

GAMIFICATION: USING GAMING MECHANICS TO PROMOTE A BUSINESS

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ABSTRACT

The use of digital games and gamification has demonstrable potential to improve many aspects of how businesses provide training to staff, operate, and communicate with consumers. However, a need still exists for the benefits and potential of adopting games and gamification be effectively communicated to decision-makers across sectors. This article provides a structured review of existing literature on the use of games in the business sector, seeking to consolidate findings to address research questions regarding their perception, proven efficacy, and identify key areas for future work. The findings consolidate evidence showing serious games can have a positive and valuable impact in multiple areas of a business, including training, decision-support, and consumer outreach. They also highlight the challenges and pitfalls of applying serious games and gamification principles within a business context, and discuss the implications of development and evaluation methodologies on the success of a game-based solution.

1 INTRODUCTION

Modern businesses are frequently faced with challenges such as rapidly evolving marketplaces, shifting labour markets, and the need to reach consumers who are increasingly engaging with a wide range of digital media, both in the workplace and during their leisure time. Addressing these challenges requires a wide range of skills from both senior and front-line staff, in-turn requiring innovative and effective training tools to aid staff at all levels of an organisation as they adapt in response to emerging challenges. This article considers the specific case of the application of digital games for serious purposes ("serious games"), and using game elements to enhance existing services, training programmes, and products ("gamification") with respect to the benefits they offer to businesses, both when adopted as additions or alternatives to existing training or decision-support systems, and as a means to reach consumers.

Underlying this review is an identified need to communicate the benefits of the use of gamification to address a wide range of perceptions of games and gaming across sectors, organisations, and individuals. Whilst academic evidence demonstrates the benefits of the use of games/gamification to address problems across a wide range of contexts, developers of serious games and gamification often face a challenge in presenting a compelling business case for their use, particularly as game elements may superficially appear unrelated to targeted objectives, or less likely

to offer return on investment when compared to a lower-cost solution. This perception is rapidly changing, in part due to the success of a wide range of games deployed in business contexts, and also due to the emergence of development tools and game engines which increasingly allow immersive, engaging, and visual content to be created with significantly lower production costs.

As highlighted by this article, many businesses have already noted the impact of games in these sectors, and explored their use. In the next section the authors are presenting the definition of gamification. Section 3 focuses on the benefits of gamification for the business sector, section 4 focusses on the inhibitors to successful exploitation of Gamification and section 5 concludes the paper.

2 BACKGROUND

Gamification is defined as the process of using game thinking and game mechanics to solve problems and engage players. (Horizon Report, 2013). It essentially describes the integration of game dynamics, service, community, content or campaign in order to drive participation to all manner of productive activities. The basic different between actual games and gamification is that the former is an actual *product* that is consisted of gamified activities whilst the latter entails a *process* that may exist within or without the necessity of a game and its subsequent environment.

Today the use of game elements, design and mechanics is incorporated in many aspects of our lives such as education, work, entertainment, communication and exercise. Many researchers have studied the benefits of participating in games in peoples' lives. For example, Jane McGonical [1] mentions numerous aspects that can be promoted through games. Some examples are: motivation, competitiveness, collaboration, creativity, enjoyment, engagement, satisfaction and innovation. Many researchers (i.e. [2],[3-7]) support her claims and provide evidence that games have the capability of satisfying a range of needs found in [8] hierarchy of needs (e.g., creativity, problem solving, morality, spontaneity, self-esteem, confidence, achievement, respect of others, respect by others, friendship, family).

Gamification offers the introduction of competitive elements. Such elements are typically unexplored or avoided in more conventional pedagogy, for example Goodman suggested competition in a conventional educational setting leads to anxiety and reduced learning enjoyment. Gamification often seeks to add value or additional challenge to mundane activities: success requires either genuine perception of this value, or utilizing the increased challenge to create a "flow" experience that engages the player. Simply adding points to tasks without having a strategy for giving them value is unlikely to lead to meaningful behavioral change or learning outcomes, rather, these points need to be given value either in terms of tangible reward, or capitalize on social elements to stimulate collaboration and/or competition.

