Editorial: Benefits and detriments with respect to the ethics and sustainability of gamification

Guest Editorial:

Benefits and Detriments with Respect to the Ethics and Sustainability of Gamification

Introduction

Motivational and persuasive approaches are increasingly employed across various domains such as business, marketing, education, healthcare, and organizational management to engage users and influence behavior (Koivisto & Hamari, 2019; Xi & Hamari, 2019). One prominent manifestation of such strategies is *gamification*, through which everyday activities, services and systems are transformed into more gameful and engaging experiences (Hamari, 2019). The application of game-related approaches is not new, as evidenced by established practices such as game-based learning, advergames, and competitive sports. However, the rapid development of digital and internet-connected technologies has significantly accelerated both the adoption of—and scholarly interest in—how gaming mechanics, affordances, and environment design can evoke game-like experiences. These elements are increasingly used within online services and platforms to generate emotional, cognitive, economic, and social value.

At the current development stage of the corpus, substantial scholarly efforts have been made to identify the conditions under which the motivational benefits brought by gamification can be optimized across *spatial* (where), *temporal* (when), and *subject*-related (who) dimensions. Correspondingly, a growing body of literature reviews has synthesized findings on the effectiveness of gamification in domains such as marketing (Yang et al., 2026), education (Oliveira et al., 2023; Zvereva et al., 2026), service (Ciuchita et al., 2023), and health and wellbeing (Johnson et al., 2016; Lehtoranta et al., 2024). Although these studies report generally positive outcomes, they also consistently reveal mixed effects and a lack of consensus regarding the effectiveness of gamification.

While basic research on the effects of gamification is by and large crucial, there has still been relative myopia and paucity in a meaningful consideration of the perplexing, interrelated functions between the sought-after sustainable ends that the gamification is aiming for, and the ethical means by which the gamification is attempted. Gamification may (un)intentionally produce (un)sustainable outcomes (Bekk et al., 2022) and likewise can also be implemented through ethically justifiable practices or manipulative and deceptive mechanisms (Al-Msallam et al., 2023a). Therefore, while sustainable outcomes may be achieved through ethically questionable means, ethically sound approaches may also result in unsustainable results. Accordingly, the question this Special Issue evokes is that given these technologies are, at their core, persuasive and nudging, then: *when gamification seeks to reshape and change user attitudes and behaviors, does it genuinely empower the users, or does it (un)intentionally manipulate them?* We suggest that research on gamification should be reframed around two interrelated dimensions: *ethical means* – how gamification is designed and implemented in an ethical manner; and *sustainable ends* – how gamification can contribute to economic, environmental and social sustainable development. Although we discuss these dimensions separately below, they should be understood as coexisting and deeply interconnected.

The need for a better understanding of sustainable ends led by gamification. Achieving the Sustainable Development Goals (SDGs) is a global objective that concerns all of society and humanity. Gamification can be applied at individual, organizational, and societal levels to support these objectives. However, the persuasive and engaging power of gamification

is normatively indeterminate, and can be directed toward any purpose, including those that are counterproductive to sustainability. On the one hand, gamification practices can lead to positive and sustainable outcomes, such as encouraging pro-environmental and green behaviors (Wang & Yao, 2020), addressing population ageing (Zhang et al., 2025), and contributing to climate change mitigation (Fernández Galeote et al., 2021). On the other hand, it may also constrain economic gains, encourage overconsumption, and undermine long-term well-being. Such consequences may arise intentionally through strategic implementation choices, or unintentionally as unforeseen side effects. Since sustainability is inherently multidimensional and the relative weight of its dimensions varies across users and societies, tensions may arise between different SDGs, between short-term and long-term goals, and among different user groups whose interests and capacities vary. These complexities and trade-offs underscore the need to move beyond the simplistic question of how to make gamification inherently contribute to sustainability. Instead, a systematic inquiry is needed to determine which sustainability objectives can be meaningfully achieved through gamification, under what kinds of conditions, for whom, and at what cost.

