastava, R. K., & Chen, T. (2019). SD logic–informed customer engagement: integrative framework, revised fundamental propositions, and application to CRM. *Journal of the Academy of Marketing Science*, 47(1), 161–185.
- Hollebeek, L. D., & Andreassen, T. W. (2018). The S-D logic-informed “hamburger” model of service innovation and its implications for engagement and value. *Journal of Services Marketing*, 32(1), 1–7.
- Hong, P. T. T., & Hai, T. V. (2018). Customer satisfaction in mobile service quality: Evidence from Hanoi and Ho Chi Minh City’s officers. *Journal of Science*, 34(5E), 63–80. <https://doi.org/10.25073/2588-1108/vnueab.4182>
- Hossain, M. N., Talukder, M. S., Khayer, A., & Bao, Y. (2020). Investigating the factors driving adult learners' continuous intention to use M-learning application: A fuzzy-set analysis. *Journal of Research in Innovative Teaching & Learning*, 14(2), 245–270.
- Hsu, H. H., Chang, C. C., & Lin, T. H. (2013). An empirical study of users' continuance intention and word of mouth toward SNA (Social Network App). *Proceedings of the 2013 International Conference on Technology Innovation and Industrial Management*, 174–183. ToKnowPress.
- Huang, C. K., Chen, C. D., & Liu, Y. T. (2019). To stay or not to stay? Discontinuance intention of gamification apps. *Information Technology & People*, 32(6), 1423–1445. <https://doi.org/10.1108/ITP-08-2017-0271>
- Huang, R. T., Hsiao, C. H., Tang, T. W., & Lien, T. C. (2014). Exploring the moderating role of perceived flexibility advantages in mobile learning continuance intention (MLCI). *International Review of Research in Open and Distributed Learning*, 15(3), 140–157.
- Huang, B., & Hew, K. F. (2018). Implementing a theory-driven gamification model in higher education flipped courses: Effects on out-of-class activity completion and quality of artifacts. *Computers & Education*, 125, 254–272.
- Hunicke, R., LeBlanc, M., & Zubek, R. (2004). MDA: A formal approach to game design and game research. *Proceedings of the AAAI Workshop on Challenges in Game AI*, (Vol. 4, No. 1, p. 1722).
- Ibrahim, E. N. M., & Walid, N. (2014). Trust contributing factors in m-learning

- technology. *Procedia - Social and Behavioral Sciences*, 129, 554–561. <https://doi.org/10.1016/j.sbspro.2014.03.713>
- Idowu, A., Nat, M., & Kissi, P. S. (2020). Student perception of usefulness and ease using Kahoot, a free web-based tool in a tertiary education setting. *Acta Scientiarum Technology*, 43, e47347-e47347. <https://doi.org/10.4025/actascitechnol.v43i1.47347>
- Indrawati & Putri, D. A. (2018). Analysing factors influencing continuance intention of E-payment adoption using modified UTAUT 2 model: (A case study of Go-Pay from Indonesia). *Proceedings of 2018 6th International Conference on Information and Communication Technology, ICoICT 2018*, 167–173.
- Indrawati, Khairunnisa, R., & Muthaiyah, S. (2021). Understanding factors influencing continuance intention of users toward community-based traffic and navigation application in Indonesia. *Turkish Journal of Computer and Mathematics Education*, 12(12), 3464-3476.
- Ishaq, K., Zin, N. A. M., Rosdi, F., Jehanghir, M., Ishaq, S., & Abid, A. (2021). Mobile-assisted and gamification-based language learning: A systematic literature review. *PeerJ Computer Science*, 7, e496.
- Islam, A. N. & Azad, N. (2015). Satisfaction and continuance with a Learning Management System: Comparing perceptions of educators and students. *The International Journal of Information and Learning Technology*, 32 (2), 109–23.
- Ismail, M. A.-A., & Mohammad, J. A.-M. (2017). Kahoot: A promising tool for formative assessment in medical education. *Education in Medicine Journal*, 9(2), 19–26. <https://doi.org/10.21315/eimj2017.9.2.2>
- Ismail, M. A. A., Ahmad, A., Mohammad, J. A. M., Fakri, N. M. R. M., Nor, M. Z. M., & Pa, M. N. M. (2019). Using Kahoot! as a formative assessment tool in medical education: A phenomenological study. *BMC Medical Education*, 19(1), 1–8. <https://doi.org/10.1186/s12909-019-1658-z>
- Ismail, S. N. S., Rangga, J. U., Rasdi, I., Abd Rahman, U. R., & Samah, M. A. A. (2018). Mobile apps application to improve safety and health knowledge, attitude and practice among university students. *Malaysian Journal of Medicine and Health Sciences*, 14(101).
- Israel, G. D. (1992). Determining sample size. Retrieved from http://www.gjimt.ac.in/web/wp-content/uploads/2017/10/2_Glenn-D.-Israel_Determining-Sample-Size.pdf
- Jaguš, T., Botički, I., & So, H. J. (2018). Examining competitive, collaborative and adaptive gamification in young learners' math learning. *Computers & Education*, 125, 444–457. <https://doi.org/10.1016/j.compedu.2018.06.022>
- Jakobsen, M., & Jensen, R. (2015). Common method bias in public management studies. *International Public Management Journal*, 18(1), 3-30.

- Jarvis, C. B., MacKenzie, S. B., & Podsakoff, P. M. (2003). A critical review of construct indicators and measurement model misspecification in marketing and consumer research. *Journal of Consumer Research*, *30*(2), 199-218.
- Jarvis, W., Halvorson, W., Sadeque, S., & Johnston, S. (2014). A large class engagement (LCE) model based on Service-Dominant Logic (SDL) and flipped classrooms. *Education Research and Perspectives (Online)*, *41*, 1.
- Jia, Y., Liu, Y., Yu, X., & Volda, S. (2017). Designing leaderboards for gamification. *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems - CHI '17, USA*, 1949–1960. <https://doi.org/10.1145/3025453.3025826>
- Jo, J., Yi, E., Yang, Y., & Choi, S. H. (2021). Game-based assessment tool using convergence of gamification and motivation theory in intelligent tutoring system. *Personal and Ubiquitous Computing*. <https://doi.org/10.1007/s00779-021-01523-6>
- Johanson, G. A., & Brooks, G. P. (2009). Initial scale development: Sample size for pilot studies. *Educational and Psychological Measurement*, *70*(3), 394–400. <https://doi:10.1177/0013164409355692>
- Johnson, H., Cuellar Mejia, M., & Cook, K. (2020). *COVID-19 shutdown forces colleges to ramp up online learning*. Retrieved 24 April 2022 from <https://www.ppic.org/blog/covid-19-shutdown-forces-colleges-to-ramp-up-online-learning>.
- Joo, Y. J., Park, S., & Shin, E. K. (2017). Students' expectation, satisfaction, and continuance intention to use digital textbooks. *Computers in Human Behavior*, *69*, 83–90. <https://doi.org/10.1016/j.chb.2016.12.025>
- Joo, Y. J., So, H-J., & Kim, N. H. (2018). Examination of relationships among students' self-determination, technology acceptance, satisfaction, and continuance intention to use K-MOOCs. *Computers & Education*, *122*(1), 260–272. <https://doi.org/10.1016/j.compedu.2018.01.003>
- Jurgelaitis, M., Čeponienė, L., Čeponis, J., & Drungilas, V. (2019). Implementing gamification in a university-level UML modeling course: A case study. *Computer Applications in Engineering Education*, *27*(2), 332–343. <https://doi.org/10.1002/cae.22077>
- Kamarozaman, Z., & Razak, F. Z. A. (2021). The role of facilitating condition in enhancing user's continuance intention. *Journal of Physics: Conference Series*, *1793*(1), 012022. doi:10.1088/1742-6596/1793/1/012022
- Kanah, Harisal, & Budiarta, I. P. (2021). The role of the Quizizz application in making online quiz in Japanese courses for students of hospitality program. *Proceedings of International Conference on Applied Science and Technology on Social Science (ICAST-SS 2020)*, 38-42. Atlantis Press.
- Kang, J.-W., & Namkung, Y. (2019). The role of personalization on continuance intention in food service mobile apps. *International Journal of Contemporary Hospitality Management*, *31*(2), 734-752. doi:10.1108/IJCHM-12-2017-0783

- Kao, D., & Harrell, D. F. (2018). The effects of badges and avatar identification on play and making in educational games. *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems*, 1-19.
- Kapp, K. (2013). *The gamification of learning and instruction fieldbook: Ideas into practice*. N.Y.: Wiley.
- Kapp, K. M. (2016). Gamification designs for instruction. In *Instructional-Design Theories and Models, Volume IV* (pp. 351-384). Routledge.
- Karahanna, E., W. Straub, D., & L. Chervany, N. (1999). Information technology adoption across time: A cross-sectional comparison of pre-adoption and post-adoption beliefs. *MIS Quarterly*, 23(2), 183–213. <http://www.jstor.org/stable/249751>.
- Karahasanović, A., & Culén, A. L. (2022). Project-based learning in human–computer interaction: A service-dominant logic approach. *Interactive Technology and Smart Education*. <https://doi.org/10.1108/ITSE-10-2021-0178>
- Karahasanović, A., & Culén, A. L. (2021). A Service-Dominant Logic based framework for teaching innovation in HCI. *Proceedings of the International Conferences on Interfaces and Human-Computer Interaction and Game and Entertainment Technologies (IHCI 2021)*, 17-25. <http://urn.nb.no/URN:NBN:no-91980>
- Karim, R. A., Adnan, A. H. M., Salim, M. S. A. M., Kamarudin, S., & Zaidi, A. (2020). Education innovations through mobile learning technologies for the Industry 4.0 readiness of tertiary students in Malaysia. *Proceedings of IOP Conference Series: Materials Science and Engineering*, 917(1), 012022. IOP Publishing.
- Khan, A. M., Patra, S., Vaney, N., Mehndiratta, M., & Chauhan, R. (2021). Rapid transition to online practical classes in preclinical subjects during COVID-19: Experience from a medical college in North India. *Medical Journal Armed Forces India*, 77, S161–S167. <https://doi.org/10.1016/j.mjafi.2020.12.030>
- Khan, M. R., Rana, S., & Hosen, M. I. (2022a). Impact of trustworthiness on the usage of m-banking apps: A study on Bangladeshi consumers. *Business Perspectives and Research*, 10(2), 234-250.
- Khan, R. U., Salamzadeh, Y., Iqbal, Q., & Yang, S. (2022b). The impact of customer relationship management and company reputation on customer loyalty: The mediating role of customer satisfaction. *Journal of Relationship Marketing*, 21(1), 1-26.
- Khan, I., Hollebeek, L. D., Fatma, M., Islam, J. U., Rather, R. A., Shahid, S., & Sigurdsson, V. (2023). Mobile app vs. desktop browser platforms: The relationships among customer engagement, experience, relationship quality and loyalty intention. *Journal of Marketing Management*, 39(3-4), 275-297.
- Khayer, A., Talukder, M. S., Bao, Y., & Hossain, M. N. (2023). Application-based mobile payment systems: continuance intention and intention to recommend. *International Journal of Mobile Communications*, 21(1), 19-53.

