

## Unethical Gamification: A Literature Review

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### Abstract

*Gamification has become a mainstay approach in designing engaging systems, practices, and cultures across practically all walks of human life. However, as gamification mainly attempts to affect individual psychological states, motivations, attitudes, and behaviors, conscious consideration of ethical aspects, as well as underlying values and premises, is very much warranted. However, gamification research and practice have sprung up rather rapidly and myopically as boosted by the contemporary hype related to technology and games, which has led to the relative dismissal of ethical considerations in relation to gamification. In order to map these considerations and the current state of the discussion in gamification literature, we systematically reviewed research related to ethics, and particularly, possible identified and discussed harms of gamification. The corpus reveals that psychological distress, exploitation, lack of performance, and privacy issues are the most commonly contemplated possible harms, with different frequencies based on the game elements, types, and contexts.*

**Keywords:** Game, Psychological distress, Persuasive technology, Ethics, Sustainability.

### 1. Introduction

Since the concept 'gamification' become popular in early 2010s, gamification practices have mushroomed in various domains such as health and wellbeing (Koivisto & Hamari, 2019), education (Legaki et al., 2021), brand (Xi & Hamari, 2020), sustainability (Guillen Mandujano et al., 2021), management (Xu et al., 2022), and transportation (Wallius et al., 2022). Through practice and research over the past ten years, gamification has become a mainstay approach in designing engaging systems, services, practices, and cultures (Hamari, 2019). The global gamification

market size is projected to reach USD 37.00 billion by 2027<sup>1</sup>. Simply speaking, as one of the typical persuasive information systems and technologies, gamification aims at providing a game-like experience in a variety of contexts (Koivisto & Hamari, 2019). As indicated by the current corpus, gamification overall and aggregately appears to have positive effects on driving motivations and reshaping behaviors across domains (Schmidt-Kraepelin et al., 2020; Koivisto & Hamari, 2019) which has further led to the field moving toward the productive and more mature development of the field beyond the initial hype (Osatuyi et al., 2018).

However, as with any technological development that has a tremendous effect on human practice and culture, there are dangers stemming from myopic, hyperbolic, and rapid progression. Furthermore, as indicated by the extant corpus across the domains, while there appears to be evidence of the positive potential of gamification, it is a design approach susceptible to ethical concerns due to its objective of affecting an individual's psychological state and behavior (Thibault & Hamari, 2021). The ethical dilemma may be related to several characteristics of gamification, such as the affordances and approaches applied, the targeted users, and the contexts of implementation. For example, clear goals and real-time feedback can promote users' self-growth and development; however, unattainable goals that do not meet the users' needs or skills might lead to excessive stress and resource waste. High frequency feedback might also easily bring anxiety. Such dilemmas are especially common in systems that use achievement-related gamification elements. On the one hand, these elements bring a sense of competence, increased effectiveness, and performance, particularly in the workplace and learning environments. On the other hand, constant engagement and over-competition may hinder individual well-being and social relationships with others in the long term (Hammedi et al., 2021).

<sup>1</sup> <https://www.fortunebusinessinsights.com/industry-reports/gamification-market-100632>

Additionally, there are general ethical concerns about unavoidable information risk and privacy issues associated with gamification in services, organizations and systems, given that most gamification types require the transparency and openness of personal data and behavioral trajectory. Information leakage, fraud, unfairness, and discrimination are all possible negative outcomes. More importantly, since gamification may be easily embedded into existing platforms and services, it might be intentionally abused as a nudging approach for behavioral change. Users may not even notice that they have been inconspicuously 'lured' and 'manipulated,' as manifested in cases of overconsumption, irrational decisions, and post-purchase dissonance along with addictive behaviors (Thorpe & Roper, 2019).

Thus, a comprehensive and systematic discussion of gamification's potential adverse outcomes, risks, and dark sides may help us draw a conceptual and theoretical picture of unethical gamification. The purpose of this systematic literature review is to synthesize the academic research conducted on the topic of unethical gamification. By doing so, we aim to understand what and how unethical issues have been investigated and addressed in the current scientific literature, to what extent gamification can bring ethical and moral risks, and future research avenues.

## 2. Protocol

The methodology of this study ensures reproducibility by following the protocol proposed by Kitchenham (2004), which includes: 1) research questions and selection criteria; 2) keywords and data extracted; 3) reporting of findings. In addition, this systematic review focuses on understanding the ethical concerns when employing gamification. Specifically, in this study, this broad objective is addressed by answering the following four research questions regarding unethical gamification:

**RQ 1:** What are the typically adopted research methods in relation to studying harmful outcomes of gamification?

**RQ 2:** What kinds of ethical concerns or harms stemming from gamification have been investigated?

**RQ 3:** How and what gamification design been connected with what ethical concerns in the literature?

**RQ 4:** Whether and how do the ethical concerns differ across the contexts?

By answering these questions, we can begin to understand the current state of literature in terms of identified and discussed harms related to gamification, and what types of gamification may be more strongly connected with which kinds of hazards. Moreover,

addressing these questions will help to close the gap in the ethics of gamification literature, where the previous literature review focus on screening the ethical concerns related to gamification in a specific context like education (Kwon & Özpölat, 2021), marketing (Thorpe & Roper, 2019) and the workplace (Hammedi et al., 2021). In this study, we survey the field with a wider scope. Ethical concerns related to gamification that might arise in one context might be repeated in another. With this, it is more beneficial for practitioners and gamification designers to recognize the negative aspects of gamification that occurred in other fields.

