Abstract
Gamification has shown to be a valuable approach that enhances participants’ engagement. In education, enhanced student engagement has proven to increase their learning effectiveness. In business, gamification permits employee innovations and helps organizations achieve various business objectives. However, the application of gamification in public services is rather limited. While public service technologies have matured from being informational in nature towards being interactional and transactional, the last maturity stage of e-Government services has not been clearly defined. Accordingly, in this paper we call for “gamifying” public sector technologies such as e-Government systems. We argue that gamification might well be the last transformational stage in the maturity of those technologies. Gamification can play a key role in increasing citizens’ use of public service technologies and, at the same time, make them feel empowered as active participants in their societies.

Keywords

Introduction
In recent years, gamification has become an important topic catching the interest of practitioners and researchers alike (Hamari and Koivisto, 2015; El-Masri et al., 2015). Pertaining to research, the surge in interest is accentuated by the ever-increasing publication of research articles on the topic. Indeed, searching the Web of Science database for articles on gamification reveals that the number of articles published on that topic rose from 8 articles in 2012 to 411 in 2015. In 2014, the 20th America’s conference on information systems started a research track targeting research on using game design in information system development. A considerable amount of the relevant published research focuses on gamification in the education sector (e.g., Botha and Herselman, 2015; Cohen, 2011; Lambert and Watkins, 2013). Furthermore, gamification was also examined by researchers in various business contexts including marketing (Bittner and Shipper, 2015), tourism (Sever et al., 2015), human resource management (Kristoffer and Robin, 2012), sales (Robson et al., 2014), and strategy (Morschheuser et al., 2016) to name a few.

However, it is believed that gamification’s potentials has not been fully explored when it comes to applications related to public sector and e-Government services (Tolmie et al., 2014). Indeed, the idea that gamification increases engagement and result in superior outcomes may not have been taken seriously in the public sector (Escobar and Urriago, 2014). Whereas educators improve students’ engagement when playing educational games (see Attali and Arieli-Attali, 2015) and business leaders improve performance and innovativeness of their staff via purposefully gamified organizational environment (Robson et al., 2014), governments lack behind in incorporating gamification into their services and interactions with their citizens (Tolmie et al., 2014). Indeed, only a handful of the 440 articles on gamification found in the information systems literature in year 2015 discuss gamifying initiatives in the public sector. More importantly, those articles are primarily descriptive in nature. On the whole, they describe cases in which government use gamification mechanics to achieve specific objectives such as improved safe driving
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(Rodríguez et al., 2014), or empowering scientists (Mason et al., 2012), and inspiring volunteers (Bowser et al., 2013).

In the present paper, we attempt to shed some light on possible opportunities to adopt some of the gamification elements that proved successful in other disciplines and apply them in the e-Government context. Moreover, we discuss how gamification can be an innovative approach to “transform” e-Government services through personalization and contribute in taking current e-Government services to a higher level of maturity. The rest of the paper is organized as follows. In the next section, we distinguish games from gamification and list the key features that gamification borrows from the gaming literature. Next, we describe gamification in the academia and in business and provide examples of the implementation of this approach in the two fields. Afterwards, we discuss the adoption of information technology in the public sector, specifically e-government technologies, and provide a detailed record of the different e-government maturity models that exist in the information systems literature. Finally, we discuss how the implementation of the gamification approach in public service technologies advances those technologies towards their last stage of maturity.

From Games to Gamified Experiences

According to Heaven (2014), 97% of American teens invest time in computer games; some spend over 25 hours every week playing games (Cole and Griffiths 2007). Teens’ and young adults’ interest in games has stirred the gaming industry to produce record breaking sales. Indeed, revenues from video games have exceeded $81 billion dollars in 2012; five times higher than the music revenues (Marchand and Hennig-Thurau 2013). More recently, the video games industry overtook the film industry in profitability (O’Brien 2016). Online games such as World of Warcraft has over 10 million active users and generates around $1 billion annually (Marchand and Hennig-Thurau 2013) while video games like Grand theft Auto (GTA 5) had a budget of 265 billion dollars (Cnet 2013).