The table below gives examples of successful introduction of gamification in business context.

Serious Games	Description	Paper
Houthoff Buruma.	The Game: serious game for recruitment purposes, developed by Dutch law firm Houthoff Buruma	
Novicraft_	NoviCraft is a serious game developed by Microsoft for supporting business customers in social excellence, in learning to construct shared understanding together with different people in changing contexts.	http://www.ludocraft.com/pellaaja/pdf.pdf
ALM: Change Adaptation Learning Model	Serious game for testing, validating, and refining plans to enable transformational organizational change. Developed by DecisionPath,	R.M. Adler and D. Koehn, "CALM: Complex Adaptive System (CAS)-Based Decision Support for Enabling Organizational Change", Intl Conference on Complex

		Systems (ICCS 2007), Oct 28- Nov 1, 2007
Addo Agnitio Award (A ³)	Accenture - a technology, outsourcing and management consulting company - started a gamification programme aiming to promote the communication and collaboration of more than 250,000 personnel around the world employed by the company. The programme was named Addo Agnitio Award(A ³) and used a rewarding system to achieve its objectives.	Leeson, C. (2013) 'Driving KM Behaviors and Adoption through Gamification'. <i>KM World</i> 22 (4), 10-20
Seattle-based Slalom Consulting Game	Seattle game consulting created a mobile phone app game in order to increase the communication between employees. The Game was played by almost 1800 (over 90% participation) employees of the company. The game included a leaderboards and achievements system	Korolov, M. (2012) 'Enterprise'. <i>Network World</i> 29 (15), 30-36
Going Social	Bunchball Bluewold uses gamification tools in order to increase the social interaction between their employees. The Going Social allows the employees to earn points for building and maintaining their profile, sharing Bluewolf content into social media sites such as Facebook, twitter, LinkedIn and posting on internal boards.	Bannan, K. J. (2012) 'Bluewolf Uses Employee Gamification to Increase Social Sharing'. <i>B to B</i> 97 (6), 11
Nike+	Nike build a system that allows it customer base to track, share and compare exercise results while they earn achievements points. Currently 11 million people are using their system	http://itechthereforeiam.com/2013/08/gamificati-on-to-nike-starbucks-us-army-and-yes-emc/
U.S Army	U.S army is currently using serious games in order to train their forces and improve their recruitment. Through the creation of the America's Army Game, they have improved their recruitment process. Currently 11 million people are playing their game.	Wray, R., J.E. Laird, A. Nuxoll, D. Stokes, and A. Kerfoot... San Jose, CA.
Starbucks Mobile app	Starbucks Mobile app rewards their loyalty customers through the usage of an achievement system. Every time their customer completes an achievement they have receive special offers from the company. Currently over 6 millions customers are using their app.	http://itechthereforeiam.com/2013/08/gamificati-on-to-nike-starbucks-us-army-and-yes-emc/

3 BENEFITS OF GAMIFICATION

Reeves and Read [9] argue that gamification can help in increasing productivity and job satisfaction by transforming serious work into exciting, engaging and entertaining play. They also believe that gamification can deliver benefits to the individuals who interact with the business and the business itself, by aligning the individuals' interests with the organisational goals. They argue that games have already influenced work, advertising, news and political communication, and that the latest games should be seriously considered and used in reengineering the entire Human-Computer Interface.

Matt Davis, director of innovation for the Filene Research Institute, realised what gamification can offer to the sector of financial services and stated [10]:

"The goal of gamification is to use the dynamics and mechanics associated with games and apply them to real-world experiences...if misaligned incentives, boring experiences, and unmotivated audiences are the enemy of traditional financial services, gamification could be our hero." Some of the characteristics of games combined with the playful nature of the human species allowed games to become a great part of our lives and progressively invade the industry.