The Scopus database was searched by the following string: ( TITLE-ABS-KEY ( gamif\* ) AND TITLE-ABS-KEY ( ethic\* ) OR TITLE-ABS-KEY ( moral\* ) OR TITLE-ABS-KEY ( dark AND side ) OR TITLE-ABS-KEY ( questionable ) OR TITLE-ABS-KEY ( discrimin\* ) OR TITLE-ABS-KEY ( corrupt ) OR TITLE-ABS-KEY ( illegal ) OR TITLE-ABS-KEY ( fair ) OR TITLE-ABS-KEY ( cheat ) OR TITLE-ABS-KEY ( deceive ) OR TITLE-ABS-KEY ( decept\* ) OR TITLE-ABS-KEY ( fraud ) OR TITLE-ABS-KEY ( manipulate\* ) OR TITLE-ABS-KEY ( exploit\* ) OR TITLE-ABS-KEY ( harmful ) OR TITLE-ABS-KEY ( addiction ) OR TITLE-ABS-KEY ( integrity ) OR TITLE-ABS-KEY ( dishonesty ) OR TITLE-ABS-KEY ( abuse ) OR TITLE-ABS-KEY ( dark AND pattern\* ) OR TITLE-ABS-KEY ( virtue\* ) ). Search keywords like gamif\*, ethic\*, moral\*, discrimin\*, decept\*, manipulate\*, exploit\*, pattern\*, and virtue\* were selected to consider various terms related to possible detriments of gamification. The articles analyzed consist only of English-written, academic papers published in peer-reviewed journals, conference proceedings, and book chapters. Because of the need of studies that empirically or conceptually investigate what kind of ethical concerns relate to gamification, other literature reviews were excluded, leaving a total of 654 publications.

The screening and eligibility check steps were conducted to evaluate the final papers that fit the study objectives. These steps were: 1) after carefully reading of the titles and the abstracts, duplicate papers were deleted. 2) we omitted the papers that did not study gamification or ethics as the main topic. For example, some papers mentioned gamification as a new tool that might be exploited to change (i.e., manipulate) users' behavior by adding gamification types to other new technology like VR, AR, and AI. 3) papers that only studied gamification without studying the ethical concerns related to gamification were also omitted. Through the screening process, we found that some research used keywords that we included in the search,

but with a different meaning. As in the following examples: (“Gamification refers to the exploitation of gaming mechanisms for serious purposes, like [...]”) (Bucchiarone et al., 2019); As the above example illustrates, the meaning of the word exploit was “make full use of and derive benefit from a resource”, which is different from the meaning we are looking for “make use of a situation in a way considered unfair or underhand.” On the other hand, several papers studied gamification; however, those papers added ethics word because of the need for ethical permission to run their studies, especially those that analyzed gamification in the health sector; the word ethics in such papers does not match what we try to discover. 4) papers related only to the ethical problems and not related to gamification were excluded from our final evaluation. For example, some papers used gamification to deliver the company’s view about many widespread ethical problems to their employees, such as information security and cyberattacks. Other omitted papers discussed the possibility of institutions e.g., universities, using gamification to make teaching ethics courses more fun and engaging. Also, we excluded several papers that discussed modern technology’s ethical concerns without specifying the discussion on one field like gamification (Table 1).

**Table 1. Literature search and inclusion**

Step	Description	Deleted	Total
Step 0	Literature search	+654	654
Step 1	Duplicated manuscripts	-15	639
Step 2	No relation to either gamification or ethics	-220	419
Step 3	Only related to gamification but not ethics	-335	84
Step 4	Only related to the Ethics, but not gamification	-48	36
Step 5	Inaccessible	-11	25

### 3. Findings and discussion: the synthesis of the literature

After determining the papers that fit our research protocol, we address the research questions we present by showing and discussing in detail the paper’s results regarding every question context.

#### 3.1. Research methods

Seven papers presented experiments as a research method to study the ethics of the gamification phenomenon (Table 2). Studies that used experimental

methods employed a gamified app or website and later measured the ethical perception of the users toward such an experience (Li et al., 2021; Schlömmmer et al., 2021). Equally to the experiment method, the conceptual method is also considered typical for studying ethical aspects of gamification. We also noticed that some researchers used two research methods: surveys and interviews (Hass et al., 2021; Shahri et al., 2014). Using two research methods can help understand the ethical impact that gamification might cause more broadly. The outcome also reported that five studies used observation methods.

