

EFFECT OF GAMIFICATION ON MOBILE FITNESS APPLICATION  
ENGAGEMENT USING GOAL SETTING THEORY

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## **DEDICATION**

This thesis is dedicated to my parents Pg Arshad Bin Pg Kassim and Dg Salamah Binti Ag Yahya and my beloved family, who taught me that the best kind of knowledge to have is that which is learned for its own sake. It is also dedicated to my supervisor Prof Dr Rohaizat Baharun and co-supervisor Dr Norzaidahwati Zaidin, who taught me that even the largest task can be accomplished if it is done one step at a time.

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## **ABSTRACT**

Research efforts at investigating the extension and joint forces of Goal Setting Theory as internal forces with gamification as external forces on engagement have received less attention among scholars especially in mobile fitness application context in Malaysia. Thus, there have been calls for the exploration of Goal Setting Theory with gamification that influence engagement behavior relationships. The aim of this research is to extend Goal Setting Theory by adding gamification engagement on mobile fitness application among Malaysian Gen Y group. Quantitative technique was used in this study and data were collected from 355 mobile fitness application user among Gen Y in Malaysia using purposive sampling techniques. Data analysis were conducted using SPSS (V23) and SmartPLS3. Results indicated that the Goal Setting Theory variables and gamification explained engagement behavior both as internal and external forces. The research finding also revealed that goal core directly influenced user engagement; while goal mechanisms fully mediated the relationship between goal core and engagement. Furthermore, the gamification was found to significantly moderate the influence of goal core on engagement. The research contributes to theory by integrating the literature on Goal Setting Theory and gamification, while the practical implication of the study provides an engagement strategy for gymnasium owners through mobile fitness application.

## ABSTRAK

Usaha penyelidikan untuk mengkaji lanjutan dan gabungan bersama Teori Penetapan Matlamat sebagai kuasa-kuasa dalaman dengan gamifikasi sebagai kuasa-kuasa luar kepada penglibatan telah menerima kurang perhatian di kalangan cendekiawan terutama dalam konteks aplikasi kecergasan mudah alih di Malaysia. Oleh itu, terdapat saranan untuk penerokaan Teori Penetapan Matlamat dengan gamifikasi bahawa ia mempengaruhi hubungan tingkah laku penglibatan. Tujuan utama kajian ini adalah untuk melanjutkan kajian Teori Penetapan Matlamat dengan menambah peranan penglibatan gamifikasi di aplikasi kecergasan mudah alih di kalangan kumpulan Malaysia Gen Y. Penyelidikan ini menggunakan teknik kuantitatif dan data telah dikumpulkan daripada 355 pengguna mudah alih aplikasi kecergasan di kalangan Gen Y di Malaysia menggunakan teknik persampelan bertujuan. Analisis data telah dijalankan dengan menggunakan SPSS (V23) dan SmartPLS3. Keputusan kajian menunjukkan bahawa pembolehubah Teori Penetapan Matlamat dan gamifikasi menjelaskan tingkah laku penglibatan kedua-dua sebagai kuasa-kuasa dalaman dan luaran. Dapatan kajian juga menunjukkan bahawa teras matlamat secara langsung mempengaruhi penglibatan pengguna; manakala mekanisma matlamat mengantara sepenuhnya hubungan antara teras matlamat dan penglibatan. Tambahan pula, penyelidikan gamifikasi didapati mempunyai pengaruh signifikan sebagai penyederhana ke atas hubungan teras matlamat pada penglibatan. Kajian ini menyumbang kepada penyelidikan teori dengan mengintegrasikan literatur Teori Penetapan Matlamat dan gamifikasi, manakala implikasi praktikal kajian menyediakan strategi penglibatan bagi pemilik gimnasium melalui aplikasi kecergasan mudah alih.

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## **LIST OF ABBREVIATIONS**

GST	-	Goal Setting Theory
ENG	-	Engagement
GAM	-	Gamification
GC	-	Goal Core
GM	-	Goal Mechanisms
MFA	-	Mobile Fitness Application
MCMC	-	Malaysian Communications and Multimedia Comission
SDT	-	Self-Determination Theory

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# CHAPTER 1

## INTRODUCTION

### 1.1 Background of the Study

The advancement of mobile technology and applications in mobile devices such as smartphones and PC tablets has a significant impact on the society, which has changed the lives of millions of people around the globe (Jusoh, 2017). For instance, a mobile fitness application has been introduced as a medium for users to practice healthy lifestyle and track fitness goals (Lim and Noh, 2017). Some of the mobile fitness apps have been incorporated with persuasive features to engage users and to adopt mobile fitness apps in ways that would allow them to feel the physical exercise experience (Higgins, 2016).

The mobile fitness application is one of the fastest-growing categories, and more than half of all mobile device users who mostly encompass smartphone users and have downloaded mobile fitness application to improve their healthy lifestyle (Byun, Chiu and Bae, 2018). Krebs and Duncan (2015) concluded that 58% of smartphone users had downloaded at least one mobile fitness application onto their mobile devices. Due to the increasing demand for mobile fitness application, several sports brand providers such as Nike and Adidas have developed their versions of mobile fitness application for their customers (Armstrong- Gibbs and McLaren, 2017).

In academics, only a few scholars have been involved in mobile fitness application engagement research through the application of Goal Setting Theory (GST) and gamification (Wolf, Weiger and Hammer Schidmt, 2018; Hofacker *et al.*, 2016). The background of the study, research problems and gaps, research questions and research objectives, significance of the study including theoretical and managerial contributions, the scope of the study, operational definition of key terms

and the organization of the study have been discussed, because it guides the research towards a position that would lead to the conduction of further analysis.

