

**FACTORS AFFECTING THE USE OF
GAMIFICATION IN ONLINE LEARNING
ENVIRONMENT AMONG SCHOOL TEACHERS
IN THE KINGDOM OF SAUDI ARABIA**

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UNIVERSITI SAINS MALAYSIA

2023

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by

ALOSAIMI MUTLAQ AYED S

**Thesis submitted in fulfilment of the requirements
for the degree of
Doctor of Philosophy**

May 2023

ACKNOWLEDGEMENT

All praise and gratitude are due to Allah (SWT), who inspired me to undertake a doctoral study and guided me throughout the journey. May His peace and blessing be upon the prophet MUHAMMAD (SAW), his household and companions. I would like to express my sincere gratitude to my supervisor, in the person of Prof. Dr. Irfan Naufal Umar and co-supervisor, Dr. Siti Nazleen Abdul Rabu. It was a great pleasure working under their supervision because their comments have served as a source of inspiration throughout this study.

I wish to register my appreciation to my family members for their great support. My appreciation goes to my parents, may God give them a long life with health and wellness. My appreciation also goes to the soul of my wife, may God have mercy on her, she passed away last year due to Covid-19. She have supported me throughout the study stage by helping me and taking care of our children needs and concerns. I ask God to give her the highest paradise. My appreciation also goes to my children, as they are the reason for my smile after all troubles and fatigue.

Special thanks to the Centre for Instructional Technology & Multimedia, Universiti Sains Malaysia for all the advices, information, or guidance they gave me, we ask God to reward them on my behalf. I also wish to express my appreciation to respondents of my survey, those who help me collect the data. I ask God to benefit me with my knowledge and increase my knowledge.

Finally, all gratitude is due to Almighty Allah, the Highest, out of whose mercy all good things are accomplished.

TABLE OF CONTENTS

ACKNOWLEDGEMENT	ii
TABLE OF CONTENTS	iii
LIST OF TABLES	viii
LIST OF FIGURES	ix
LIST OF ABBREVIATIONS	x
LIST OF APPENDICES	xii
ABSTRAK	xiii
ABSTRACT	xvi
CHAPTER 1 INTRODUCTION	1
1.1 Introduction.....	1
1.2 Research Background	4
1.3 Problem Statement	9
1.4 Research Objectives.....	11
1.5 Research Questions	12
1.6 Research Hypotheses	12
1.7 Theoretical Framework	13
1.8 Research Limitations	18
1.9 Research Significance	20
1.10 Operational Definitions.....	20
1.11 Summary	23
CHAPTER 2 LITERATURE REVIEW	24
2.1 Introduction.....	24
2.2 Online Education and eLearning	25
2.3 Education System in Saudi Arabia	27
2.4 Education Policy	29

2.4.1	Current Educational Priorities and Concerns.....	31
2.4.2	The Digital Transformation in Saudi Arabia	33
2.4.3	Changes in Teachers’ Roles.....	36
2.4.4	The “Future Gate” Project.....	38
2.5	Gamification	43
2.5.1	Gamification in “Future Gate”.....	46
2.6	Teachers’ Use of Technology	49
2.7	Behavioural Intention.....	50
2.7.1	Brief History of Behavioural Intention Theories	52
2.7.1(a)	The Technology Acceptance Model (TAM).....	52
2.7.1(b)	The Theory of Reasoned Action (TRA).....	53
2.7.1(c)	The Theory of Planned Behaviour (TPB)	54
2.7.1(d)	A Model Combining TAM and TPB (C-TAM-TPB)	55
2.7.1(e)	The Motivational Model (MM).....	56
2.8	Theoretical Framework	57
2.8.1	The UTATU2 Model	57
2.8.2	The Task Technology Fit Model (TTF).....	60
2.9	Research Hypotheses	64
2.9.1	UTAUT-Based Hypotheses	64
2.9.2	TTF-Based Hypotheses.....	70
2.9.3	The Moderating Effects	75
2.10	Summary	77
	CHAPTER 3 RESEARCH METHODOLOGY	79
3.1	Introduction.....	79
3.2	Research Design.....	80
3.3	Population and Sampling	81
3.4	Research Instrument.....	82

3.5	Validity	88
3.6	Reliability.....	88
3.7	Data Collection	89
3.8	Data Analysis	90
	3.8.1 Assessment of the Measurement Model	96
	3.8.2 Assessment of Structural Model	98
3.9	Summary	100
CHAPTER 4 RESULTS AND ANALYSIS		101
4.1	Introduction.....	101
	4.1.1 Response Rate	101
	4.1.2 Demographic Characteristics	102
4.2	Responses of Study Participants	104
	4.2.1 Task Characteristics	105
	4.2.2 Technology Characteristics.....	106
	4.2.3 Task Technology Fit	107
	4.2.4 Performance Expectancy.....	108
	4.2.5 Effort Expectancy	109
	4.2.6 Social Influence	110
	4.2.7 Facilitating Conditions.....	111
	4.2.8 Hedonic Motivation	112
	4.2.9 Habit.....	113
	4.2.10 Intention to use.....	114
	4.2.11 Gamification use	115
4.3	Normality, Missing Values, Outliers and Response Rate.....	116
	4.3.1 Normality	116
	4.3.2 Missing Values.....	117
	4.3.3 Outliers.....	117

4.4	Measurement Model Assessment.....	118
4.4.1	Internal Consistency Reliability.....	118
4.4.2	Indicator Reliability	118
4.4.3	Convergent Validity.....	120
4.4.4	Discriminant Validity.....	120
4.4.5	Goodness of Fit.....	123
4.5	Structural Model	124
4.5.1	Coefficient of Determination (R^2).....	124
4.5.2	Lateral Collinearity (VIF).....	125
4.5.3	Path Coefficient	127
4.5.4	Effect Size (f^2).....	129
4.5.5	Cross Validated Redundancy (Q^2).....	130
4.6	Hypothesis Testing.....	132
4.7	Mediation Relationship.....	135
4.8	Moderators Effects.....	139
4.9	Hypotheses and Decisions	141
4.10	Summary	143
	CHAPTER 5 DISCUSSION AND CONCLUSION.....	145
5.1	Introduction.....	145
5.2	Summary of the Research Findings	145
5.2.1	Hypotheses and Factors Affecting the Behavioural Intention	146
5.2.2	Hypotheses and Factors Affecting the Teachers' Perception of Task-Technology Fit.....	148
5.2.3	Hypotheses and Factors Affecting the Usage of Gamification.....	148
5.2.4	Hypotheses and Factors Moderating the Influence of Demographics on Intention to Use.....	149
5.3	Discussion of Study Findings with Direct Effect	150
5.3.1	The Relationship Between the Performance Expectancy and Intention to Use.....	150