**Table 2. The research methods used in reviewed literature**

Methods	Studies	Total
Experiment	A7, A12, A13, A18, A20, A23, A24	7
Survey	A8, A21, A25	3
Interview	A1, A3, A7, A8, A21	5
Conceptual studies	A2, A5, A10, A11, A16, A19, A22	7
Observation	A6, A9, A14, A15, A17	5

#### 3.2. Dimensions of ethical concerns

The outcome of the literature review showed that psychological distress is the most frequently cited ethical concern related to gamification. Sixteen papers documented that user experienced various negative experiences, some of which can be linked with more serious psychological distress, including stress, anxiety, frustration, and feeling of helplessness (Yang & Li, 2021). Based to the reviewed papers, these negative experiences might be caused: for example, by the repeated inability of the user to overcome the challenge (Andrade, 2016); constant preoccupation with monitoring the performance of others (Orduna-Malea et al., 2016); cause data disclosure over the loss of self-consciousness (Trang & Weiger, 2021); and increase pressure on users (e.g., employees) to achieve more (e.g., increase work productivity) (Seo et al., 2021). Five papers documented addictive behavior; these five papers conclude that hyper-using gamified apps to diminish boredom and keep the mind stimulated could be categorized as addictive behavior. In that respect, it is noteworthy that psychological studies which discussed the addictive behavior among the users of video games, specifically the adolescent population, indicated that some game elements and designs might be an essential factor in causing such behavior (Stockdale & Coyne, 2018). On this ground, users of gamification apps with the same designs that video game users use, like immersive designs and

gamification-based challenges, might be more vulnerable to addiction. Another harmful aspect of gamification can be in its indirect detrimental outcomes. These might include for example the use of gamification for motivating behaviors that are harmful, such as the sales of substances or encouraging behaviors related to sedentary lifestyles or other extreme behaviors or any behavior in excess. In this vein, three reviewed studies discussed how using gamification might cause physical damage to the user himself or others (Kim & Werbach, 2016). For instance, among 102 harmful apps identified by Ghassemlou and colleagues (2020), 44 of the apps used gamification to promote and sell alcohol and illicit substances (e.g., cocaine, marijuana, and heroin); these apps use game-like features or drinking games to stimulate users' motivation. These discussions imply that while gamification might have been designed neutrally and even virtuously, the purposes and goals of the persuading party may lead to ethical concerns related to the sought-after outcomes of the 'gamifier'.

Thirteen papers documented exploitation, an ethical concern when there is an imbalance of mutual benefits between gamification providers and users, mostly in favor of the providers (Wertheimer, 1999). This kind of exploitation occurs when using gamification in contexts like marketing and the workplace; in the marketing field, for example, companies offer to the users, in most cases, virtual rewards in the form of points, badges, and stars. However, companies get more benefits from users by increasing their engagement; such benefits might be in the form of increased market share, improved brand awareness, improved brand image, and building customer loyalty (Kim, 2015). In the same regard, Seo et al. (2021) discuss that using game elements like points, badges, and leaderboards to gamify the work environment makes employees feel exploited to perform only productive behavior, which causes a sense of boredom and stress. Overall, it can be deduced that exploitation appears to happen because of initial over-valuation of the experience and rewards accrued from gamification contrary to other compensation possibly because of the psychological susceptibility towards game design as a source of engagement and value.

Reviewed literature stated that using gamification to increase, for example, employees' productivity or students' engagement could be counterproductive, like demotivation and lack of performance (Kwon & Özpola, 2021; Hammedi et al., 2021). Preoccupation with increasing the number of points, keeping a high position on the leader board, being concerned about their peers' results, and other behaviors related to frantic efforts to win a game, might distract the users'

concentration. This distraction will lead users to perform the primary tasks in low quality or become demotivated to continue their vital work (Hammedi et al., 2021).

In parallel, seven of the studies we reviewed documented ethical issues related to the manipulation of users. Using gamification as a marketing tool consider a prominent example of the veracity of this claim. By using gamification, companies try to make the consumer journey turn into an attempt to accumulate points, badges, or get discounts; such a transformation might divert the consumer's attention far from the significant aspects of the product, such as quality, product life, and guarantee period. This kind of exploitation of cognitive errors before buying by using gamification and denying consumers a rational purchase decision can be considered a manipulation of consumers' behavior to choose an option that serves the company's interests (Thorpe & Roper, 2019).

Thirteen reviewed studies warned of ethical risks related to user data privacy. For most of the apps or websites that use gamification technology, users need to provide personal information like name, email, and phone number. Moreover, the daily life activities of the users are also vulnerable to tracking by some gamified apps, specifically, apps that provide health services and require tracking the user's diet. All this is often accompanied by a lack of opportunities for the users to consent (or reject) the app's privacy policy. Such an unclarity of the fate of users' data might create a state of worry among the users about using their data to achieve undesirable goals or sharing it with unknown parties.

