Exploring the Darkness of Gamification: You Want It Darker?

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Abstract. Both academia and industry have shown an increased interest in gamification. To enhance the design and understanding of gamification there is a need to explore the negative aspects of the concept. Negative sides, "the darkness" of gamification is further explored in this paper. Through a systematic literature review the darkness of gamification is mapped and categorized into seven problem domains. This new information could help both industry and academia to acknowledge problem domains of gamification and develop better frameworks for designing gamification. It will also reignite the call to conduct more research about negative sides of gamification in order to improve the gamification experience.

Keywords: Darkness · Dark Patterns · Design · Gamification · Negative · Persuasive Technology · Systematic Review

1 Introduction

Like most technologies the introduction and use of persuasive technology (PT) to persuade a transformation of mind and behavior could have both positive and negative effects on the user. Gamification has recently gained in popularity as an enabler of persuasion since it is supposed to increase engagement by using game elements [59]. Gamification could be seen as a catalyst to increase the effects of the designed and intended persuasion. The study of unintended negative consequences of behavioral interventions are becoming an important research area [19, 21, 39, 53].

In persuasion and gamification research, the negative effects are often named "the dark side" [5, 15, 31, 35], ethical issues concerning gamification are rarely explored [33]. Previous research on the negative effects of gamification calls for further exploration [5, 31]. The rationale behind this study is that there is a research gap and this research aims at mapping this very important but relatively uncharted area of gamification. Hence, this systematic review will examine the negative effects caused by gamification. Conducting a systematic literature review and exploring and categorizing the discovered negative effects should give a better understanding of the present knowledge. This can be used to better understand the drawbacks of gamification and what needs to be addressed to exclude or reduce the possible negative side effects.

This paper is structured as follows. In section 2 the background is set, by presenting the concept of gamification, the negative sides of gamification, and dark patterns. The systematic literature review is given in section 3, followed by the mapping in section 4. A framework using the identified problem domains is presented in section 5. Finally, conclusion, limitations, and potential future work are given in section 6.

2 Background

2.1 Gamification

Several definitions of gamification exist, two commonly used in academia are Deterding et al. "Use game elements in a non-game context" [17], and Huotari and Hamari "a process of providing affordances for gameful experiences which support the customers' overall value creation" [28]. Gamification has previously been used to alter the behavior of people, e.g., quit smoking, exercise more, drive the car less, etc. [7,26,27,43]. Critics of gamification consider gamification to be exploitation [12]. Gamification usually implements and uses points, badges, and leaderboards (PBL) [59], but often includes progress bars, avatars, quests, and performance graphs.

Gamification is popular in both industry and academia, to give a hint a quick search (2019-03-12) on "gamification" in Scopus generated the graph in Figure 1. Starting from 2011 the output of research has steadily increased and generated, for the year of 2018, almost 1200 hits. The annual research output from 2012 to 2018 range between 180 and 207, except for year 2017 with 92.

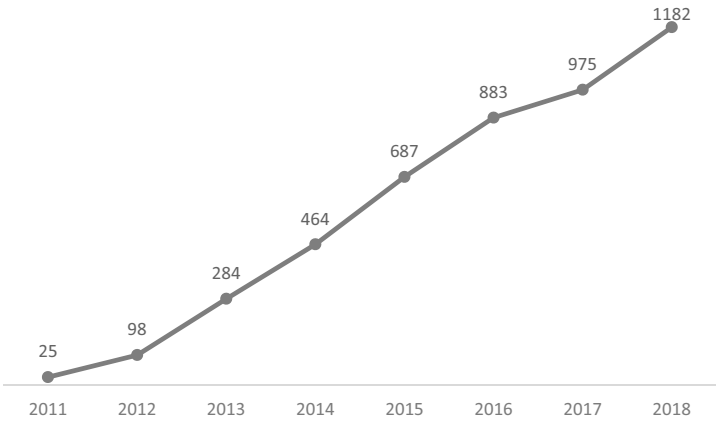

Fig. 1. Number of search hits for gamification in titles, keywords, and abstracts by year in Scopus

The concept of gamification does not require a computer to mediate e.g., game elements like points, leaderboards, and badges, could be applied in a school context where the student receives points that count towards a *course grade* and are measured against each other in leaderboards such as a *grade transcript* (e.g., summa cum laude, A-student etc.) and a badge *degree certificate*. Gamification is nothing new, in the 1964 Disney movie Marry Poppins the protagonist uses gamification to make the children do their chores, "In every job that must be done, there is an element of fun. You find the fun, and - SNAP - the job's a game!" [52].