The need for a better understanding of the ethical means of how gamification is implemented. While various approaches can be employed to achieve SDGs, not all pathways are normatively justifiable. In practice, it can often be seen that gamification services and system providers may deliberately deploy manipulative or deceptive design strategies, especially for achieving short-term goals (e.g. dark patterns in e-commerce and greenwashing), leveraging psychological vulnerabilities to maximize retention, consumption, or data acquisition. Beyond deliberate manipulation, we should also be aware that certain game design features may themselves inherently carry ethical risks. For example, competition-related elements may conflict with principles of fairness and privacy, as they can easily foster excessive competitiveness and lead to overexposure of user information and data (Al-Msallam et al., 2023b). Clear rules and goals in gamification design are necessary to ensure the playability and usability of the system; however, when they are overly rigid, they may restrict users' autonomy and limit meaningful, self-determined choices (Zvereva et al., 2025). Similarly, social mechanisms can provide social support and fulfil the need for relatedness, but they may also inadvertently create social pressure. More fundamentally, the elements, rules, and mechanisms of gamification design, at its core, reflect assumptions about how social, economic, and emotional resources are allocated and valued. Gamified systems determine who receives such things as rewards, opportunities, recognition, reputation, and visibility. Moreover, such distributions are rarely neutral, and they implicitly value judgments about performance, merit and worth. Ultimately, these judgments are deeply embedded in and shaped by prevailing moral standards, social norms, and culturally situated expectations.

Special issue

This Special Issue "*Ethics and Sustainability in Gaming and Persuasive Systems*" is focused on the juxtaposition, optimization, tradeoffs, and reconciliation of the inevitably interdependent dimensions of motivational and persuasive technologies; the sustainable ends and the ethical means. The issue attracted a wide range of submissions addressing sustainability and ethics-related topics within the field of gamification. With the help of the editorial team and reviewers, eight full-length articles were accepted and have been published in this issue. Most of these contributions emphasize sustainability outcomes, while several also tackle ethical aspects of gamification.

The accepted articles address topics including how gamification can promote pro-environmental behaviors, knowledge contribution, health management, learning, and

corporate sustainability. At the same time, some of the articles identify unintended negative consequences such as impulsive consumption, information deprivation, and a means–ends inversion in education. The following three papers have a strong and clear focus on the sustainability dimension of gamification. Liu and Hu (2026) examine both the promotional and preventive roles of gamification in relation to knowledge hiding among gig workers. Weber et al. (2025) investigate how different gamification features enhance both the quality and quantity of knowledge contributions in the context of knowledge-sharing platforms. Through a comprehensive literature review study, Kirchner-Krath et al. (2024) develop a conceptual framework and practical strategies for the gamification of corporate sustainability.

The following papers also address sustainability, while to some extent reflecting ethical aspects. Wan and Ng (2025) examine C2C secondary marketplace apps, revealing that gamification can motivate pro-environmental behaviors but may also unintentionally lead to overconsumption through mechanisms such as warm glow and moral licensing. Chen and Wang (2025) explore maladaptive goal orientation in gamified learning, explaining how instruction and interface design can inadvertently foster behaviors that hinder the achievement of educational goals. Sun et al. (2025) examine the effects of different gamification elements on self-health management and highlight exhaustion as one potential negative side effect led by gamification. Singh and Biswas (2025) investigate impulsive in-app purchases in mobile games, revealing how time urgency, interactivity, and cognitive fatigue influence gamers' impulsive purchasing behavior. Lee et al. (2025) focus on randomness in dual-purpose serious games, demonstrating how aleatory uncertainty or 'randomness' can reduce usage intention.

The articles represent a range of empirical and theory-based studies. Their methodological composition includes a diverse range of approaches, including surveys, interviews, experimental design, fuzzy-set qualitative comparative analysis, and systematic literature review. Collectively, their findings provide comprehensive insights into the mechanisms, benefits, and potential risks of gamification from the perspectives of ethical means and sustainable ends across learning, consumption, organizational, and knowledge management contexts. Below, we briefly introduce each of the papers.