In addition to the previously mentioned ethical issues, thirteen reviewed papers reported that using types primarily developed for games to gamifying work tasks or education activities might cause a social overload and strain on users; employees might consider the gamification task as extra work duty, which effects negatively to their performance (Hammedi et al., 2021). Failing to consider the users' needs and characters during the developing stage of gamification design might force users to achieve objectives that are not suited to them (Jacobs, 2020). Furthermore, users are different in their willingness to participate in gamification tasks. For example, some users might enjoy achieving a high level on the leaderboard or collecting more points and badges. However, it could strain those compelled to participate in a gamified experiment (Yang & Li, 2021). Moreover, users who are resistant to being part of gamified activities might face social pressure to force them to join these gamified activities (Algashami et al., 2019). Ethical concerns related to gamification are presented in Table 3.

**Table 3. Ethical concerns related to gamification**

Ethical concerns	Studies	Total
Demotivation	A1, A2, A7, A12, A16, A20, A21	7
Psychological distress	A1, A2, A6, A7, A9, A10, A11, A13, A14, A15, A16, A17, A19, A20, A21, A23	16
Manipulation	A3, A5, A9, A10, A13, A14, A22	7
Exploitation	A1, A3, A6, A7, A10, A11, A14, A16, A17, A19, A20, A21, A22	13
Lack of performance	A1, A2, A7, A11, A12, A15, A16, A17, A19, A21	10
Privacy related issue	A1, A5, A8, A13, A14, A16, A17, A19, A21, A22, A23, A24, A25	13
Addiction	A2, A6, A15, A17, A19	5
Physical harm	A6, A10, A22	3
Social overload	A1, A2, A6, A14, A16, A19, A22, A25	8
Strain	A1, A15, A16, A22, A25	5

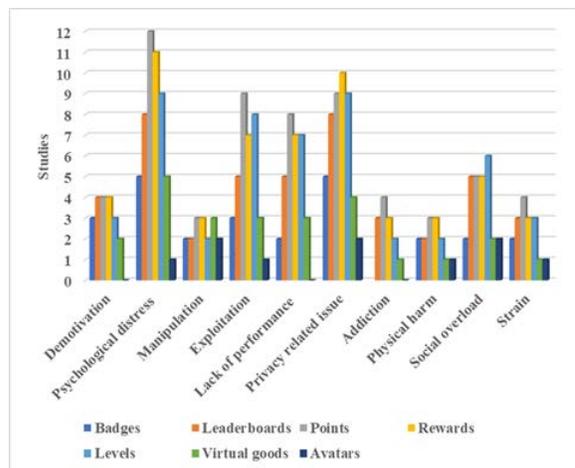
### 3.3. Investigated gamification elements related to ethical concerns

Literature showed that when ethical issues occur, some gamification elements are documented more than others. For example, points, rewards, and levels are the most frequent elements (Table 4).

**Table 4. Gamification elements discussed in the reviewed literature.**

Elements	Studies	Total
Badges	A8, A10, A16, A20, A21, A22, A23	7
Leader boards	A2, A10, A16, A17, A19, A20, A21, A22, A23, A24, A25.	11
Points	A2, A3, A6, A10, A11, A12, A13, A15, A16, A17, A19, A20, A21, A22, A23, A24, A25	16
Rewards	A1, A2, A6, A7, A8, A9, A10, A13, A14, A16, A17, A19, A21, A22,	14
Levels	A1, A3, A6, A7, A8, A10, A11, A14, A16, A17, A19, A21, A23, A25	14
Virtual goods	A3, A6, A9, A13, A16, A17, A21	7
Avatars	A1, A3, A6, A25	4

Identifying the most frequent gamification elements accompanying specific ethical issues will help designers think carefully when integrating these elements into their potential gamified design. In addition, designers might remove or replace these gamification elements with another one that contains less probability of causing ethical issues. Figure 1. shows the frequency of gamification elements at each ethical concern related to gamification based on the reviewed studies. Some reviewed studies discussed a variety of game elements; therefore, they are included in more than one category in the graph. In psychological distress issues, for example, fourteen of the reviewed studies documented that gamification designs that involved points were associated with this ethical problem, whereas avatars were reported only by one study. Ethical issues like negative experience, addiction, and data privacy are still under intense screening by game-related literature to examine how likely video game players are vulnerable to such issues (Mathews et al., 2019).



**Figure 1. Gamification elements associated with ethical concerns based on the reviewed studies.**

### 3.4. Investigated gamification types related to ethical concerns

Table 5. shows the gamification types addressed in screening literature. The harmful outcomes associated with the different types are not surprising per se Feedback, competition, and collaboration attracted the attention of researchers in the field of ethics of gamification. This increased interest has been attributed to the popularity of using these designs in gamification environments, which required the researchers to explore the dark sides and associated risks more.

