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Abstract

Gamification is relatively novel concept which is attracting increasing interest from academics and practitioners as a method of mediating behaviour in a wide range of social and business contexts. In this paper, we catalogue the atomic components used to implement gamification. Using a standardised rubric, we study a sample of gamified activities in order to measure the prevalence of the various components used to implement gamification. This research provides an empirically derived and validates catalogue of specific components used to implement gamification, which can serve to guide the work of academics and practitioners. It demonstrates variance in the use of the different types of component, indicating that the utility of gamification components may differ. Finally by contrasting the utilization of components in the individual and group contexts, this research identifies the contextual sensitivity of gamification and highlights the need for more sensitive research agendas in advancing our understanding of gamification.

Keywords: Gamification, Human Behaviour, Information Systems Design

1.0   Introduction

Human beings are hardwired to play. Games are an integral part of our personal, social and cultural identity. Scientists and researchers are discovering deep, complex relationships between our brains, neural systems, learning and game play (Zichermann & Cunningham, 2011). These emerging relationships have led to the concept of gamification arousing increased interest across a diverse range of contexts from education to personal productivity to business management. Gamification is the use of elements traditionally associated with games, such as structured rules, points and competition, to prompt specific behaviours in individuals.

As a relatively novel paradigm, competing definitions of gamification abound. Various authors provide differing definitions as to the precise nature and constituent components of gamification. In many ways, gamification can be seen as a suite of techniques and psychological prompts connected by their association with games and play. Gamification is implemented using specific, atomic components such as points or badges. This paper catalogues the components that are being used in gamified interventions, activities and processes and in doing so makes number of contributions to the literature.

In order to empirically derive this catalogue, a sample of gamified activities is evaluated. A rubric of gamification components, derived from both the literature on gamification and an analysis of extant gamified activities is used to evaluate each activity. The rubric checks for the existence of the gamification components. When aggregated, these data records the number of times each individual component is used across the sample and so provides a rich data set that can be analysed to provide a number of contributions.

First, the paper empirically validates existing theoretical derivations of the tools and techniques used in gamification. This analysis also identifies gaps in the literature where extant mechanics that are absent from the literature. A third contribution arises from quantifying the different elements that are used in gamified activities. This data is used to analyse the relative importance of elements used in gamification, which can serve as both a guide to practitioners and also a roadmap for further research in the area. Finally, by quantifying the elements of gamification used in different contexts, the paper demonstrates that the utility of specific gamification elements varies in individual and group activities. This demonstrates the importance of context in gamification, and serves as a starting point to allow the development of a more subtle understanding of the applicability and effectiveness of gamification in different contexts.

The rest of the paper is structured as follows. First, the extant literature on gamification is reviewed. Particular attention is paid to identifying the benefits and challenges associated with it and identifying the specific methods, tools and techniques that comprise gamification. Following this, the methodology used in this study is discussed, before findings are presented in the following sections. The paper concludes by summarising and analysing the results before suggesting several new research avenues.

2.0   Literature Review

2.1   Introduction to Gamification

Gamification is "using game-based mechanics, aesthetics and game thinking to engage people, motivate action, promote learning, and solve problems" (Kapp 2012, p.10). Increasing interest in gamification is engendered by the idea that it can be used to effectively influence behaviour. From this perspective, motivation is the underlying theoretical construct of interest. Motivation is used to explain the initiation, direction, intensity, persistence and quality of behaviour (Maehr & Meyer 1997). It is contextual, multi-dimensional and variable in both the magnitude of motivation and individual has and in the type of motivation an individual experiences (Ryan & Deci 2000). It is used as a dependent variable to explain a vast range of human behaviours across varying contexts and environments. The idea that gamified activities can affect motivation and thereby mediate behaviour provides the rationale for current academic and practitioner interest in gamification. Games provoke powerful emotional responses, such as curiosity, frustration and joy (McGonigal 2011). Gamification uses familiar metaphors and design constructs to align individuals behaviours with those of the designer of the gamified activity.

Gamification is a relatively novel field of study. The extant literature does not provide definitive answers with regards to the benefits and challenges of gamification, but rather highlights two important issues. First, further research is required to build a solid empirical understanding of the effects of gamification. Second, this work must be conducted in a contextually sensitive way. For example, if the goal of a gamified process is to prompt a simple, time limited behaviour in an individual, gamification shows great potential. On the other hand, if the goal is change a behaviour pattern over the long term, then the potential interaction between extrinsic and intrinsic motivation may undermine the effectiveness of gamification as a suitable methodology. Similarly, competition may be an effective technique in some situations, but it's suitability to an educational context is questionable. It is important that future research in gamification be directed and cognizant of the fact that the effects of gamification are likely to be contextually relevant.

2.2 Components of Gamification

Werbach identifies 15 specific components that are associated with Gamification (Werbach & Hunter 2012). These are the specific atomic components that are used to gamify activities, procedures and behaviours in various contexts. Conceptually,

gamification is implemented by a designer choosing which dynamics and mechanisms to introduce into an activity, and then operationalising the process by introducing a mix of the specific components that instantiate the required mechanism or dynamic. From this perspective, components are the key enablers of gamification which are used to directly prompt the required behaviour change in an individual.

