

**Towards a Socio-Technical Theoretical Framework for
Enterprise Gamification:
A Research-in-Progress Paper**

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Abstract

Gamification initiatives are currently top-of-mind for many organizations seeking to engage their employees in creative ways, improve their productivity, and drive positive behavioral outcomes in their workforce – ultimately leading to positive business outcomes on the whole. Despite its touted benefits, little empirical research has been done to date to investigate sociological and technological factors that affect the acceptance and success of gamification technologies in an organizational context.

This article proposes a theoretical framework for investigating key individual, organizational and technological factors that are posited to be important determinants of effectiveness of gamification initiative. At the technology level, game mechanics and user experience are posited to be essential elements that drive end-user attitude towards gamification technologies. At the individual level, employee engagement is positioned to be the central construct that mediates the relationship between technological and organizational factors, and impacts organizational commitment. Finally, at the organizational level, psychological climate is proposed as an important antecedent of employee engagement and organizational commitment at the individual level, as well as a determinant of end-user acceptance of enterprise gamification technologies.

This article outlines the conceptual underpinnings of the proposed theoretical framework, and provides a summary of the planned research methodology that will be used to empirically validate the framework. The expected contributions of this research are highlighted at the end of the paper.

1. Introduction

As a relatively new breed of technology based interventions, gamification refers to the process of incorporating game-like elements (game mechanics) in non-game contexts with the objective of driving positive behavioral outcomes among intended audience. In an enterprise setting, gamification techniques may be applied to engage employees in helping an organization realize business process improvements, service efficiencies, talent development, innovative research ideas, and constructive collaboration practices.

While the hype surrounding enterprise gamification has not yet receded, some early adopters have reported failures with gamification initiatives. Their experience has afforded more credence to those who question the potential of gamification – whether it constitutes a trivialization of work and whether it is a frivolous diversion?

To counter these negative accounts, analysts and experts have directed attention to the myriad of success stories that demonstrate benefits of gamification to organizations in various sectors including airline, healthcare, financial services, consumer products, and education. Consequently, these experts have expounded that organizations and their leaders need to avoid jumping on the gamification bandwagon and not use it in a knee-jerk fashion to coerce behaviour and outcomes. Rather, organizations and leaders are urged to understand the business case for gamification, appreciate the opportunities and limitations associated with it, and approach the implementation of technologies within the firm's specific organizational and individual context. Attention has been drawn to factors such as user experience, employee motivations, and organizational culture – often the key to successful adoption of enterprise gamification programs. However, owing to the novel nature of gamification and its emergent corporate use-cases, there is a general dearth of academic and industry literature explaining these issues.

The proposed research aims to address this research gap by explicating technology key success factors and management best practices for gamification based interventions in the enterprise. Toward this, the research investigation would explore cognitive, affective and conative aspects of using gamification technologies in a work context, and study the effects of these technologies on user experience, organizational culture, employee engagement, and commitment.

Our planned methodology is geared towards explaining how gamification leverages human psychology using technology platforms and motivates individual behaviors that drive organizational outcomes. In doing so, this study will be among the first to undertake an empirical investigation based on currently operating gamification programs across various organizations and industry sectors. Data will be collected from management teams involved in the implementation of gamification programs as well as employees who are participating in gamification initiatives. Through exploratory factor analysis and structural equation modeling techniques, we aim to develop and validate psychometric measurements and path models that can be applied to assess gamification interventions in terms of the factors that affect the success of these initiatives and their subsequent performance outcomes for individuals and organizations.

In addition to being a pioneer in answering the call for empirical research on gamification, this study will provide important practical implications. It will assist in a rethink of gamification platforms as holistic sociotechnical systems rather than narrowly defined software systems. The research findings can aid in the development of game mechanics that can translate into positive user experience and foster higher levels of employee engagement. Furthermore, our research findings will

provide insights on key success factors for the effective adoption and institutionalization of enterprise gamification initiatives in organizations, and subsequently help them enhance the performance of their employees and drive positive business outcomes.

