

GOAL-SETTING THEORY AND GAMIFICATION IN MOBILE FITNESS APP ENGAGEMENT: A PILOT STUDY

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ABSTARCT

This paper aims to extend Goal-Setting Theory (GST) by adding gamification on mobile fitness app engagement. This research developed a research model based on Goal-Setting Theory (GST) and gamification in explained engagement behaviour on mobile fitness apps. Both academician and practitioner proposed that goal-setting theory as internal forces and gamification as external forces which described engagement behaviour. However, until now, scholars and practitioner have paid less attention to how these two combination forces justify the engagement behaviour in mobile fitness. Besides, there have been calls for the exploration of the mediator and or moderator influences on goal core – engagement relationships. By extended goal-setting theory and added gamification, it helps to explain the engagement relationships on mobile fitness app engagement. The research used quantitative technique and data were collected from 100 mobile fitness app user using purposive sampling. The pilot analysis conducted through SPSS (V23). The pilot results indicated that the reliability items of goal-setting theory variables, gamification and engagement Cronbach alpha achieved the reliability requirement. The EFA results indicated The research contributes to the originality item, which can be applied by academician for future research.

Keywords: Goal-Setting Theory, Gamification and Engagement.

INTRODUCTION

The creation of mobile apps has had a significant impact on society that has changed the lives of millions of people across the world (Jusoh, 2017). Like other new technologies, mobile fitness apps developer faced the fundamental challenge is how to encourage user, especially for newcomers, try out the apps with gamification features (Lim & Young-Noh, 2017). In academic fields, there is insufficient research of gamification and engagement relationships in mobile fitness apps context (Wolf, et al., 2018; Hofacker et al., 2016). Most of the gamification study focused on education context only, and there is a lack of theoretical connection which causes the shortcomings in explaining the engagement behaviour (Bui et al., 2017). From the researcher knowledge, only few of scholars investigated the application of gamification as external forces in explaining the engagement on mobile fitness app context (Goodwin & Ramjaun, 2017; Chen & Pu, 2014) and the extension study of goal-setting theory and gamification in mobile fitness app (Lim & Noh, 2017; Arraya et al., 2015).

The review of goal-setting theory depicted that this theory only explained internal forces behaviour in engagement from organisational context (Bipp & Kleingeld, 2017; Sholihin et al., 2016) although it can explain engagement behaviour through internal and external forces from an individual setting (Locke & Latham, 2006). The reviews of the existing literature of goal-setting theory research revealed that most of the scholars extended goal-setting theory focused on organisational engagement context and concentrate on internal forces (Bipp & Kleingeld, 2017; Smith et al., 2017). Therefore, this paper 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 and gamification on engagement (Lim & Noh, 2017; Arraya et al., 2015). This paper proceeds as follows. Section 2 reviews the background theoretical foundations from previous literature and then advances a research model and hypotheses. Section 3 describes the methodology and research design. Section 4 details the pilot analysis outcomes of the research model. Section 5 discusses the findings and implications. Finally, the paper concludes by presenting the limitations and discussing potential topics for future research.

