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THE ROLE OF GAMIFICATION IN MOTIVATING USER PARTICIPATION IN REQUIREMENTS DETERMINATION

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ABSTRACT

The success of a project heavily relies on the quality of requirements determination, which the systems are built upon. However, about 60% of project failures are due to weak requirements determination. This weakness is due to poor communication and lack of stakeholder engagement. Understanding the factors that motivate user participation behaviors during requirements determination can increase user engagement during the requirements determination process. However, empirical research on the factors that motivate participants during requirements determination to engage and share their knowledge is still lacking. The purpose of this paper is to examine the motivational impact of gamification elements on user participation behaviors during requirements determination. This paper presents an extended model of the theory of reasoned action. The extended model posits that gamification elements will influence user participation intentions indirectly through their effects on attitude and subjective norms.

Keywords

Requirements determination, gamification, user participation, theory of reasoned action

INTRODUCTION

The success of a project heavily relies on the quality of requirements determination, which the systems are built upon (Kumari & Pillai, 2013). Aranda, Vizcaíno, & Piattini (2010) indicate that about 60% of project failures are due to weak requirements determination. Researchers and practitioners are aware of the fact that a majority of project failures are due to weak requirements determination (Kumari & Pillai, 2013). There are different reasons behind that such as poor communication and lack of stakeholder engagement (Sabahat, Iqbal, Azam, & Javed, 2010). However, empirical research on the factors that motivate participants during requirements determination to engage and share their knowledge is still lacking. The purpose of this paper is to examine the motivational impact of gamification elements on user participation behaviors during requirements determination.

To investigate this issue, the theory of reasoned action (TRA) will be utilized to identify the gamification factors that motivate participants during requirements determination to engage and share their knowledge. It is one of the most influential and popular conceptual frameworks for the study of human behavior. TRA hypothesizes that individual behavior is driven by behavioral intentions where behavioral intentions are a function of an individual's attitude toward the behavior and the subjective norms surrounding the performance of the behavior.

This study will extend the TRA model by adding gamification elements. Gamification offers an opportunity to engage users and to influence individual behavior, enhancing the chance of project success (Gartner, 2012). Gamification confirmed its capability to be effective in influencing behavior, enhancing engagement, and improving user performance (Gartner, 2012). The model posits that gamification elements directly influence attitudes toward behavior and subjective norms that associated with intention to participate in requirements determination, leads to motivate the behavioral intention to participate in requirements determination.

LITERATURE REVIEW

The issues related to all stakeholders in information systems development (ISD) have been a focused area of research because the strategic uses of information technology increasingly have more managerial and functional issues than technical issues. The influence of user participation in ISD has a distinct way of transforming focus as one of the essential ways of ISD success (He & Sheu, 2014). Leva, Guardascione, and Newton (2011) recognize that ISD effort may incorporate knowledge management that considers knowledge sharing as one of the organizational and functional objectives.

Expert users are a great source of knowledge that is needed in ISD as they have the information about how to perform a task, “work practice, context of the system use and their behavior and preferences” (Hendry, 2008). Acquiring this knowledge is critical to accomplish comprehensive and clear requirements (Bano & Zowghi, 2013). Thus, including users are essential to enhance the quality, preciseness, and completeness of requirements (Kujala, 2003) and to create the right outcomes (Hope & Amdahl, 2011). In addition, including users will improve and accelerate the acquiring of tacit knowledge and decide their participation in the rest of ISD (Pilat & Kaindl, 2011). Furthermore, Harris and Weistroffer (2009) include some advantages of user participation during ISD, such as enhanced quality due to more accurate and complete requirements and the deterrence of unnecessary components.

User Engagements and Theory of Reasoned Action

The theory of reasoned action (Ajzen & Fishbein, 1980) has been a long-established theory that is used as a framework to predict a diversity of behaviors and/or behavioral intentions (Madden, Ellen & Ajzen, 1992; Venkatesh et al., 2003). It suggests that behavioral intentions, as the key factor of individuals’ behavior, are beliefs about the possibility that conducting a certain activity will result in a specific consequence (Ajzen & Fishbein, 1980). Fishbein and Ajzen (1977) divide beliefs into two constructs: behavioral and normative. According to Fishbein and Ajzen (1977) “behavioral beliefs are postulated to be the underlying influence on an individual’s attitude toward performing the behavior, whereas the normative beliefs influence the individual’s subjective about performing the behavior” (as cited in Madden et al., 1992, p. 1).

