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Editorial

The maturing of gamification research

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1. Introduction

Throughout history, many have championed the use of play, games, and game-inspired design to improve the human condition. In the mid-2000s, the confluence of web technologies, digital business models, and online and location-based gaming gave rise to the most recent manifestation of this basic idea. Mobile applications like foursquare and websites like StackOverflow borrowed design elements like point scores, badges, or leaderboards from social network games and meta-gaming systems like Xbox Live to motivate user activity. This industry practice quickly became known as gamification, which can be defined as the use of game design elements in non-game contexts (Deterding, Dixon, Khaled, & Nacke, 2011). Many startups and design agencies emerged to offer gamification design or software-as-a-service (SaaS) packages, and large organisations (e.g., Oracle and SAP) across the globe began exploring gamification as a way to motivate people and improve the user experience. Applications reach from education and training to health, self-management, innovation, employee engagement, heritage, crowdsourcing, civic engagement, and marketing (Seaborn & Fels, 2015). Today, gamification is an established practice and industry segment, by some estimates poised to grow to over US\$ 11 billion by 2020 (Markets and Markets, 2016).

A key enabler of this groundswell has been now-ubiquitous sensor and computing technology: smart cities, smartphones, and wearables are increasingly tracking and processing our every step, effectively turning our life-world into a digital game in waiting. In parallel, we see a shift to post-material values of self-expression and experience, catered to by a dematerialized 'experience economy' and a new profession and practice of experience designers, as well as the growth of digital games into a dominant cultural form, complete with a whole 'gamer generation' socialised into them. Economically, we can observe the transformation of business models and market differentiators towards innovation, user experience, customer relations, and the tight integration of customers into value chains with user-led innovation,

crowdsourcing, and word-of-mouth-marketing, all of which make employee customer engagement a crucial capacity for organisations. Meanwhile, policy-makers around the globe awake to motivation, engagement, and user experience as vital levers for public policy goals in health, education, or civic engagement. Taken together, these technical, cultural, economic, and political forces afforded and demanded a design practice that harnessed the potential of computing technology for improving user experience and engagement across domains and industries – and gamification filled this niche (Deterding, 2015).

As a research field, gamification has similarly risen to significance in the past six years and shows no sign of slowing growth. The first wave of gamification research has predominantly consisted of (1) definitions, frameworks and taxonomies for gamification and game design elements; (2) technical papers describing systems, designs, and architectures; and (3) effect and user studies of gamified systems (Hamari, Koivisto, & Sarsa, 2014; Seaborn & Fels, 2015). While work was initially published across venues in computer science, informatics, human-computer interaction, game studies, psychology, and many other disciplines, we are today seeing early signs of gamification research institutionalising as a cross-disciplinary field in the form of dedicated professorships,¹ educational programs,² collected volumes (Fuchs, Fizek, Ruffino, & Schrape, 2014; Reiners & Wood, 2015; Stieglitz et al., 2016; Walz & Deterding, 2015), and academic conferences like *Gamification 2013*,³ where many authors submitted first versions of the present papers (Nacke, Harrigan, & Randall, 2013) and where the idea for this special issue was born.

2. Articles in this special issue

If the papers collected in this volume share one common trait compared to the first wave of gamification research, it is maturity. Each one in its own way marks a step forward in theoretical consideration, methodological rigour, and differentiated conclusions. This maturity undoubtedly (hopefully!) owes to the extensive review and revision the articles have undergone since their submission, for which we thank our many reviewers and authors. However, as this volume holds even more papers submitted on an open call following *Gamification 2013*, it is also indicative of the field as a whole. If the first wave of gamification research was held together by fundamental questions of "what?" and "why?",

¹ <https://web.archive.org/web/20161114121948/http://www.tut.fi/en/about-tut/news-and-events/tenure-track-in-gamification-x156741c1>, accessed November 14, 2016.

² <https://web.archive.org/web/20160903072123/https://www.coursera.org/learn/gamification>, accessed November 14, 2016.

³ <https://uwaterloo.ca/gamification/>, accessed November 14, 2016.

the current wave is asking differentiated questions around “how?”, “when?”, and “how and when not?” More specifically, the papers collected here mark a maturation in three research domains: (1) theory-driven empirical studies, (2) design methods, and (3) application areas.

2.1. Theory-driven empirical studies

The first wave of empirical gamification research asked the blanket question, “does gamification work?”, testing a wide diversity of gamified systems with an equally wide range of effect measures (Hamari et al., 2014; Seaborn & Fels, 2015). While studies in this mode helped establish the face validity of gamification, their knowledge returns diminished quickly. For research to add up to a joint knowledge structure, it needs to flow into and from theories. These theories integrate and explain divergent empirical findings, identify relevant hypotheses to test next, and give practitioners a form of knowledge that helps understand and predict when and how which particular design will be effective or not (Whitley, Kite, & Adams, 2013, pp. 34–39; Deterding, 2014b). And it needs to advance from testing gamified systems that combine (and thus conflate the effects of) multiple game design elements to study paradigms that tease out the effects, moderators and mediators of individual elements (Deterding, 2014b; Hamari et al., 2014). The majority of papers in this special issue in various ways manifest this maturation from theory-less effect studies asking *whether* gamification works to theory-driven studies exploring *how* particular design elements work.