### 1.1.1 Mobile Fitness Application and Gamification

Based on a Reuters Report (2017), mobile fitness application are one of the primary contributors to the mobile health market, which accounted for around USD\$ 23 billion, and is estimated to grow by a further CAGR 35% over the next three years (Goodwin and Ramajaun, 2017; Jusoh, 2017). On the other hand, mobile fitness appication is expected to expand the market of mobile health (m-health) to reach around USD\$ 111.8 billion by 2025, with a growth of CAGR 44.2% in the global market (Gibbs, 2016). These two research reports have concluded that mobile fitness apps have the potential to improve consumers' healthy lifestyles. In terms of market size, this area has been growing up at a rapid pace; and many developers are developing mobile fitness application to cater to the needs of users, where it would help them in accessing the fitness programs available at clubs through the mobile application platform (Market Research Report, 2019). Figure 1.1 shows the recent forecasting global market size of mobile fitness application:

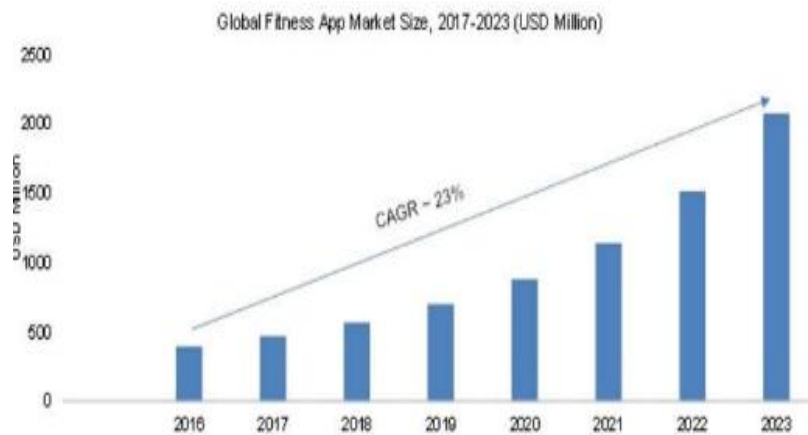


Figure 1.1 Global Market Size for Mobile Fitness Application adapted from Market Research Report (2019).

Based on Figure 1.1, the CAGR global market size of mobile fitness application in global market is expected to grow around 23% on 2023. It shows that mobile fitness application received a great attention among developers and started to expand globally. Table 1.1 illustrated the engagement of mobile fitness apps user survey worldwide in 2019: -

Table 1.1 The Frequency of Mobile Fitness Application Engagement (2019)

Frequency of Engagement	Percentage (%)
10 times a week	26 %
6 to 10 times a week	16 %
2 to 5 times a week	33%
Once a week	25%

Source: Grand View Research (2019)

From Table 1.1, it indicated that most of the mobile fitness application users engaged their apps at least 2 to 5 times but lower percentage of user used mobile fitness application around 6 to 10 times a week. Thus, the there is a lower percentage of user engagement on mobile fitness application based on the report. The innovation of mobile fitness application has offered an opportunity for the practitioner to introduce gamification, which initially appeared in 2008 and broadly applied in technology and health practitioner encompasses a broad spectrum of gamification into the commercial world (Goodwin and Ramajaun, 2017).

The growth of mobile devices such as smartphones and tablets have far-reaching implications for the e-Health industry, especially on mobile fitness application, which are leading the rapid growth in the development of m-Health apps industry (Jusoh, 2017). Currently, there are more than 165,000 mobile fitness apps (including free and paid) publicly that used gamification as available in major app stores and some of the academic fitness centres have started to developed apps on their own (Mobile Health Developer Economic,2018).

Statista Report (2019) quotes that the total volume of the mobile fitness application market is \$ 1.778 Billion in 2016, and it is expected to grow \$ 4.1 Billion in 2021. Thus, the demand for mobile fitness app continuously evolves due to fitness awareness on the importance of a healthy lifestyle and stay in shape. The key players of the mobile fitness application are shown on Table 1.2 and all of them are engaged in the production of sportswear, sports footwear, fitness bracelets, and other gadgets which projected to grow faster and caught up with the physical devices in 2021. All of them have their apps for Google Apps and the App Store as shown on Table 1.2:

Table 1.2 The Key Player of Mobile Fitness Application and Revenue (2017)

<b>Company</b>	<b>Products</b>	<b>Revenue (in USD \$ Billion 2015)</b>
Adidas	miCoach FIT SMART, Heart Rate Monitor and Runtastic	19.28
FitBit	FitBit Zip, FitBit One, FitBit Flex, FitBit Charge and FitBit Alta	1.86
Garmin	Garmin Vivofit 3, Garmin Vivoactive, Garmin Vivismart and Garmin Forerunner	2.82
Nike	Nike+ Fuel Band, Nike+Fuel Band SE and Nike+Running	30.6
Under Armour	Under Armour Band, MapMy Fitness, MyFitness Pal and Endomondo	3.96
Xiaomi	Mi Band, Mi Band Pulse, Mi Fit	5

Source: Statista Report (2017)

Recently, the mobile fitness apps market has embraced about 45,000 app developers and more than 3 billion mobile fitness application have been downloaded since 2015 (Mobile Health App Developer Economic,2017). In 2017, 50% of mobile device users downloaded at least one mobile fitness application (Mobile Marketer, 2017). The proliferation of mobile devices such as smartphones and consumer interest in fitness life has fuelled the growth of mobile fitness application.