Gamification

Gamification is defined as “use of game design elements in non-game contexts” (Deterding, Dixon, Khaled, & Nacke, 2011). Also, Huotari and Hamari (2012) defined gamification, “as a process of enhancing services with affordances in order to invoke gameful experiences and further behavioral outcomes.” The main objective of gamification is to enhance user engagement by employing game-like methods such as points, badges, and feedback (Flatla, Gutwin, Nacke, Bateman, & Mandryk, 2011). It has become a recognized method to encourage certain behaviors and enhance motivation and engagement. Gamification may be considered a tool that can be utilized in efforts to impact behavior in different domains by offering game-like experiences that consequently can impact attitude and behavior (Hamari & Koivisto, 2013).

Recently, gamification features were emerging in marketing (Downes-Le Guin, Baker, Mechling, & Ruylea, 2012; Muntean, 2011), healthcare (Hamari & Koivisto, 2013; Lee & Hammer, 2011), interactive systems (Flatla et al., 2011) and education (Hakulinen, Auvinen, & Korhonen, 2013). These growing numbers in research for gamification have encouraged scholars to use gamification in different settings such as enabling mass collaboration (McGonigal, 2011) and encouraging knowledge sharing (Krause & Smeddinck, 2011).

Gamification and User Engagement

Research indicates that gamification is a trending topic as tools in supporting user engagements such as increasing user activity and social interaction (Deterding et al., 2011; Hamari, 2013; Hamari, Koivisto, & Sarsa, 2014). The gamification tools are considered to be publicity engagement supporting tools due to the positive and gameful experience brought about by motivational actions applied into a system (Koivisto & Sarsa, 2014). The central idea of gamification in an enterprise context is to engage employees, for example, to motivate them to fulfill obligatory tasks. Many studies confirmed that gamification does create positive effects and benefits (Denny, 2013; Eickhoff, Harris, de Vries, & Srinivasan, 2012; Hamari, 2013). Also, in the education contexts, using gamification elements provide positive results and increase learning performance (Dong et al., 2012; Hakulinen et al., 2013).

METHODOLOGY

Theoretical Model

Our proposed theoretical model, shown in Figure 1, incorporates gamification elements, attitudes, subjective norms, and participation intention. The model expands on TRA by including gamification elements as antecedents to attitude and subjective norms. That is, gamification elements influence user participation intentions indirectly through their effects on attitude and subjective norms.

Attitude and Subjective Norms

Individuals' behavioral intention has two main factors that are attitude toward the behavior and subjective norms associated with the behavior (Montano & Kasprzyk, 2015). Attitude is influenced by one's beliefs about consequences of acting on the behavior. Therefore, an individual who has strong beliefs that performing a behavior will result in positive outcomes will hold a positive attitude toward the behavior (Montano & Kasprzyk, 2015). Subjective norms are influenced by whether valued individuals such as managers or supervisors favor or disfavor of acting on the behavior. Therefore, individuals who think that valued individuals think they must act on a behavior will hold a positive subjective norm (Montano, & Kasprzyk, 2015).

H1A: Positive attitude positively influences user intention in ISD participation.

H1B: Subjective norms positively influences user intention in ISD participation.

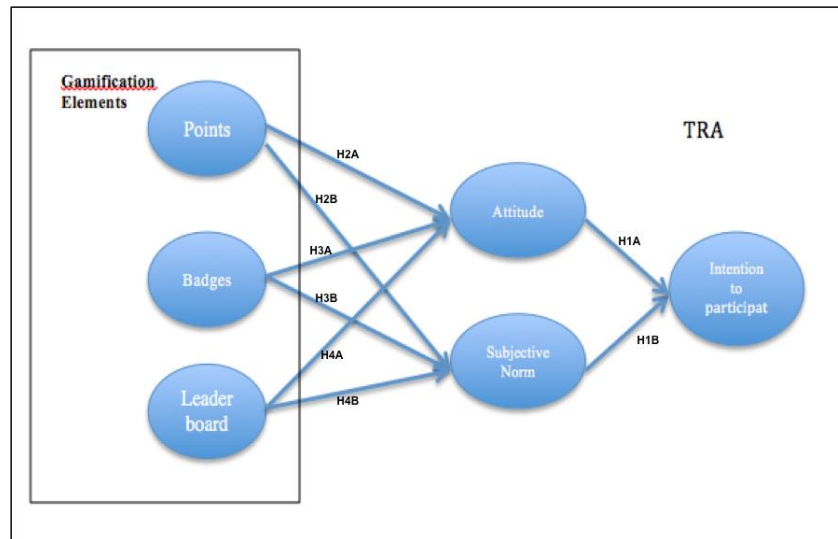


Figure 1: The Extended TRA Model

Gamification Elements

The main objective of gamification is to employ the motivational power of games to encourage participation and accomplishment (Richter, Raban, & Rafaeli, 2015). The employment of gamification can be accomplished in different ways such as points, badges, and leaderboard (Richter et al., 2015). The literature of gamification shows a large number of different elements established in empirical studies; however, points, badges, and leaderboards were noticeably the most common gamification elements used (Hamari et al., 2014).