Csikszentmihalyi [11] suggests that rewards of conventional sort are not the only motivations for the human behaviour. By studying people who dedicate a lot of time and energy on activities offering minimal conventional rewards, Csikszentmihalyi (1975) wanted to find a different form of motivation and better understand the human behaviour. During his study he recognised the importance of "flow" in keeping someone interested and engaged in a task. Amy et al [12], believes that flow is an important feature of games that helps in shaping someone's behaviour.

Another common characteristic of games is competition, which has been a part of human life since the beginning. Based on Darwin's theory of natural selection, all species, humans included, have always been competing against each other for vital (e.g., food, water, land) or scarce resources in order to survive. Therefore, McDonald, Musson and Smith [13] argued that by having people to compete against each other within a game stimulates the survival instincts that are found in everyone.

Montola et al [14], believes that a practical way of overcoming challenges is play, as activities with no external goals can become pleasant with challenge stimulations, while goal oriented activities become unpleasant with challenge stimulations. Reimer states that many activities are already inherently game-like, and gamification can involve fostering the recognition of this, rather than explicitly attempting to modify the activity [15]. The simple notion of gaming can stimulate interest in certain audiences [16], and it could be argued, based on the author's own subjective experience, that simply referencing pop-culture shows built around teamworking such as *The Apprentice* can have a dramatic impact on students' enthusiasm and attitude in approaching team-based activities.

Rewarding systems, which are part of game mechanics, are also a common feature of games and play a central role. Reeves and Read [9], support that by using rewards that are directly connected and core to the employees tasks and removing the responsibility and control from supervisors, can lead to the decentralisation of a business and allow personnel emphasise their efforts according to their interests. Furthermore, these loose hierarchies will force people to adjust and develop self-organising behaviours that are ideal for them, and therefore, more efficient. These changes can create a democratic environment, where employees will be able to select and execute task that better fit their aims and ambitions. Additionally, well-designed rewarding systems can become a permanent reminder of peoples' contributions to every task. They can also empower the spontaneous formations of teams and alliances between people from anywhere in the business that share common interests and have the same excitement and internal motivation in completing a specific task.

4 INHIBITORS TO SUCCESSFUL EXPLOITATION OF GAMIFICATION

Forecasts show that growth of gamification within the business world will increase exponentially in the following few years. According to Gartner, by 2014 the percentage of Global 2000 organisation that will have at least one gamified application will surpass 70 [17], and by 2015 25 percent of redesigned processes will incorporate some form of gamification. M2 Research estimates that the gamification market will grow to more than US\$2.8 billion by 2016, from US\$100 million in fall 2012 (Korolov, 2012).

Nevertheless, Gartner estimates that, by 2014, 80% of gamification attempts will fail as a result of poor design. It is, therefore, essential to raise awareness around the limitations, pitfalls and barriers of the gamification process for both the enthusiasts and sceptics who would like to cautiously make their first steps towards gamifying parts of their organisations. Game-based approaches are not universally welcomed, and in this case could be perceived as making a resource less valued as a learning resource. The "strictness" of game rules and level of difficulty are also noted as challenging to effect without leading to usability issues. Given the recognised importance of usefulness and ease-of-use in technology acceptance [18], these findings suggest gamification must be carefully and selectively applied to avoid a negative outcome. This could be achieved by adaptivity on an individual level, for example giving users the choice between the initial resource and its gamified form, though this assumes users would be able to introspectively select the ideal resource for their learning needs, a

theory partly contradicted by a number of studies [19, 20]. A more comprehensive solution, therefore, should seek to understand the learner more fully and provide them with the optimum resource based on this understanding, a task which is the subject of continued research [21]

Korolov [22] mentions a number of mistakes or omissions that could lead a gamification initiative to failure. According to the author, using the wrong rewards or replacing reasonable compensation with virtual rewards can be reasons for failure. Letting a game to become stale is another reason. Following the example of video game companies, businesses should keep updating their games, release expansion packs and develop new games in order to maintain their employees' interest and engagement; and target new organisational objectives.

Leeson (2013) and Korolov (2012) argue that taking a simplistic approach and ignoring the importance of game design and behavioural economics can lead to failure. Games must be meaningful to the employees, and points, badges and leader boards are not enough to accommodate the desirable longstanding outcomes.