'**Promotion or prevention? Impact of gamified work on knowledge hiding among gig workers**' by *Weiwei Liu and Lingyan Hu* examines how gamified work affects knowledge hiding behaviors among gig workers by conducting three studies, including an experiment and two surveys. The results indicate that gamified work both reduces knowledge hiding through increasing self-efficacy, and promotes knowledge hiding through enhancing affective rumination. In addition, the significant moderating role of task-technology fit highlights the importance of aligning gamified work design with task requirements. The study extends knowledge hiding research to gig workers outside traditional organizational contexts, and provides practical guidance for designing gamified systems that foster knowledge sharing.

'**Unleashing the power of knowledge — the role of gamification in enhancing knowledge contribution**' by *Sebastian Weber, Bastian Kordyaka, Gerhard Klassen, and Björn Niehaves* examines the psychological mechanism through which gamification increases the quantity and quality of knowledge contributions. By conducting a cross-sectional survey of 236 Stack Overflow users, the study finds that

achievement-related and social-related gamification features significantly enhance users' motivational state of inspiration (from being inspired by gamification features to being inspired to contribute knowledge), which in turn, positively predicts both the quality and quantity of knowledge contributions. The paper highlights inspiration as a key psychological mechanism in gamified knowledge-sharing environments, and advances gamification research by linking gamification design to motivational processes and contribution behaviors.

'**Gameful systems for corporate sustainability: systematic review, conceptual framework and research agenda on gamification and sustainable employee behavior in companies**' by *Jeanine Kirchner-Krath, Samanthi Dijkstra-Silva, Benedikt Morschheuser and Harald F.O. von Korflesch* presents a systematic review of 76 studies to develop a deeper understanding of how gamification design influences sustainable employee behavior in corporate environments. Based on this review, the authors propose a conceptual framework illustrating how different types of affordances, both utilitarian and gameful (including achievement-, immersion-, and social-related affordances) shape psychological processes and behavioral outcomes related to sustainability. The paper further outlines seven research agendas and proposes three practical strategies for leveraging gamification as a tool to advance corporate sustainability.

'**Gamification in C2C secondary marketplace Apps: from motivating sustainable behavior to unintended overconsumption**' by *Calvin Wan and Peggy M. L. Ng* investigates pro-environmental behavior and unintended overconsumption in the context of gamified consumer-to-consumer (C2C) secondary marketplace apps. Drawing on a survey of 613 Chinese users, the study finds that instrumental and hedonic affordances are positively associated with pro-environmental motivations through both intrinsic and extrinsic motives, whereas social affordances appear to be less influential. However, engaging in pro-environmental behaviors may also evoke a warm glow effect, which can inadvertently lead to overconsumption behaviors such as impulse buying and hedonic consumption. Furthermore, moral licensing strengthens the impact of the warm glow effect. The paper highlights both the positive motivational effects and the potential unintended consequences of gamification in shaping consumption behavior, and provides valuable empirical evidence and practical design guidance for C2C platforms that seek to balance user motivation with responsible consumption.

'**How gamification goes wrong: understanding the maladaptive goal orientation in gamified learning systems**' by *Chongyang Chen, and Yao-Yu Wang* investigates how gamification affordances influence maladaptive psychological and behavioral outcomes in learning. Using a scenario-based study of Duolingo and analyzing data from 100 forum users, the study finds that in instruction design, instant competitive feedback is more likely than instant individualistic feedback to foster maladaptive outcomes such as the sense of heightened competence and goal-focused attention. Regarding interface design, multisensory interaction significantly increases focused attention on game goals, but does not affect the feeling of competence. Furthermore, a feeling of competence contributes to maladaptive behaviors. The paper reveals how game objectives may override educational goals.