Points are used in gamification as an indicator to measure progression and performance by collecting points, which motivate self-efficacy (Fu, 2011; Gnauk, Dannecker, & Hahmann, 2012). Points have different social effects such as status that is deserved by accomplishing specific activities and reputation that is based on evaluations conducted by others (Gnauk et al., 2012). Thus, the motivational power of points is drawn with the help of social motivations (Richter et al., 2015). According to Hamari and Koivisto (2014), "Social influence positively affects perceptions of recognition: the more strongly a person believes that others expect and support certain behavior, the better it feels to conform to those expectations." In addition, once the related behavior is welcomed and socially acknowledged, social influence will have a positive influence on the attitude toward the task.

H2A: Points positively influence user attitude toward ISD participation.

H2B: Points positively influence user subjective norms in ISD participation.

Badge is used as "a goal-setting device; they signal progression by being rewarded for the completion of distinct goals; they represent achievements and success and serve as reminders of past achievements" (Gnauk et al., 2012). These features form a positive attitude toward user behavior. Moreover, badges help shape the social norms through emphasizing different activities and actions that are valued (Antin & Churchill, 2011; Halavais, 2012). Badges has a positive effect in recognizing a player's achievement, accomplishment and signaling their status to others (Vleeshouwer, 2015).

H3A: Badge positively influences user attitude toward ISD participation.

H3B: Badge positively influences user subjective norms in ISD participation.

Leaderboard shows who gained the most points and badge. The central objective of leaderboard is to promote competition between users of the system (Meder et al., 2014). This competitive mechanism is anticipated to encourage the users to enhance their participation and achievement to obtain social recognition (Amriani, Aji, Utomo, & Junus, 2013). Accordingly, the activity is more positively perceived when it creates a sense of recognition from others (Preece, 2001); hence, it positively influences user attitude toward the behavior.

H4A: Leaderboard positively influences user attitude toward ISD participation.

H4B: Leaderboard positively influences user subjective norms in ISD participation.

Gamifying Requirements Determination and Measurement

This study will focus on a gamification system in an enterprise forum, which will enable ISD developers and expert users to communicate and participate in requirements determination within a large security firm in Saudi Arabia. The main objective of the gamification system is to motivate user participation and contribution. Therefore, points will be awarded when performing different activities including posting comments, daily login, providing feedback, and offering recommendations (Meder et al., 2014; Thom, Millen, & DiMicco, 2012). In addition, users gain extra points when they provide their feedback on posts or recommendations as “helpful” or “not helpful” to differentiate helpful posts and none helpful ones. Each user will obtain five points for each activity they perform, while “helpful” or “non-helpful” feedback will obtain two points. Moreover, the owner of the activity will obtain an extra point if other users consider their post as “helpful” or will lose one point if other users consider their post as “non-helpful”.

Depending on the accomplishment of certain activities such as posting feedback on a comment or recommendation or reaching a specific amount of points, badges will be awarded and displayed on the user profile page. Users who obtain the most points will appear on the leaderboard. Although points and badges are rewards, which can be accomplished by performing certain activities, leaderboards illustrate a competitive factor.

After completing the assigned project, an Internet-based survey will be used to collect the data from employees who participated in the project. The survey items related to the constructs of attitude and subjective norms will be adopted from previous research (Ajzen, 1991; Davis, 1989; Fishbein & Ajzen, 1977; Hamari & Koivisto, 2015; Venkatesh, Morris, Davis, & Davis, 2003). The survey items will be modified and used in the context of gamification.

The Contribution of the Study

The success of a project heavily relies on the quality of requirements determination, which the systems are built upon (Kumari & Pillai, 2013). Aranda et al., (2010) indicate that about 60% of project failures are due to weak requirements determination. Researchers and practitioners are aware of the fact that a majority of project failures are due to weak requirements determination (Kumari & Pillai, 2013). However, empirical research on motivating user participation behaviors and factors impacting them is still lacking. To investigate this issue, TRA will be utilized to identify the gamification factors that motivate participants in requirements determination. Research indicates that gamification is a trending topic as tools to support user engagement such as increasing user activity and social interaction (Hamari, 2013; Hamari et al., 2014). This study will use the gamification elements such as points, badges, and leaderboard as antecedents to attitude and subjective norms, which will influence user participation intentions indirectly through their effects on attitude and subjective norms.