5.3.2	The Relationship Between the Effort Expectancy and Intention to Use.....	151
5.3.3	The Relationship Between the Social Influence and Intention to Use	152
5.3.4	The Relationship Between the Facilitating Conditions and Intention to Use.....	153
5.3.5	The Relationship Between the Hedonic Motivation and Intention to Use.....	154
5.3.6	The Relationship Between Habit and Intention to Use.....	155
5.3.7	The Relationship Between the Intention to Use and Gamification Use	156
5.3.8	The effect of Task Characteristics and Technology Characteristics on the Task-Technology Fit	157
5.3.9	The Effect of Task-Technology Fit on the Gamification Use	158
5.3.10	The Effect of Task-Technology Fit on the Intention to Use.....	159
5.3.11	The Effect of Task-Technology Fit on Performance Expectancy	160
5.3.12	The Effect of Habit on Gamification Use	161
5.4	The Effect of Mediators on the Intention and Gamification Use.....	161
5.5	The Effect of Moderators on The Intention to Use the Technology	164
5.6	Implications of the Research.....	166
5.6.1	Theoretical Implications	166
5.6.2	Practical Implications.....	170
5.7	Limitations of the Study.....	171
5.8	Future Works	172
5.9	Conclusion	173
	REFERENCES.....	175
	APPENDICES	

LIST OF TABLES

		Page
Table 2.1	Gamification use in Future Gate	47
Table 3.1	The number of schools and teachers in each district.....	81
Table 3.2	The instrument of this study.....	85
Table 3.3	Reliability test of the pilot study	89
Table 4.1	Participants responses of Task Characteristics (n: 328).....	105
Table 4.2	Participants responses of Technology characteristics	107
Table 4.3	Participants’ responses to Task Technology Fit.....	108
Table 4.4	Participants’ responses of Performance Expectancy.....	109
Table 4.5	Participants responses of Effort expectancy	110
Table 4.6	Participants’ responses of Social influence.....	111
Table 4.7	Participants’ responses of Facilitating conditions	112
Table 4.8	Participants’ responses of Hedonic Motivation	113
Table 4.9	Participants’ responses on Habit	114
Table 4.10	Participants responses of Intention to use	115
Table 4.11	Participants’ responses of Gamification use	116
Table 4.12	Normal distribution of study constructs	117
Table 4.13	Indicator reliability for items of constructs	119
Table 4.14	Fornell and Larcker’s criterion of constructs	121
Table 4.15	Cross loadings of discriminant validity.....	122
Table 4.16	Inner and Outer Values of VIF.....	126
Table 4.17	Hypotheses with results, coefficient, t-values and <i>p</i> values.....	134
Table 4.18	Impact of mediators between dependent and independent variables	138
Table 4.19	Moderators for model of present study	140
Table 4.20	Research hypotheses and results	142

LIST OF FIGURES

		Page
Figure 1.1	Theoretical framework	16
Figure 1.2	Research theoretical model	18
Figure 2.1	Future Gate main page	35
Figure 2.2	The main functionalities provided in the Future Gate project (obtained from teachers' accounts)	41
Figure 2.3	The Technology Acceptance Model (Davis, 1989)	53
Figure 2.4	The Theory of Reasoned Action Model (Fishbein & Ajzen, 1977)	54
Figure 2.5	The TPB model (Ajzen, 1985)	55
Figure 2.6	The C-TAM-TPB Model (Taylor & Todd, 1995).....	56
Figure 2.7	UTAUT2 (Venkatesh et al., 2003)	60
Figure 2.8	TTF Theoretical Framework (Goodhue & Thompson, 1995)	61
Figure 2.9	Hypothesized Model	64
Figure 3.1	A representation of PLS-SEM phases.....	93
Figure 4.1	Gender percentages of study	103
Figure 4.2	Age groups of study participants.....	103
Figure 4.3	Percentage of experience in Future Gate platform groups.....	104
Figure 4.4	Constructs of the structural model	128
Figure 4.5	<i>f</i> square of constructs of structural model	129
Figure 4.6	Cross validated redundancy of the structural model	131

LIST OF ABBREVIATIONS

AVE	Average Variance Extracted
CFA	Confirmatory Factor Analysis
CR	Composite Reliability
C-TAM-TPB	Combining TAM and TPB
DOI	Diffusion of Innovation Theory
EE	Effort Expectancy
FC	Facilitating Conditions
GPA	Grade-Point Average
HB	Habit
HM	Hedonic Motivation
ICT	Information and Communication Technology
IT	Information Technology
KMS	Knowledge Management System
KSA	Kingdom of Saudi Arabia
LMS	Learning Management Systems
MM	Motivational Model
MPCU	Model of PC Utilization
NNFI	Nonnormed Fit Index
PCs	Personal Computers
PDA	Personal Digital Assistants
PE	Performance Expectancy
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PV	Price-Value
SCT	Social Cognitive Theory
SEM	Structural Equation Modeling

PLS-SEM	SEM-Partial Least Square
SI	Social Influence
SRMR	Standardised Root Mean Square Residual
TAM	Technology Acceptance Model
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action
TTF	Task-Technology Fit
UTAUT	Unified Theory of Acceptance and Use of Technology
WDQ	Work Design Questionnaire

LIST OF APPENDICES

Appendix A	Questionnaire (English Version)
Appendix B	Questionnaire (Arabic Version)
Appendix C	Implementation of mediators in SmartPLS
Appendix D	Validation 1
Appendix E	Validation 2

**FAKTOR YANG MEMPENGARUHI PENGGUNAAN GAMIFIKASI
DALAM PERSEKITARAN PEMBELAJARAN DALAM TALIAN DI
KALANGAN GURU SEKOLAH DI ARAB SAUDI**

ABSTRAK

Penggunaan teknologi dan sistem e-pembelajaran di bilik darjah boleh memberi kesan yang besar terhadap pembelajaran pelajar. Untuk tidak ketinggalan, pihak kerajaan Arab Saudi juga telah memperkenalkan inisiatif program ‘Future Gate’ dalam melaksanakan teknologi di peringkat sekolah menengah, di mana gamifikasi telah diaplikasikan dalam platform ini. Namun begitu, apakah faktor-faktor yang boleh mempengaruhi penerimaan dan penggunaannya dalam kalangan guru sekolah? Secara khususnya, kajian ini bertujuan menyiasat kesan dan hubungan antara jangkaan prestasi, jangkaan usaha, pengaruh sosial, motivasi hedonik, persekitaran yang memudahkan, dan tabiat guru sekolah terhadap hasrat mereka untuk menggunakan gamifikasi dalam aktiviti pengajaran dan pembelajaran dalam persekitaran platform Future Gate. Kajian ini juga berhasrat menyiasat impak faktor usia, jantina, dan pengalaman terhadap semua pemboleh ubah tersebut. Seterusnya, kesan ciri-ciri teknologi dan tugas serta bagaimana ia secara langsung atau tidak langsung mempengaruhi persepsi guru terhadap Kesesuaian Tugas–Teknologi atau *Task-Technology Fit* (TTF), hasrat untuk menggunakan gamifikasi dan perlakuan penggunaan gamifikasi turut diukur. Kajian korelasi ini menggunakan pendekatan SEM – *Partial Least Square* (PLS-SEM) bagi menganalisis hubungan antara konstruk-konstruk yang dikenalpasti melalui sorotan literatur. Seramai 328 orang guru sekolah menengah dari tujuh daerah pentadbiran pendidikan di Arab Saudi telah terlibat dalam kajian ini. Dapatan menunjukkan bahawa jangkaan usaha, pengaruh