- Kim, B. (2011). Understanding antecedents of continuance intention in social-networking services. *Cyberpsychology, Behavior, and Social Networking*, *14*(4), 199–205. <https://doi.org/10.1089/cyber.2010.0009>
- Kim, S. H., Bae, J. H., & Jeon, H. M. (2019). Continuous intention on accommodation apps: Integrated value-based adoption and expectation–confirmation model analysis. *Sustainability*, *11*(6), 1578.
- Kim, B., & Kim, D. (2020). Exploring the key antecedents influencing consumer’s continuance intention toward bike-sharing services: Focus on China. *International Journal of Environmental Research and Public Health*, *17*(12), 1–14. <https://doi.org/10.3390/ijerph17124556>
- Kim, K.-H., Kim, K.-J., Lee, D.-H., & Kim, M.-G. (2019). Identification of critical quality dimensions for continuance intention in mHealth services: Case study of onecare service. *International Journal of Information Management*, *46*, 187–197. <https://doi.org/doi:10.1016/j.ijinfomgt.2018.12.008>
- Kim, S. S., & Malhotra, N. K. (2005). A longitudinal model of continued IS use: An integrative view of four mechanisms underlying post-adoption phenomena. *Management Science*, *51*(5), 741–755.
- Kim, J., & Nam, C. (2019). Analysing continuance intention of recommendation algorithms. *Proceedings of 30th European Regional ITS Conference, Helsinki 2019* (205190). International Telecommunications Society (ITS).
- Kline, R. B. (2015). *Principles and practice of structural equation modelling* (4th ed.). New York: Guilford Publications.
- Kock, N., & Hadaya, P. (2018). Minimum sample size estimation in PLS- SEM: The inverse square root and gamma-exponential methods. *Information Systems Journal*, *28*(1), 227–261. doi:10.1111/isj.12131
- Kock, N., & Lynn, G. (2012). Lateral collinearity and misleading results in variance-based SEM: An illustration and recommendations. *Journal of the Association for Information Systems*, *13*(7).
- Kock, N., & Gaskins, L. (2014). The mediating role of voice and accountability in the relationship between Internet diffusion and government corruption in Latin America and Sub-Saharan Africa. *Information Technology for Development*, *20*(1), 23–43.
- Koivisto, J., & Hamari, J. (2019). The rise of motivational information systems: A review of gamification research. *International Journal of Information Management*, *45*, 191–210. <https://doi.org/doi:10.1016/j.ijinfomgt.2018.10.013>
- Krouska, A., Troussas, C., & Sgouropoulou, C. (2022). Mobile game-based learning as a solution in COVID-19 era: Modeling the pedagogical affordance and student interactions. *Education and Information Technologies*, *27*(1), 229–241.
- Kumar, R. R., Israel, D., & Malik, G. (2018). Explaining customer’s continuance intention to use mobile banking apps with an integrative perspective of ECT

and Self-Determination Theory. *Pacific Asia Journal of the Association for Information Systems*, 10(2), 79–112.

- Kumar Basak, S., Wotto, M., & Belanger, P. (2018). E-learning, M-learning and D-learning: Conceptual definition and comparative analysis. *E-learning and Digital Media*, 15(4), 191-216.
- Kumar, J. A., Rajamanickam, S., & Osman, S. (2020). Exploring the use of mobile apps for learning: A case study on final year engineering undergraduates in Malaysia. *ASM Science Journal*, 13(3), 63-67.
- Kumar, K. A., & Natarajan, S. (2020). An extension of the Expectation Confirmation Model (ECM) to study continuance behavior in using e-Health services. *Innovative Marketing*, 16(2), 15.
- Kusuma, G. P., Wigati, E. K., Utomo, Y., & Suryapranata, L. K. P. (2018). Analysis of gamification models in education using MDA framework. *Procedia Computer Science*, 135, 385-392.
- Kyewski, E., & Krämer, N. C. (2018). To gamify or not to gamify? An experimental field study of the influence of badges on motivation, activity, and performance in an online learning course. *Computers and Education*, 118, 25–37. <https://doi.org/10.1016/j.compedu.2017.11.006>
- Lachowicz, M. J., Preacher, K. J., & Kelley, K. (2018). A novel measure of effect size for mediation analysis. *Psychological Methods*, 23(2), 244.
- Lai, T. L., (2004). Service quality and perceived value's impact on satisfaction, intention and usage of short message service (SMS). *Information System Frontier*, 6, 353–368.
- Landers, R. N. (2014). Developing a theory of gamified learning: Linking serious games and gamification of learning. *Simulation and Gaming*, 45(6), 752–768. <https://doi.org/10.1177/1046878114563660>
- Landers, R. N., Bauer, K. N., & Callan, R. C. (2017). Gamification of task performance with leaderboards: A goal setting experiment. *Computers in Human Behavior*, 71, 508–515. <https://doi.org/10.1016/j.chb.2015.08.008>
- Landers, R. N., Collmus, A. B., & Williams, H. (2019). The greatest battle is within ourselves: An experiment on the effects of competition alone on task performance. *International Journal of Human-Computer Studies*, 127, 51-61.
- Lange, R. T. (2011). *Inter-rater reliability*. Encyclopedia of Clinical Neuropsychology. Springer, New York, NY. https://doi.org/10.1007/978-0-387-79948-3_1203
- Leclercq, T., Poncin, I., Hammedi, W., Kullak, A., & Hollebeek, L. D. (2020). When gamification backfires: The impact of perceived justice on online community contributions. *Journal of Marketing Management*, 36(5-6), 550-577.
- Leckie, C., Nyadzayo, M. W., & Johnson, L. W. (2016). Antecedents of consumer brand engagement and brand loyalty. *Journal of Marketing Management*, 32(5–6),

- 558–578. <https://doi.org/10.1080/0267257X.2015.1131735>
- Lee, M. C. (2010). Explaining and predicting users' continuance intention toward e-learning: An extension of the expectation-confirmation model. *Computers and Education, 54*(2), 506–516. <https://doi.org/10.1016/j.compedu.2009.09.002>
- Lee, S., & Quan, C. F. (2013). Factors affecting Chinese Ubiquitous Game Service usage intention. *International Journal of Mobile Communications, 11*(2), 194–212. <https://doi.org/10.1504/IJMC.2013.052641>
- Lee, Y. P., Tsai, H. Y., & Ruangkanjanases, A. (2020). The determinants for food safety push notifications on continuance intention in an e-appointment system for public health medical services: The perspectives of utaut and information system quality. *International Journal of Environmental Research and Public Health, 17*(21), 8287.
- Leech, N. L., Barrett, K. C., & Morgan, G. A. (2008). *SPSS for intermediate Statistics: Use and interpretation*. New York: Routledge.
- Leslie, H. J. (2019). Trifecta of student engagement. *Journal of Research in Innovative Teaching & Learning, 13*(2), 149-173. <https://doi.org/10.1108/jrit-10-2018-0024>
- Lestari, P., & Nugraha, J. (2021). Analysis of using quizizz to the students of grade xii SMK N 1 Surabaya using the technology acceptance model. *Jurnal TAM (Technology Acceptance Model), 12*(2), 123-134.
- Liao, C., Chen, J. L., & Yen, D. C. (2007). Theory of planning behavior (TPB) and customer satisfaction in the continued use of e-service: An integrated model. *Computers in Human Behavior, 23*(6), 2804–2822. <https://doi.org/10.1016/j.chb.2006.05.006>
- Lim, T. M., & Yunus, M. M. (2021). Teachers' perception towards the use of Quizizz in the teaching and learning of English: A systematic review. *Sustainability, 13*(11), 6436. <https://doi.org/10.3390/su13116436>
- Lim, W. N. (2017). Improving student engagement in higher education through mobile-based interactive teaching model using socrative. *Proceedings of IEEE Global Engineering Education Conference, EDUCON, 404–412*. <https://doi.org/10.1109/EDUCON.2017.7942879>
- Lim, F. V., & Toh, W. (2022). Considerations on the curation of educational apps for digital play and learning. *Contemporary Educational Technology, 14*(3), ep366.
- Lim, X. J., Cheah, J. H., Ng, S. I., Basha, N. K., & Soutar, G. (2021). The effects of anthropomorphism presence and the marketing mix have on retail app continuance use intention. *Technological Forecasting and Social Change, 168*, 120763.
- Limayem, M., Hirt, S. G., & Cheung, C. M. (2007). How habit limits the predictive power of intention: The case of information systems continuance. *MIS*

Quarterly, 705-737.