In 2019, the global industry market accounted for \$4.2 trillion with \$595 billion in spending for fitness and mind-body products (Global Wellness Institute Survey Report,2019) and mobile fitness application were in 8th place among the most popular apps in the Apple App Store with 3.01% of the market share (Statista Survey,2019). In Google Play, health and fitness apps were in 11th place with 2.94% of the market share (Statista Survey, 2018). The global fitness application market size is anticipated to reach over \$14.7 billion by 2026 (Polaris Market Research,2018). The engagement rate of mobile fitness application indicated that almost 96% of user only engaged at least one mobile fitness application because not all of user will implement their fitness goals in various platform. In term of engagement frequency, 75% of active users engage with their apps at least twice a week. As well, 25% of the most engaged user's open health or fitness application more than 10 times a week (Flurry Analytics Survey, 2018).

Gamification is usually frequently applied in designing mobile fitness application to practice exercises and sports activities for fun and engagement. Leader boards and metaphorical visualization are used on mobile fitness application to encourage individuals to work out more than normal. Many commercial mobile fitness applications such as Nike and MiCoach adopt gamification to motivate their users and engagement (Kim *et al.*, 2018). However, Kao and Liebovitz (2017) academic research noted that the application of gamification in mobile fitness application faced a critical problem with regard to how it can maintain the individual motivation and engagement with sports activities. In recent times, mobile fitness application in the market faced many obstacles and issues.

The main obstacles of mobile fitness application that used the gamification challenges are the inconsistency of user's engagement on mobile fitness application. Approximately one-third of mobile fitness application users are not engaged after downloading within 6 to 12 months because the gamification features offered are not tailored with their requirements, and not all gamification supported their goals (Hingle *et al.*, 2016). Shih, Liccardi and Weitzner (2015) identified that 50% of mobile fitness apps users are disengaged within the first two weeks or at best within six months after joining it because the available features did not motivate and help them in accomplishing the goals. One of the main issues that examined the reasons for disengagement is the ability of the user to align on tracking accuracy and user's inconsistency to commit to mobile fitness apps, although gamification is applied (Harrison *et al.*, 2015).

### **1.1.2 Goal Setting Theory (GST) and Gamification Academic Overview**

The existing of academic literature reveals that the adoption of Goal Setting Theory is the basis of success for any organizational context. The concept of Goal Setting Theory (GST) is the specific and focuses goals that lead to a higher level of task performance and engagement task and activity. Previously, studies had been found on more than 88 different tasks, involving more than 40,000 male and female participants across Asia, Australia, Europe and North America since 1990 (Locke and Latham,2006). For example, Wiese *et al.* (2005) revealed that goal setting theory can be applied effectively on any domain in which an individual or group has some control over the outcomes. They reviewed that it has been used not only to the organisational context but towards tasks and work.

According to Landers *et al.* (2015), Goal Setting Theory (GST) was initially developed by Locke (1968), who proposed that people will be motivated and engaged in striving towards goals. This theory is considered among powerful motivational interventions and capable across many situations and tasks. On the other hand, Karimi and Nickpayam (2017) justified that Goal Setting Theory (GST) is most likely to improve engagement when the goals are specific and challenging,

the subjects have sufficient ability, the progress feedback in goals related task and the exception of assigned which is accepted by the individual. These two studies showed that specific and clear goals are the keys to Goal Setting Theory to trigger the motivation and create the engagement as they perform daily task to attain the outcome.

Camp (2017) on meta-analysis found that the accumulated findings from the research on Goal Setting Theory have compacted into a set of patterns and assumptions now referred to as Goal Setting Theory (GST). He described an “open” theory that evolves a new research that is an original version of Goal Setting Theory (GST) formulated in 1990 based on 400 studies. Since then, more than 600 reviews of Goal Setting Theory have been completed leading to new findings and additional areas of inquiry.

Mora *et al.* (2017) found that most of the gamification included some ways of Goal Setting Theory (GST) at both the organizational level and as well as the individual level. However, some scholars such as Jacobs (2013) only investigated the implementation of gamification in organizations and goals as the centre of the model, but he did not investigate the relationship between gamification and Goal Setting Theory (GST). Hamari (2017) only studied how gamification works and supports the Goal Setting Theory but did not work on the link.

Tondello *et al.* (2018) found that Goal Setting Theory (GST) has been studied for more than two decades in justifying the engagement in the task by setting and monitoring goals. They also reviewed the identified 42 studies that are related to goal setting theory in the context of gamification and concluded that most of them employ Goal Setting Theory (GST) to support and design the gamification features, but it lacks the comprehensive work on establishing the link between gamification and Goal Setting Theory (GST).

Tondello (2018) claimed that the Goal Setting Theory (GST) with gamification could explain the actual behaviour such as performance and engagement. They claimed that the Goal Setting Theory explains the principles and common elements of gamification. Their finding noted that gamification is based on setting specific and challenging goals, encouraging users to pursue these goals, and providing constant feedback. Therefore, a gamification implementation that follows these guidelines should be able to satisfy these principles, as explained by Goal Setting Theory. They also introduced a probable explanation regarding how gamification works when goal setting is used to improve engagement and performance: (1) setting clear goals through gamification and encouraging users to pursue them help users focus their attention and efforts towards achieving the goals; (2) gamification can promote users to fail and try again until they achieve mastery, thus fostering persistence; (3) gamification can help users learn new skills by scaling the challenges according to the users' current abilities; and (4) gamification usually lead to self-attribution of performance, positive affect, and self-efficacy, further enhancing the effect of performance improvement.