sosial dan motivasi hedonik mempunyai kesan positif yang signifikan terhadap hasrat peserta kajian, walaupun jangkaan prestasi menunjukkan sebaliknya. Walaubagaimana pun, persekitaran dan tabiat tidak memberikan kesan signifikan terhadap hasrat penggunaan gamifikasi guru. Seterusnya, ciri-ciri teknologi dan tugas mempunyai kesan positif yang signifikan terhadap TTF, dan TTF ini juga turut memberi kesan signifikan terhadap jangkaan prestasi dan hasrat mereka. Bagi faktor yang mempengaruhi penggunaan gamifikasi, hanya konstruk hasrat sahaja yang memberikan kesan positif dan signifikan, manakala TTF dan tabiat tidak menunjukkan kesan sedemikian. Sementara itu, bagi kesan moderasi pemboleh ubah demografi, didapati: (i) jantina tidak menunjukkan kesan signifikan terhadap mana-mana peramal bagi hasrat menggunakan gamifikasi, (ii) pengalaman memberi kesan moderasi yang signifikan dan positif antara pengaruh sosial dan hasrat menggunakannya, namun memberi kesan moderasi negatif antara jangkaan prestasi dan hasrat tersebut. Akhirnya, dari segi kesan perantara, hasrat guru untuk menggunakan gamifikasi tidak menunjukkan impak perantara persekitaran dan perlakuan penggunaan. Walaubagaimana pun, kesan perantara yang signifikan dapat dilihat bagi faktor hasrat terhadap motivasi hedonik, pengaruh sosial serta TTF terhadap perlakuan penggunaan. Kajian ini telah menyumbang kepada badan ilmu dari aspek keserasian integrasi model UTAUT2 dan TTF dalam menentukan penerimaan guru dan penggunaan sebenar gamifikasi dalam aktiviti-aktiviti pengajaran dan pembelajaran. Juga, dalam kajian ini, memandangkan jangkaan usaha, pengaruh sosial dan motivasi hedonik adalah merupakan peramal-peramal signifikan yang utama bagi penggunaan gamifikasi di kalangan guru, konstruk-konstruk ini perlu diberikan penekanan dan pertimbangan dalam mereka bentuk dan

melaksanakan aktiviti pengajaran dan pembelajaran dalam talian yang melibatkan gamifikasi – sekurang-kurangnya di Arab Saudi.

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ABSTRACT

The use of technology and e-learning systems in classrooms can have a significant impact on students' learning. Not to be left behind, the Saudi government launched the 'Future Gate' project to implement technology in secondary schools in which gamification is applied in this e-learning platform. However, what are the factors that might influence its acceptance and utilization among the school teachers? Specifically, this study examined the effects of performance expectancy, effort expectancy, social influence, hedonic motivation, facilitating conditions, and habit on teachers' behavioural intention to use gamification in teaching and learning activities in the Future Gate platform. It also investigated the impact of age, gender, and experience on these variables. In addition, the study evaluated the effects of task and technology characteristics and how they influence teachers' perception of Task-Technology Fit (TTF) and the teachers' behavioural intention to use gamification. This study utilised SEM-Partial Least Square (PLS-SEM) to analyse the relationships between the constructs identified from the literature review. A total of 328 secondary school teachers participated in this study from seven districts in Saudi Arabia. The findings indicated that effort expectancy, social influence and hedonic motivation have significant positive impacts on the teachers' intention to use, although performance expectancy indicates otherwise. However, facilitating conditions and habit did not have any significant influence on the teachers' intention to use gamification. Next, task and technology characteristics both have a significant

positive influence on TTF, while TTF itself has a significant impact on intention to use and performance expectancy. As for the factors that affect the usage of gamification, only the intention to use construct had a significant positive influence while TTF and habit did not indicate such influence. Meanwhile, for the moderating effects of the demographic variables, the findings indicate that (i) age has limited the predictive impact of habit on intention to use gamification, (ii) gender did not show any significant moderating effect of any predictors on the respondents' intention to use, and (iii) experience significantly and positively moderates the effect between social influence and intention to use, but negatively moderates the effect between performance expectancy and intention to use. Finally, in terms of mediating effect, the teachers' intention to use did not mediate the impact of facilitating conditions on use behaviour. Nevertheless, a significant mediating effect was found for the intention to use on the influence of hedonic motivation, social influence, and task-technology fit on the gamification use. This study has contributed to the body of knowledge as it suggests the compatibility of integrating the UTAUT2 and TTF models in determining teachers' acceptance and actual use of gamification in their online teaching and learning activities. Also, in this study, as effort expectancy, social influence, and hedonic motivation are the most significant predictors of the teachers' use of gamification, these constructs need to be given more emphasis and consideration in designing and delivering online teaching and learning activities with gamification – at least among Saudi secondary school teachers.

CHAPTER 1

INTRODUCTION

1.1 Introduction

The current utilisation of various motivational approaches in teaching and learning processes has increased students' excitement and involvement in the classroom. It is evident from the literature that the process of using motivational strategies in the classroom may not reveal the true potential of these strategies (Chai, Wong, & King, 2016; Hornstra, Mansfield, van der Veen, Peetsma, & Volman, 2015; Wlodkowski & Ginsberg, 2017), particularly concerning how interventions using motivational/enforcement activities would influence students' learning. Using certain activities or strategies depends mainly on how a teacher manages students' interactions and performance. According to Stupnisky BrckaLorenz, Yuhas, & Guay (2018), instructors' motivation for teaching can be used as the main predictor of their utilisation of teaching best practices. In addition, the positive intention of individuals toward technology has been found by many previous studies to be the core factor for technology usage in different contexts, such as mobile learning (Briz-Ponce, Pereira, Carvalho, Juanes-Méndez, & García-Peñalvo, 2017; Hong, Thong, & Tam, 2006), e-learning systems (Fathema, Shannon, & Ross, 2015; Siegel, Acharya, & Sivo, 2017), banking (Lu, Tzeng, Cheng, & Hsu, 2015; Susanto, Chang, & Ha, 2016), and many more.

In a classroom setting, it is always important to consider the best teaching practices to help teachers move out of their submissive positions in educational systems and encourage them to offer a more innovative role in curriculum design and improvement (Darling-Hammond, Flook, Cook-Harvey, Barron, & Osher, 2020).