LITERATURE REVIEW

Goal-Setting Theory

Goal-Setting Theory initially introduced by Locke (1968) which posited that the individual desired behaviour achieved when the specific goals are clear. It has been applied for decades among scholars because it helps to explain engagement and performance that related in many contexts through the setting and monitoring goals (Locke & Latham, 2002). The development of goal-setting theory has evolved and based on the two core findings from empirical studies in 1990, there is a linear relationship between the degree of goal core, and individual behaviour to perform the task and the higher of goal core set by organisation or individual would lead to higher individual desire to performed the behaviour through the goal mechanism (Locke & Latham, 2013). It concluded that individual engagement achieved when the goal core is clear and specific. Goal-setting theory has been applied in terms of how it can influence engagement in a different context (Knight et al., 2001). DeWalt et al. (2009) found that there is a direct correlation between those who achieved the set of goal core would motivate to create an additional strategy or add more mechanism to the task performance based on feedback. Parker, Jimmieson and Amiot (2009) found that autonomy as goal mechanism improved their self-efficacy which improved their engagement towards reaching the goals. Thus, the idea and concepts of goal-setting theory help individual or group to engage with their activities (Sorrentino, 2006). The meta-analysis by Zhou et al. (2001), goal-setting theory has the potential to increase engagement in physical activity. Munson et al. (2012) developed a mobile app that implemented primary (base) and secondary (stretch) through the application of goal-setting theory and found that goal-setting theory is beneficial in facilitating engagement. There is already abundant academic research into the goal-setting theory, and these studies have consistently shown that goal-setting theory explained engagement behaviour in activities (Bipp & Kleingeld, 2017; Smith et al. 2017).

Gamification

Gamification has become a fast-emerging business practice in the worldwide industry (Yang, et al., 2017). Although gamification is still relatively new among practitioners, it is not a new concept in information systems (IS) context. The term gamification initially introduced by Nick Pelling in 2002 and it started to gain the popularity in information systems (IS) academics around 2010 (Liu, et al., 2017). Then, it actively discussed on a blog post by Brett Terrill which he described gamification as the application of game mechanics to other web properties for engagement purposes, but it does not gain the popularity until 2010 (Zichermann & Cunningham 2011). Despite its practical adoption, research on this topic remains infancy and should ideally build a bridge between game studies and service research (Huotari & Hamari, 2012).

Meta-analysis research by Schepers & Wetzels (2007) concluded that only a few of research related to gamification conducted in the large scale of user adoption in certain technology aspects. Scholars have shown their interest to explore how the gamification can utilise the potential in facilitating the human behavioural changes (Landers et al., 2014; Hainey et al., 2012). Extant literature highlights the positive effects of gamification on the attitudes of participants (Domínguez et al., 2013), experience (Robson et al., 2014), enjoyment and engagement (Harwood & Garry, 2015). Werbach & Hunter (2012) conceptualise gamification as the process of making activities more game-like environment. It is also as “*a process of enhancing a service with affordances for the gameful experience to support engagement creation*” (Huotari & Hamari, 2012). This focus on the user perspective highlights the experience that gamification attempts to create engagement (Huotari & Hamari, 2012).

Some researchers explained this connection between gamification, on one hand, and human psychology and engagement, on the other hand, as gamification “*rests on three primary factors: motivation, ability level, and triggers*” (Dale, 2014). Folmar (2015) considered the real power of gamification its ability to produce engagement change. Some researchers have defined gamification from a behavioural scientific perspective: “*Gamification is a designed-engagement shift through playful experiences*” (Reiners & Wood, 2015). The present study investigates how mobile fitness app users derive various forms of intrinsic and extrinsic value from the active or passive co-creation of the gamified experience, and how these types of value affect their engagement and engagement outcomes.

Engagement

The engagement has closely related the concept of intrinsic and extrinsic motivation (Guthrie et al., 2012). Griffiths et al. (2012) stated that engagement has evolved to include the psychological inner processes and the manifestation of that in human behaviour in the form of task engagement, affective, and cognitive engagement. Since 2005, the term of “*engagement*” increasingly used by scholars but the conceptualisation that form engagement such as “*cognitive*” and “*emotional*” remains limited in marketing and technology (Brodie et al., 2011). As a result, engagement research is crucial for further research in addressing consumer/customer engagement issues (Desai et al., 2012). A number of scholars have considered the consequences of engagement such as perceived value (Kim, et al. 2013), satisfaction (Hapsari, et al, 2017; Khan, et al., 2016; Kim, et al. 2013), brand image (Hapsari, et al. 2017; Greve et al. 2014) and time convenience and interactivity (Kim & Baek, 2017). Among the number of the engagement consequences, not many scholars extend the study of gamification as the consequences of user engagement in academic literature and research although scholars provided the details on how