Thus, following up on an earlier study (Mekler, Brühlmann, Opwis, & Tuch, 2013), Mekler, Brühlmann, Tuch and Opwis (2015) used self-determination theory (SDT, Deci & Ryan, 2012) – arguably the most-frequently used psychological theory in gamification research to date (Seaborn & Fels, 2015) – to develop and test hypotheses about the trinity of gamification design elements: points, badges (here: *levels*), and leaderboards (Werbach & Hunter, 2012). SDT would suggest that points, levels, and leaderboards, visualising progress made, serve as informational feedback instilling a sense of intrinsically motivating competence in the user. In *Towards understanding the effects of individual gamification elements on intrinsic motivation and performance*, Mekler and colleagues tested this hypothesis with an image annotation task. They found that compared to a non-gamified control condition, performance did increase significantly; however, they observed no significant differences in competence need satisfaction or intrinsic motivation emerged. In short, game design elements do increase performance, but not through intrinsic motivation, giving rise to the question what other psychological mediators account for their effect.

A possible answer to this question comes from Landers, Bauer, and Callan (2015) in the shape of *Gamification of task performance with leaderboards: A goal setting experiment*. As their title indicates, they used goal-setting (Gollwitzer & Oettingen, 2012), another well-established theory of motivation, to generate and test predictions about the effect of leaderboards on performance in a brainstorming task. Findings suggest that leaderboards indeed may function as an implicit form of goal-setting, inviting users to self-set performance goals at or near the top of the leaderboard: people's performance on leaderboards populated with high scores that are difficult or impossible to achieve was comparable to that of people being given explicit difficult or impossible goals. In addition, the authors found that individual goal commitment, an established individual moderator in goal-setting theory, moderates performance with leaderboards as it does with explicit goals.

Another appeal to goal-setting theory comes from Hamari (2015). In *Do badges increase user activity? A field experiment on the effects of gamification*, he tested the effects of badges in a

large-scale, two-year field experiment on an online peer-to-peer trading platform. Comparing pre- and post-implementation groups, Hamari found that awarding badges for them significantly increased the mean number of all core activities on the platform: making trade proposals, carrying out transactions, commenting, and viewing pages. While these findings are coherent with multiple theoretical mediators, not just goal-setting – as Hamari himself explicitly stresses –, the paper nevertheless demonstrates the uptake of goal-setting in the theoretical canon of gamification research.

Cruz, Hanus, and Fox (2015) nicely demonstrate that theory holds value not just for quantitative, hypothetico-deductive gamification research, but can also enrich and deepen the analysis of qualitative, exploratory studies. Their article, *The need to achieve: Players' perceptions and uses of extrinsic meta-game reward systems for video game consoles*, combined SDT and signaling theory (Donath, 2007) to guide a qualitative focus group study on meta-game or achievement systems on video game consoles like Xbox or PlayStation – arguably the blueprint for many of today's gamification platforms (Hamari & Eranti, 2011). Their findings highlight a key tenet of SDT, namely that the motivational effect of an environmental stimulus depends on the individual's *interpretation*, its meaning or “functional significance” (Deci & Ryan, 1985b). Different players ascribed different meanings and functions to achievements and reported analogous different uses and experiences. Depending both on the design features of different platforms and games and players' need for achievement, they could be experienced as intrinsically motivating competence boosts or more extrinsically motivated ego boosts and social status signals relating to how others perceive and appreciate one's own achievement.

Landers and Armstrong (2015) further showcase that different users may be more or less keen on adopting gamified systems depending on their attitude towards and prior experience with games – a key tenet of the Technology-Enhanced Training Effectiveness Model (Landers & Callan, 2012). In *Enhancing instructional outcomes with gamification: An empirical test of the Technology-Enhanced Training Effectiveness Model*, they tested the pre-training valence of regular PowerPoint versus gamified instructions, that is, how satisfying, enjoyable and relevant participants expected them to be before being exposed to them. Participants read scenarios describing each type of instruction. Overall, participants expected greater value from gamified instructions, but as predicted, this effect was moderated by attitude and experience: Participants with positive attitudes towards and high experience in games expected to benefit more from gamification, while participants with negative attitudes and little experience expected more benefits from traditional instruction.

2.2. Design studies

Gamification design has been dominated by industry publications and frameworks, the majority of which have been neither validated nor grounded in game research or game design (Deterding, 2015a). Thus, several scholars called for systematic research into challenges, heuristics, tools, and methods around designing gamification (Deterding, Björk, Nacke, Dixon, & Lawley, 2013; Mora, Riera, González, & Arnedo-Moreno, 2015; Morschheuser, Werder, Hamari, & Abe, 2017).

One common critique of existing industry frameworks has been that they needlessly foreclose the gamut of inspiration games could provide to a small set of progress feedback interface patterns. *Designing interactive systems through a game lens: An ethnographic approach* by Rapp (2015) directly responds to this critique by conducting an ethnographic study of *World of Warcraft* to tease out key factors of its long-lasting appeal beyond those already

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