- Lin, H.-H., Wang, Y.-S., & Chou, C.-H. (2012). Hedonic and utilitarian motivations for physical game systems use behavior. *International Journal of Human-Computer Interaction*, 28(7), 445–455. <https://doi.org/10.1080/10447318.2011.618097>
- Lin, D. T. A., Ganapathy, M., & Kaur, M. (2018). Kahoot! It: Gamification in higher education. *Pertanika Journal of Social Sciences and Humanities*, 26(1), 565–582.
- Li, Y., & Zhao, M. (2021). A study on the influencing factors of continued intention to use MOOCs: UTAUT model and CCC moderating effect. *Frontiers in Psychology*, 12.
- Liu, N., & Pu, Q. (2020). Factors influencing learners' continuance intention toward one-to-one online learning. *Interactive Learning Environments*, 1–22. <https://doi.org/doi:10.1080/10494820.2020.1857785>
- Liu, D., Santhanam, R., & Webster, J. (2017). Toward meaningful engagement: A framework for design and research of gamified information systems. *MIS Quarterly*, 41, 1011-1034.
- Liu, H., Shao, M., Liu, X., & Zhao, L. (2021). Exploring the influential factors on readers' continuance intentions of E-Book APPs: personalization, usefulness, playfulness, and satisfaction. *Frontiers in psychology*, 12, 262. <https://doi.org/10.3389/fpsyg.2021.640110>
- Lo, C. K., & Hew, K. F. (2020). A comparison of flipped learning with gamification, traditional learning, and online independent study: The effects on students' mathematics achievement and cognitive engagement. *Interactive Learning Environments*, 28(4), 464–481. <https://doi.org/10.1080/10494820.2018.1541910>
- Localytics (2018). *Apps retention improves – apps used only once declines to 20%*. Retrieved 24 December 2020 from <http://info.localytics.com/blog/app-retention-improves>
- Lopez, C. E., & Tucker, C. S. (2019). The effects of player type on performance: A gamification case study. *Computers in Human Behavior*, 91, 333–345. <https://doi.org/10.1016/j.chb.2018.10.005>
- Lu, H. P., & Ho, H. C. (2020). Exploring the impact of gamification on users' engagement for sustainable development: A case study in brand applications. *Sustainability (Switzerland)*, 12(10). <https://doi.org/10.3390/su12104169>
- Lusch, R. F., & Nambisan, S. (2015). Service Innovation: A Service-Dominant logic perspective. *MIS Quarterly*, 39, 155-175.
- Lutfi, A. (2022). Factors influencing the continuance intention to use accounting information system in Jordanian SMEs from the perspectives of UTAUT: Top management support and self-efficacy as predictor factors. *Economies*, 10(4),

- Manzano-León, A., Camacho-Lazarraga, P., Guerrero, M. A., Guerrero-Puerta, L., Aguilar-Parra, J. M., Trigueros, R., & Alias, A. (2021). Between level up and game over: A systematic literature review of gamification in education. *Sustainability*, *13*(4), 2247.
- Maqableh, M., Hmoud, H. Y., & Jaradat, M. (2021). Integrating an information systems success model with perceived privacy, perceived security, and trust: The moderating role of Facebook addiction. *Heliyon*, *7*(9), e07899.
- Marchewka, J. T., Liu, C., & Kostiwa, K. (2007). An application of the UTAUT model for understanding student perceptions using course management software. *Communication IIMA* *7*, 93–104. Available online at: <http://citeseerx.ist.psu.edu/viewdoc/download;jsessionid=B6135B8F5BD7CE7A272CC590ADF7B44?doi=10.1.1.457.8274&rep=rep1&type=pdf> [Google Scholar]
- Marczyk, K., DeMatte, O., & Festinger, D. (2005). *Essentials of research design and methodology*. NJ: John Willey and Sons Inc.
- Mardia, K. V. (1970). Measures of Multivariate Skewness and Kurtosis with Applications. *Biometrika*, *57*(3), 519–530. <https://doi.org/10.2307/2334770>
- Marsh, H. W., & Hocevar, D. (1988). A new, more powerful approach to multitrait - multimethod analyses: Application of second-order confirmatory factor analysis. *Journal of Applied Psychology*, *73*(1), 107-117.
- Martinez, M. G. (2017). Inspiring crowdsourcing communities to create novel solutions: Competition design and the mediating role of trust. *Technological Forecasting and Social Change*, *117*(1), 296-304.
- Masrek, M. N., & Shahibi, M. S. (2019). Mobile learning adoption: The case of Malaysian university students. *International Journal for e-Learning Security (IJeLS)*, *8*(1), 574-564.
- Masri, N. W., You, J. J., Ruangkanjanases, A., Chen, S. C., & Pan, C. I. (2020). Assessing the effects of information system quality and relationship quality on continuance intention in e-tourism. *International Journal of Environmental Research and Public Health*, *17*(1), 174. <https://doi.org/10.3390/ijerph17010174>
- May, B. M. (2022). Effects of spaced, repeated retrieval practice and test-potentiated learning on mathematical knowledge and reasoning. *International Journal of Mathematical Education in Science and Technology*, *53*(1), 92-107.
- Mayer, R. C., & Davis, J. H. (1999). The effect of the performance appraisal system on trust in management: A field quasi-experiment. *Journal of Applied Psychology*. *84*(1), 123-136.
- Mayer, R. C., Davis J. H., & Schoorman, F. D. (1995). An integrative model of organisational trust. *Academy of Management Review*, *20*(3), 709-734.

- McColl-Kennedy, J. R., Vargo, S. L., Dagger, T. S., Sweeney, J. C., & Van Kasteren, Y. (2012). Health care customer value cocreation practice styles. *Journal of Service Research, 15*(4), 370-389.
- McGonigal, J. (2011). *Reality is broken: Why games make us better and how they can change the world*. Penguin Press.
- McIntosh, A. R., & Gonzalez-Lima, F. (1994). Structural equation modeling and its application to network analysis in functional brain imaging. *Human Brain Mapping, 2*(1-2), 2-22.
- McNeish, D. (2018). Thanks coefficient alpha, we'll take it from here. *Psychological Methods, 23*(3), 412.
- Mcknight, D. H., Carter, M., Thatcher, J. B., & Clay, P. F. (2011). Trust in a specific technology: An investigation of its components and measures. *ACM Transactions on Management Information Systems, 2*(2). <https://doi.org/10.1145/1985347.1985353>
- MCMC (2020). 2019 Universal Service Annual Report. Retrieved 24 September 2023 from <https://www.mcmc.gov.my/skmmgovmy/media/General/pdf/MCMC-USP2019AR-ENG.pdf>
- MEB (2015). Malaysian Education Blueprint (Higher Education). Retrieved 24 September 2023 https://www.academia.edu/38153132/_Executive_Summary_PPPM_2015_2025_Higher_Education_
- Meng, Z., & Li, R. (2023). Understanding Chinese teachers' informal online learning continuance in a mobile learning community: an intrinsic–extrinsic motivation perspective. *Journal of Computing in Higher Education, 1-23*.
- Md Yunus, M., Ang, W. S., & Hashim, H. (2021). Factors affecting teaching English as a Second Language (TESL) postgraduate students' behavioural intention for online learning during the COVID-19 pandemic. *Sustainability, 13*(6), 3524.
- Meena, R., & Sarabhai, S. (2023). Extrinsic and intrinsic motivators for usage continuance of hedonic mobile apps. *Journal of Retailing and Consumer Services, 71*(1), 103228.
- Mesghi, D., Ugnich, E. & Ponomareva, S. (2018). E-learning in higher inclusive education: Needs, opportunities and limitations. *International Journal of Educational Management, 33*(3), 424-437.
- Meyers, L. S., Gamst, G., & Guarino, A. J. (2016). *Applied multivariate research: Design and interpretation*. Sage Publications.
- Mishra, P., Pandey, C. M., Singh, U., Gupta, A., Sahu, C., & Keshri, A. (2019). Descriptive statistics and normality tests for statistical data. *Annals of Cardiacanaesthesia, 22*(1), 67–72. https://doi.org/10.4103/aca.ACA_157_18

- Missaoui, S., & Maalel, A. (2021). Student's profile modeling in an adaptive gamified learning environment. *Education and Information Technologies*, 26(5), 6367-6381.
- Mheidly, N., Fares, M. Y., & Fares, J. (2020). Coping with stress and burnout associated with telecommunication and online learning. *Frontiers in Public Health*, 672.
- Mkumbo, P. J., Ukpabi, D. C., & Karjaluoto, H. (2020). Adapting and validating scale of customer engagement in online travel communities. *European Journal of Tourism Research*, 25(2501).
- MOE Publication (2019). e-Learning Guidelines for Malaysian HEI. Retrieved 24 September 2023 from <https://www.moe.gov.my/en/penerbitan1/1596-e-learning-guidelines-for-malaysian-heis-1/file>
- Mohamad, Z. B., Kamarozaman, Z. B., Kassim, M. F. R. B., & Razak, F. Z. A. (2021). Does social influence affect continuance intention to use e-campus? A study in Malaysian private higher institution. *Proceedings of Journal of Physics: Conference Series*, 1793(1), 012008. IOP Publishing.
- Mohd Adam, A. F., Mohd Radin, N. N., Hashim, N., & Sulaiman, M. S. (2021). Diploma students' challenges and best practices in ODL at UiTM Terengganu: A pilot study. *Malaysian Online Journal of Education (ATTARBAWIY)*, 5(1), 32 - 45.
- Molinillo, S., Muñoz-Leiva, F., & Pérez-García, F. (2018). The effects of human-game interaction, network externalities, and motivations on players' use of mobile casual games. *Industrial Management & Data Systems*, 118(9), 1766– 1786. <https://doi.org/10.1108/IMDS-11-2017-0544>
- Montazemi, A. R., & Qahri-Saremi, H. (2015). Factors affecting adoption of online banking: A meta-analytic structural equation modeling study. *Information and Management*, 52(2), 210–226. <https://doi.org/10.1016/j.im.2014.11.002>
- Morera, O. F., & Stokes, S. M. (2016). Coefficient α as a measure of test score reliability: Review of 3 popular misconceptions. *American Journal of Public Health*, 106(3), 458-461.
- Mtebe, J., & Gallagher, M. (2022). Continued usage intentions of digital technologies post-pandemic through the Expectation-Confirmation Model: the case of a Tanzanian University. *International Journal of Education and Development using Information and Communication Technology*, 18(1), 125-145.
- Muqtadiroh, F. A., Herdiyanti, A., Wicaksono, I., & Usagawa, T. (2019). Analysis of factors affecting continuance intention of e-learning adoption in lecturers' perspectives. *Proceedings of IOP Conference Series: Materials Science and Engineering*, 588(1). <https://doi.org/10.1088/1757-899X/588/1/012022>
- Muslimin, M. S., Nordin, N. M., Mansor, A. Z., & Yunus, M. M. (2017). The design and development of MobiEko: A mobile educational app for microeconomics module. *Malaysian Journal of Learning and Instruction*, 1, 221-255.