Several studies have been conducted to promote teachers' usage of technology in which it is argued that when teachers use innovative technologies and strategies, they can deliver efficient teaching to their students. In addition, teacher's use of modern strategies to scaffold students' learning helps them become less vulnerable to and dependent on external challenges (Mehrani, 2015). This is why it is assumed that when teachers provide their students with a set of optimal sub-goals for their learning session, they can potentially progress (Azevedo et al., 2011). Based on the literature (Yildirim, 2017), this can be achieved using modern motivational activities such as gamification to help in emulating students' interest in the learning topic.

In the meantime, Saudi's first initiative to integrate Information and Communication Technology (ICT) services into secondary schools occurred in 2007 by launching Tatweer (to develop). This tool created by the King Abdullah bin Abdul-Aziz Project to aid in the facilitation of learning and teaching. The generalisation of this program from secondary education to primary education has not been attempted, and despite the urgent need for new forms of learning mode, the integration of modern technology at the secondary school level continues to be misrecognised (Alshmrany & Wilkinson, 2014). This led the Government of Saudi Arabia to consider expanding its education system at the secondary school level by using modern technology and apply educational theories that will support the educational process and the agenda of the Ministry of Education. In order to achieve the Kingdom's 2030 vision, the Minister of Education, Dr Ahmed Al-Issa, launched the "Future Gate Program" as one of the initiatives of national transformation towards digital education. The Future Gate project is already implemented in 300 schools within Saudi Arabia (Hadi, 2018). Gamification is one of the ministry's agendas currently being applied in all schools in the Kingdom. It provides further

educational support for students and teachers, such as gamified learning activities, to support students and teachers' teaching and learning activities at different educational levels (Broer & Breiter, 2015; Faiella & Ricciardi, 2015; Holmes & Gee, 2016).

In the context of this study, gamification refers to the practice of applying game design principles to non-game situations (Brigham, 2015). Zichermann and Cunningham (2011) asserted that incorporating game mechanics into the teaching process of a lesson can potentially improve learners' abilities. This is because game mechanics can result in a higher level of learners' commitment and motivation to the learning task they are involved in (Browne et al., 2018). Teachers at secondary and primary levels worldwide have been adopting these game mechanics to engage their students in learning different topics and subjects. Because of that, teachers have been more concerned about applying new game techniques to motivate students to participate in the learning process (Cavalcanti, Filatro, & Presada, 2018). As a result, reward and other similar mechanisms have been integrated and used widely by teachers. According to Matallaoui et al., (2017), incorporating gamification strategies into the design of a curriculum may often result in a better teaching situation. Nevertheless, this does not imply that gamification should be a replacement for face-to-face teaching. In general, gamification offers game-based elements and strategies to increase motivation and engagement and even solve students' problems (Brigham, 2015).

The application of gamification in school teaching and learning has received much attention over the past few years (Khaleel et al., 2015; Kim et al., 2018; Rughiniş, 2013). This is because motivating young students to practice becomes more complex, especially when learning is partially carried out online via the

learning management system (Dodero, Gennari, Melonio, & Torello, 2014; Kickmeier-Rust, Hillemann, & Albert, 2014). Marín et al., (2015) reported the potential of using gamification in school classes from the teachers' perspectives. They emphasised the importance of embedding gamification into the teaching and learning processes, mainly to promote a lifelong learning agenda. In this study, gamification and gamified learning activities are used interchangeably to represent teachers' use of points, leader boards, and badges in teaching.

1.2 Research Background

The digital age and technology have provided many solutions to improve people's living conditions in all aspects including education. The Kingdom of Saudi Arabia has launched the Future Gate platform, a renewed educational initiative for the Kingdom of Saudi Arabia that supports a vision for high-quality, inclusive, and accessible digital education, and aims to support the adaptation of education and training systems to the digital age to meet challenges and provide opportunities for the education and training community for teachers and students. Transforming education through innovative technologies is not enough to ensure the success of students. It also includes the movement towards replacing old teaching methods like the teacher-centred approach with other modern teaching practices to facilitate students' interest in the learning process (Mirete, Maquilón, Mirete, & Rodríguez, 2020). The researcher's literature review showed an ongoing argument about the need for adjusting online services to achieve and facilitate students' motivation through the appropriate instructional approaches (Jang, 2008; Muro, Soler, Cebolla, & Cladellas, 2018).

In Saudi Arabia, although e-learning systems have been extensively studied in a higher education context, little attention seems to be given to the involvement of technology in schools (Sabti & Chaichan, 2014). In addition, there is limited evidence about the intention of school teachers to consider utilising the gamified services offered in the Future Gate platform. Teachers' intentions to utilise gamified services to motivate students in their learning process have yet to be determined. According to Alebaikan (2012), the loss of teacher-student contact is mainly due to the increased class sizes. This is why the Ministry of Education in Saudi Arabia considered using electronic means to provide different gamified learning activities. Alghamdi and Higgins (2015) stated that it is essential to investigate teachers' views in Saudi schools towards their current skills to use modern online tools. It is possibly due to teachers' different perceptions and beliefs, which can lead to a shift in the use and adoption of technology.

Gamification uses game aspects in non-game contexts, such as learning (Deterding, Dixon, Khaled, & Nacke, 2011). The main gamification elements and mechanics are rewards, achievements, leaderboards, and badges; all are used to increase students' motivation in the learning process. The concept of gamification in education has been regarded as an important development in Information Technology (IT), and therefore, other different forms of IT have also been utilised to facilitate a more comprehensive and behavioural change in similar contexts (Huotari & Hamari, 2012; Majuri, Koivisto, & Hamari, 2018). Although gamification may differ from other IT advances in influencing motivation and behaviour (Hamari, Koivisto, & Sarsa, 2014), individuals' intention to use or adapt gamification serves as an essential avenue for investigation. For example, specific learning management systems, such as e-learning, m-learning, augmented reality, etc., have been utilised to

sway people's emotions and behaviours. The primary goal of implementing these systems is to influence users' social and communicative behaviour and modify their attitudes (Al-Emran et al., 2016; Althunibat, 2015; Park et al., 2012). Meanwhile, gamification aims to aid teachers to help students to learn efficiently by employing emotional processes rather than cognitive processes (Caponetto, Earp, & Ott, 2014). Using gamification with rewards such as leaderboards, and badges gives students' more motivations to learn and increase their learning process. Hence, this study attempts to investigate the potential role of using gamified learning activities in facilitating school teachers' teaching in the Future Gate platform.

In addition, the application of gamification in education process helps to encourage students to make "good" decisions by providing several options and consequences with each choice. These rewards and consequences help students to value their decision and encourage them to learn more effectively and achieves more rewards. Based on this, it can be assumed that the phenomenon of using gamification among teachers can be related to the concept of "choice" as defined in many behavioural studies (Bekkering, Johnston, Warkentin, & Schmidt, 2009; Mun, Jackson, Park, & Probst, 2006; Straub, 2009). This perspective, which involves a positive outlook on behavioural biases, is a personal preference or decision to utilise or modify a service. It is anticipated that using gamification through modern means may influence teachers' choices to make them hesitate to adapt and use it in their institutions. Examining people's decisions whether or not to utilise technology in a context-specific environment might aid decision-makers in designing settings in which helpful biases are enhanced while negative ones are minimised (Thaler & Sunstein, 2009). According to Hamari and Koivisto (2015), when individuals shift from the traditional way to more advanced teaching and learning approaches, their

behavioural intention may change due to this transition. Thus, when school teachers in Saudi Arabia are encouraged to use Future Gate to offer various gamified learning activities, their intention may change through design reminiscent from games (Dodero et al., 2014; Kickmeier-Rust et al., 2014).