**Table 5. Abstract categories of types of gamification which covered in the reviewed literature**

Gamification types	Studies	Total
Feedback	A1, A3, A5, A6, A7, A8, A11, A12, A13, A16, A19, A20, A21, A22, A23, A24, A25	17
Competition	A1, A2, A3, A6, A7, A10, A15, A16, A19, A21, A22, A24, A25	13
Collaboration	A3, A7, A10, A12, A13, A16, A17, A19, A21, A24, A25	11
Challenges	A1, A8, A20, A18, A14, A3, A10, A11	8
Quiz	A12, A24	2
Achievements	A2, A7, A9, A6, A11, A15, A16, A19, A23, A25	10
Narrative	A19, A20	2

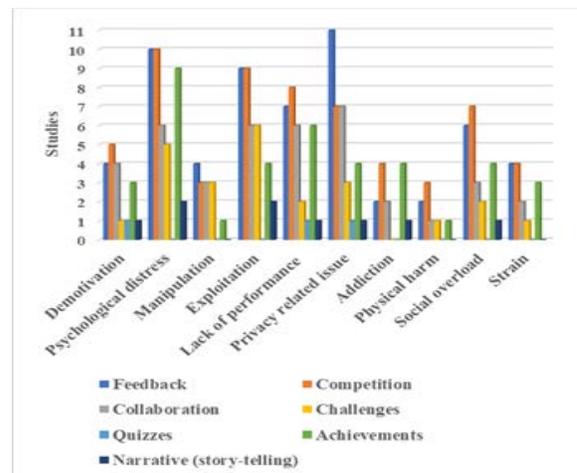
Figure 2. illustrates how the intensity of ethical concerns differs based on the types operated in gamification. On the one hand, ten studies reported that psychological distress occurs when designers build design structures depending on competition and feedback types; such types deliver a feeling to the users that they get remuneration for achieving a high level of excessive substance use compared with other players. (Ghassemlou et al., 2020). On the other hand, we can observe from the outcomes that types like achievements and challenges might lead to more minor ethical issues. In general, when gamification design involves types that make users feel that they receive a valuable added value, have more autonomy, and make accomplishments; it might be considered an ethical design or include fewer ethical issues compared with designs that are developed only to achieve providers goals without providing a meaningful experience to the users. Some reviewed studies discussed several ethical concerns and several gamification types simultaneously; therefore, they are included in more than one category in the graph.

### 3.5. Investigated ethical concerns based on the contexts

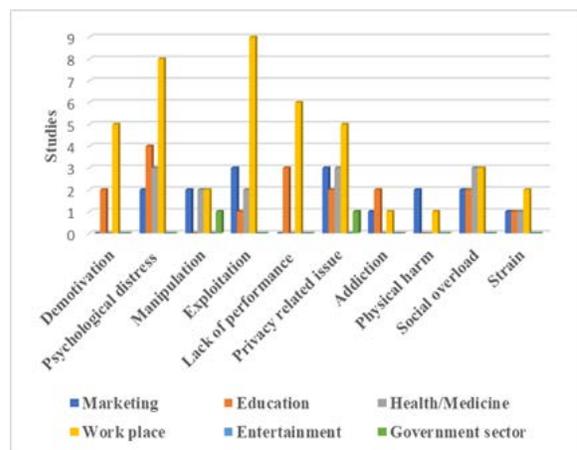
With the widespread prevalence of using gamification to redirect users' behavior and make them more engaging, for example, with a specific marketing campaign or workplace activities, practitioners from various industries have started to adopt gamification to achieve particular goals based on their needs (Xi & Hamari, 2020). However, using gamification designs

close to each other in terms of game elements and types raises the question of whether the ethical issues documented in a specific context (e.g., marketing) are recurrent in another context (e.g., workplace).

As a result of reviewed studies, the outcome shows that the workplace was the most frequent context where studies investigated ethical concerns (ten publications), followed by marketing, education, and health/medicine with five studies of each (Fig 3). The governmental sector was the lowest frequent context with only one study. A similar finding was documented for the entertainment context, but without notifying any ethical concerns. Some literature discussed several ethical concerns within the same context; thus, they are included in more than one category in the graph.



**Figure 2. Associated gamification types with ethical concerns based on the reviewed studies**



**Figure 3. The contexts in which the reviewed studies discussed the ethical concerns related to gamification.**

## 4. Contribution and implications

The findings of this study contribute to identifying and monitoring ethical risks and encourages gamification designers and other stakeholders who use or plan to use gamification (e.g., companies' owners, managers, employees in educational institutions, policymakers, and others) to adopt ethical orientations related to using gamification taking into account the pitfalls that it might entail if used without ethical regulations and limits.