Chen *et al.* (2019) concluded that Goal Setting Theory justified on how goals influenced organization and individual behavior related to performance and engagement. They defined goals as a primary objective that people endeavour to achieve through goal-related activities and increase their efforts to make the target. They also elaborated that the employment of gamification can help indicate the performance goals that organization or individuals to achieve and promote their efforts to attain those specific and core target.

Therefore, the study of Goal Setting Theory with gamification is related to the engagement behavior that is actively explored by the scholars. Richter *et al.* (2015) found that the application of Goal Setting Theory (GST) as the theoretical base in gamification explains the goals towards behavior in gaming systems. Other studies from Landers *et al.* (2015) and Neeli *et al.* (2015) found that the understanding of gamification through Goal Setting Theory (GST) are good starting points to understand on how it can explain the engagement behavior.



Based on literature review notes by Hamari *et al.* (2016), much empirical research has used Goal Setting Theory (GST) with gamification interventions as direct relationships, but they have not explicitly used gamification to construct and evaluate their responses, and only a few of empirical research works have explicitly studied Goal Setting Theory (GST) by adding gamification as the intervention. The present research intends to identify the application of Goal Setting Theory (GST) in justifying the engagement and the response of gamification as they are related with the goals which have not been exhaustively investigated by previous research at an individual level. Therefore, the information above leads to shedding light on the research gap and shows the opportunity for conducting the research discussed in the next session.

## **1.2 Research Problem**

Due to the rapid advance in mobile technology in the past decade, mobile apps have become the fastest-growing marketplace in the world. The advancement of mobile application in healthcare has offered innovative approaches to addressing user healthy lifestyle issues and problems (Jusoh, 2017). The usage of mobile fitness application among individuals is on the rise, and many of this mobile fitness application are downloaded by the user to motivate and engage them to do exercise more (Chen and Pu, 2014). However, mobile fitness application developer faces the fundamental challenge on how to make people try out the mobile fitness app and engage once they start using it (Lim and Young-Noh, 2017). To increase the successful usage of the mobile fitness application, the group of scholars has emphasized the importance of Goal Setting Theory and gamification in mobile fitness application while performing physical and engagement activities (Thomson, Nash and Maeder, 2016; Hermsen *et al.*, 2016).

Previously, only few of scholars have responded to the study of mobile fitness application engagement from different theory by including gamification. For instance, Goodwin and Ramjaun (2017) studied mobile fitness application engagement through the integration of Flow Theory and Lim and Young-Noh (2017)

through the combination of prospect theory and self-efficacy theory. Although there are theories studied by both scholars, it not focused on how mobile fitness application user goals arrangement are justified by the theories but only explain on the intrinsic and mental state involvement while engaging the activity in mobile fitness apps. Then, Honary *et al.* (2019) suggested that Goal Setting Theory (GST) as the basis or foundation for studying engagement because it justifies on how the goals leads to more engagement improvement.

The ideal situation to successfully the understanding of Goal Setting Theory for any research context is to ensure that the study can justify how Goal Setting Theory (GST) guides the academicians and practitioners to set the goals and implementation (Deschamps and Mattijs, 2016). It is possible by enriching the application of Goal Setting Theory (GST) with gamification since these two combinations related to each other. However, references in the literature show minimal emphasis on the use of Goal Setting Theory with gamification and highlights regarding the ways to introduce it on engagement behavior (Smith *et al.*, 2017; Shoaib and Kohli, 2017). The challenging and issues on the study of Goal Setting Theory (GST) wih gamification are how it can elaborate astute the strategy on deriving the engagement such as regulating their efforts and the intervention of gamification in influence the behavior (Deschamps and Mattijs, 2016; Cohn *et al.*, 2014; Horton, 2010).

Besides, the application of Goal Setting Theory (GST) as internal forces and gamification as external forces were studied to justify the engagement behavior. As a result, there is an insufficient amount of research focused on the combination of both internal and external forces (Moon *et al.*, 2017; Chernbumroong *et al.*, 2017). Also, these insufficiencies are higher when it comes to studies targeting developing countries (Latham *et al.*, 2017). Therefore, the researcher needs to identify the issues and challenges of this research. The next section discussed the potential of research gaps opportunities such as theoretical, methodological and practical for further justification.

### 1.2.1 Research Opportunity of Theoretical Gap

Theoretically, there had been a variety of engagement theories and models used by scholars to cater to the engagement behavior in the mobile fitness app. Engagement variables have been studied in mobile fitness application to analyse individual reactions to different initiatives. However, the results from the past research on engagement are mixed results especially on the antecedents of engagement. Therefore, this requires further understanding of the study of engagement behavior in supporting the justification and providing a piece of new knowledge to the existing literature of the engagement of the mobile technology and application in general and the mobile fitness application in particular.

Some of the scholars proposed to extend the research of the application of game elements in non-game context known as gamification in explaining the engagement behavior (Hofacker *et al.*, 2016). Most of the gamification studies by scholars focused on education context only, and there is a lack of theoretical connection which causes the shortcomings in explaining the engagement behavior (Bui *et al.*, 2017). Therefore, it provides the basis for the researcher to extend the study of gamification by including the theoretical connection to explain the engagement in a different context such as mobile application as recommended by scholars (Martí-Parreño *et al.*, 2016; Hardwood and Garry, 2015).