However, video or computer games cannot be equated with gamification. While the objectives of video games typically relate to entertainment, gamification’s objective is to promote intrinsic motivations toward various activities for the participants to produce better results (Hamari et al. 2015). A Game is a “physical or mental activity or contest that has rules and that people do for pleasure” (Bryan 2013). On the other hand, gamification is commonly defined as the use of game mechanics for non-game applications so as to encourage gamers to achieve the ultimate goal of producing better results (Bajdar and Dragolea 2011). Gamification is the act of applying lessons from the gaming domain in order to alter the behaviors of actors in non-game situations (Robson et al., 2014). In other words, gamification borrows the fundamental design principles – which are rules that govern the construction of artifacts (El-Masri and Rivard, 2012) – and game features that have been successfully embedded in game designs to engage their players and provide them with a sensation of euphoria.

When gamified, experiences can pay close attention to business processes like customer acquisition or outcomes like employee sales (Robson et al., 2014).

Game Features

The literature pertaining to video and computer games has abundant descriptions of game features that lead to high levels of engagement. Perhaps one of the main features of video or computer games is to personalize the experiences that players have when playing the game. This is often achieved by allowing players to select a game character, or an avatar, to represent them in the game. According to Smahel et al. (2008), players often develop a strong relationship with the avatar they select. This relationship leads to stronger attachment of the player to the game itself. Another important game feature that helps increase gamers’ engagement is the high quality of game aesthetics (Chang and Chen, 2008). According to the authors, in order to provide a “WOW experience” to the players, a strong visual appeal such as 3D virtual worlds is crucial. Successful games make players feel that they are “part of something grand and extraordinary” (Yee, 2002). However, players enjoy games that allow them to interact with other players. Successful games include easy-to-use to engage with other players (whether online or offline). Chat channels for extensive in-game socializing or animated and audible character expressions (Chang and Chen 2008). Game players also seek to access one or more of their preferred psychological states while interacting with real or virtual players (Kalinauskas, 2014). Some of the main states sought are competition.
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and cooperation (Hamari et al., 2014; Kalinauskas, 2014). Competition refers to the ability to outrival the others (Kalinauskas, 2014), whereas cooperation is to work collectively with other players in order to advance through the stages of the game (Smith, 2005). Last but not least, a good game has features to rank the reputation of players according to their performance, reward their good performance, and penalize them for unsatisfactory performance (Butler, 2014; Chang and Chen, 2008). While penalizing players for unsatisfactory performance might sound reasonably easy, adequately rewarding player is rather difficult and must take into account the difficulty of the tasks that players face (Butler, 2014).

The current set of key features that are embedded in today's computer and video games have been defined and developed over a period of a few decades. As a result, they have been tested and proven to be efficient in attracting and engaging gamers. In this respect, gamification, which is a new phenomenon, must adopt and tailor those features to fit the associated non-game environment. While players play video games for pleasure, employees, citizens, and students, should "play" in a gamified experiences in order to produce better results that are predetermined by the designers and at the same time enjoy that experience.

Gamification in Academia and Business

Educators are incorporating gamification elements in their curriculum and learning strategies in order to engage and motivate students. For instance, students at HEC Montreal play a simulation game (ERPSim) on enterprise resource planning in order to learn about business processes and decision making (Cronan et al. 2011). The ERPSim game incorporates game elements such as competition, ranking, and collaboration. On the other hand, the University of California in Irvine developed an award winning role-playing educational game named SimSE to teach students how to plan and execute software development processes (Sadabadi 2014). The main premise is that games capture students’ attention and keep them engaged. Indeed, a Vice President at Amplify Learning Company emphasizes the importance of effective games to keep students engaged in intense, high-cognitive tasks for longer time periods (Heaven 2014).