Gamification designers should consider ethical principles before and during the design process. Cultural aspects, the probability of psychological distress, social overload, data privacy issues, and other ethical caveats should not be lost from the designers' sight. Reviewed research ratified that some users might have psychological distress in different forms like anxiety, stress, and addiction due to their engagement in apps supported by gamification technology. Developers should be able to estimate such a possibility, considering the more vulnerable users. Testing several prototypes of the designs before the gamified app is released to the users would be useful in identifying and managing any possible issues that affect users' psychology. In addition, lack of performance also emerged as an adverse effect of gamification, especially in the workplace. The autonomy issue here is crucial. Company management should introduce gamification giving the employees with a space of freedom to participate (or not); otherwise, employees could consider it an additional work burden. Moreover, reviewed literature indicates that designers should invest more to develop designs strengthened by types centered around increasing the sense of achievement and challenge among users when they experience products, services, or applications supported by gamification, in parallel with minimizing types that support hyper-competitive between users. Gamification designers and other significant stakeholders (i.e., universities and companies) have a joint responsibility to raise ethical awareness. Designers should be intrinsically motivated to build gamification designs on an ethical basis by recognizing the negative ramifications of their work and the negative societal view of their role if they ignore the ethical caveats. In addition, to the designers' responsibility to develop designs ethically, gamification providers in various industries are also responsible for minimizing the negative implications of gamification.

Gamification providers, specifically companies that use gamification as an interactive marketing tool, should balance satisfying their goals and what is good for the users and society; such balance requires the

provider to avoid manipulation or exploitation when adding gamification to their strategy. Moreover, the results show the need for the providers to be more transparent regarding the users' data privacy; nowadays, most apps supported by gamification ask users to provide personal information without informing them about the objectives of such data collection or the fate of this data.

Governmental institutions and policymakers are called upon to play a greater role in regulating gamification, especially since gamification is currently being used in different sectors (see section 3.5), which may make its possible negative implications include a wide segment of society members. From that perspective, increasing communication between government institutions and all parties related to the design and implementation of gamification is necessary to maintain the practice of gamification within an ethical framework.

## 5. Conclusions and Limitations

This literature review study provides an overview of how research has investigated the ethical concerns related to gamification thus far. Based on a rigorous systematic review of twenty-five studies, we synthesized the findings regarding used methods, investigated gamification elements and types, different dimensions of harm and contexts.

In more detail, beyond seven conceptual studies, experiments were the most adopted research method to investigate ethical concerns related to gamification. Ten ethical concerns were documented, the most common being psychological distress, exploitation, privacy-related issues, and lack of performance. In addition, reviewed papers focused mostly on examining the role of points, rewards, and levels in causing ethical concerns. Similarly, studies reported that some ethical issues like psychological distress to occur when gamification designs are developed based on, for example, competition and feedback types. Lastly, the workplace context was more vulnerable than others regarding the ethical issues when adding gamification technology to work tasks.

Still, there are a few limitations to this study. This literature review focused on the ethical issues / detriments discussed in the literature, however, it is very much noteworthy, that ethics our review here is mostly focused on culturally-bound detriments discussed in the literature, while ethics, virtue, value (or the lack thereof) cover much broader range of good and bad. Here we have mostly discussed the identified 'bad', i.e., the negative side of dimensions that could take both positive and negative values. Therefore, for fuller ethical treatise, we should also consider the

positive outcomes of gamification and to posit different trajectories of outcomes on a more holistic consideration. Based on the reviewed literature, the current study discussed the ethical considerations that might emerge when using particular gamification elements and types. Future research could examine the effect of other related factors that might lead to decreasing or strengthening some ethical issues; these factors might be, for example, social environment, user's moral perspective, demographic characteristics, and organization's ethical standards.

## 6. Future research agenda

As we have noted, reviewed literature pointed out that gamification could potentially be linked with a variety of detriments to the users if gamification designers and other involved parties do not take the ethical caveats seriously. To further these discussions and continue promoting ethical awareness of the importance of monitoring gamification practices, this study presents recommendations as a future agenda for researchers who investigate the gamification phenomenon and study its implications.

**Agenda 1:** Although the gamification phenomenon and its benefits have attracted significant attention from academic researchers, at least over the past ten years (Xi & Hamari, 2019), investigating the ethical implications that may accompany gamification is still in its early stages (Thorpe & Roper, 2019). With this, Future research should explore the ethical risks to users exposed to gamified products, services, or applications. Additionally, it would be interesting to examine the ethics of gamification empirically and closely observe the potential adverse effects. Such empirical studies might provide more validation to the results rather than be limited to theoretical guesses, which may sometimes carry a kind of prejudice toward gamification (Kim & Werbach, 2016).

**Agenda 2:** The review of previous studies showed that workplace context had powerfully captured the researchers' attention; expanding the research to include other contexts might help to note more related dark sides of using gamification; suggested contexts might be the government sector or entertainment.

**Agenda 3:** Given that reviewed studies assess psychological distress as the most dramatic possible consequence; future research should investigate in more detail what kind of psychological effects users might experience when participating in a gamified environment vis-à-vis possible positive outcomes. In addition, using modern software to measure, for example, users' emotions, heart rate, and facial expression during and after using, e.g., a gamified sports app, or marketing campaigns supported by

gamification, will give more accurate results to measure the psychological impacts of using gamification in different contexts.

**Agenda 4:** Despite the wide use of gamification techniques in the education field, our study noted that the study of ethical aspects of using gamification in this field was limited to only five studies. Future studies should investigate more how ethical to expose students, especially students in the primary education stage, to materials supported by gamification designs.