Montola et. al. [14] and Burke and Hiltbrand [23] call for caution when integrating achievement systems. Even though there are examples with successful utilisation, they bear some yet unrevealed traps due to their youth in the context of gamification. In the case of *Nokia Image Space*, a geo-tagged photo sharing service, achievements did not have a main role. Nevertheless, they aided the participants to navigate and learn the different features of the system's prototype, and stimulated some friendly competition between the users [23]. However, along with the positive effects, the achievement systems triggered undesirable usage patterns leaving the users unconvinced and concerned.

Montola et. al [14] believes that for an achievement system to work, it is important that the users already like and appreciate what they are doing and they just need something further. In such cases, providing loyal users with status symbols connected with something they value brings better results. However, if those achievements gain a negative connotation (e.g., wasting time, non-productive, just entertainment), the opposite results can occur with the users stop using the system, information getting ignored [23] and productivity declining. Another result of using a poorly designed achievement systems is the confusion about progress they can be caused amongst users. Based on [23] experience, immediate and explicit feedback is critical in order to avoid such confusion. They highlight that the users have to be "notified immediate when they gain an achievement, to remind them of the existence of the achievements, to reward them on the spot, and to arouse their curiosity towards achievements."

One of the greatest barriers when implementing gamification is the culture within the organisation and the way serious work is seen by the management. The use of words or phrases that include the word "game", like "Serious Games" or "Gamification", are a headache for the members of management who believe that work should be grim and unpleasant and not enjoyable in order to be serious. James Gardner, chief strategy officer at Spigit, recommends the use of the phrase "psychological dynamics" when talking to the management team (Korilov, 2012). Leeson [17] provides some guidelines and draws attention to areas that require greater consideration throughout the gamification programme. Having the programme's objectives always in mind during design, development and implementation is one of the key success factors. Focusing on the behaviours the employees must embrace and not the activities indicating those behaviours is another. If the opposite happens, staff members will end up doing things that are not necessary and are not helping towards achieving the programme's objectives.

Making the system available to as many employees as possible, and consequently, recognising and rewarding the efforts of as many staff members as possible can also assist in its success. However, being aware that the possibilities of having people taking advantage of the system, cheating and using it in a way that is was not intended increase is important [17]. Even though the supporters of gamification can list numerous positive effects of serious games in the business world, they still acknowledged that it is not panacea and can bring negative or even the opposite of the intended effects if not used carefully. Although it is not a trend and it is here to stay, it is not a silver bullet for all the problems in the industry [17]. Being able to capture, store, retrieve and correctly interpret data is also very important [17], especially in cases where people's efforts need to be recognised and rewarded, and where the systems are used for monitoring and presenting progress and performance, and providing feedback.

Burke and Hiltbrand (2011), warn that once gamification is applied and users are accustomed to perform learned behaviours only when participating in the game, those behaviours can be lost when play stops. Therefore, it is suggested that play continues in order to motivate users perform those behaviours.

5 CONCLUSION

This article has presented the benefits and limitations of gamification for business context. The findings, highlighted in their relevant sections, show demonstrable benefits from using game-based approaches in a diverse range of application areas, ranging from training to customer engagement. Whilst these benefits in turn have contributed to increased uptake of game-based approaches, serious game developers need to be aware of the need for solutions to provide demonstrable return on investment and solutions to business needs. The increasing evidence base is already challenging perceptions that work cannot be "fun", and the use of games and gamification principles has demonstrable potential to improve the efficacy of training programmes, increase productivity, and even reach out to a global community of volunteers willing to contribute their time to gamified problem-solving.