In business, Organizations nowadays develop and implement gamification techniques in order to improve work processes such as training, recruitment and marketing. According to Vasudevamurt and Uskov (2015), companies such as Microsoft, IBM, Toyota, Oracle, Adobe, Cisco, Siemens, SAP, Google, Accenture, American Express, Caterpillar, and Ford have already implemented gaming elements in their core business systems. For example, SAP developed a gamified environment they named SAP Roadwarrior to explain new products to their sales teams and prepare them to interact with customers (Herger 2012). The social computer game “Second Life” was used by Toyota as a virtual store environment and to stimulate advertisement ideas (Kaplan and Haenlein 2009). Purposeful game playing with Lego bricks has also been used as a technique by organizations to achieve various business objectives. The idea that when building the world, mental models are indeed build to make sense of the world we live and work in (Hadida 2013). For example, bank of china derived powerful insights pertaining to their corporate strategies and team dynamics by building models with Lego bricks (Hadida 2013). Lego bricks were also used by companies like Nokia and Orange to allow participants to create shared understanding and organizational goals (Hyvönen, 2014). The technology consultancy firm Gartner advocates that corporations will continue to advance their innovations using gamified elements (Anderson and Harrison 2012). Deloitte, another major consulting firm, predicts that serious gaming simulations and mechanics will become embedded in day-to-day “business processes, driving adoption, performance, and engagement” (Anderson and Harrison 2012).

Technology in the Public Sector

The wide proliferation of technology has significantly affected the traditional ways governments used to realize their strategic aims and fulfill duties towards their citizens. This impact can be attributed to a myriad of factors such as the ever-increasing performance and democratization of personal computers and the fast-paced spread of broadband internet connections accompanied by the rushing entrance of mobile and ubiquitous connected devices, such as smartphones and tablets, into people’s life. E-government systems have been one of the most common carriers of innovation when it comes to apply modern information and technology (ICT) developments to the public administration. Despite the fact that e-Government had, and still has, different definitions due to the continuous change in technology trends, it is mainly referred to as the use of ICT to provide people with administrative services and interaction with governments. In this context, the United Nations defined e-Government in its annual survey of 2014 as “the use and application
of information technologies in public administration to streamline and integrate workflows and processes, to effectively manage data and information, enhance public service delivery, as well as expand communication channels for engagement and empowerment of people.” (United Nations, 2014, pp. 1). In other words, e-Government is about the exploitation of ICT, and web-based technologies more specifically, to improve the efficiency and effectiveness of administrative public services delivery to citizens. Furthermore, citizens’ widespread adoption of e-Government services and public agencies’ commitment to deliver their services online would also extend to promote a broader stakeholders’ contribution at the local, community and national levels (Alenezi et al., 2015).

From its definition, it can be understood that e-Government development is highly coupled with the available technology. For instance, Web 2.0 has played a crucial role in bringing e-Government services a step forward by allowing interaction between citizens and government agencies. This has notably been extended to cover financial transactions when technical information security proved to be reliable. Therefore, several maturity models were proposed in the e-Government theoretical literature and practice.

**Maturity Models in e-Government**

Maturity models are generally developed in order to monitor the progress of e-Government developments, if they are going on the right track with using the available technology in achieving the basic objectives of e-Government systems (Andersen and Henriksen, 2006). These maturity models not only considered the technical challenges in measuring the maturity of a given e-Government system but also included other critical success factors that are not directly linked to ICT technicalities such as business processes, integration, and governments’ strategic support.