- Nabavi, A., Taghavi-Fard, M. T., Hanafizadeh, P., & Taghva, M. R. (2016). Information Technology Continuance Intention: A Systematic Literature Review. *International Journal of E-Business Research*, 12(1), 58–95. <https://doi.org/10.4018/IJEBR.2016010104>
- Nadeem, N., & Falig, H. A. (2020). Kahoot! Quizzes: A formative assessment tool to promote students' self-regulated learning skills. *Journal of Applied Linguistics and Language Research*, 7, 1-20.
- Nair, P. (2022). Determinants of Satisfaction and Deep Structure Usage of Post-acceptance Learning Management Systems by Malaysian Higher Education Lecturers. *International Journal of Information and Education Technology*, 12(7).
- Nguyen, L. T. K., Lin, T. M., & Lam, H. P. (2021). The role of co-creating value and its outcomes in higher education marketing. *Sustainability*, 13(12), 6724.
- Nicol, D., & Milligan, C. (2006). Rethinking technology-supported assessment practices in relation to the seven principles of good feedback practice. *Innovative Assessment in Higher Education*, pp. 84–98. Routledge. <https://doi.org/10.4324/9780203969670>
- Nicolaou, A. I., & McKnight, D. H. (2006). Perceived information quality in data exchanges: Effects on risk, trust, and intention to use. *Information Systems Research*, 17(4), 332–351. <https://doi.org/10.1287/isre.1060.0103>
- Nikou, S. A., & Economides, A. A. (2017). Mobile-based assessment: Investigating the factors that influence behavioral intention to use. *Computers & Education*, 109, 56-73.
- Nikou, S. A., & Economides, A. A. (2018). Mobile-based assessment: A literature review of publications in major referred journals from 2009 to 2018. *Computers & Education*, 125, 101–119.
- Niro, R. H. A., Daracan, V. S.L., Pizarro, A. J.D., & German, J.D. (2021). The use of gamification tools to boost students' engagement and motivation. [Paper presentation]. *Proceedings of the Second Asia Pacific International Conference on Industrial Engineering and Operations Management 2021*, Surakarta, Indonesia. <http://ieomsociety.org/proceedings/2021indonesia/331.pdf>
- Nojen, E. A. (2021). The effectiveness of interactive learning based on Quizziz applications among students of tourism and hospitality marketing. *Jurnal Asian Pendidikan*, 1, 22–27.
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychological theory*. New York, NY: MacGraw-Hil.
- Nyadzayo, M. W., Leckie, C., & Johnson, L. W. (2020). The impact of relational drivers on customer brand engagement and brand outcomes. *Journal of Brand Management*, 27(5), 561–578. <https://doi.org/10.1057/s41262-020-00198-3>

- Offredy, M., & Vickers, P. (2013). *Developing a healthcare research proposal: An interactive student guide*. Oxford: Wiley-Blackwell.
- Oghuma, A. P., Libaque-Saenz, C. F., Wong, S. F., & Chang, Y. (2016). An expectation-confirmation model of continuance intention to use mobile instant messaging. *Telematics and Informatics*, 33(1), 34–47. <https://doi.org/10.1016/j.tele.2015.05.006>
- Okumus, B., Ali, F., Bilgihan, A., & Ozturk, A. B. (2018). Psychological factors influencing customers' acceptance of smartphone diet apps when ordering food at restaurants. *International Journal of Hospitality Management*, 72, 67–77. <https://doi.org/10.1016/j.ijhm.2018.01.001>
- Oliver, R. L. (1980). A cognitive model of the antecedents and consequences of satisfaction decisions. *Journal of Marketing Research*, 17(4), 460–469.
- Olivia, M., & Marchyta, N. K. (2022). The influence of perceived ease of use and perceived usefulness on e-wallet continuance intention: Intervening role of customer satisfaction. *Jurnal Teknik Industri*, 24(1).
- Oluwatayo, J. A. (2012). Validity and reliability issues in educational research. *Journal of educational and social research*, 2(2), 391-391.
- Omar, N. N. (2017). The effectiveness of Kahoot application towards students' good feedback practice. *PEOPLE: International Journal of Social Sciences*, 3(2), 2551-2562.
- Oppong, F. B., & Agbedra, S. Y. (2016). Assessing univariate and multivariate normality. a guide for non-statisticians. *Mathematical Theory and Modeling*, 6(2), 26-33.
- Ortiz-Rojas, M., Chiluiza, K., & Valcke, M. (2019). Gamification through leaderboards: An empirical study in engineering education. *Computer Applications in Engineering Education*, 27(4), 777–788. <https://doi.org/10.1002/cae.12116>
- Osei, H. V., Kwateng, K. O., & Boateng, K. A. (2022). Integration of personality trait, motivation and UTAUT 2 to understand e-learning adoption in the era of COVID-19 pandemic. *Education and Information Technologies*, 1-26.
- Otegi, A., San Vicente, I., Saralegi, X., Peñas, A., Lozano, B., & Agirre, E. (2022). Information retrieval and question answering: A case study on COVID-19 scientific literature. *Knowledge-Based Systems*, 240, 108072.
- Ouellette, J. A., & Wood, W. (1998). Habit and intention in everyday life: The multiple processes by which past behavior predicts future behavior. *Psychological Bulletin*, 124(1), 54–74. <https://doi.org/10.1037/0033-2909.124.1.54>
- Ouyang, Y., Tang, C., Rong, W., Zhang, L., Yin, C., & Xiong, Z. (2017). Task-technology fit aware expectation-confirmation model towards understanding of MOOCs continued usage intention. *Proceedings of the 50th Hawaii International Conference on System Sciences 2017, USA*, 174-183. <https://doi.org/10.24251/hicss.2017.020>

- Owusu Kwateng, K., Osei Atiemo, K. A., & Appiah, C. (2019). Acceptance and use of mobile banking: an application of UTAUT2. *Journal of Enterprise Information Management*, 32(1), s118–151.
- Özdener, N. (2018). Gamification for enhancing Web 2.0 based educational activities: The case of pre-service grade school teachers using educational Wiki pages. *Telematics and Informatics*, 35(3), 564–578. <https://doi.org/10.1016/j.tele.2017.04.003>.
- Ozturk, A. B., Nusair, K., Okumus, F., & Hua, N. (2016). The role of utilitarian and hedonic values on users' continued usage intention in a mobile hotel booking environment. *International Journal of Hospitality Management*, 57, 106–115. <https://doi.org/10.1016/j.ijhm.2016.06.007>
- Pagani, M., & Mirabello, A. (2011). The influence of personal and social-interactive engagement in social TV web sites. *International Journal of Electronic Commerce* 16(2), 41–68. <https://doi.org/10.2753/JEC1086-4415160203>
- Pallant, J. (2013). *SPSS survival manual: A step by step guide to data analysis using IBM SPSS* (4th ed.). Berkshire: Open University Press.
- Panigrahi, R., Srivastava, P. R., & Sharma, D. (2018). Online learning: Adoption, continuance, and learning outcome-A review of literature. *International Journal of Information Management*, 43, 1–14. <https://doi.org/10.1016/j.ijinfomgt.2018.05.005>
- Pansari, A., & Kumar, V. (2017). Customer engagement: The construct, antecedents, and consequences. *Journal of the Academy of Marketing Science*, 45(3), 294–311. <https://doi.org/10.1007/s11747-016-0485-6>
- Park, S., & Kim, S. (2021). Leaderboard design principles to enhance learning and motivation in a gamified educational environment: Development study. *JMIR Serious Games*, 9(2), e14746.
- Parra-Santos, T., Molina-Jordá, J. M., Casanova-Pastor, G., & Maiorano-Lauria, L. P. (2018). Gamification for formative assessment in the framework of engineering learning. *Proceedings of the sixth international conference on technological ecosystems for enhancing multiculturalism*, 61-65.
- Patil, D., & Naqvi, W. M. (2020). COVID-19 and education system: Impact of current pandemic on adaptive learning strategies in medical education system. *International Journal of Research in Pharmaceutical Sciences*. 403-406.
- Pechenkina, E., Laurence, D., Oates, G., Eldridge, D., & Hunter, D. (2017). Using a gamified mobile app to increase student engagement, retention and academic achievement. *International Journal of Educational Technology in Higher Education*, 14(1), 1-12.
- Pereira, R., & Tam, C. (2021). Impact of enjoyment on the usage continuance intention of video-on-demand services. *Information & Management*, 58(7), 103501.

- Perro (2017). *Mobile Apps: What's a good retention rate?*. Retrieved 14 March 2021 from <http://info.localytics.com/blog/mobile-apps-whats-a-good-retention-rate>
- Persada, S. F., Miraja, B. A., Nadlifatin, R., Belgiawan, P. F., Perwira Redi, A. A. N., & Lin, S. C. (2021). Determinants of Students' Intention to Continue Using Online Private Tutoring: An Expectation-Confirmation Model (ECM) Approach. *Technology, Knowledge and Learning*, 1-14.
- Pham, L. L. N., Nguyen, H. T., & Le, V. T. K. (2021). Triggering students' learning autonomy using the combination of m-learning and gamification: A case study at Nguyen Tat Thanh University. *Teaching English with Technology*, 21(2), 66-91.
- Phuong, N. N. D., & Dai Trang, T. T. (2018). Repurchase intention: The effect of service quality, system quality, information quality, and customer satisfaction as mediating role: A PLS approach of m-commerce ride hailing service in Vietnam. *Marketing and Branding Research*, 5(2), 78-91. <https://doi.org/10.33844/mbr.2018.60463>
- Phuong, N. N., Luan, L. T., Van Dong, V., & Le Nhat Khanh, N. (2020). Examining customers' continuance intentions towards E-Wallet usage: The emergence of mobile payment acceptance in Vietnam. *Journal of Asian Finance, Economics and Business*, 7(9), 505-516.
- Pitoyo, M.D., Sumardi, & Asib, A. (2019). Gamification based assessment: A test anxiety reduction through game elements in Quizizz platform. *International Online Journal of Education and Teaching (IOJET)*, 6(3), 456-471. <http://iojet.org/index.php/IOJET/article/view/626>
- Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of applied psychology*, 88(5), 879.
- Poondej, C., & Lerdpornkulrat, T. (2016). The development of gamified learning activities to increase student engagement in learning. *Australian Educational Computing*, 31(2).
- Pop, R. A., Dabija, D. C., Pelău, C., & Dinu, V. (2022). Usage intentions, attitudes, and behaviors towards energy-efficient applications during the COVID-19 pandemic. *Journal of Business Economics and Management*, 23(3), 668-689.
- Poromatikul, C., De Maeyer, P., Leelapanyalert, K., & Zaby, S. (2019). Drivers of continuance intention with mobile banking apps. *The International Journal of Bank Marketing*, 38(1), 242-262.
- Prahalad, C.K., & Ramaswamy, V. (2004). Co-creation experiences: The next practice in value creation. *Journal of Interactive Marketing*, 18(3), 5-14
- Praveena, K. (2018). Trust and hedonic motivation: Predicting the satisfaction and continuance intention to use Facebook. *Asian Journal of Management*, 9(1), 317. <https://doi.org/10.5958/2321-5763.2018.00048.3>

- Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers*, 36(4), 717-731.
- Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40(3), 879-891.
- Preacher, K. J., & Hayes, A. F. (2009). SPSS and SAS macro for bootstrapping specific indirect effects in multiple mediation models.
- Preacher, K. J., & Kelley, K. (2011). Effect size measures for mediation models: Quantitative strategies for communicating indirect effects. *Psychological Methods*, 16(2), 93–115. <https://doi.org/10.1037/a0022658>
- Premkumar, G., & Bhattacharjee, A. (2008). Explaining information technology usage: A test of competing models. *Omega*, 36(1), 64–75. <https://doi.org/10.1016/j.omega.2005.12.002>
- Qashou, A. (2021). Influencing factors in M-learning adoption in higher education. *Education and Information Technologies*, 26(2), 1755-1785. <https://doi.org/10.1007/s10639-020-10323-z>
- Qing, T., & Haiying, D. (2021). How to achieve consumer continuance intention toward branded apps—from the consumer–brand engagement perspective. *Journal of Retailing and Consumer Services*, 60, 102486. <https://doi.org/10.1016/j.jretconser.2021.102486>
- Quan-Haase, A., & Young, A. L. (2010). Uses and gratifications of social media: A comparison of Facebook and instant messaging. *Bulletin of Science Technology & Society*, 30(5), 350–361. <https://doi.org/10.1177/0270467610380009>
- Rabianski, J. S. (2003). Primary and secondary data: Concepts, concerns, errors, and issues. *The Appraisal Journal*, 71(1), 43.
- Rachels, J. R., & Rockinson-Szapkiw, A. J. (2018). The effects of a mobile gamification app on elementary students' Spanish achievement and self-efficacy. *Computer Assisted Language Learning*, 31(1–2), 72–89. <https://doi.org/10.1080/09588221.2017.1382536>.
- Raes, A., Vanneste, P., Pieters, M., Windey, I., Van Den Noortgate, W., & Depaepe, F. (2020). Learning and instruction in the hybrid virtual classroom: An investigation of students' engagement and the effect of quizzes. *Computers and Education*, 143, 103682. <https://doi.org/10.1016/j.compedu.2019.103682>
- Raffaghelli, J. E., Rodríguez, M. E., Guerrero-Roldán, A. E., & Bañeres, D. (2022). Applying the UTAUT model to explain the students' acceptance of an early warning system in Higher Education. *Computers & Education*, 182, 104468.
- Ramayah, T., Cheah, J., Chuah, F., Ting, H., & Memon, M. A. (2016). *Partial least squares structural equation modeling (PLS-SEM) using SmartPLS 3.0: An updated and practical guide to statistical analysis*. Pearson Malaysia Sdn Bhd.

- Ramle, R., Hairulhaizuren, N., Abdullah, N. A. A., & Shaaban, N. N. (2017). Parking Dash: An educational game of queue and search in data structure. *Proceedings of the International University Carnival on E-Learning (IUCEL)*, 1(1), 286-290.
- Ramle, R., Nathan, S. S., & Berahim, M. (2019a). Digital game based learning of stack data structure using question prompts. *International Journal of Interactive Mobile Technologies (IJIM)*, 13(7), 90-102.
- Ramle, R., Rosli, D.I., Abdullah, N.A.A., Hairulhaizuren, N., Shaaban, N.N. (2019b). Gamification of queue data structure learning application. In *Ict For Technology Humanization Series 1* (pp. 63-72). UTHM. ISBN:9789672306276
- Ramle, R., Rosli, D. I., Soosay Nathan, S. & Berahim, M. (2020a). Question-led learning of iteration in C Programming learning application with gamification, *Journal of Advanced Research in Dynamical and Control Systems*, 12(6), 1633- 1639. <https://doi.org/10.5373/JARDCS/V12I2/S20201361>
- Ramle, R., Nathan, S. S., & Berahim, M. (2020b). Question-led approach in designing Dijkstra algorithm game-based learning: A pilot study. *International Journal of Evaluation and Research in Education*, 9(4), 926-933.
- Rasool, A., Shah, F. A., & Islam, J. U. (2020). Customer engagement in the digital age: A review and research agenda. *Current Opinion in Psychology*, 36, 96-100.
- Razak, F. Z. A., Rahman, A. A., & Abidin, M. Z. Z. (2021). The role of trust on continuance intention to use e-campus. *Proceedings of Journal of Physics: Conference Series 1793(1), 012023*. IOP Publishing.
- Reio, T. G. (2010). The threat of common method variance Bias to theory Building. *Human Resource Development Review*, 9, 405 - 411.
- Rigdon, E. E. (2014). Rethinking partial least squares path modeling: breaking chains and forging ahead. *Long Range Planning*, 47(3), 161-167.
- Rigdon, E. E., Sarstedt, M., & Ringle, C. M. (2017). On comparing results from CB-SEM and PLS-SEM: Five perspectives and five recommendations. *Marketing: ZFP–Journal of Research and Management*, 39(3), 4-16.
- Ringle, C. M., & Sarstedt, M. (2016). Gain more insight from your PLS-SEM results the importance-performance map analysis. *Industrial Management & Data Systems*, 116(9), 1865-1886.
- Robson, K., Plangger, K., Kietzmann, J. H., McCarthy, I., & Pitt, L. (2015). Is it all a game? Understanding the principles of gamification. *Business Horizons*, 58(4), 411–420. <https://doi.org/10.1016/j.bushor.2015.03.006>
- Roca, J. C., Chiu, C. M., & Martínez, F. J. (2006). Understanding e-learning continuance intention: An extension of the Technology Acceptance Model. *International Journal of Human Computer Studies*, 64(8), 683–696. <https://doi.org/10.1016/j.ijhcs.2006.01.003>

- Rodríguez-Torrico, P., San-Martín, S., & San José-Cabezudo, R. (2019). What drives M-Shoppers to continue using mobile devices to buy?. *Journal of Marketing Theory and Practice*, 27(1), 83-102. <https://doi.org/10.1080/10696679.2018.1534211>
- Rohan, R., Pal, D., Funilkul, S., Chutimaskul, W., & Eamsinvattana, W. (2021). How gamification leads to continued usage of MOOCs? A theoretical perspective. *IEEE Access*, 9(1), 108144–108161. <https://doi.org/10.1109/ACCESS.2021.3102293>
- Roinioti, E., Pandia, E., Konstantakis, M., & Skarpelos, Y. (2022). Gamification in tourism: A design framework for the TRIPMENTOR Project. *Digital*, 2(2), 191-205.
- Roslan, R., Masli, M. Z., Bohari, N. A., Md Nor, I. H., Bahrudin, I. A., Kassim, N., Berahim, M., Soosay Nathan, S., Omar, A. H., Jofri, M. H., Md Yasin, M. S., Surip, M., Masandig, H., Mohamed Ali, M. H., Mohamad Hanifa, R., Abdul Hamid, M., Ramle, R., & Mohamed, M. F. (2018). Engaging classroom using game based quizzes (EDventure). *Proceedings of the International University Carnival on E-Learning (IUCEL), Humanising Technologies, IIUM, Selangor, Malaysia*, 1(1), 596–600.
- Roslan, R., Kasmin, N. F., Mohd Noor, S. H. I., Jeffry, N. E., Masli, M. Z., Omar, A. H., Masandig, H., Mohamed Ali @ Md Hani, M. H., Mohamed, J., & Abd Hamid, M. (2019). Learning Al Quran comprehension, translation and usages using a ‘multiplayer’ game (Pahlawan Qarin). *Proceedings of the International University Carnival on E-Learning 2019, DeTAR PUTRA, UNIMAS, Sarawak, Malaysia*, 1(1), 3–6.
- Roslan, R., Mohd Ayub, A. F., Ghazali, N., & Zulkifli, N. N. (2021 a). The development of a collaborated gamified e-quiz and strategy game mobile application to increase students’ motivation and continuance usage intention. *ANP Journal of Social Science and Humanities*, 2(2), 74–81. <https://doi.org/10.53797/anp.jssh.v2i2.10.2021>
- Roslan, R., Mohd Ayub, A. F., Ghazali, N., Abu Hanifah, S. S., & Zulkifli, N. N. (2021b). Stimulating students’ self and peer assessment by incorporating e-quiz and a strategy game in a gamified mobile application. *Proceedings of the International University Carnival on E-Learning (IUCEL), UUM, Kedah, Malaysia*, 1(1), 701-708.
- Rowland, C. A. (2014). The effect of testing versus restudy on retention: A meta-analytic review of the testing effect. *Psychological Bulletin*, 140(6), 1432–1463. <https://doi.org/10.1037/a0037559>
- Saari, U. A., Tossavainen, A., Kaipainen, K., & Mäkinen, S. J. (2022). Exploring factors influencing the acceptance of social robots among early adopters and mass market representatives. *Robotics and Autonomous Systems*, 151, 104033.
- Sahak, A. A. M., Rahman, A. W. A., Ismail, M. R. F. H. R., Rohiat, M. A., Yazid, N. D. M., Aminudin, S. N., & Zakariah, S. H. (2021). Students’ acceptance towards