REFERENCES

1. Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, 50(2), 179-211.
2. Aranda, G. N., Vizcaíno, A., & Piattini, M. (2010). A framework to improve communication during the requirements elicitation process in GSD projects. *Requirements engineering*, 15(4), 397-417.
3. Amriani, A., Aji, A. F., Utomo, A. Y., & Junus, K. M. (2013, October). An empirical study of gamification impact on e-Learning environment. In *Computer Science and Network Technology (ICCSNT), 2013 3rd International Conference on* (pp. 265-269). IEEE.
4. Antin, J., & Churchill, E. F. (2011, May). Badges in social media: A social psychological perspective. In *CHI 2011 Gamification Workshop Proceedings* (Vancouver, BC, Canada, 2011).
5. Bano, M., & Zowghi, D. (2013, July). Users' involvement in requirements engineering and system success. In *Empirical Requirements Engineering (EmpiRE), 2013 IEEE Third International Workshop on* (pp. 24-31). IEEE.
6. Cheng, C. H. (2011). A study of critical factors of the job involvement for hotel employees Taking hotels in Taiwan as an example. *International Journal of Hospitality Management*, 30(4), 990-996.
7. Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319-340.
8. Denny, P. (2013, April). The effect of virtual achievements on student engagement. In *Proceedings of the SIGCHI conference on human factors in computing systems* (pp. 763-772). ACM.
9. Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011, September). From game design elements to gamefulness: defining gamification. In *Proceedings of the 15th international academic MindTrek conference: Envisioning future media environments* (pp. 9-15). ACM.
10. Di Leva, C., Guardascione, I., & Newton, F. (2011, June). International mission in Kosovo: program, project and knowledge management. In *Proceedings of the 12th International Conference on Product Focused Software Development and Process Improvement* (pp. 120-127). ACM
11. Dicheva, D., Dichev, C., Agre, G., & Angelova, G. (2015). Gamification in education: a systematic mapping study. *Educational Technology & Society*, 18(3), 1-14.
12. Dong, T., Dontcheva, M., Joseph, D., Karahalios, K., Newman, M., & Ackerman, M. (2012, May). Discovery-based games for learning software. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 2083-2086). ACM.
13. EDUCAUSE Learning Initiative. (7). Things you should know about gamification. Retrieved October, 12, 2013.
14. Eickhoff, C., Harris, C. G., de Vries, A. P., & Srinivasan, P. (2012, August). Quality through flow and immersion: gamifying crowdsourced relevance assessments. In *Proceedings of the 35th international ACM SIGIR conference on Research and development in information retrieval* (pp. 871-880). ACM.
15. Eisenberger, R., Huntington, R., Hutch-Hutchison, S., and Sowa, D. 1986. "Perceived Organizational Support," *Journal of Applied Psychology* (pp. 500-507).
16. Flatla, D. R., Gutwin, C., Nacke, L. E., Bateman, S., & Mandryk, R. L. (2011, October). Calibration games: making calibration tasks enjoyable by adding motivating game elements. In *Proceedings of the 24th annual ACM symposium on User interface software and technology* (pp. 403-412). ACM.
17. Fishbein, M., & Ajzen, I. (1977). Belief, attitude, intention, and behavior: An introduction to theory and research
18. Fu, Y. C. (2011). The game of life: Designing a gamification system to increase current volunteer participation and retention in volunteer-based nonprofit organizations.
19. Gnauk, B., Dannecker, L., & Hahmann, M. (2012, March). Leveraging gamification in demand dispatch systems. In *Proceedings of the 2012 Joint EDBT/ICDT Workshops* (pp. 103-110). ACM.
20. Hakulinen, L., Auvinen, T., & Korhonen, A. (2013, March). Empirical study on the effect of achievement badges in TRAKLA2 online learning environment. In *Learning and Teaching in Computing and Engineering (LaTiCE), 2013* (pp. 47-54). IEEE.
21. Hamari, J. (2013). Transforming homo economicus into homo ludens: A field experiment on gamification in a utilitarian peer-to-peer trading service. *Electronic commerce research and applications*, 12(4), 236-245.