## 7. Acknowledgement

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## 8. Reference

- Bucchiarone, A., Cicchetti, A., & Marconi, A. (2019, September). GDF: A gamification design framework powered by model-driven engineering. In 2019 ACM/IEEE 22nd International Conference on Model Driven Engineering Languages and Systems Companion (MODELS-C) (pp. 753-758). IEEE.
- Guillen Mandujano, G., Quist, J., & Hamari, J. (2021). Gamification of backcasting for sustainability: The development of the gameful backcasting framework (GAMEBACK). *Journal of Cleaner Production*, 302, 126609.
- Hamari, J. G., Ritzer, G., & Rojek, C. (2019). *The Blackwell Encyclopedia of Sociology*.
- Jacobs, N. (2020). Two ethical concerns about the use of persuasive technology for vulnerable people. *Bioethics*, Vol. 34 No.5, pp. 519-526.
- Kim, B. (2015). Gamification. *Library Technology Reports*, Vol. 51 No. 2, pp. 10-18.
- Kitchenham, B. (2004). Procedures for performing systematic reviews. Keele, UK, Keele University, 33(2004), 1-26.
- Koivisto, J., & Hamari, J. (2019). Gamification of physical activity: A systematic literature review of comparison studies. In 3rd International GamiFIN Conference, GamiFIN 2019. CEUR-WS.
- Legaki, N. Z., Karpouzis, K., Assimakopoulos, V., & Hamari, J. (2021). Gamification to avoid cognitive biases: An experiment of gamifying a forecasting course. *Technological Forecasting and Social Change*, 167, 120725.
- Mathews, C. L., Morrell, H. E., & Molle, J. E. (2019). Video game addiction, ADHD symptomatology, and video

game reinforcement. *The American journal of drug and alcohol abuse*, 45(1), 67-76.

- Osatuyi, B., Osatuyi, T., & De La Rosa, R. (2018). Systematic review of gamification research in education: A multi-method approach. *Communications of the Association for Information Systems*, 42(1), 5.
- Schmidt-Kraepelin, M., Warsinsky, S., Thiebes, S., & Sunyaev, A. (2020, January). The role of gamification in health behavior change: a review of theory-driven studies. In *Proceedings of the 53rd Hawaii international conference on system sciences*.
- Stockdale, L., & Coyne, S. M. (2018). Video game addiction in emerging adulthood: Cross-sectional evidence of pathology in video game addicts as compared to matched healthy controls. *Journal of affective disorders*, 225, 265-272.
- Thibault, M., & Hamari, J. (2021). Seven points to reappropriate gamification. In *Transforming Society and Organizations through Gamification* (pp. 11-28). Palgrave Macmillan, Cham.
- Wallius, E., Klock, A. C. T., & Hamari, J. (2022). Playing it safe: A literature review and research agenda on motivational technologies in transportation safety. *Reliability Engineering & System Safety*, 108514.
- Wertheimer, A. (1999). *Exploitation*. Princeton University Press.
- Wunderlich, N. V., Gustafsson, A., Hamari, J., Parvinen, P., & Haff, A. (2020). The great game of business: Advancing knowledge on gamification in business contexts. *Journal of Business Research*, 106, 273-276.
- Xi, N., & Hamari, J. (2019). Does gamification satisfy needs? A study on the relationship between gamification features and intrinsic need satisfaction. *International Journal of Information Management*, Vol. 46, pp. 210-221.
- Xi, N., & Hamari, J. (2020). Does gamification affect brand engagement and equity? A study in online brand communities. *Journal of Business Research*, 109, 449-460.
- Xu, H., Wu, Y., & Hamari, J. (2022). What determines the successfulness of a crowdsourcing campaign: A study on the relationships between indicators of trustworthiness, popularity, and success. *Journal of Business Research*, 139, 484-495.
- Young, M. F., Bassett, L., Burkey, D. D., Streiner, S., & Reed, J. B. (2021, July). Let's play! gamifying engineering ethics education through the development of competitive and collaborative activities. In *ASEE annual conference*.
- Notes in Bioinformatics). doi:10.1007/978-3-319-39583-8\_17
- A3. Birtchnell, T., McGuirk, P., Moore, C., & Vettoreto, L. (2020). Pay to play? Subverting the digital economy of Pokémon Go in the smart city. *Digital Geography and Society*. doi:10.1016/j.diggeo.2020.100004
- A4. Callan, R. C., Bauer, K. N., & Landers, R. N. (2015). How to avoid the dark side of gamification: Ten business scenarios and their unintended consequences. *Gamification in Education and Business*. doi:10.1007/978-3-319-10208-5\_28
- A5. Coppola, P., Costantini, F., & Franco, G. (2020). Participative decision-making and gamification: The case of «civic points». *Jusletter IT*. doi:10.38023/eb9f785c-729a-46d9-95fc-41d0a9a59978
- A6. Ghassemilou, S., Marini, C., Chemi, C., Ranjit, Y. S., & Tofighi, B. (2020). Harmful smartphone applications promoting alcohol and illicit substance use: A review and content analysis in the United States. *Translational Behavioral Medicine*. doi:10.1093/tbm/ibz135
- A7. Hammedi, W., Leclercq, T., Poncin, I., & Alkire, L. (2021). Uncovering the dark side of gamification at work: Impacts on engagement and wellbeing. *Journal of Business Research*. doi:10.1016/j.jbusres.2020.08.032
- A8. Hass, D., Hass, A., & Joseph, M. (2021). A preliminary investigation of gamification from the young consumer's perspective. *Young Consumers*. doi:10.1108/YC-10-2020-1221
- A9. Kaufman, E. M. (2020). Reprogramming consent: implications of sexual relationships with artificially intelligent partners. *Psychology and Sexuality*. doi:10.1080/19419899.2020.1769160
- A10. Kim, T. W., & Werbach, K. (2016). More than just a game: ethical issues in gamification. *Ethics and Information Technology*. doi:10.1007/s10676-016-9401-5
- A11. Korn, O., & Schmidt, A. (2015). Gamification of Business Processes: Re-designing Work in Production and Service Industry. *Procedia Manufacturing*. doi:10.1016/j.promfg.2015.07.616
- A12. Kwon, H. Y., & Özpölat, K. (2021). The dark side of narrow gamification: Negative impact of assessment gamification on student perceptions and content knowledge. *INFORMS Transactions on Education*. doi:10.1287/ITED.2019.0227
- A13. Li, M., Xu, D., Ma, G., & Guo, Q. (2021). Strong tie or weak tie? Exploring the impact of group-formation gamification mechanisms on user emotional anxiety in social commerce. *Behaviour and Information Technology*. doi:10.1080/0144929X.2021.1917661
- A14. Oravec, J. A. (2020). Digital iatrogenesis and workplace marginalization: some ethical issues involving self-tracking medical technologies. *Information Communication and Society*. doi:10.1080/1369118X.2020.1718178
- A15. Orduna-Malea, E., Martín-Martín, A., & López-Cózar, E. D. (2016). Metrics in academic profiles: A new addictive game for researchers? *Revista Espanola de Salud Publica*.