2. Research Objectives

As an innovative technology based intervention, gamification entails the integration of game-like elements (game mechanics) in non-game contexts with the aim of driving positive behavioral outcomes among targeted audience (Deterding et al., 2011; Hamari et al., 2014; Huotari & Hamari, 2012; Werbach, 2014). In the organizational context, gamification has been shown to enhance employee engagement and produce desired business outcomes in a variety of business functions including marketing, logistics, human resources, customer service, and knowledge collaboration (Buggie et al., 2014; Hense et al., 2014; Meister, 2013; Post, 2014; Sayeed & Meraj, 2013; Werbach, 2014; Wood & Reiners, 2012).

Despite its touted benefits, little is known about the individual and organizational factors that determine the success or failure of enterprise gamification initiatives (Hamari & Koivisto, 2013; Hamari et al., 2014). According to a recent systematic review of the academic literature on gamification Hamarai et al. (2014) noted that only a few studies have attempted to evaluate the effectiveness of gamification through rigorous empirical research, and of these, many have yielded contradicting findings.

In addition to the above, human computer interaction (HCI) researchers have stressed the need for academics and practitioners to consider features and functions of gamification technologies vis-à-vis user experience processes that drive engagement at cognitive and affective levels (Deterding et al., 2013, Nicholson, 2012). Current industry literature on this subject usually only offers advice for adding gamification as a bolt-on application or service for existing business processes (Ferrara, 2012; Zichermann, G. & Cunningham, 2011). This proposed research is concerned with addressing the current gap in the academic and industry literature through three objectives as outlined below.

1) Measure fit between game design elements and pertinent user experience dimensions:

To our knowledge, currently, there are no academic studies that have formally validated linkages between game design elements such as points, badges and leaderboards, and user experience (UX) dimensions such as usability, affect, and value (Park et al., 2013) through an empirical investigation. Furthermore, to study the full range of interactions that users have with gamification features, HCI researchers have emphasized the need for quantification of user experience in a gamification context (Deterding et al., 2013; Park et al., 2013). Our proposed research aims to answer this call.

2) Examine the mediating role of employee engagement as a multidimensional construct that drives intended positive behavioral outcomes through enterprise gamification:

The industry has many encouraging accounts from organizations that have successfully deployed enterprise gamification platforms to inspire higher levels of employee engagement (Buggie, 2014; Palmer et al., 2012; Wang, 2011). However, research that provides an empirically grounded explanation of the motivation process driven by gamification tools is currently sparse (Deterding et al., 2013; Hamari et al., 2014). In this study, we aim to model and validate the mediating role of engagement as a cognitive and emotional manifestation of an employee's motivation, and to study its

relationship with behavioral outcomes such as workplace commitment and individual intention to use gamification technologies.

3) *Clarify the role of psychological climate as an enabling factor for driving employee engagement and positive behavioral outcomes through gamification:*

As such, the introduction of gamification technologies in the workplace constitutes a significant change in the organization's operating model. Research in organizational psychology has shown that organizational contexts have an important role to play in any transformation or change initiatives (Hamzeh & Bergstrom, 2010; Martin et al., 2005), of which enterprise gamification is an example. To our knowledge, to date, no research studies have investigated the role of organizational environment in shaping behavior through gamification initiatives. In this study, we aim to empirically validate the role of psychological climate as an organizational environment construct to analyze whether employee perceptions of workplace characteristics can be shaped through gamification initiatives, and to determine the correlation between employee ascribed workplace attributes and outcomes of gamification programs.

In a recent systematic review of the academic literature on gamification, Hamari et al. (2014) found that there are only a few studies that have attempted empirical investigations on the effectiveness of gamification initiatives. Moreover, empirical studies that evaluate gamification through a psychological lens have only attempted to study individual motivational factors simply as antecedents that affect the use of technology features (game mechanics), or as the outcome of gamification technology use. This viewpoint lacks to recognize motivational dimensions of user experience such as performance, achievement, and social interaction (referred to as game dynamics), and the interplay between these dimensions, user engagement, and desired individual behavioral outcomes (Deterding, 2011; Deterding et al., 2013).

In sum, while gamification technologies and related management interventions hold great promise, as a subject area, gamification remains largely unexplored, especially from an empirical research standpoint. The proposed research seeks to remedy this current state by investigating enterprise gamification initiatives in terms of their sociotechnical determinants as outlined in the theoretical framework in the next section.