According to a recent review of the prospect of gamification in education, the majority of prior research found that the deployment of gamification had positive outcomes (Koivisto & Hamari, 2019; Majuri et al., 2018; Zhang, Ying, Song, & Ho, 2018). Despite the positive effects and benefits of utilising gamification in education process, there is still a notable lack of studies on factors predicting why school teachers should use gamified learning activities which include several variables such as age, gender, experience, etc. The process of examining issues related to why individuals prefer to utilise available technologies or services would help us explain technology adoption and acceptance (Mun et al., 2006). Based on an interview with an educational policy maker in Jeddah, Saudi Arabia, the concept of gamification has been recently introduced in July 2017 to school teachers to modernise their current teaching and learning practices. This move is intended to alter teachers' motivational strategies for inspiring students to achieve goals other than using the service. While reviewing the literature (Davis, 1989; van der Heijden, 2004), the researcher found some studies emphasising the importance of utilitarian systems for completing tasks efficiently and with as little effort as possible. Therefore, when teachers perceive the technology to offer the facilitating conditions needed to perform a task, they are likely to have the intention to use it (Liu et al., 2018; Teo & Beng Lee, 2010; Venkatesh et al., 2008). In addition, when an individual has an intrinsic motivation by the antecedents of the technology or system, they are said to

engage in an activity solely for the sake of engaging in it, rather than for any external purposes (Hamari & Koivisto, 2015).

Teachers' enjoyment from using the technology can potentially drive their performance and achieve their goals (Panda & Mishra, 2007). It includes the role of technology in creating an optimal or autotelic experience (Aubusson, Burke, Schuck, Kearney, & Frischknecht, 2014; Klimmt, Roth, Vermeulen, Vorderer, & Roth, 2012). Systems that can create a sense of motivation or enjoyment to people are referred to as hedonic systems. For example, when teachers use Future Gate to motivate students to learn collaboratively, teachers' sense of performance expectancy can be improved due to their hedonic experience. Thus, when the concept of gamification is explored from the teachers' views, we can understand how it would emulate teachers' use for future teaching. In addition, there is a reason to believe that a technological fit in terms of teachers' abilities to handle the gamified learning activities may also influence, in a way, their intention to use or adapt technology in their teaching. Therefore, gamification can be viewed as an exciting class of activities that not any teacher would like to use or integrate into their teaching (McFarland et al., 2017).

Similarly to system types, perceiving the fit between technology and task can provide a better view of technology acceptance (McGill & Hobbs, 2008). The Task Technology Fit (TTF) Model, which posits that technology adoption is partly influenced by how well the new technology meets the requirements of a particular task, is one of the most extensively used theories on individual fit (Goodhue & Thompson, 1995). Based on these observations, this study will be carried out to determine how the main factors affect secondary school teachers' intention to utilise gamified learning activities in the Future Gate platform. This study attempts to

combine TTF with Unified Theory of Acceptance and Use of Technology or UTAUT, as proposed by Venkatesh et al., (2012), in order to determine the intention of Saudi teachers to use gamified learning activities in the Future Gate platform. It is believed that the outcomes from this work would extend current knowledge about teachers' views toward gamification as a concern in the Kingdom.

1.3 Problem Statement

The gamified elements within the Future Gate platform (e.g., badges, leaderboards, and points) were introduced as an alternative solution to the problem of technology integration within the secondary school context (Al-Ohali et al., 2019). Although teachers at secondary schools in the Kingdom of Saudi Arabia generally agreed on the significance of online learning platforms in improving the learning process, several issues continue to arise while implementing these technologies. It pushed some previous studies, like Al-Ohali et al., (2019), to outline the importance of examining the physiological constructs contributing to people use and interaction with the learning activities within the Future Gate platform, mainly through a comprehensive evaluation. Several concerns were shared across the Future Gate platform teachers concerning their interest in using the activities to teach their subjects (Abdullah. Masmali, 2020). Few concerns were mapped around the conflict between teachers' interests and their responsibilities, their inability to manage the learning activities, and concerns about the impact of learning activities on students' learning. As such, the use of technology among secondary school teachers in the Kingdom seems to be less common, thus putting it at a disadvantage compared to the other countries (Alenezi, 2017; Alshmrany & Wilkinson, 2017).

Moreover, knowledge about teachers' behavioural intention to use the gamified learning platform to support learning process in several areas and to develop associated behaviours, (e.g., participatory approaches, collaboration, self-guided study, completion of assignments, making assessments easier) is not sufficient (Dichev & Dicheva, 2017). To ascertain this point and build the necessary basis for this research, the researcher conducted an email interview with one of the administrators of the Future Gate platform to gain some insights into the current understanding of teachers' use of the platform. The interviewee was from a leadership level with 14 years of experience in teachers' development programs. He was selected because of his role as the associate administrator of the Future Gate platform. Based on the interview, the researcher found a variation in teachers' use of the gamified services offered in the Future Gate platform. When asked about the current use of the gamified services offered to the teachers, the administrator responded that most teachers who have been encouraged to use the platform did not show the expected usage rate. Out of approximately 7000 teachers, only 1500 teachers were found to be active users of this platform.

The interviewee was also asked about the current understanding of the reasons behind teachers' use of the platform. He answered that:

“There are no studies conducted yet to investigate or even examine users' intention to use the gamified activities in the platform. I think there is room for improvements, and like any new technology, we always try to explore its impact on the users. This is why I believe that studying the intention of teachers to use our modern teaching services is essential and timely.”

Based on these observations, the researcher was motivated to examine Saudi school teachers' use behaviour of the gamified learning and teaching services available at the Future Gate platform.

1.4 Research Objectives

The main aim of this study is to model the key factors affecting teachers' use of gamification in the Future Gate platform. To determine the behavioural intention of teachers to use gamification, this study is established based on the UTAUT2 and TTF models. In addition, the present work aims at achieving the following objectives:

- a) To examine the effects of performance and effort expectancy, social influence, hedonic motivation, facilitating conditions, and habit on the behavioural intention of school teachers to use gamification.
- b) To examine the effects of task and technology characteristics on instructors' perception of task-technology fit.
- c) To examine the effects of task-technology fit on the behavioural intention of school teachers to use gamification/gamified learning activities.
- d) To examine the effects of the behavioural intention and task-technology fit in teachers on their use behaviour (actual use) of gamification in their teaching.
- e) To examine the effects of age, gender and experience on the relationships among performance and effort expectancy, social influence, facilitating conditions, hedonic motivation, and habit towards teachers' intention to use gamification.