One of the most seminal e-government maturity model is the Layne and Lee maturity model proposed in 2001. This maturity model looked at e-Government completeness from technical and organizational perspectives where capabilities such as catalogues and transactions are considered technical, whereas integration is primarily considered organizational. An e-Government system in its earliest stages of maturity, according to Layne and Lee model, should ensure the technical requirements for presenting information in a static way through documented catalogues. The next level adds to catalogues the ability to exchange information between citizens and government agencies through electronic channels ensuring transactional interactivity. Finally, integration happens vertically when local government agencies are properly integrated with all superior public agencies, and horizontally when all agencies are integrated at the same hierarchical level. E-Government gateways and portals providing electronic versions of one-stop shops are considered to be the result of such horizontal integration (Persson and Goldkuhl, 2005).

Based on Layne and Lee maturity model, Hiller and Bélanger (2001) had developed an extended version of the model by adding a fifth level focusing on the citizens’ participation. Similarly, Andersen and Henriksen (2006) emphasized on the importance of the customer-centric nature of any e-Government maturity model since citizens form the most active part of the e-Government loop. Few other maturity models were built by international institutions such as the United Nations (2012), Gartner Group (Baum and Di Maio, 2000) and Deloitte and Touche (2000), among others. Despite their relative high number for theoretical models, they mostly share similar features (Fath-Allah et al., 2014), notably for the first few maturity levels regarding catalogues, interaction, and transactions. However, some models, such as Gartner's model (Baum and Di Maio, 2000), suggested transformation as the highest level of a 4-level maturity model suggesting web presence, interaction, transaction and transformation as its benchmarking levels. This model was further extended by Siau and Long (2005) to accommodate a sixth level: e-Democracy as the highest degree of maturity an e-Government system may provide.

An interesting point can be noted from these maturity levels. It is the uncertainty of how future technology and organizational efforts exercised by governments at different levels could further develop into an even more reliable, usable, useful and more accepted e-Government services. Transformation could denote to changes and reforms in business processes that should essentially be done on e-Government providers’ side that, when accompanied with citizens’ engagement and active participation, would grow to reach the highest level of e-Democracy. In other words, to ensure a successful implementation of innovative e-Government services is to secure three main elements: availability of technology, organizational and management reforms at the public sector level that can be aligned with the available technology, and users’ adoption. While all maturity models perceive the first element (i.e. technology) quite similarly, organizational and management reforms could be embraced under the umbrella of transformation.
Therefore, a way to conduct transformation that would potentially attract more citizen engagement is the individual personalization of e-Government services (West, 2004; Guo and Lu, 2007). In retailing, service personalization and products' customization are deep-rooted methods to attract new and strengthen existing customers' loyalty, and modern technology has proven to be an efficient channel to further implement these principles (e.g. Rust and Lemon, 2001; Van Riel et al., 2004; Ding and Keh, 2016). Furthermore, in their recent study Din and Keh (2016) suggests that personalized services demonstrate higher impact on the satisfaction of customers with hedonic goals, rather than on those with utilitarian goals. Therefore, if the transformation of e-Government is intended to go towards the trend of personalization of e-Services, then this transformation will demonstrate higher effectiveness if public e-Services shift from pure utilitarian to include some more engaging and entertaining dimensions while preserving their aim.

Discussion

Gamification is often perceived as a way to introduce entertainment in fields generally considered “serious” (Robson, 2014). For instance, gamification in primary education fostered the idea of exchanging the boredom of learning with the one of “learning by fun”, and therefore to transform the negative perception of children that learning is a hard and long endeavor. The outcome of this experience would result in a better and more enjoyable learning journey. In fact, from the initial definition of gamification, entertainment is not a mandatory requirement when it comes to adopt gamification techniques. Instead, it stresses on the borrowing elements that are usually present in a game and apply them in processes belonging to other context (Mahnič, 2014). These gamification elements would indirectly contribute to the success of the whole process while creating some benefits such as enhanced performance, sustainability, stakeholder satisfaction etc...