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REFERENCES

- McGonigal, J., *Reality is Broken: Why Games make Us Better and how they can Change the World*. 2011, New York,: The Penguin Press.
- Gee, J.P., *What video games have to teach us about learning and literacy*. . 2003: New York: Palgrave Macmillan.
- Zhang, P., *Motivational Affordances: Reasons for ICT Design and use*. Communications of the ACM, 2008. **51**(11): p. 145-147.
- von Ahn, L.a.D., L.,, *Designing Games with a Purpose*. Communications of the ACM, 2008. **51**(8): p.58-67.
- Sánchez, J., and Olivares, R., *Problem Solving and Collaboration using Mobile Serious Games'*. Computers & Education 2011. **57**(3): p. 1943-1952.
- Lamas, P., Petridis,P., Dunwell,I., Hendrix,M., Arnab,S., de Freitas,S., Stewart,C. (2013). , *Game-based Approach for Raising Awareness on Sustainability Issues in Public Spaces*. , in *The Spring Servitization Conference: Servitization in the multi-organisation enterprise*, 2013: Aston Business School Birmingham, UK.
- Uren, V., Brewster, C., , *Linked Data Flows in Multi-player Games for Servitization*, in *Spring Servitization Conference 2013*: Aston Business School, UK. .
- Maslow, A.H., *Motivation and Personality*. 1954, New York,: Harper and Row.
- Reeves, B., and Read, J. L.,, *Total Engagement: Using Games and Virtual Worlds to Change the Way People Work and Businesses Compete*. 2009, MA: Boston,: Harvard Business School Publishing.
- Anon, *Gamification' is Finding a Place in the Business World*. Credit Union Magazine, 2012. **78**(11): p. 10-11.
- Csikszentmihalyi, M., *Beyond Boredom and Anxiety: Enjoyment and Intrinsic Motivation*. 1975, London (United Kingdom): Jossey-Bass Inc.
- Amy, A.J. *Putting the Fun in Functional - Applying Game Mechanics to Functional Software*. 2008 June 11 2013,; Available from: <http://www.slideshare.net/amyjokim/putting-the-fun-in-functiona>.

- McDonald, M., Musson, R., and Smith, R., *Using Productivity Games to Prevent Defects*. The Practical Guide to Defect Prevention, ed. AnonRedmond. 2008: Microsoft Press. 79-95.
- Montola, M., Nummenmaa, T., Lucero, A., Boberg, M., and Korhonen, H., *Applying Game Achievement Systems to Enhance User Experience in a Photo Sharing Service* in *Mindtrek 2009*2009: Tampere, Finland.
- Reimer, C., *Play to order: what HuiZinga has to say about gamification*, in *Proceedings of the 7th international conference on Games + Learning + Society Conference*2011, ETC Press: Madison, Wisconsin. p. 272-274.
- Rankin, Y., A. Gooch, and B. Gooch, *The impact of game design on students' interest in CS*, in *Proceedings of the 3rd international conference on Game development in computer science education*2008, ACM: Miami, Florida. p. 31-35.
- Leeson, C., *Driving KM Behaviors and Adoption through Gamification*. KM World, 2013. **22**(4): p. 10-20.
- Davis, F.D., *Perceived usefulness, perceived ease of use, and user acceptance of information technology*. MIS Quarterly, 1989. **13**(3): p. 319-340.
- Kostons, D., T.v. Gog, and F. Paas, *Self-assessment and task selection in learner-controlled instruction: Differences between effective and ineffective learners*. Comput. Educ., 2010. **54**(4): p. 932-940.
- Tsui, E., V.W.S. Yeung, and B.J. Garner, *Motivation, self-assessment & tacit knowledge in e-learning context selection*, in *Proceedings of the Seventh IASTED International Conference on Web-based Education*2008, ACTA Press: Innsbruck, Austria. p. 309-314.
- Komedani, A., T. Kojiri, and T. Watanabe, *Modeling understanding level of learner in collaborative learning using bayesian network*, in *Proceedings of the 9th international conference on Knowledge-Based Intelligent Information and Engineering Systems - Volume Part II*2005, Springer-Verlag: Melbourne, Australia. p. 665-672.
- Korolov, M., *Enterprise*. Network World, 2012. **29**(15): p. 3-36.
- Burke, M., Hiltbrand, T., *How Gamification Will Change Business Intelligence*. Business Intelligence Journal 2011. **16**(2): p. 8-16.