- Kahoot application in mastering culinary terminology. *Jurnal Pendidikan Teknologi dan Kejuruan*, 27(1), 1-6.
- Sailer, M., Hense, J. U., Mayr, S. K., & Mandl, H. (2017). How gamification motivates: An experimental study of the effects of specific game design elements on psychological need satisfaction. *Computers in Human Behavior*, 69, 371–380. <https://doi.org/10.1016/j.chb.2016.12.033>
- Salloum, S. A., & Shaalan, K. (2018, September). Factors affecting students' acceptance of e-learning system in higher education using UTAUT and structural equation modeling approaches. *Proceedings of International Conference on Advanced Intelligent Systems and Informatics*, 469-480. Springer, Cham. https://doi.org/10.1007/978-3-319-99010-1_43
- Salkind, N. J. (2018). *Exploring research (Ninth edition. Global)*. Pearson.
- Sánchez, R. A., & Hueros, A. D. (2010). Motivational factors that influence the acceptance of Moodle using TAM. *Computers in Human Behavior*, 26(6), 1632–1640. <https://doi.org/10.1016/j.chb.2010.06.011>
- Sanchez, D. R., Langer, M., & Kaur, R. (2020). Gamification in the classroom: Examining the impact of gamified quizzes on student learning. *Computers and Education*, 144, 103666. <https://doi.org/10.1016/j.compedu.2019.103666>
- Sanchez, J. A. R., & Tanpoco, M. (2023). Continuance intention of mobile wallet usage in the Philippines: A mediation analysis. *Review of Integrative Business and Economics Research*, 12(3), 128-142.
- Sarstedt, M., Bengart, P., Shaltoni, A.M. & Lehmann, S. (2018). The use of sampling methods in advertising research: A gap between theory and practice. *International Journal of Advertising*, 37(4), 650-663.
- Sarstedt, M., Hair Jr, J. F., Nitzl, C., Ringle, C. M., & Howard, M. C. (2020). Beyond a tandem analysis of SEM and PROCESS: use of PLS-SEM for mediation analyses!. *International Journal of Market Research*, 62(3), 288-299.
- Sarstedt, M., Ringle, C. M., & Hair, J. F. (2017). Partial least squares structural equation modeling. In *Homburg, C., Klarmann, M. and Vomberg, A. (Eds), Handbook of Market Research*. Springer, Heidelberg.
- Sarstedt, M., Ringle, C. M., Henseler, J., & Hair, J. F. (2014). On the emancipation of PLS-SEM: A commentary on Rigdon (2012). *Long range planning*, 47(3), 154-160.
- Sarstedt, M., Ringle, C. M., Smith, D., Reams, R., & Hair Jr, J. F. (2014). Partial least squares structural equation modeling (PLS-SEM): A useful tool for family business researchers. *Journal of Family Business Strategy*, 5(1), 105-115.
- Savitska, V., & Krychkivska, O. (2022). Higher education gamification: the trinity of pbl as a tool for educational process modernization. *Physical and Mathematical Education*, 33(1), 43-47.

- Schuberth, F., Henseler, J., & Dijkstra, T. K. (2018). Confirmatory composite analysis. *Frontiers in Psychology, 9*, 2541.
- Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill building approach*. John Wiley & Sons.
- Selya, A. S., Rose, J. S., Dierker, L. C., Hedeker, D., & Mermelstein, R. J. (2012). A practical guide to calculating Cohen's f^2 , a measure of local effect size, from PROC MIXED. *Frontiers in psychology, 3*, 111.
- Shanahan, T., Tran, T. P., & Taylor, E. C. (2019). Getting to know you: Social media personalization as a means of enhancing brand loyalty and perceived quality. *Journal of Retailing and Consumer Services, 47*, 57-65.
- Shanshan, S., & Wenfei, L. (2022). Understanding the impact of quality elements on MOOCs continuance intention. *Education and Information Technologies, 27*(8), 10949-10976.
- Shao, Z., Zhang, L., Li, X., & Guo, Y. (2019). Antecedents of trust and continuance intention in mobile payment platforms: The moderating effect of gender. *Electronic Commerce Research and Applications, 33*, 100823. <https://doi.org/j.eleap.2018.100823>
- Shao, Z., Liang, X., & Yang, M. (2017). Impact of Interactivity on Individuals' Continuance Participation in MOOCs Platform. *Proceedings of Pacific Asia Conference on Information Systems (PACIS)*. Langkawi, Kedah, Malaysia. <https://aisel.aisnet.org/pacis2017/267>
- Sharifi Fard, S., Alkelani, A. M., & Tamam, E. (2019). Habit as a moderator of the association of utilitarian motivation and hedonic motivation with purchase intention: Implications for social networking websites. *Cogent Social Sciences, 5*(1). <https://doi.org/10.1080/23311886.2019.1674068>
- Sharma, S., & Saini, J. R. (2022). On the role of teachers' acceptance, continuance intention and self-efficacy in the use of digital technologies in teaching practices. *Journal of Further and Higher Education, 46*(6), 721-736.
- Shmueli, G., Ray, S., Velasquez Estrada, J. M., & Chatla, S. B. (2016). The elephant in the room: Predictive performance of PLS models. *Journal of Business Research, 69*(10), 4552–4564. <https://doi.org/10.1016/j.jbusres.2016.03.04>
- Shmueli, G., Sarstedt, M., Hair, J. F., Cheah, J. H., Ting, H., Vaithilingam, S., & Ringle, C. M. (2019). Predictive model assessment in PLS-SEM: guidelines for using PLSpredict. *European Journal of Marketing, 53*(11), 2322-2347.
- Simon, F., & Tossan, V. (2018). Does brand-consumer social sharing matter? A relational framework of customer engagement to brand-hosted social media. *Journal of Business Research, 85*, 175-184.
- Sjöblom, M., Törhönen, M., Hamari, J., & Macey, J. (2017). Content structure is king: An empirical study on gratifications, game genres and content type on Twitch.

- Computers in Human Behavior*, 73, 161–171.
<https://doi.org/10.1016/j.chb.2017.03.036>
- Sijtsma, K. (2009). Reliability beyond theory and into practice. *Psychometrika*, 74(1), 169.
- Singh, R., Timbadia, D., Kapoor, V., Reddy, R., Churi, P., & Pimple, O. (2021). Question paper generation through progressive model and difficulty calculation on the Promexa Mobile Application. *Education and Information Technologies*, 26(4), 4151–4179. <https://doi.org/10.1007/s10639-021-10461-y>
- Singh, S. (2020). An integrated model combining ECM and UTAUT to explain users' post-adoption behaviour towards mobile payment systems. *Australasian Journal of Information Systems*, 24, 1-27.
<https://doi.org/10.3127/ajis.v24i0.2695>
- Sinton, L. (2022). Understanding students' perceptions of their role as value co-creators in Higher Education. *Proceedings of 2022 Academy of Marketing Conference: Marketing: The Fabric of Life*. 54(1), 4-10.
- Smiderle, R., Rigo, S. J., Marques, L. B., de Miranda Coelho, J. A. P., & Jaques, P. A. (2020). The impact of gamification on students' learning, engagement and behavior based on their personality traits. *Smart Learning Environments*, 7(1), 1-11.
- Smith, M. A., & Karpicke, J. D. (2014). Retrieval practice with short-answer, multiple-choice, and hybrid tests. *Memory*, 22(7), 784-802.
- Solmaz, E., & Cetin, E. (2017). Ask-response-play-learn: Students' views on gamification based interactive response systems. *Journal of Educational and Instructional Studies in the World*, 7(3), 28–40.
- Sosik, J. J., Kahai, S. S., & Piovoso, M. J. (2009). Silver bullet or voodoo statistics?: A primer for using the partial least squares data analytic technique in group and organisation research. *Group & Organisation Management*, 34(1), 5-36.
- Streukens, S., & Leroi-Werelds, S. (2016). Bootstrapping and PLS-SEM: A step-by-step guide to get more out of your bootstrap results. *European Management Journal*, 34(6), 618-632.
- Stocchi, L., Michaelidou, N., Pourazad, N. & Micevski, M. (2018). The rules of engagement: How to motivate consumers to engage with branded mobile apps. *Journal of Marketing Management* 34(13–14), 1196–226. <https://doi.org/10.1080/0267257X.2018.1544167>.
- Stone, M. (1974). Cross-validation and multinomial prediction. *Biometrika*, 61(3), 509-515.
- Storbacka, K., Brodie, R. J., Böhmman, T., Maglio, P. P. & Nenonen, S. (2016). Actor engagement as a microfoundation for value co-creation. *Journal of Business Research*, 69, 3008–3017.