3. Theoretical Framework

The theoretical framework shown in *Figure 1* below depicts the overall orientation of this study and the core ideas that underpin the research investigation. The components of the conceptual framework are outlined in this section.

Game Mechanics and *User Experience* constitute the *technographic constructs* in the theoretical framework. As outlined earlier, game mechanics refers to the various actions, behaviors, and control mechanisms that are integrated with non-game activities and processes (Sicart, 2008). Processes imbued with these game-like elements have the potential to create a positive and compelling user experience. User experience constitutes a multi-dimensional construct that captures the users' overall perceptions and feelings about their interaction with the technology. Sub-dimensions of user experience include usability, affect, and user value (Park et al., 2013). In the context of gamification, part of the user experience relates to the cognitive and emotional effects of game mechanics that help

drive user behavior. These effects are referred to as game dynamics (Hunicke et al., 2004), and they contribute towards the overall subjective user experience of individual participants.

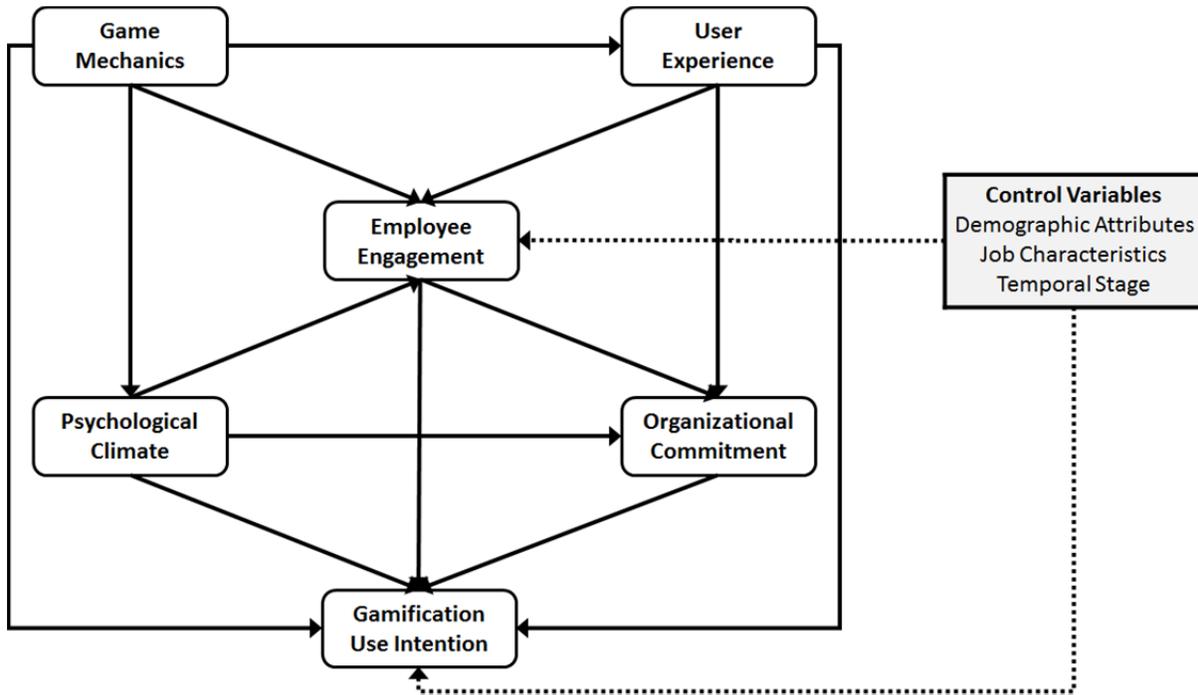


Figure 1: Theoretical Framework for This Study

Employee Engagement is at the core of any enterprise gamification initiative (Deterding et al., 2012; Palmer et al., 2012), and the link between employee engagement and business performance is well documented (Buggie et al., 2014). In the proposed theoretical framework, employee engagement is posited to play an important role as a mediating construct between gamification initiatives and the behavioral outcomes for their participants. Through links between engagement and game mechanics and user experience, engagement is conceptualized to be a manifestation of motivational elements (such as game dynamics). This is in line with prior research showing that engagement cannot be separated from the environment in which the user interactions occur (Fredricks & McColskey, 2012).