1.5 Research Questions

Based on the previous problem statement and objectives, this research aims at answering the following questions:

- a) What are the effects of performance and effort expectancy, social influence, hedonic motivation, facilitating conditions, and habit on the intention of school teachers to use gamification?
- b) What are the effects of task and technology characteristics on instructors' perception of task-technology fit?
- c) What are the effects of task-technology fit on the behavioural intention of school teachers to use gamification/gamified learning activities?
- d) What are the effects of the behavioural intention and task-technology fit in teachers on their use behaviour (actual use) of gamification in their teaching?
- e) What are the effects of age, gender and experience on the relationships among performance and effort expectancy, social influence, facilitating conditions, hedonic motivation, and habit towards teachers' intention to use gamification?

1.6 Research Hypotheses

- H₁. Performance expectancy positively influences teachers' intention to use gamification in the Future Gate platform.
- H₂. Effort expectancy positively influences teachers' intention to use gamification in the Future Gate platform.

- H₃. Social influence positively influences teachers' intention to use gamification in the Future Gate platform.
- H₄. Hedonic motivation positively influences teachers' intention to use gamification in the Future Gate platform.
- H₅. Facilitating conditions positively influence teachers' intention to use gamification in the Future Gate platform.
- H₆. Habit positively influences teachers' intention to use gamification in the Future Gate platform.
- H₇. Teachers' behavioural intention positively influences their usage of gamification.
- H₈. Task characteristics positively influence teachers' task technology fit.
- H₉. Technology characteristics positively influence teachers' task technology fit.
- H₁₀. Task technology fit of teachers positively influences their gamification usage.
- H₁₁. Task technology fit positively influences teachers' intention to use gamification in the Future Gate platform.

1.7 Theoretical Framework

The theoretical basis of this study was formed based on the factors from UTAUT2 and TTF models. The review of previous studies showed different degrees of interest in using the original Technology Acceptance Model (TAM) to understand the adoption of technological innovations. This model has been constantly developed or adjusted to meet the different requirements of new upcoming technologies and

usage purposes. Initially being TAM, it became TAM 2, TAM 3, and finally the Unified Theory of Acceptance and Use of Technology model, shortly referred to as UTAUT. The last one has also been adjusted based on findings from previous works. The latest version of the UTAUT model (UTAUT2) was proposed by Venkatesh et al., (2012). In educational contexts, many studies used UTAUT2 to understand and identify factors influencing students' and teachers' behavioural intention to use technology (Alasmari & Zhang, 2019; El-Masri & Tarhini, 2017; Raman & Don, 2013). Meanwhile, these authors recommended using this model in exploring users' acceptance of new technologies in different contexts.

Since the present study is mainly concerned with gamification in Saudi Arabia, the researcher considered using UTAUT2, furthermore, this study examines the elements that influence adoption in secondary school education from teachers' perspectives. The Future Gate platform's gamified services are a new technology recently deployed to secondary schools in the Kingdom. It has not been investigated in the technology adoption literature which elements impact future teachers' behaviour in embracing gamification as a teaching method on the Future Gate platform. As a result, this study uses UTAUT2, to understand instructors' attitudes regarding gamification adoption.

Since the context of this study is mainly devoted to the secondary education level, price value as a factor of UTAUT2, was not considered because it refers to the individuals' trade-off between the applications' perceived advantages and the monetary expense of utilising them. Furthermore, because UTAUT2 has the same factors as UTAUT1 and has not been further improved, and since teachers' fit is an essential element to be examined, this study considered integrating the task-technology fit model.

Goodhue and Thompson (1995) addressed two main concerns in their Task-Technology Fit (TTF) and individual performance research. The first concern was about understanding individuals' utilisation of technology (DeLone & McLean, 1992). The authors proposed a model to estimate users' attitudes and beliefs to predict the utilisation of technologies. The primary assumption in this model was that an increase in the use of technology would potentially lead to positive performance impacts (Goodhue & Thompson, 1995). However, the second concern was not mainly towards the role of technology in offering the required features and support that complete a work, which may positively impact individuals' performance and utilisation of innovation. When comparing the two models, the researcher found that the model for measuring technology fit examines individuals' performance (and sometimes utilisation). However, the model concerned with the utilisation part does not have as significant an impact as it has in the utilisation focus research stream. Thus, many previous studies, such as Gebauer et al., (2010), suggested using the performance model as utilisation is not always voluntary. For many users, job design is more important than system utility or users' attitudes about utilising them when it comes to usage (Goodhue & Thompson, 1995). Therefore, this study used TTF along with UTAUT2 in order to shape the research model of this study (Chapter 2 will provide more information about this). Figure 1.1 shows the theoretical framework of this study.