- Streiner (1994). Figuring out factors: the use and misuse of factor analysis. *Canadian Journal of Psychiatry*, 39(3), 135-140.
- Streiner, D. L. (2003). Starting at the beginning: an introduction to coefficient alpha and internal consistency. *Journal of Personality Assessment*, 80(1), 99-103.
- Suhan, Samartha, V. & KodikaL, R. (2018). Measuring the effect size of coefficient of determination and predictive relevance of exogenous latent variables on endogenous latent variables through PLS-SEM. *International Journal of Pure and Applied Mathematics*, 119(18), 39-48.
- Suka, I. E., & Hamid, N. A. (2020). The implication of attitude towards Educational Support System (ESS) use in education. *Research in Management of Technology and Business*, 1(1), 233-244.
- Sunarti, N., Nik Yahya, N. F. A., Lew B. C. L., Mahdzir, M. (2022). Students' perception on the application of gamification in education during Covid-19 pandemic. *Journal of Innovation and Technology*, 2022(10), 1-7.
- Sung, Y. T., Chang, K. E., & Liu, T. C. (2016). The effects of integrating mobile devices with teaching and learning on students' learning performance: A meta-analysis and research synthesis. *Computers & Education*, 94, 252-275.
- Susanto, P., Hoque, M. E., Nisaa, V., Islam, M. A., & Kamarulzaman, Y. (2023). Predicting m-commerce continuance intention and price sensitivity in Indonesia by integrating of expectation-confirmation and post-acceptance model. *SAGE Open*, 13(3), 21582440231188019.
- Taha, J. A. A., Mohamad, M. (2021). Capstone Project: Development of interactive video related to Integrated Learning System. *Research and Innovation in Technical and Vocational Education and Training*, 1(1), 111-118. https://drive.google.com/file/d/1pT3bWSeoRAQMqzH_CrvF-Pkvfsv_qiKh/view?usp=sharing
- Taherdoost, H. (2018). A review of technology acceptance and adoption models and theories. *Procedia Manufacturing*, 22, 960-967.
- Tak, P., & Gupta, M. (2021). Examining travel mobile app attributes and its impact on consumer engagement: An application of SOR framework. *Journal of Internet Commerce*, 20(3), 293-318.
- Talwar, S., Dhir, A., Khalil, A., Mohan, G., & Islam, A. N. (2020). Point of adoption and beyond. Initial trust and mobile-payment continuation intention. *Journal of Retailing and Consumer Services*, 55, 102086.
- Tam, C., Santos, D., & Oliveira, T. (2020). Exploring the influential factors of continuance intention to use mobile apps: Extending the Expectation Confirmation Model. *Information Systems Frontiers*, 22(1), 243-257. <https://doi.org/10.1007/s10796-018-9864-5>
- Tam, C., Barroso, M., & Cruz-Jesus, F. (2022). Understanding the determinants of users' continuance intention to buy low-cost airline flights online. *Journal of*

- Tamilmani, K., Rana, N. P., & Dwivedi, Y. K. (2018). Use of 'habit' is not a habit in understanding individual technology adoption: a review of UTAUT2 based empirical studies. *Proceedings of International Working Conference on Transfer and Diffusion of IT*, 277-294. Springer, Cham.
- Tamilmani, K., Rana, N., Wamba, S. & Dwivedi, R. (2021). The extended unified theory of acceptance and use of technology (UTAUT2): A systematic literature review and theory evaluation. *International Journal of Information Management*, 57, 102269. <https://doi.org/10.1016/j.ijinfomgt.2020.102269>
- Tams, S., Thatcher, J. B., & Craig, K. (2018). How and why trust matters in post-adoptive usage: The mediating roles of internal and external self-efficacy. *Journal of Strategic Information Systems*, 27(2), 170–190. <https://doi.org/10.1016/j.jsis.2017.07.004>
- Tan, T. Y., Jain, M., Obaid, T., & Nesbit, J. C. (2020). What can completion time of quizzes tell us about students' motivations and learning strategies? *Journal of Computing in Higher Education*, 32(2), 389–405. <https://doi.org/10.1007/s12528-019-09239-6>
- Tao, D., Fu, P., Wang, Y., Zhang, T., & Qu, X. (2022). Key characteristics in designing massive open online courses (MOOCs) for user acceptance: An application of the extended technology acceptance model. *Interactive Learning Environments*, 30(5), 882-895.
- Tarute, A., Nikou, S., & Gatautis, R. (2017). Mobile application driven consumer engagement. *Telematics and Informatics*, 34(4), 145–156. <https://doi.org/10.1016/j.tele.2017.01.006>
- Tegambwage, A. G., & Kasoga, P. S. (2022). Antecedents of customer loyalty in Islamic banking: evidence from Tanzania. *Journal of Islamic Accounting and Business Research*, 13(4), 701-713.
- Tehseen, S., Ramayah, T., & Sajilan, S. (2017). Testing and controlling for common method variance: A review of available methods. *Journal of Management Sciences*, 4(2), 142-168.
- Teo, T. S. H., Srivastava, S. C., & Jiang, L. (2008). Trust and electronic government success: an empirical study. *Journal of Management Information Systems*, 25(3), 99–132.
- Teong, K. V., & Ang, M. C. (2016). Internet use and addiction among students in Malaysian public Universities in East Malaysia: some empirical evidence. *Journal of Management Research*, 8(2), 31-47.
- Thakur, R. (2019). The moderating role of customer engagement experiences in customer satisfaction–loyalty relationship. *European Journal of Marketing*, 53(7), 1278-1310.

- Thang, S. M., Lee, K. W., Murugaiah, P., Jaafar, N. M., Tan, C. K., & Bukhari, N. I. A. (2016). ICT tools patterns of use among Malaysian ESL undergraduates. *GEMA Online Journal of Language Studies*, 16(1).
- The Manifest (2018). *Mobile app usage statistics 2018*. Retrieved 24 December 2020 from <https://themanifest.com/app-development/mobile-app-usage-statistics-201>
- Thong, J. Y. L., Hong, S.-J., & Tam, K. Y. (2006). The effects of post-adoption beliefs on the expectation-confirmation model for information technology continuance. *International Journal of Human-Computer Studies*, 64(9), 799–810. <https://doi.org/10.1016/j.ijhcs.2006.05.001>
- Tian, X. F., & Wu, R. Z. (2022). Determinants of the mobile health continuance intention of elders with chronic diseases: an integrated framework of ECM-ISC and UTAUT. *International Journal of Environmental Research and Public Health*, 19(16), 9980.
- Tivaraju, J., Md Yunus, M., & Badusah, J. (2017). Learning English is fun via Kahoot: Students' attitude, motivation and perceptions. In *Seminar Pendidikan Transdisiplin (STEd 2017)*, 218–229.
- Toda, A. M., do Carmo, R. M. C., da Silva, A. P., Bittencourt, I. I., & Isotani, S. (2018). An approach for planning and deploying gamification concepts with social networks within educational contexts. *International Journal of Information Management*, 1–10. <https://doi.org/10.1016/j.ijinfomgt.2018.10.001>
- Tommasetti, A., Troisi, O., & Vesce, M. (2017). Measuring customer value co-creation behavior: Developing a conceptual model based on service-dominant logic. *Journal of Service Theory and Practice*. 27(5), 930-950. <https://doi.org/10.1108/JSTP-10-2015-0215>
- Topping, K. (1998). Peer assessment between students in colleges and universities. *Review of Educational Research*, 68(3), 249–276. <https://doi.org/10.3102/00346543068003249>
- Tóth, Á., Lógó, P., & Lógó, E. (2019). The effect of the kahoot quiz on the student's results in the exam. *Periodica Polytechnica Social and Management Sciences*, 27(2), 173–179. <https://doi.org/10.3311/PPso.12464>
- Trafimow, D., & Borrie, W. T. (1999). Influencing future behavior by priming past behavior: A test in the context of petrified forest national park. *Leisure Sciences*, 21(1), 31–42. <https://doi.org/10.1080/014904099273273>
- Tran, T. P., Mai, E. S., & Taylor, E. C. (2021). Enhancing brand equity of branded mobile apps via motivations: A service-dominant logic perspective. *Journal of Business Research*, 125, 239-251
- Trivedi, S. K., & Yadav, M. (2018). Predicting online repurchase intentions with e-satisfaction as mediator: a study on Gen Y. *VINE Journal of Information and Knowledge Management Systems*, 48(3), 427-447.

- Tsai, H., Lee, Y. P., & Ruangkanjanases, A. (2020). Understanding the effects of antecedents on continuance intention to gather food safety information on websites. *Frontiers in Psychology, 11*, 3074.
- Tsay, C. H. H., Kofinas, A., & Luo, J. (2018). Enhancing student learning experience with technology-mediated gamification: An empirical study. *Computers and Education, 121*, 1–17. <https://doi.org/10.1016/j.compedu.2018.01.009>
- Tsui, H. D. (2019). Trust, perceived useful, attitude and continuance intention to use e-government service: An empirical study in Taiwan. *IEICE Transactions on Information and Systems, E102D(12)*, 2524–2534. <https://doi.org/10.1587/transinf.2019EDP7055>
- Urbach, N., & Ahlemann, F. (2010). Structural equation modeling in information systems research using partial least squares. *Journal of Information technology theory and application, 11(2)*, 5-40.
- van Elderen, J., & van der Stappen, E. (2019). The potential impact of gamification elements on the acceptance of technology in the context of education: a literature review. *Proceedings of 32nd Bled eConference/ Humanizing Technology for a Sustainable Society*, 177-201. University of Maribor Press. <https://doi.org/10.18690/978-961-286-280-0.10>
- Vanduhe, V. Z., Nat, M., & Hasan, H. F. (2020). Continuance intentions to use gamification for training in Higher Education: Integrating the Technology Acceptance Model (TAM), social motivation, and Task Technology Fit (TTF). *IEEE Access, 8*, 21473–21484. <https://doi.org/10.1109/ACCESS.2020.2966179>
- Van Heerde, H. J., Dinner, I. M., & Neslin, S. A. (2019). Engaging the unengaged customer: The value of a retailer mobile app. *International Journal of Research in Marketing, 36(3)*, 420-438.
- van Roy, R., & Zaman, B. (2018). Need-supporting gamification in education: An assessment of motivational effects over time. *Computers & Education, 127*, 283–297. <https://doi.org/10.1016/j.compedu.2018.08.018>.
- Van Vu, D., Tran, G. N., & Van Nguyen, C. (2022). Digital transformation, student satisfaction, word of mouth and online learning intention in Vietnam. *Emerging Science Journal, 6*, 40-54.
- Vargo, S. L., & Lusch, R. F. (2004). Evolving to a new dominant logic for marketing. *Journal of Marketing, 68(1)*, 1–17. <https://doi.org/10.1509/jmkg.68.1.1.24036>
- Vargo, S. L., & Lusch, R. F. (2008a). Service-dominant logic: Continuing the evolution. *Journal of the Academy of Marketing Science, 36(1)*, 1–10. <https://doi.org/10.1007/s11747-007-0069-6>
- Vargo, S. L., & Lusch, R. F. (2008b). Why "service"?. *Journal of the Academy of Marketing Science, 36(1)*, 25–38. <https://doi.org/10.1007/s11747-007-0068-7>