2.2 Dark Patterns and Gamification

Connected to the darkness of gamification are dark patterns. Design patterns as a concept was introduced by Christopher Alexander as a solution that is proven and reusable for an architectural design problem [1]. Design patterns have, for example, been used as a reusable solution in game design [11], interaction design [13], and software engineering [25] for problems in a specific context. A pattern solution frequently captures more solutions rather than one exact solution. Harry Brignull introduced Dark patterns when he cataloged, on darkpatterns.org, the different types of user interfaces that trick users into doing things that are not in the user's best interest [14]. Zagal et al., researched dark game design patterns, and these design patterns could be seen as questionable and unethical [62], e.g., Linehan et al. developed dark design patterns for anti-health games [37]. The negative experiences for players are likely to happen without their consent and against their best interest. Dark patterns are design strategies that are used to benefit developers rather than the target audience, using unethical applications such as coercion, deception, and fraud.

Hence, dark gamification design could be defined as *the craft of purposefully designing gamification that do not have the well-being of the user in mind.*

3 Literature Review

The exploration is based on conducting a systematic literature review in the gamification domain. Moher et al. [41] was used as a guideline for the review. The underlying research question of this paper "What domains of negative side effects are acknowledged in gamification research?" Articles were retrieved in a systematic literature review. The first step was a keyword search using *ACM Digital Library*, *IEEE*, *Scopus* and *Web of Science*, to capture articles and papers until 2019. Google Scholar was omitted because it returns too many papers that are not peer-reviewed. The search string "gamification AND (dark* OR negative OR ethics OR manipulation OR exploitation)" was used to find previous research about negative outcomes, darkness, dark side, ethics, exploitation, and manipulation in the context of gamification. *ACM Digital Library* returned 46 papers (n=46), *IEEE* returned 45 papers (n=45), *Scopus* returned 171 papers (n=171) and *Web of Science* returned 141 papers (n=91), the total number of

unique papers was 191 (n=191). The inclusion criteria were a negative effect of gamification at an individual level, peer-reviewed, and written in English. The exclusion criteria were poster, (extended-)abstract, tutorial, workshop, note, and keynote. The 191 papers were reviewed first by examining the title, keywords and reading the abstract, a total of 35 papers (n=35) were considered for the next step. These 35 papers were read and further assessed using the inclusion and exclusion criteria. Following these steps 28 papers (n=28) were found to discuss negative aspects of gamification and passed the inclusion and exclusion criteria. The result is shown in Table 1. The column "Problem area" shows the main negative aspect that the paper discusses. NVivo 12.4.0 Pro was used in a thematic analysis to code the 28 identified papers. The coding was done independently twice to reduce bias, the result was almost identical (e.g., paper by Shahri et al. [50], and Yamakami [61] gives several problem areas and belong in several problem domains). In the next step, it was then possible to cluster the 28 papers based on the identified and coded problem area into seven problem domains.

Previous related research on gamification has been done in specific contexts e.g., educational, software engineering, and marketing [40, 44, 51, 57], all of them arguing that there is a research gap concerning negative effects of gamification.

Table 1. Identified papers that explores the negative and dark side of gamification

Id	Authors	Title & short description	Year	Problem area
[2]	Algashami A. et al.	*Conceptualising gamification risk to teamwork within enterprise* Find risks to teamwork	2018	Collaboration and exploitation
[3]	Algashami A. et al.	*Strategies and design principles to minimize negative side-effects of digital motivation on teamwork* Reduction of collaboration at work	2017	Collaboration and competition
[4]	Anderson J., Rainie L.	*Gamification and the Internet: Experts expect game layers to expand in the future, with positive and negative results* People fear manipulation and data security	2012	Manipulation and information disclosure
[5]	Andrade F.R.H. et al.	*The bright and dark sides of gamification* A framework to avoid negative aspects	2016	Addiction, competition, and distraction