## 8.1. Appendix reference.

- A1. Algashami, A., Vuillier, L., Alrobai, A., Phalp, K., & Ali, R. (2019). Gamification risks to enterprise teamwork: Taxonomy, management strategies and modalities of application. *Systems*. doi:10.3390/systems7010009
- A2. Andrade, F. R. H., Mizoguchi, R., & Isotani, S. (2016). The bright and dark sides of gamification C3 - Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture

- A16. Raftopoulos, M. (2014). Towards gamification transparency: A conceptual framework for the development of responsible gamified enterprise systems. *Journal of Gaming and Virtual Worlds*. doi:10.1386/jgvw.6.2.159\_1
- A17. Rogl, R. (2016). No work and all play – the intersections between labour, fun and exploitation in online translation communities. *European Journal of Applied Linguistics*. doi:10.1515/eujal-2015-0022
- A18. Schlömmner, M., Spieß, T., & Schlögl, S. (2021). Leaderboard positions and stress—experimental investigations into an element of gamification. *Sustainability (Switzerland)*. doi:10.3390/su13126608
- A19. Schulz, R., Isabwe, G. M., & Reichert, F. (2016). Ethical issues of gamified ICT tools for higher education C3 - 2015 IEEE Conference on e-Learning, e-Management and e-Services, IC3e 2015. doi:10.1109/IC3e.2015.7403481
- A20. Seo, K., Fels, S., Kang, M., Jung, C., & Ryu, H. (2021). Goldilocks conditions for workplace gamification: how narrative persuasion helps manufacturing workers create self-directed behaviors. *Human-Computer Interaction*. doi:10.1080/07370024.2020.1744145
- A21. Shahri, A., Hosseini, M., Phalp, K., Taylor, J., & Ali, R. (2014). Towards a code of ethics for gamification at enterprise C3 - Lecture Notes in Business Information Processing. doi:10.1007/978-3-662-45501-2\_17
- A22. Thorpe, A. S., & Roper, S. (2019). The Ethics of Gamification in a Marketing Context. *Journal of Business Ethics*. doi:10.1007/s10551-017-3501-y
- A23. Trang, S., & Weiger, W. H. (2019). Another dark side of gamification? How and when gamified service use triggers information disclosure C3 - CEUR Workshop Proceedings.
- A24. Trang, S., & Weiger, W. H. (2021). The perils of gamification: Does engaging with gamified services increase users' willingness to disclose personal information? *Computers in Human Behavior*. doi:10.1016/j.chb.2020.106644
- A25. Yang, H., & Li, D. (2021). Understanding the dark side of gamification health management: A stress perspective. *Information Processing and Management*. doi:10.1016/j.ipm.2021.102649