- Vega, A., Ramírez-Benavidez, K., & Guerrero, L. A. (2019). Tool UTAUT applied to measure interaction experience with NAO robot. *Proceedings of International Conference on Human-Computer Interaction*, 501-512. Springer, Cham.
- Venkatesh, V. & Morris, M. G. (2000). Why don't men ever stop to ask for directions? Gender, social influence, and their role in technology acceptance and usage behavior. *MIS Quarterly*, 24(1), 115-139.
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425. <https://doi.org/10.2307/30036540>
- Venkatesh, V., Thong, J. Y. L., Chan, F. K. Y., Hu, P. J.-H., & Brown, S. A. (2011). Extending the two-stage information systems continuance model: Incorporating UTAUT predictors and the role of context. *Information Systems Journal*, 21(6), 527–555. <https://doi.org/10.1111/j.1365-2575.2011.00373.x>
- Venkatesh, V., Thong, J. Y., & Xu, X. (2012). Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. *MIS Quarterly*, 36(1), 157-178. <https://doi.org/10.2307/41410412>
- Vitkauskaitė, E., & Gatautis, R. (2018). Points for posts and badges to brand advocates: The role of gamification in consumer brand engagement. *Proceedings of the Annual Hawaii International Conference on System Sciences*, 1148–1157. <https://doi.org/10.24251/hicss.2018.143>
- Vivek, S. D., Beatty, S. E., Dalela, V., & Morgan, R. M. (2014). A generalized multidimensional scale for measuring customer engagement. *Journal of Marketing Theory and Practice*, 22(4), 401-420.
- Wang, Y., Asaad, Y., & Filieri, R. (2020). What makes hosts Trust Airbnb? Antecedents of hosts' Trust toward Airbnb and its impact on continuance intention. *Journal of Travel Research*, 59(4), 686–703. <https://doi.org/10.1177/0047287519855135>.
- Wang, W. T., Ou, W. M., & Chen, W. Y. (2019a). The impact of inertia and user satisfaction on the continuance intentions to use mobile communication applications: A mobile service quality perspective. *International Journal of Information Management*, 44, 178-193.
- Wang, L. Y., Lew, S. L., Lau, S. H., & Leow, M. C. (2019b). Usability factors predicting continuance of intention to use cloud e-learning application. *Heliyon*, 5(6), e01788.
- Wang, Y. S., Tseng, T. H., Wang, W. T., Shih, Y. W., & Chan, P. Y. (2019c). Developing and validating a mobile catering app success model. *International Journal of Hospitality Management*, 77, 19-30.
- Wang, Y. T., & Lin, K. Y. (2021). Understanding continuance usage of mobile learning applications: The moderating role of habit. *Frontiers in Psychology*, 12, 736051.

- Wang, A. I., & Tahir, R. (2020). The effect of using Kahoot! for learning – A literature review. *Computers and Education*, 149, 103818. <https://doi.org/10.1016/j.compedu.2020.103818>
- Wang, T., Wang, W., Liang, J., Nuo, M., Wen, Q., Wei, W., Han, H., & Lei, J. (2022). Identifying major impact factors affecting the continuance intention of mHealth: a systematic review and multi-subgroup meta-analysis. *NPJ Digital Medicine*, 5(1), 145.
- Wang, M. M., & Wang, J. J. (2019). Understanding solvers' continuance intention in crowdsourcing contest platform: An extension of expectation-confirmation model. *Journal of Theoretical and Applied Electronic Commerce Research*, 14(3), 17–33. <https://doi.org/10.4067/S0718-18762019000300103>
- Werbach K., & Hunter D. (2015). *The gamification toolkit: Dynamics, mechanics, and components for the win*. Philadelphia: Wharton Digital Press.
- Wijardi, C., Tjokrosaputro, M., Ekarista, M., & Krisnaputra, A. (2022). The effect of consumer engagement as a mediation variable on brand experience and brand loyalty on e-commerce in COVID-19 pandemic. *Proceedings of Tenth International Conference on Entrepreneurship and Business Management 2021 (ICEBM 2021)*, 193-199. Atlantis Press.
- Wilkinson, K., Dafoulas, G., Garelick, H., & Huyck, C. (2020). Are quiz-games an effective revision tool in Anatomical Sciences for Higher Education and what do students think of them?. *British Journal of Educational Technology*, 51(3), 761-777.
- Wirani, Y., Nabarian, T., & Romadhon, M. S. (2022). Evaluation of continued use on Kahoot! as a gamification-based learning platform from the perspective of Indonesia students. *Procedia Computer Science*, 197, 545-556.
- Wong, W. P. M., Tan, K. L., & Lim, B. C. Y. (2019). The effect of technology trust on customer E-loyalty in online shopping and the mediating effect of trustworthiness. *Journal of Marketing Advances and Practices*, 1(2), 38-51.
- Wu, B., & Chen, X. (2017). Continuance intention to use MOOCs: Integrating the technology acceptance model (TAM) and task technology fit (TTF) model. *Computers in Human Behavior*, 67, 221-232. <https://doi.org/10.1016/j.chb.2016.10.028>
- Xavier, P. S., & Zakkariya, K. A. (2021). Factors predicting consumers' continuance intention to use mobile wallets: Evidence from Kerala, India. *Colombo Business Journal*, 12(1), 114–144. <http://doi.org/10.4038/cbj.v12i1.73>
- Xie, C., Bagozzi, R. P., & Troye, S. V. (2008). Trying to prosume: Toward a theory of consumers as co-creators of value. *Journal of the Academy of Marketing Science*, 36(1), 109-122.
- Yahaya, T., Idris, K., Suandi, T., & Ismail, I. (2018). Adapting instruments and modifying statements: The confirmation method for the inventory and model for information sharing behavior using social media. *Management Science*

Letters, 8(5), 271-282.

- Yan, M., Filieri, R., & Gorton, M. (2021). Continuance intention of online technologies: A systematic literature review. *International Journal of Information Management*, 58, 102315.
- Yang, H., Cai, J., Yang, H. H., & Wang, X. (2023). Examining key factors of beginner's continuance intention in blended learning in higher education. *Journal of Computing in Higher Education*, 35(1), 126-143.
- Ye, P., Liu, L., Gao, L., & Mei, Q. (2023). Factors Affecting Woman's Continuance Intention for Mobile Games. In *Research Anthology on Game Design, Development, Usage, and Social Impact* (pp. 1795-1817). IGI Global.
- Yi, E. L. Y., Sng, W. C., Leong, C. M., & Ho, S. J. (2021). Determinants of mobile banking services continuance intention in Malaysia. *Journal of Marketing Advances and Practices*, 3(1), 20-41. e-ISSN 2682-8170
- Yousef, A. M. F., Wahid, U., Chatti, M. A., Schroeder, U., & Wosnitza, M. (2015). The effect of peer assessment rubrics on learners' satisfaction and performance within a blended MOOC environment. *Proceedings of the 7th International Conference on Computer Supported Education (CSEDU 20156)*, 2(1), 148-159.
- Yu, C. M., Chang, H. T., & Chen, K. S. (2018). Developing a performance evaluation matrix to enhance the learner satisfaction of an e-learning system. *Total Quality Management and Business Excellence*, 29(7-8), 727-745. <https://doi.org/10.1080/14783363.2016.1233809>
- Zainuddin, Z. (2018). Students' learning performance and perceived motivation in gamified flipped-class instruction. *Computers & Education*, 126, 75-88. <https://doi.org/10.1016/j.compedu.2018.07.003>.
- Zainuddin, Z., Chu, S. K. W., Shujahat, M., & Perera, C. J. (2020a). The impact of gamification on learning and instruction: A systematic review of empirical evidence. *Educational Research Review*, 30, 100326. <https://doi.org/10.1016/j.edurev.2020.100326>
- Zainuddin, Z., Shujahat, M., Haruna, H., & Chu, S. K. W. (2020b). The role of gamified e-quizzes on student learning and engagement: An interactive gamification solution for a formative assessment system. *Computers and Education*, 145, 103729. <https://doi.org/10.1016/j.compedu.2019.103729>
- Zakaria, N. S., Saripan, M. I., Subarimaniam, N., & Ismail, A. (2020). Assessing Ethoshunt as a gamification-based mobile app in Ethics education: Pilot mixed-methods study. *JMIR Serious Games*, 8(3). <https://doi.org/10.2196/18247>
- Zhang, M., Shu, L., Luo, X., Yuan, M., & Zheng, X. (2022). Virtual reality technology in construction safety training: Extended technology acceptance model. *Automation in Construction*, 135, 104113

- Zhao, Y., & Bacao, F. (2020). A comprehensive model integrating UTAUT and ECM with espoused cultural values for investigating users' continuance intention of using mobile payment. *Proceedings of ACM International Conference Proceeding Series*, 155–161. <https://doi.org/10.1145/3422713.3422754>
- Zhao, L., Lu, Y., Wang, B., & Huang, W. (2011). What makes them happy and curious online? An empirical study on high school students' Internet use from a self-determination theory perspective. *Computers & Education*, 56(2), 346–356. <https://doi.org/10.1016/j.compedu.2010.08.006>
- Zheng, L. (2020). The role of consumption emotions in users' mobile gaming application continuance intention. *Information Technology & People*, 33(1), 340-360.
- Zhou, F., Mou, J., & Kim, J. (2021). Toward a meaningful experience: an explanation of the drivers of the continued usage of gamified mobile app services. *Online Information Review*. <https://doi.org/10.1108/OIR-10-2020-0464>
- Zhou, T. (2011). Understanding mobile internet continuance usage from the perspectives of UTAUT and flow. *Information Development*, 27(3), 207–218. <https://doi.org/10.1177/0266666911414596>
- Zhou, T. (2013). An empirical examination of continuance intention of mobile payment services. *Decision Support Systems*, 54(2), 1085–1091. <https://doi.org/10.1016/j.dss.2012.10.034>
- Zhou, L., Xue, S., & Li, R. (2022). Extending the Technology Acceptance Model to explore students' intention to use an online education platform at a University in China. *SAGE Open*, 12(1), 21582440221085259.
- Zhu, G., So, K. K. F., & Hudson, S. (2017). Inside the sharing economy. *International Journal of Contemporary Hospitality Management*, 29(9), 2218–2239. <https://doi.org/10.1108/ijchm-09-2016-0496>
- Zirawaga, V., Olusanya, A., & Maduki, T. (2017). Gaming in education: Using games a support tool to teach History. *Journal of Education and Practice*, 8(15), 55–64. <https://files.eric.ed.gov/fulltext/EJ1143830.pdf>