'**Gamification affordances in self-health management: perspectives from achievement satisfaction and gamification exhaustion**' by *Jiayue Sun, Yadi Gu,*

Dongxiao Gu, Kaixiang Su, Xiaoyu Wang, Changyong Liang, and Xuejie Yang investigates the roles of gamification affordances, including competition, visibility of achievement and interactivity in self-health management by utilizing structural equation modelling (SEM) and fuzzy-set qualitative comparative analysis (fsQCA). The results indicate that these affordances significantly enhance users' achievement satisfaction, which in turn promotes continued use and healthy behaviors. However, certain affordances include competition and interactivity which also contribute to gamification exhaustion, thereby partially offsetting these positive effects. The study provides valuable empirical evidence on the relationship between gamification affordances and self-health management behaviors, offering important guidance for designing more engaging and sustainable mobile fitness applications.

'**Swipe now, reflect later: examining the magnitude of time urgency, interactivity, and cognitive fatigue on gamers' impulsive in-app purchases**' by *Apoorva Singh, and Abhijeet Biswas* investigates the drivers of impulsive in-app purchases in mobile games. By analyzing in-depth interview and survey data, they show that in-app promotional offers, perceived time urgency, mobile game interactivity, and gaming community increase impulsive buying through imprudence and self-indulgence, especially when players experience cognitive fatigue. The paper provides new insights for developers, gamers and regulators on managing and understanding impulsive spending in mobile gaming.

'**The serious gaming randomness in dual-purposed systems: the effect of aleatory uncertainty from the perspective of information deprivation**' by *Philip Tin Yun Lee, Michael Chau, and Richard Wing Cheung Lui* investigates how randomness in dual-purposed systems influences users' intention to use serious games, from the perspective of information deprivation. Using both quantitative and qualitative data collected from university students, the study finds that randomness negatively affects usage intention, while the effect is mediated by perceived control and curiosity. However, users with high pre-usage arousal-avoidance states are less impacted by randomness. By introducing measurement entropy to quantify aleatory uncertainty, this paper offers a novel approach to understanding randomness effects beyond the traditional utilitarian–hedonic system dichotomy.

Final reflections and outlook

The eight articles accepted in this Special Issue collectively make significant theoretical, methodological, and practical contributions to the field of gamification. At the same time, from the perspective of the two fundamental dimensions of sustainability and ethics, we observed that these aspects are not always explicitly or clearly articulated by the authors. Therefore, it is difficult to position each paper within a conceptual framework consisting of four quadrants defined by (un)sustainable outcomes and (un)ethical means. In fact, this challenge extends beyond the papers in this special issue; across gamification literature more broadly, discussions of its effectiveness, impact and significance often fail to systematically distinguish between outcomes and the means to achieve them.

We therefore call for a more nuanced and conceptually rigorous understanding of how the two dimensions interact. But at the same time, we should also acknowledge that what counts as a "sustainable end" and what constitutes an "ethical means" are not

universally agreed upon, as they vary across different ethical perspectives, political orientations, and cultural contexts. Moreover, sustainability and ethics are evolving constructs, and as such they should be approached from a developmental and reflexive perspective, rather than being anchored solely in contemporary normative assumptions.

Ethical considerations and sustainability should not be treated as peripheral concerns, but rather as foundational principles guiding the design and implementation of gamification. However, responsibility for ensuring ethical means and sustainable ends should not be attributed only to service providers and system designers, based on the assumption that they possess a high degree of autonomy and free will in making design and implementation decisions. In reality, human decision-making is characterized by bounded intentionality, and gamification providers are no exception. As economic actors, they often operate in competitive market environments while navigating differing regulatory frameworks, governance systems, and prevailing social norms. Therefore, in addition to individual efforts, advancing the ethics and sustainability of motivational and persuasive approaches such as gamification necessarily requires the active participation of regulatory institutions and governance structures.

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Nannan Xi
XR Economies Lab, Research Centre of Gameful Realities, Tampere University, Finland
Rebekah Rousi
Communication Studies, *School of Marketing and Communication, University of Vaasa, Finland*
Juho Hamari
Gamification Group, Research Centre of Gameful Realities, Tampere University, Finland
Pekka Abrahamsson
GPT Lab, Tampere University, Finland
Ville Vakkuri
Communication Studies, School of Marketing and Communication, University of Vaasa, Finland

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