According to the literature, the group scholars have investigated gamification effect and influence on engagement behavior from various contexts and produced a mixed result among them (e.g., Aldemir *et al.*, 2018; Landers *et al.*, 2017; Hardwood and Garry, 2015; Insley and Nunan, 2014). A review of the literature indicated that past research dealt with the study of gamification in mobile fitness application. Although mobile fitness apps engagement research is growing, only a few scholars focused the study of gamification as intervention variables in mobile fitness application engagement (Goodwin and Ramajaun, 2017; Chen and Pu, 2014).

Additionally, some of the scholars have introduced the specific gaps in their research about the gamification in engagement behavior such as inappropriate of statistical validation (Insley and Nunan, 2014) and lack of conceptual and theoretical connection (Landers *et al.*, 2017; Hardwood and Garry, 2015). Therefore, it caused the difficulties among scholars to derive the explanation of gamification in engagement behavior on a mobile fitness application. Through the strengthening of the theoretical connection with gamification, it can enhance explanatory power to predict individuals' engagement in the mobile fitness app context. The study of Goal Setting Theory (GST) extensively investigated the empirical research of which the group of scholars has explored.

From the researcher's knowledge, only few of scholars investigated the application of gamification as external forces in explaining the engagement behavior on mobile fitness app context (Goodwin and Ramajaun, 2017; Chen and Pu, 2014) and the extension study of Goal Setting Theory (GST) and gamification in mobile fitness application (Lim and Noh, 2017; Arraya *et al.*, 2015). The Goal Setting Theory (GST) refers to individual motivation and desired behavior on goal achieving during the task accomplishment phase (Locke *et al.*, 1968). It reflects the individual state of mind on pursuing the relevant (the object of an action) and the intensity (the amount of effort to achieve the goal) (Locke and Latham, 2002).

The review of Goal Setting Theory (GST) depicted that this theory only explained internal forces behavior in engagement from organisational context (Bipp and Kleingeld, 2017; Sholihin *et al.*, 2016) although it can explain engagement behavior through internal and external forces from individual context (Locke and Latham, 2006). Some of scholars such as Lim and Noh (2017) and Arraya *et al.* (2015) proposed that goal-setting theory should be extend through the combination between internal and external forces because both forces able to justify the expected behaviour such as engagement and re-conceptualise the engagement from inindividual perspectives. However, the group of scholars such as Li *et al.* (2019), Ramshe, Ghazanfari and Ghonsooly (2019) and Smith *et al.* (2017) only extended the study of Goal Setting Theory (GST) from individual internal motivation only but not in both external and internal forces. By extending the study of Goal Setting

Theory (GST) in mobile fitness apps context, it can help mobile fitness app users to set their goals in fitness activity and how the goal mechanism helps them to achieve their goals and perform the actual behaviour in external and internal forces perspectives.

In addition, previous research has concentrated on the direct relationship among the antecedents of Goal Setting Theory (X-M) such as goal core and goal mechanisms (Shoaib and Kohli, 2017, Motel, 2016) and Goal Setting Theory (GST) variables and engagement (M-Y) (Kuo and Chen, 2019). However, only a few scholars tested the indirect relationship (X-M-Y) as well as the mediation role of goal mechanisms at the individual level. Hence, it is necessary to further the study on the mediating role of goal mechanisms at individual level because there is low intensity in research focusing on the mediation of goal mechanisms in Goal-Setting Theory specifically at individual level (Rodrigues *et al.*, 2017). Consistently, scholars have developed several perspectives in studying Goal-Setting Theory in public and private organizations (Shoaib and Kohli, 2017) and managerial aspects (Landers *et al.*, 2015). These perspectives focused at organizational level and mostly supported direct relationships rather than complex links that involve mediations and moderations.

The synthesized review of literature in Chapter 2 revealed that most of the gamification research focused on education (e.g., Aldemir *et al.*, 2018; Landers *et al.*, 2017; Martí-Parreño *et al.*, 2016). The reviews of the existing literature of Goal Setting Theory (GST) research revealed that most of the scholars extended Goal-Setting Theory on organisational engagement context and focused on internal forces (Bipp and Kleingeld, 2017; Smith *et al.*, 2017). Previous research on gamification has concentrated on the direct relationship as antecedents (Sailer *et al.*, 2017; Hammedi *et al.*, 2017) and gamification and outcome (Yang *et al.*, 2017; Hardwood and Garry, 2015). However, they rarely tested the indirect relationship as well as the moderation role of gamification from individual perspectives. Hence, it is necessary to conduct more research on the study of gamification as moderation as recommended by scholars (Mulcahy *et al.*, 2018; Rodrigues *et al.*, 2016). Therefore, this research aims to extend the study of Goal Setting Theory and adding

gamification as external forces in justifying the engagement in mobile fitness app context since there is a strong recommendation from scholars in strengthening the justification of Goal Setting Theory (GST) and gamification (Lim and Noh, 2017; Arraya *et al.*, 2015).

It also enlightens the researcher to develop a more comprehensive research model that includes all potential variables of Goal Setting Theory (GST) and gamification that may influence the individuals to engage in new technology and the mobile fitness app. The researcher believes that the research could be the basis to develop a comprehensive research model in the mobile fitness app engagement field. The research contributions provide new knowledge to the existing literature of the engagement in new technology in general and to the gamification on mobile fitness app in particular.