When it comes to the concept of gamifying e-Government systems, a few points are worth discussing from two distinct perspectives: the e-Government service providers in term of public agencies' perspective, and e-Government users' perspective. Firstly and assuming that public agencies are rationally prioritizing their efforts to fulfill the government economic, justice, and social duties such as ensuring national security, social welfare and prosperity (Parsons, 1995), it is imperative to agree on the fact that citizens' preferences within the society are closely aligned with governments' global objectives. Similarly, a “good citizen” is expected to exercise her/his constitutional rights as well as duties that would contribute to the benefit of the society as a whole (Pammett, 2009).

Gamification as a Booster of Participation

A major factor of e-Government success is the rate of citizens’ adoption and their engagement in active participation in public topics using provided e-Services. In that sense, e-Government services may not only be considered as a mean to deliver utility administrative services to citizens, but also as a way to empower them in taking actions that would benefit the society around such as sharing information, express opinions and disseminating positive civic and social actions.

With regards to citizens’ engagement, governments would find great potential in gamification to create positive incentives to actively participate in campaigns organized by local or national governments. For instance, as an effort to encourage people to regularly carry on a physical activity to reduce obesity and chronic diseases, local government may borrow some gamification elements (e.g. scores, badges, avatars, etc...) to create a kind of mild competition environment where contesters would share their physical activities performance through mobile phones and smart watches. By the end of the competition or at regular periods, winners are announced and rewarded as a sign of appreciation and encouragement to current and future participants. Rewards may range from a simple symbolic title (e.g. member of a local or national community fit list) to more influencing rewards, like qualifying the top ten best performers to advise governments on designing policies aligned with encouraging other citizens to achieve similar results. The main difference with commercial or individual campaigns (e.g. González et al., 2016; Maturo and Setiffi, 2016) is that this type of rewards can only be achieved when such the competition is organized and supported at the public level. With such settings, rewards may not be limited to extrinsic but also extend to reach a form of strong intrinsic motivation. Therefore, it is strongly believed that with careful and smart design of such personalized and interactive gamified systems, many contemporary issues challenging governments could be totally, or partially, resolved. Examples of potential problems that gamification may
address is increasing people’s awareness of dangers resulting from the waste of natural resource or dangers of using mobile phones while driving.

This type of e-Government transformation will not only increase people’s awareness of the initiatives proposed by governments to increase social welfare, but will also create a sort of social networking dynamism where exchange of useful information may achieve better outcomes.

**Empowering Citizens through Gamification**

As mentioned earlier, it has been proven in the retailing and marketing literature that customization and personalization of product or service positively affects customer satisfaction and also result in better behavior (e.g. Rust and Lemon, 2001; Van Riel et al., 2004; Ding and Keh, 2016). Despite the difference between e-Government users and e-Commerce customers, the effect of personalization when it comes to deal with the public sector is in no doubt still valid. There are several gamification elements that would support personalization. On the other hand and due to gamification, e-Government services may shift from the traditional way of serving citizens by better exploiting the current mobile and web technologies. Last but not least, gamification may encourage new “players”, such as children, to interact with administrative services or initiatives organized by local governments to increase their awareness of issues challenging governments and have a better opportunity to form future “good” citizens.

**Conclusion**

This paper puts forward the idea of gamification as a facilitator to enhance the maturity level of current e-Government systems. It also places the concepts of gamification in the body of e-Government maturity literature by considering gamification as a carrier of innovative features to e-Government such as personalization and active participation. In that sense, gamification may not only push e-Government services towards transformation levels but it may also promote e-Democracy. The paper also discussed the mutual benefits between e-Government providers and e-Government users, notably in applications that would considerably contribute to better societies.

The main practical contribution of this paper lays in proposing to public authorities and e-Government providers an innovative way to transform e-Government services that would not only change the way how e-Services are proposed but also in the way they are perceived and used by citizens. It is acknowledged that the lack of empirical support to back the claims made in this paper form a limitation, but future work could include the development of an experimental platform where a gamification framework is developed to examine the effects of the foreseen e-Government transformation. Modern web technologies and mobile capabilities can easily be employed to contain some gamification elements addressing different scenarios.

**REFERENCES**


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