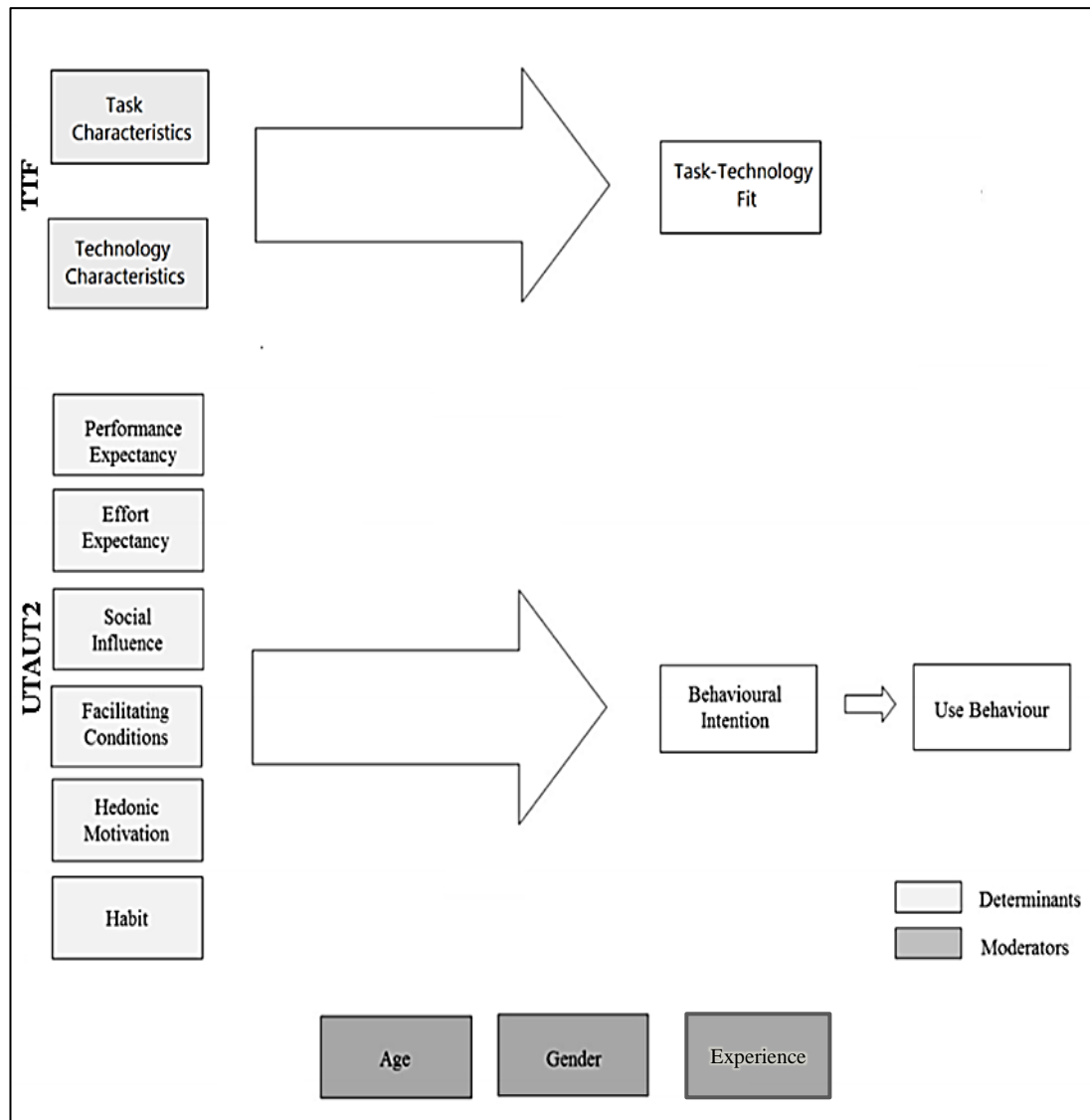


Figure 1.1 Theoretical framework

The UTAUT2 model considers factors which are seen critical in shaping users' attitudes and behaviours towards technology adoption, while the TTF model considers factors such as task complexity, technology functionality, and user experience to assess the match between the technology and the task. TTF model focuses on the fit between the technology and the task at hand. The assumption is that the better the fit between the technology and the task, the more likely users are to adopt and utilize the technology. These two models can be related and complement each other where the UTAUT2 model may help to explain why users' attitudes and

behaviours towards technology adoption vary based on task-technology fit. For instance, if a technology is perceived to be easy to use (effort expectancy) and likely to improve performance (performance expectancy), users may be more willing to adopt it, even if it doesn't fit perfectly with the task at hand. On the other hand, if a technology is seen as difficult to use or not likely to improve performance, users may be less likely to adopt it, even if it does fit well with the task. Therefore, while the UTAUT2 model focuses on user attitudes and beliefs, the TTF model emphasizes the importance of the technology-task fit. In order to determine the factors affecting the teachers' use of gamification, this study aims at using two theoretical models: UTAUT2 and TTF. UTAUT2 is used to explain how gamification usage among teachers can be influenced by performance and effort expectancy, social influence, hedonic motivation, facilitating condition and habit. All of the mentioned variables are regulated by the behavioural intention to use the gamification in the Future Gate platform. In addition, TTF is also used to examine the effects of task characteristics and technology characteristics on the teachers' intention to use gamification. The Task-Technology Fit mediates this effect on teachers' usage of gamification (see Figure 1.2). Age, gender and experience are used as moderating factors affecting the relationship between facilitating conditions, hedonic motivation and habit on teachers' intention to use gamification, as indicated by the original UTAUT2 model.

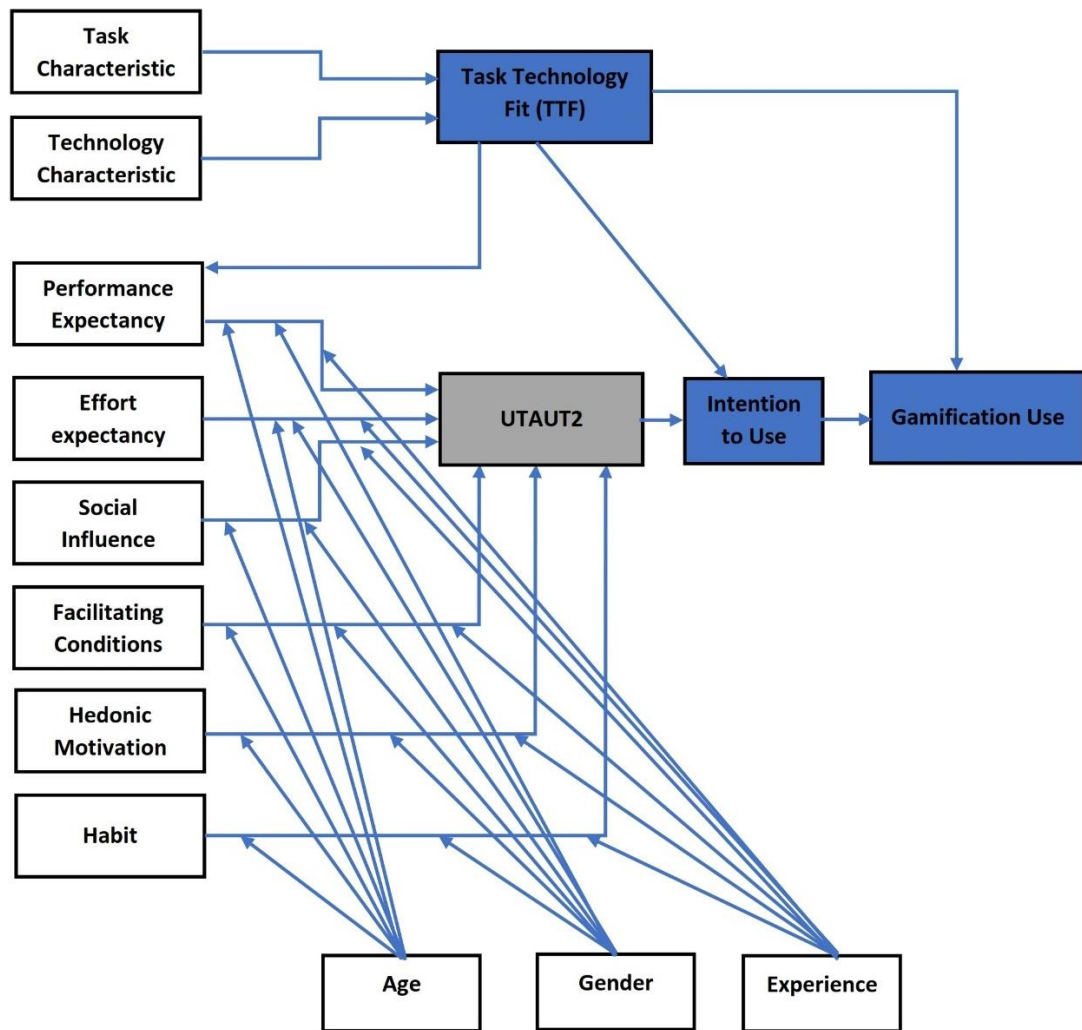


Figure 1.2 Research theoretical model

1.8 Research Limitations

This study is limited to studying the effect of certain moderating factors, namely age, gender, and experience on teachers' use or utilisation of the gamified learning activities as recommended by Nunes and Arruda Filho, 2018; Sánchez-Mena et al., 2019) which stated that these factors might facilitate or hinder technology adoption and found that age, gender and experience may potentially moderate teachers' behavioural use of technology.