### **1.2.2 Research Opportunity of Practical Gap**

Engagement is an asset for the mobile fitness app developer though equally crucial across the healthcare industry and businesses. Some mobile fitness application developers are moving towards it by introducing the variation of mobile fitness app to engage with current user and promoting fitness lifestyles. However, some of the mobile fitness apps developers are struggling to maintain users' engagement. A study by Jusoh (2017) discovered that not all mobile fitness apps users would engage in fitness activities although they download apps, and some of them disengaged with fitness activities due to unattractive reward and inappropriate functionality.

Since 2013, there are 39,849 mobile fitness application that have been downloaded by the users from major app stores such as Google Store and Apple Store, but their engagement rate is only 38% (Mobilewalla, 2017; Flurry, 2017). In 2017, the engagement rate of mobile fitness application is shallow and comparatively less downloaded by mobile devices users (i.e., Games 39%, Social Networking 24%, and Health and Fitness 3%) (Flurry, 2017). It indicates that mobile fitness application

users' engagement is not entirely achievable strength in fitness lifestyles. Therefore, the mobile fitness apps developers faced a critical challenge on persuading the users to engage them in mobile fitness application activities behaviour (Yoganathan and Kajanan, 2017).

Although mobile fitness application are offered in mobile apps platforms, the awareness of fitness and healthy lifestyles is still at the infancy stage in Malaysia. According to Malay Mail (2016), only 40% of Malaysian citizens, especially Gen Y have adopted healthy lifestyles by participating in the activities on mobile fitness application and the government is planning to increase the rate of fitness engagement up to 60%. Although there is a user engagement on mobile fitness application among Malaysian and the awareness of government in promoting fitness lifestyle through free mobile fitness application is still on infancy stage and earned the unfortunate accolade as the fattest country in Asia and the survey found that the obesity and unhealthy lifestyles among Malaysian make up from 17.7% to 30% of the population respectively which means that the unhealthy lifestyles among Malaysian has a wider repercussions and negative economic impact on the long-term outlook of a country and not many Malaysian specifically Gen Y would genuinely be engaged with their mobile fitness app (The Star, 2017). Thus, the mobile fitness app still lacks of strategy to prevent unhealthy problems among Malaysian Especially Gen Y group, and the fitness awareness is still at infancy stage.

According to the above discussion, there is a critical issue on mobile fitness application users and they are misleading on the functionality that is not tailored with user's requirement. There is no suitable approach to persuade the user to engage them in fitness activity through a mobile fitness application. Then, the mobile fitness application developer adopted gamification which can increase initiation and motivate users' engagement behavior (Fankhauser, 2014). In addition, it has been estimated that 60% of mobile fitness application developer started to include gamification elements and it is on track to becoming a USD\$ 2.8-billion-dollar industry started on 2016 although there is a little evidence in the scientific literature in improving engagement regards to fitness behaviors (Munos *et al.*, 2016; Ferara, 2015).

In Malaysia, most of the exploration of gamification potential focuses on educational context only because it is a creative solution that successfully sustains the learning outcomes and engagement (Yue and Ying, 2017; Sanmugam et al., 2014). From researcher knowledge, not many researches in Malaysia context focused on gamification (the application of game elements exploration) in mobile fitness app and mostly were studied in a developed country (Lim and Young-Noh, 2017; Chen and Pu, 2014). Therefore, it is an opportunity for the researcher to explore the knowledge of gamification in the mobile fitness app context and increase the knowledge on how gamification conceptualizes the engagement on mobile fitness application in Malaysia research context.

This research posits that the gamification in mobile fitness application as a practical approach is uniquely promoting users' engagement. By studying gamification in the mobile fitness application context, it could help the developer to counter the disengagement of results from the act of user by applying gamification. At the same time, it highlights the opportunity to study the development of gamification in the mobile fitness application context by introducing the comprehensive research model.

### **1.2.3 Research Opportunity of Conceptual Gap**

An extensive literature review of Goal Setting Theory (GST) domain has rarely considered the contribution of an individual as well as using the individual as a unit of analysis (Robson *et al.*, 2016; Hamari and Koivisto, 2015; Seabron and Fels, 2015). Consequently, research that focused on the individual level unit of analysis is relatively scarce as compared to the research that conducted analysis at the organisational level. The majority of existing research has used organisation as a unit of analysis, and only a few scholars have touched some factors that are related to individuals. For instance, Tondello *et al.* (2018) concluded that many researchers had viewed Goal Setting Theory (GST) from organisational level perspectives, but few of them only considered the actions of individual level. This aspect is very crucial in



such that more research is needed to concentrate on individual factors and analysis. It also provides rich insights into individual perspectives and behaviors.

The review of the literature regarding respondents was conducted since respondents are crucial in any research. The selection of respondents requires a careful procedure and a strong sense of creativity to avoid bias. Previous scholars such as Debicki *et al.* (2016) and Nebel *et al.* (2017) argue that the extensive research of Goal Setting Theory (GST) is losing credibility by using the individual as the unit of analysis for respondents because they usually use their sense-making and imagination while responding the questionnaire. They also highlighted that using an individual as a respondent is essential because it provides insights from individual perspectives regarding the Goal Setting Theory (GST) view.