gamification could conceptualise the user engagement in the mobile application such as mobile fitness app (Hardwood & Garry, 2015). Suh et al. (2016) found that gamification enhances the engagement of gamified systems in mobile application and proposed gamification should go beyond engagement study. Shiou-Kuo & Yen-Chuang (2015) revealed that gamification has the potential to attract and engage the users in e-learning. Ab. Rahman et al. (2018) research found that the students positively engage towards e-learning website through the application of game design as gamification. Therefore, this research extends the understanding of engagement by adding gamification focusing since it can justify the engagement behaviour app based on the discussion above.

METHODOLOGY AND RESEARCH DESIGN

Sample and Data Collection

This paper tested the above theoretically using survey and the research context mainly focused on mobile fitness applications with gamification design features. This study intends to examine user relation to gamification apps. It would be better to define the qualifications of respondents in this setting. Thus, they were asked to reflect on the recent use of a gamification app (within the past three months). The primary purpose of this manipulation is to define a clear picture or memory from the respondents to serve as the basis for completion of the survey. A total of 100 responses received on this pilot test, a fitness centre at Johor Bahru, Malaysia. Specific demographic information is shown in Table I. Among the 100 respondents, 76.7 per cent were males, and 23.3 per cent were females. Most respondents are younger users from selected fitness class centre that used mobile fitness apps (with ages ranging from 26 to 30).

Research Instruments

All constructs were measured by using multiple-item perceptual scales, using pre-validated instruments from prior studies wherever possible, and reworded to relate specifically to the context of the gamification and mobile fitness apps, as illustrated in the Appendix. Moreover, the preliminary instrument was pilot tested and reviewed by faculty and selected respondents who are used mobile fitness app a year for clarity. The questionnaire items modified following a pre-test of the survey instrument with a certain amount of real-case respondent samples. All of items from goal-setting theory, gamification and engagement were based on operational definition and literature review from previous research by scholars and sixty-per cent of the items were self-developed to modified the previous items for paper context application. The measurement items of goal core and goal mechanisms construct developed from the original works of Locke & Latham (2006); Locke & Latham (1990). Gamification emerged from the conceptual of operational definition from Hofacker et al. (2016); Hamari & Koivisto (2014). The measurement items of engagement were derived from Brockmyer et al. (2009).

Pilot Test

On this paper, there are two main reasons for conducting a pilot study. Next, the proposed survey items need to be validated and accuracy tested and validity established. Finally, this paper check, refine and validate our hypotheses through the pilot test before the analysis. The pilot data analysis performed through SPSS V23 to ensure that the survey instruments are free from any defects (Sekaran, 2003). The collected questionnaires analysed for reliability items for each

construct. Exploratory Factor Analysis (EFA) applied to the seventy-one items of the questionnaire. First, the Keiser-Meyer-Olkin (KMO) test for sampling adequacy and Bartlett's test for sphericity was done to ensure that the EFA was adequate for principal component analysis (PCA). The extraction method used for the PCA using eigenvalue, scree plot and component matrix.

RESULTS AND DISCUSSION

Reliability Analysis

After the data collected from 100 respondents, this paper analysed the data by checking the reliability of each construct. Table 1 shows the results of reliability items after tested in SPSS as below:-

Section	Constructs	Total of Items before Deletion	Cronbach's Alpha (α)	Total of Items after Deletion	Cronbach's Alpha (α)
A	Goal Core	17	0.769	15	0.771
B	Goal Mechanisms	20	0.750	19	0.759
C	Gamification	16	0.690	14	0.703
D	Engagement	18	0.716	15	0.748

From Table 2, Cronbach's alpha was used to check the constructs' consistency. Table 1 provides an overview of the reliability results for the constructs. From the results, the Cronbach's Alpha (α) for all constructs exceeded than 0.7 (Hair et al. 2014) except for gamification, which is 0.690. Then, this paper proceeds with the second reliability test to gain the maximum number of Cronbach's Alpha rate by deleted certain items for all constructs. It found that all constructs achieved the Cronbach's Alpha above 0.700, which indicated that all items are useful for EFA analysis. Also, the total of original items reduced from 71-items to 66 items through the second test of scale reliability check process. The next section discussed the results of the EFA analysis.