This study only examines teachers' use behaviour of the gamified learning activities across different secondary-level subjects. The Future Gate platform is the primary investigation environment as it integrates the major gamification elements (points, leaderboard, and badges) to provide the required gamification activities. However, other gamification elements such as avatar, progress bar and challenges are not applied in the Future Gate platform.

In addition, this study considered excluding the 'price value' factor mainly because it does not fit into the context of this work. More precisely, the use of gamified learning activities in the Future Gate platform is fully sponsored by the Ministry of Education in KSA. Thus, the price value of using these activities is not relevant. Teachers' use of the platform may vary from one individual to another, which may help explain how they intend to use it in the future because the introduction of gamification took place in 2017. Thurm and Barzel (2020) found that prior experience moderates the relationship between teachers' beliefs and online system usage. In addition, Castañeda et al., (2019) found significant results of previous experience on the effect of perceived usefulness on users' intention to use a website. Also, Al-Ohali et al., (2019) stated that the Future Gate teachers seem to have enough experience to know the platform. This evidence was confirmed by Wendt and Courduff (2018), who discussed how teachers with more professional experience did not perform better than graduate teachers concerning technology use. As for using TTF, this study is limited to the TTF model that emphasises the performance and utilisation of technology. These aspects are believed to indicate that TTF and individual characteristics may influence user evaluation of the technology.

1.9 Research Significance

The research aims to fill the gap identified in the literature related to using advanced technologies and teaching strategies in the secondary education context. It is hoped that educational decision-makers will benefit from the present study's findings by providing the needed support and time to achieve this objective. The integration of UTAUT2 and TTF models in understanding teachers' use of gamification is novel and may potentially extend the current knowledge about technology adoption and utilisation in Saudi Arabia. It will help the Saudi education policymakers to set appropriate decisions, rules and guidelines that can increase teachers' use of the platform. Meanwhile, the theoretical implications from such integration can yield some innovative results into how elements from UTAUT2 and TTF can predict teachers' intention to use technology. This study may also contribute to developing a timely research model to better understand the factors affecting teachers' use of the gamification teaching method. Finally, the Ministry of Education in Saudi Arabia will likely benefit from this study as it may offer a glimpse of how school teachers perceive gamification or gamified teaching strategies.

1.10 Operational Definitions

The operational definitions are defined as below:

Future Gate: is an e-learning platform that the Kingdom's Ministry of Education introduced in 2017 to achieve the Kingdom's 2030 vision. The learning activities in this platform are gamified using the points-based system, leaderboard, and badges.

Task characteristics: is defined as the nature of the task users must execute (Trice & Treacy, 1988). In this study, task characteristics represent the gamified learning activities teachers need to execute in their teaching using the Future Gate platform. The activities include electronic homework and activities, electronic tests, interactive content, discussion, etc. In each of these tasks or activities, gamification elements involving badges, points, and leaderboard are used.

Technology characteristics: refers to the technology used by individuals to perform their tasks (D'Ambra, Wilson, & Akter, 2013). This study uses the gamified learning elements involving points, badges, and leaderboards in the Future Gate platform.

Task-Technology Fit: refers to the level of support technology provides to a user in completing a task (Goodhue & Thompson, 1995). This study refers to the degree of assistance (managing tasks, grading, monitoring, and sharing) that the Future Gate environment provides for the teachers to complete a specific task.

Performance expectancy: refers to a person's belief that using the system would improve their job performance (Venkatesh, Morris, Davis, & Davis, 2003). Here, it refers to the belief of teachers that using the gamification elements in the Future Gate platform will help them attain a better teaching performance.

Effort expectancy: refers to the degree to which an individual perceives that the technology will be easy to use (Venkatesh et al., 2003). In this study, effort expectancy refers to the teachers' perceptions of Future Gate ease of use.

Social influence: refers to a person's view of how significant the target behaviour is to others and whether they anticipate others undertaking it (Ajzen,

1985). Here, it represents teachers' perception of the importance of others' behaviours on using the Future Gate.

Facilitating conditions: refers to the availability of resources necessary to engage in a particular activity (Venkatesh et al., 2003). In this study, it refers to the support provided by the school to use the Future Gate platform in teaching.

Hedonic motivation: refers to the enjoyment of pleasure gained by using technology (Venkatesh et al., 2003). In the context of this study, it refers to the teachers' perception of enjoyment or pleasure gained by using the Future Gate platform.

Habit: refers to a habitual pattern of behaviour that occurs without conscious awareness (Gardner, 2015). Here, it refers to the repeated use of gamification in the Future Gate platform for teaching.

The intention to use: refers to the level to which teachers would like to use gamification in the Future Gate platform for teaching purposes.

Use Behavior: is the behavioural use of gamification elements and its repetition to achieve learning objectives (Venkatesh & Morris, 2000).

Experience: is a particular knowledge, skill or activity, which a person acquires because he has done that work or activity for a specified period (Lewis, 1988). In this study, the respondents' experience in using the gamification in the Future Gate platform is measured.

1.11 Summary

This chapter discussed the primary motivations for conducting this study. It introduced the research background and an introduction of the main elements for implementing this study. This chapter also highlighted the main research objectives and their significance for education in Saudi Arabia. The theoretical foundation for establishing the relationship between the study variables was explained and justified. The next chapter will discuss the literature related to this study.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter aims at introducing the main bases of this study. It explains the historical foundation of the educational system in Kingdom of Saudi Arabia (KSA) in its development throughout the years. It includes describing the current utilisation of the “Future Gate” platform in the context of this study. In addition, the role of gamification in facilitating students’ learning in this platform is discussed and linked to the purpose of this study. The research theories and associated hypotheses are also introduced and justified. A review of previous studies on gamification among school teachers is included to provide an in-depth understanding of the research gap. It is hoped that, in the light of the limited evidence about the use of gamification among school teachers, this chapter will bring new insight into why the researcher is conducting this work. Previous studies on the use of gamification and its relation to teachers’ intention have been explained by two main theories: The Unified Theory of Acceptance and Use of Technology (UTAUT2) and the Task-Technology Fit (TTF) theory. The main reason for using these theories is due to their popularity in technology adoption and utilisation research. In addition, these theories are commonly used when explaining teachers’ adoption and use of modern technology (Mamat, Yusoff, Abdullah, & Razak, 2015; Mokhtar, Katan, & Hidayat-ur-Rehman, 2018). These theories are also relevant to the context of this study since they involve the use of the Future Gate platform among teachers.

According to Zniva and Weitzl (2016), a literature review provides a more profound view and insight into the main aspects of the topic under investigation. It