Most of Goal Setting Theory (GST) questionnaire items focused on group and organizational context. The majority of scholars adopted Goal Setting Theory items for the group and organizational context but scant in individual perspectives (Chernbumroong *et al.*, 2018; Shoaib and Kohli, 2017; Motel, 2016). They also recommended expanding the items that are related to the individual context, which can fill the gap. The majority of previous researches on Goal Setting Theory (GST) has used the items that focused on group and organizational context. Thus, there is insufficient knowledge about the Goal-Setting Theory (GST) items for individual perspectives on how to evaluate the extension of Goal-Setting Theory (GST) by looking from individual perspectives. Consequently, this research fills the identified gap regarding Goal-Setting Theory (GST) by constructing an item from individual perspectives.

### **1.3 Research Questions**

The research model of this current research based on the Goal Setting Theory (GST) (Locke and Latham, 1968) variables such as goal core and goal mechanism by incorporating the intervention of the gamification variable. Furthermore, one significant contribution to academic research knowledge is that the current research

combined gamification as external motivators with goal-setting theory as internal motivators in predicting the engagement behavior. The present research seeks to investigate the study of goal-setting theory with gamification in individual engagement on mobile fitness apps among Malaysian Gen Y. Therefore, this ongoing research looked for the answers to the following research questions:

1. What is the relationship between goal core and engagement in mobile fitness application?
2. What is the relationship between goal core and goal mechanisms in mobile fitness application?
3. What is the relationship between goal mechanisms and engagement in mobile fitness application?
4. Do the goal mechanisms mediate the relationship between goal core and engagement in mobile fitness application?
5. Do the gamification moderate the relationship between goal core and engagement in mobile fitness application?

#### **1.4 Research Objectives**

The research tries to contribute to the body of knowledge in the area of technology application engagement. It investigated the constructs mentioned above that may influence an individual engagement on a mobile fitness app. Moreover, it extends our knowledge of the application of the Goal Setting Theory (GST) and gamification in mobile fitness application engagement by individuals among the Malaysian Gen y group. Specifically, the principal objectives of this current research are:

1. To examine the relationship between goal core and goal engagement in mobile fitness application.
2. To examine the relationship between goal core and goal mechanisms in mobile fitness application.
3. To examine the relationship between goal mechanisms and engagement in mobile fitness application.

4. To evaluate the mediation role of goal mechanisms in mobile fitness application.
5. To evaluate the moderation role of gamification in mobile fitness application.

## **1.5 Justification of Research and Motivation**

There are some primary justifications that prompted the researcher to conduct this study. They can be discussed and explained as follows: first of all, previous research has indicated that individual engagement is the main construct to be considered in the development of mobile fitness application in the future. Therefore, this requires further research exploration to facilitate a comprehensive understanding of what makes an individual engage in a mobile fitness app (Byun, Chiu and Bae, 2018; Cho, Lee and Quinlan, 2017; Lee and Cho, 2016).

Based on the discussion in the research problems and gaps, it has been seen that the mobile fitness application engagement is still low in Malaysia specifically on Gen Y groups. The majority of mobile fitness application target market is Gen Y segments because they are digital natives, technology adopters, and embrace fitness lifestyles, but only one in Gen Y would engage with their mobile fitness application at least once a week (Fadzilah and Arshad, 2015). Although mobile fitness application with gamification features are booming in Malaysia but the engagement of Gen Y is still low because most of their mobile fitness application goals are not tailored with individual goals that cause abandonment and disengagement, which ultimately affect the growth of engagement (Teik, 2014).

Although Malaysian Gen Y incorporated with a fitness regimen into their lifestyles, they are not engaged with mobile fitness apps due to lack of incorporated goals and prefer joining a health and fitness club (Alam and Hossain, 2017). Some of them disengaged with mobile fitness application for an extended period because the features were not motivated and mismatched with their fitness goals (Lim, Tung, Jan and Chiang, 2018). Based on the information above, it leads and motivated

researcher to conduct this research because although the trend of mobile fitness application among Malaysian Gen Y is booming the engagement level among them remains declined and user continuously abandon mobile fitness application.

The discussion of the research problem and gaps show that the researcher should extend the application of goal-setting theory because most of the Goal Setting Theory (GST) are used in organizational context in justify engagement instead of individual context. Most of the scholars have an argument and criticism on gamification on the aspect of how game design and game mechanics feature influence user's behavior that influences the engagement (Robson *et al.*, 2016; Burke, 2014). Therefore, its motivated researcher to conduct this research and aimed to develop a comprehensive model by studying internal and external human psychology behavior in mobile fitness apps engagement as a single research model.

## **1.6 Scope of Research**

The scope of the research focused on the extension of Goal Setting Theory (GST) and gamification in justifying engagement behavior in mobile fitness apps among Malaysian Gen Y. This research empirically tested the role of Goal Setting Theory (GST) as internal forces and gamification as external forces and moderator simultaneously towards engagement. The target respondents of this research are Malaysian Gen Y groups who downloaded and used mobile fitness application as the most suitable and informant mobile fitness apps user since they are the majority of mobile fitness application users. To engage with them, the researcher distributed the questionnaire through identified fitness and gym center that conducts a class that used mobile fitness application.

## **1.7 Significance of Research**

The findings of this current research are expected to provide significant contributions in theoretical knowledge and practical application. This research offers two contributions in theoretical and practical as discussed below.