22. Hamari, J., & Koivisto, J. (2015). Why do people use gamification services?. *International Journal of Information Management*, 35(4), 419-431.
23. Hamari, J., & Koivisto, J. (2013, June). Social Motivations To Use Gamification: An Empirical Study Of Gamifying Exercise. In *ECIS* (p. 105).
24. Hamari, J., Koivisto, J., & Sarsa, H. (2014, January). Does gamification work?--a literature review of empirical studies on gamification. In *2014 47th Hawaii International Conference on System Sciences* (pp. 3025-3034). IEEE.
25. Harris, M. A., & Weistroffer, H. R. (2009). A new look at the relationship between user involvement in systems development and system success. *Communications of the Association for Information Systems*, 24(1), 42.
26. He, X. J., & Sheu, M. (2014). Enterprise Documentation: A Formal-Model Approach. *Communications of the IIMA*, 7(2), 6.
27. Hendry, D. G. (2008). Public participation in proprietary software development through user roles and discourse. *International Journal of Human-Computer Studies*, 66(7), 545-557.
28. Hope, K. L., & Amdahl, E. (2011). Configuring designers? Using one agile project management methodology to achieve user participation. *New Technology, Work and Employment*, 26(1), 54-67.
29. Huotari, K., & Hamari, J. (2012, October). Defining gamification: a service marketing perspective. In *Proceeding of the 16th International Academic MindTrek Conference* (pp. 17-22). ACM.
30. Krause, M., & Smeddinck, J. (2011, September). Human computation games: A survey. In *Proc. of 19th European Signal Processing Conference (EUSIPCO 2011)*.
31. Kujala, S. (2003). User involvement: a review of the benefits and challenges. *Behaviour & information technology*, 22(1), 1-16.
32. Kumari, S. N., & Pillai, A. S. (2013, May). A survey on global requirements elicitation issues and proposed research framework. In *Software Engineering and Service Science (ICSESS), 2013 4th IEEE International Conference on* (pp. 554-557). IEEE.
33. Lee, J. J., & Hammer, J. (2012). Gamification in education: What, how, why bother?. *Academic exchange quarterly*, 15(2), 146.
34. McGonigal, J. (2011). *Reality is broken: Why games make us better and how they can change the world*. Penguin.
35. Montano, D. E., & Kasprzyk, D. (2015). Theory of reasoned action, theory of planned behavior, and the integrated behavioral model. *Health behavior: Theory, research and practice*.
36. Pilat, L., & Kaindl, H. (2011, May). A knowledge management perspective of requirements engineering. In *Research Challenges in Information Science (RCIS), 2011 Fifth International Conference on* (pp. 1-12). IEEE.
37. Richter, G., Raban, D. R., & Rafaeli, S. (2015). Studying gamification: the effect of rewards and incentives on motivation. In *Gamification in education and business* (pp. 21-46). Springer International Publishing.
38. Sabahat, N., Iqbal, F., Azam, F., & Javed, M. Y. (2010, August). An iterative approach for global requirements elicitation: A case study analysis. In *Electronics and Information Engineering (ICEIE), 2010 International Conference On* (Vol. 1, pp. V1-361). IEEE.
39. Saleem, H., Beaudry, A., & Croteau, A. M. (2011). Antecedents of computer self-efficacy: A study of the role of personality traits and gender. *Computers in Human Behavior*, 27(5), 1922-1936.
40. Soltani, S., Elkhani, N., Ahmad, M., & Taghia, J. (2013). The effects of perceived organizational support and personality traits on user involvement. In *24th Australasian Conference on Information Systems (ACIS)* (pp. 1-11). RMIT University.
41. Terzis, V., Moridis, C. N., & Economides, A. A. (2012). How student's personality traits affect Computer Based Assessment Acceptance: Integrating BFI with CBAAM. *Computers in Human Behavior*, 28(5), 1985-1996.
42. Thom, J., Millen, D., & DiMicco, J. (2012, February). Removing gamification from an enterprise SNS. In *Proceedings of the ACM 2012 conference on Computer Supported Cooperative Work* (pp. 1067-1070). ACM.
43. Vassileva, J. (2012). Motivating participation in social computing applications: a user modeling perspective. *User Modeling and User-Adapted Interaction*, 22(1-2), 177-201.
44. Vleeshouwer, J. J. (2015). *Gamification in higher education: factors influencing the usage intensity of a gamified E-learning application* (Master's thesis, University of Twente).

45. Venkatesh, V., Morris, M., Davis, G., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425-478