Exploratory Factor Analysis (EFA) Results

Exploratory Factor Analysis (EFA) carried out to assess the factor structure of the measuring products and to test further the multicollinearity of the variables used for actual data collection. The EFA was conducted using the key element analysis of Principal Axis Factoring with direct oblimin rotation, as the objects are required to overlap (Field, 2009). To determine the suitability of the data for factor analysis, the information from the KMO and Bartlett's Test examined. The information below shows the EFA results after analysis stage.

Table 2 shows the EFA analysis in 100 mobile fitness apps user sample; all 66 items of the instrument subjected to an exploratory factor analysis with oblique rotation (Oblimin). The Kaiser-Meyer-Olkin measure verified the sampling adequacy for the analysis, KMO = .70. Bartlett's test of sphericity $\chi^2(210) = 621.398$, $p < .001$, indicating that correlation structure is

adequate for factor analyses. The maximum likelihood factor analysis with a cut-off point of .40 and the Kaiser's criterion of eigenvalues greater than 1 (Field, 2009; Stevens, 1992) yielded a ten-factor solution as the best fit for the data. For factors analysis, only 53-items achieved more than 0.32 as recommended by Tabachnick and Fidel (2014). They recommended that any items that achieved factor loadings more than 0.3, the items should be retained for data analysis. Therefore, this paper retained 53- items from 66 for the next data collection.

Table 2
EXPLORATORY FACTOR ANALYSIS OF THE ITEMS

Items	Factor									
	1	2	3	4	5	6	7	8	9	10
GC6	.722									
GC7	.592									
GC12	.519									
GC11	.552									
GAM48	.584									
GM25	.559									
GC10	.518									
GAM47	.509									
ENG69		.606								
ENG63		.595								
ENG64		.582								
ENG70		.484								
GAM43			.597							
GAM42			.581							
GM20			.565							
ENG67			.562							
GC16				.652						
GC15				.611						
GC17				.540						
GM21				.534						
GM27				.523						
GM33					.719					

GAM46					.667					
ENG62					.526					
GC13					.517					
GM28					.506					
ENG54					.500					
GAM49						.689				
ENG65						.670				
GAM53						.608				
ENG59						.509				
ENG71						.505				
GM23							.647			
GM22							.634			
GM24							.619			
GAM52							.519			
ENG66							.508			
GM36								.600		
GM35								.590		
GM32								.562		
GM34								.555		
GC1								.537		
GM26								.534		
GM29								.522		
GAM44									.649	
GAM41									.597	
GM31									.564	
GM37									.530	
GAM40									.518	
GC9										.692
ENG68										.565

GC8										.545
GC3										.524
Extraction Method: Principal Axis Factoring. Rotation Method: Oblimin with Kaiser Normalization.										

Notes. Extraction method; Principle Axis Factoring Rotation method; Oblimin with Kaiser normalization. Loadings larger than 0.40 are included in the analysis.

CONCLUSION

The purpose of this pilot study was to examine constructs reliability and items factors that contribute to initial research stability highly correlated with the reliability of the methods chosen, particularly when studying complex phenomena such as taking risks. This pilot paper analysed the self-developed items and accuracy of the mobile fitness apps user items. The findings affirmed that the reliability of the Cronbach's alpha and achieved more than 0.7 after went through the item-deleted process. The result of this pilot study provided higher internal consistency values of creativity domain subscales, relatively higher standardised factor-to-item path coefficients, and important consistent loading patterns. Therefore, the selected items of this pilot study are eligible to be used as the questionnaire for data collection stage.

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