### **1.7.1 Theoretical Significance**

Gamification and Goal Setting Theory (GST) was extended on this research, and each of them had a type of effect on user's engagement on a mobile fitness application. Therefore, it is worthwhile to conduct this research because the results could be used to explain engagement on mobile fitness application. The researcher developed a new research model based on Goal Setting Theory (GST) and gamification as a comprehensive model that helps to clarify how an individual engaged with mobile fitness application especially among Malaysian Gen Y perspectives.

The research extends Goal Setting Theory (GST) as internal force and gamification as external force because this research wants to examine how both forces explain the engagement behavior in mobile fitness application among Gen Y in Malaysia. The result of this research can be used effectively on any domain in which an individual or organisation has some control over the outcomes. By testing gamification as a moderator, it contributes to the body of knowledge about gamification which does not only influence the engagement behavior but also as the strengthening of engagement relationships.

The research also represents an attempt to bridge three significant gaps identified for goal setting theory and gamification. These research gap opportunities include the theoretical, practical and methodological gap associated with the existing literature on Goal Setting Theory (GST) and gamification within the engagement. The introduction of goal mechanisms and gamification as variable represents an attempt to fill a theoretical gap in this research. The discussion above suggests that

the issue of mobile fitness application engagement has not yet received the attention of researchers in engagement literature.

The development of questionnaire items is also one of the theoretical contributions of this research. Before this, the items of Goal Setting Theory (GST) were only limited for organizational and group context. In this research, sixty-percent of items are self-developed and have gone through to face the construct validity by selected experts from academicians and industry experts that are related to this research fields. Therefore, it asserted that the items on this research are also one of the main theoretical contributions because the items are based on individual perspectives.

### **1.7.2 Practical Significance**

This research is expected to help and enlighten the direction for the practitioners on influencing mobile fitness apps users to engage in short- and long-term periods specifically among Malaysian Gen Y. There is an active exploration of gamification in mobile fitness application for marketing strategy among developers, and it is the strategy to interact and create an engagement with users due to the advancement of technology application and the increasing trend of mobile technology application usage among users. It provides insightful views and knowledge of gamification applications in a service marketing perspective.

The finding of this research is expected to provide the recommendation of engagement knowledge for fitness instructors and fitness centers who are wished to extend their fitness market strategy in a mobile application. Furthermore, the results of this research are expected to be useful for the game designer to developing the use of gamification to persuading potential users to engage. To sum up, the research contributes to a broader understanding of mobile fitness app developer especially on how to encourage mobile fitness app users to engage and avoid abandonment in the future. Moreover, it provides practical guidance for mobile health and service

marketing industry in developing strategic engagement plans to promote fitness lifestyles by including gamification roles in mobile fitness app in the future.

## 1.8 Operational Definition

The following variables and terms have been used in this research that are as follows:

**Mobile Fitness Application:** The application downloaded on any mobile device from app stores that can be used anywhere to get instructions for fitness (Deloitte Insights, 2012). This research defines mobile fitness app as a tool that performs various functions such as tracking caloric intake, gathering workout ideas and sharing progress on social media to facilitate healthy behavior change.

**Goal Setting Theory:** Defined as an individual process on accomplishment of desired behaviour and the individual motivation to perform better in related tasks and performance which involves the conscious process of establishing the performance or task in order to obtain the desirable outcomes (Locke and Latham, 2006). This research defined as a source of motivation this theory forms the setting of goal core and mechanism to reach the desired results and behaviour.

**Goal Core:** Defined as the aim and specific task set by an individual who is desired to achieve and obtain a higher performance in the required task (Locke and Latham, 2006). In this research, goal core has been defined as the clarity of main objective that motivates individuals to engage in the mobile fitness app.

**Goal Mechanism:** Defined as the direction planning of an individual and organisation after the specific goal is set and focus on the attention toward goal-relevant that leads to a more significant effort in implementing the actual behaviour (Locke and Latham, 2006). In this research, goal mechanism defined as the direction planning and strategy applied by the individual as a mechanism and effort to engage in the mobile fitness app.

**Gamification:** Defined as the application of game design and game mechanics into non-game context in motivating user engagement behaviour (Hofacker *et al.*, 2016; Robson *et al.*, 2015). In this research, gamification has been defined as the

application of game elements into the non-game context, which influences individual engagement behaviour.

**Engagement:** Refers to a psychological process that involved cognitive and emotional aspects (Browden, 2009). In this research, engagement is defined as the actual behaviour which derives from cognitive and emotional elements through the behavioural manifestation during the interaction process in the mobile fitness app (Cheung *et al.*, 2011; Browden, 2009).

## 1.9 Organisation of the Thesis

This research is designed into five chapters as following:

- Chapter 1 This chapter discusses the background of the study regarding development of mobile fitness apps, the gamification study and academic research. Besides, it also explains the problem statement, the purpose of study, research questions, research objectives, the significance of the study, key terms of operational and definition and summary of the chapter.
- Chapter 2 It discussed previous empirical studies and relevant literature on mobile fitness app, gamification evolution and empirical research related to the variables, underpinning theory and the current research model. In addition, previous research of goal setting theory has been added for further justification.
- Chapter 3 The discussion of the proposed research methodology which applied for data collection and analysis phase.
- Chapter 4 Presents a detailed account of the data, and the analysis carried out in the study. The discussion covered the data collecting process, descriptive analysis, and the test of measurement and



structural models in the PLS-SEM, along with the test of mediation and moderation effects.

Chapter 5 Provides discussions on the findings of the study and the main contribution of the research. The limitation has also been discussed in this chapter.

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