Organizational Commitment relates to an employee's attachment, identification and involvement with the organization (Meyer & Allen, 1991). It also represents an individuals' belief in the organization's goals and their desire to exert considerable effort on behalf of the organization (Morrow, 1983). In the theoretical framework, organizational commitment is posited to be a consequent of user experience and employee engagement. This will allow it to be validated as an indicator of the efficacy of gamification initiatives in driving positive employee behaviour, and as a mediating variable that affects employee intentions to continue using gamification technologies on a voluntary basis.

Psychological Climate is used in this theoretical model as a construct that characterises the organizational culture (Brown & Leigh, 1996). Extant research has demonstrated it to be a critically important factor that impacts workplace attitudes and behaviors (O'Neill & Arendt, 2008). In the proposed theoretical framework, psychological climate is posited to be linked to employee

engagement and employee intentions to continue using gamification technologies. Findings from previous research show that organizational contexts play an important role in business transformation and change initiatives (Hamzeh & Bergstrom, 2010; Martin et al., 2005), and enterprise gamification can be classified as such an undertaking (Buggie et al., 2014; Palmer et al., 2012).

Gamification Use Intention is positioned as the ultimate consequent variable in the theoretical framework. This is aligned with other theoretical models in the information systems literature including the technology acceptance model (TAM) (Davis, 1989; Davis & Bagozzi, 1989) and the IS success model (DeLone & McLean, 1992; DeLone & McLean, 2003).

Lastly, the theoretical framework includes various *control variables* that will be investigated in terms of their interaction effects on employee engagement and gamification use intention variables. Inclusion of demographic attributes as control variables will help answer questions such as whether gamification is only suitable for certain age groups (e.g. Gen Y). To investigate the effect of novelty, the model includes temporal stage as a moderating variable. Many critics of gamification contend that these technologies are only successful in the initial stages after their launch, and as novelty wears out, so does the participation in such initiatives. It is also posited that job characteristics (job autonomy, variety etc.) would be important moderating variables in determining the success of gamification on employee engagement.

4. Planned Research Methodology

4.1 Data Collection & Sampling Frame

Quantitative data will be collected from participating organizations through web-based survey questionnaires administered to employees who have participated in the firm's gamification initiatives.

The study will draw samples of respondents from a diverse cross section of organizations that have implemented gamification initiatives. The principal investigator has already sought cooperation from multiple potential organizations experimenting with gamification initiatives in Canada. Additional Canadian and US organizations across various industry sectors will be approached for potential participation in the research study.

A purposive sampling procedure will be used to select diverse gamification programs that vary in their business process context, time maturity, and the nature of game design features deployed as part of the initiative. Additionally, we will solicit participation from employees with varying levels of exposure to gamification programs.

4.2 Survey Resource Instrument & Construct Measurement

The survey instrument for quantitative data collection will comprise demographic information questions, technographic behavioral items, questions about work atmosphere, and psychographic perceptions based questions. While the demographic and technographic sections of the survey will be operationalized through direct questions consisting of an inventory of possible responses, the questions pertaining to other constructs in the theoretical framework will be operationalized using psychometric scales with responses on a Likert-scale and through categorical response type questions. Most measurement items pertaining to the theoretical constructs will be adapted from scales that have

been previously used and validated in other research studies. The key variables in this study will be measured using the following scales:

- *Game Mechanics* data will be collected by creating an inventory of popular gamification tools and features used across gamification platforms. These include features such as points, badges, leaderboards, feedback mechanisms, and goal setting features. Survey items pertaining to the availability, efficacy, and level of use of these tools and features will use a 7-point scale ranging from “Use Very Rarely” to “Use Very Frequently”. The quality of the features and functions in the game mechanics inventory will be assessed using pertinent indicators from the Information Systems (IS) Success model (DeLone & McLean, 1992; 2003) and the Task-Technology Fit (TTF) scale (Goodhue, 1998).
- *User Experience* will be operationalized as a multi-dimensional construct. Generic indicators pertaining to elements such as usability, affect and user value will be used from the User Experience (UX) hierarchical dimensions suggested by Park et al. (2013). Additionally, we will develop our own measures by including self- and social-elements of gamification platforms (Huang & Soman, 2013) and elements from the Mechanics, Dynamics and Aesthetics (MDA) framework (Hunicke et al., 2004).
- *Employee Engagement* will be measured using the short form of the Utrecht Work Engagement Scale (UWES-9) (Schaufeli et al., 2006) and the ISA (Intellectual, Social, Affective) engagement scale (Soane et al., 2012).
- *Psychological Climate* will be operationalized using indicators from the Psychological Climate Measure (PCM) (Brown & Leigh, 1996).
- *Organizational Commitment* will be measured using items from the organizational commitment scale (OCS) (Mowday et al., 1979)
- *Gamification Use Intention* will be operationalized using the IS continuance intention scale developed by Bhattacharya (2001).
- *Control Variables* in the research framework will be operationalized as follows. Demographic Attributes data will be collected through questions about the respondents’ age, gender, education, and occupation. Information about the time since launch of the gamification program (*temporal stage*) will be obtained through self-reported responses as well as data from the participating organization’s project teams. Finally, *Job Characteristics* will be measured using the attributes suggested in the widely used Job Diagnostic Survey (Hackman & Oldham, 1975) and the Job Characteristics Inventory (Sims et al., 1976).

4.3 Data Analysis Procedures

Demographic and technographic variables will be analyzed using a selection of statistical analysis techniques including descriptive statistics, non-parametric statistical tests, cluster analysis, and contingency table analysis procedures.

Exploratory factor analysis will be used to assess the validity of various measures incorporated in the survey resource instrument and to subsequently recalibrate the instrument with the valid indicators. These procedures will also be used to ascertain the dimensionality of various newly conceptualized constructs in the theoretical framework, including the user experience construct.

The theoretical model will be analyzed in its full form using structural equation modeling (SEM), a second generation data analysis approach used to test statistical conclusion validity (Gefen et al., 2000; Rigdon, 1998). In recent years, the use of SEM as a battery of procedures to simultaneously analyze multiple measurements on individual model constructs has increased significantly in the management information systems research community (Chin & Saunders, 2009; Straub et al., 2004). Specifically, we will utilize the component-based SEM approach to estimate the measurement model and to analyze the structural model. The component-based SEM approach is suited to this study since it allows for predictive analysis in an exploratory setting (Andersen & Gerbing, 1988; Chin, 1998).

5. Conclusions

The proposed research project is original in several ways. First, it investigates the promising innovation of gamification that is top of mind for many fortune 500 companies (Buggie, 2014; Post, 2014). The study seeks to explicate technology key success factors and management best practices for gamification based interventions in the enterprise which are currently lacking in both academic and industry literature (Burke, 2014; Kumar, 2013; Rauch, 2013). Second, the study aims to investigate and assess the multi-dimensional nature of the user experience (UX) construct. Currently, this is an under-researched area in human computer interaction, and many researchers have called for empirical studies that can help elucidate the criteria for quantification of user experience (Cowan & Jack, 2011; Law & Van Schaik, 2010; Park et al., 2013). Third, this study aims to clarify the role of psychological climate, an organizational culture factor that has been discussed in the organizational psychology literature, and has been shown to shape individual behavior in a variety of business transformation initiatives. However, there is a dearth of academic studies that empirically validate the role of psychological climate in technology acceptance and use contexts. This study expects to address that gap.

In addition to its potential theoretical contributions, the proposed research also expects to offer important implications for practice. The outputs of this research program have the potential to advance an understanding of organizational objectives that can be satisfied through the implementation of gamification platforms. Furthermore, the research findings can aid in the development of game mechanics that can translate into positive user experience and foster higher levels of employee engagement. Finally, our research findings will provide insights on key success factors for the effective adoption and institutionalization of enterprise gamification initiatives in organizations, and subsequently help them enhance the performance of their employees and drive positive business outcomes.

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