Gamified activities may include *Achievements*, which are specific, defined objectives that participants are expected to achieve. Gamified activities, particularly those implemented on information systems often provide participants with *Avatars*, which are visual representations of a player's character. Gamified activities will often have *Badges*, which serve as visual representations to the players and others that particular achievements have been reached. Gamified activities will often have *Boss Fights*. These are particularly hard challenges which are presented at the culmination of a level, and will require the player to display mastery of particular skills and attributes which should have been honed during the previous game period. Badges can often be grouped together in *Collections*, where a specific set of badges are combined together to indicate a higher level mastery of a particular skill or technique. Gamified activities will sometimes include *Combat*. This is not necessarily martial in the traditional sense, but implies that two or more players interact for a prize or goal in a process which is in some sense zero-sum. Gamified activities often include some form of *Content Unlocking*, whereby reaching some intermediate goal allows the player to engage in new tasks or provides the player with heretofore restricted capabilities. Gamified processes which allow for or promote interaction between players often allow *Gifting*, whereby players can offer help in the form of resources or time to other players. Gamified activities often include some form of *Leaderboard*, which allows players to compare their prowess directly to others. Activities often include *Levels*, a key feature which provides a fair yet challenging experience to players of different experience and expertise. Leaderboards are often implemented using *Points*. Points are simply a numeric record of a player's performance to date in the gamified activities. *Quests* are predefined challenges which include a defined set of goals and rewards. Quests often include a goal path, whereby players must achieve goals in a specific order to unlock the next goal. This feature is often used to provide games with a narrative structure. Gamified activities also can include *Social Graphs* which are tools that represent a player's social network with in the game and allow the

players to interact socially. In turn, these tools are often used to enable *Teams*. Some gamified activities seek to allow groups of players to work together for common goals. Finally, some gamified activities offer *Virtual Goods*, which are game assets that have a perceived value within the game. Players can trade these goods with each other.

The specific components identified by Werbach often interact in gamified processes and activities. For example, the appearance of participant's avatars may change as a person progresses through a game. In this case, badges are items of virtual clothing or other accoutrements which serve as a visual representation of achievement by altering the avatars on-screen appearance.

2.3   Research Questions

Gamification is a strong emergent trend with many multinational companies now investing significant resources to incorporate Gamification within their business (Sreedhar 2014). Most studies to date have focussed on gamification as holistic entity. In order to develop a more refined understanding of gamification, an understanding of its individual components and their effects is required. This paper seeks to advance this research agenda by addressing a number of research questions. First, we seek to validate the list of components identified by Werbach. Our second contribution is to identify empirically what are the components of gamification that are most widely used. We also explore what components are used in which contexts. This work enables our third contribution, which is to provide a guide to practitioners identifying what components are available to them, and in what contexts have they been successfully deployed. Finally, by identifying the most commonly used components associate with gamification, we provide a roadmap that other researchers can used to focus their research on investigating and evaluating those components which are most widely used and so of greatest practical impact.

3.0 Methodology

A pre-requisite for investigating the research questions was the generation of a list of gamified activities that could be evaluated. The first step was to identify examples of gamification. Four main databases were queried, namely the Google Search Engine,

the Yahoo Search Engine, the Google Play Store for Android and the Apple App Store for iOS. Each of these databases was searched using relevant terms such as "Instance of Gamification", "Example of Gamification" and "Gamified Activity". Pre-screening checked whether the results were actual instances of gamification or links to articles or other writings discussing gamification. In order to ensure a wide coverage, after this initial hygiene test had been concluded, the top 100 results from each of the data sources were taken.

The next step consisted of amalgamating and cleaning the returned results. After duplicates were removed and each result was checked again to ensure that the gamified activity or process could be actually accessed by the researchers. Each specific example of gamification was empirically tested. The researchers registered or logged on to the gamified activity and actually engaged in the process or activity being studied. Secondary data, reports or discussions of gamified activities were excluded from this study. This protocol did have the effect of limiting the data gathered by this study to publicly accessible gamified activities. Many organisations are reported as using gamification for internal activities, however as we were often unable to directly access these systems, they were not evaluated as part of the study.

In order to address the 2nd research question, before the main analysis commenced, 20 instances of gamification were selected at random. For each of the selected instances, textual descriptions of the gamification components found in that instance were prepared. After this analysis had concluded, the generated textual descriptions of the gamification components were analysed and aggregated, with a view to identifying additional gamification components which were not present Werbachs model. Based on this analysis a list of additional gamification components which were empirically observed was created. This list was added to the original list of 15 components provided by Werbach.

The final rubric was then used to guide the evaluation of each instance of gamification. Demographic information was also collected for each instance. The name, objective and category of each instance of gamification were recorded as was a brief textual description of the gamified activity. The above process provided the researchers with a rich data set which was then used to investigate the research questions identified earlier. Our results are presented in the following section.

4.0   Results & Conclusions

Data collection from this process is currently underway, and is expected to be concluded in early February 2015. Initial analysis, results and conclusions will be presented at UKAIS 2015.

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