Table 1. *Continued from previous page*

Id	Authors	Title & short description	Year	Problem area
[6]	Barata G. et al.	*So fun it hurts - Gamifying an engineering course* Student felt privacy problem with leaderboards and more competition	2013	Privacy and competition
[7]	Barratt P.	*Healthy competition: A qualitative study investigating persuasive technologies and the gamification of cycling* Bike rider feel monitored and pressured to compete	2017	Surveillance and competition
[9]	Birk M.V. et al.	*The motivational push of games: The interplay of intrinsic motivation and external rewards in games for training* Extrinsic reward demotivate user with intrinsic motivation	2016	Motivation
[10]	Bjering A. et al.	*Gamification and family housework applications* Only focusing on extrinsic motivation	2015	Motivation
[15]	Callan R.C. et al.	*How to avoid the dark side of gamification: Ten business scenarios and their unintended consequences* Rewards not valued	2015	Motivation, not to reach business goal
[16]	Danaher J. et al.	*The quantified relationship* Surveillance and ethics of private life	2018	Ethics and surveillance
[18]	DeWinter J. et al.	*Taylorism 2.0: Gamification, scientific management and the capitalist appropriation of play* Exploitation, uncompensated productivity	2014	Exploitation
[20]	Eveligh A. et al.	*Gamification in the Old Weather Citizen Science Project* Competition can demotivate	2013	Motivation and competition
[22]	Fitz-Walter Z. et al.	*Exploring the effect of achievements on students attending university orientation* Users not motivated, and easy to cheat	2014	Motivation and cheating

Table 1. *Continued from previous page*

Id	Authors	Title & short description	Year	Problem area
[24]	Fuchs M.	*Gamification as twenty-first-century ideology* The ideology of gamification	2014	Exploitation and ethics
[29]	Hutton, R.	*The Gamification of Finance* The ideology of gamification	2014	Ethics and exploitation
[30]	Hyrynsalmi S. et al.	*The shades of grey: Datenherrschaft in data-driven gamification* Ethics of collecting data with dubious, use in the future	2017	Use and privacy of data
[31]	Hyrynsalmi S. et al.	*The dark side of gamification: How we should stop worrying and study also the negative impacts of bringing game design elements to everywhere* Tertiary literature review	2017	Ethics and addiction
[32]	Kim T.W.	*Gamification of labor and the charge of exploitation* Explores gamification as exploitation	2016	Ethics and exploitation
[33]	Kim T.W., Werbach K.	*More than just a game: ethical issues in gamification* Ethics, harm, and damage to character	2016	Manipulation and exploration
[34]	Kirkpatrick G.	*Ludefaction: Fracking of the Radical Imaginary* The ideology of gamification	2015	Ethics and exploitation
[38]	Luo S. et al.	*Reward-based intermittent reinforcement in gamification for e-learning* Methods to gain motivation	2015	Motivation
[46]	Raftopoulus M.	*Towards gamification transparency: A conceptual framework for the development of responsible gamified enterprise systems* Better design and responsible gamification of enterprise systems	2014	Ethics and exploitation
[47]	Rey PJ.	*Gamification and post-fordist capitalism* Hypercommodization and prosumption	2014	Exploitation

Table 1. *Continued from previous page*

Id	Authors	Title & short description	Year	Problem area
[48]	Rogl R.	*No work, and all play, the intersection between labour, fun and exploitation in online translation communities* Work exploitation	2016	Exploitation
[49]	Schulz R et al.	*Ethical issues of gamified ICT tools for higher education* Motivation and ethics, gamifying e-learning	2015	Ethics and motivation
[50]	Shahri A. et al.	*Towards a code of ethics for gamification at enterprise* Problems when gamifying enterprises	2014	Competition, privacy, surveillance, and exploitation
[56]	Thorpe A, Roper S.	*The ethics of gamification in a marketing context* Gamification as a marketing tool. Perhaps a need of regulation.	2017	Ethics
[61]	Yamakami T.	*Gamification literacy: Emerging needs for identifying bad gamification* Argues for the need of gamification literacy	2013	Manipulation, competition, and addiction

4 Mapping Gamification

The seven problem domains found by coding and clustering are shown in Table 2. It is important to note that if the search had not included "ethics" 37 fewer unique papers would have been included in the systematic review and 8 less in the results in Table 1, paper id: [16, 18, 24, 29, 46, 49, 50, 56]. Following Webster and Watson's [58] concept of matrices, a table was constructed that captures and collects the negative aspects of the 28 papers into seven domains.

1. *Motivation* is a frequent concern among the studied papers. By gamifying and using extrinsic rewards, the extrinsic rewards need to be given repetitively to keep the motivation level high. Research showed that people who from the beginning have had an intrinsic motivation could even be demotivated by the gamification and feel like a guinea-pig that had to respond to stimuli [9]. The use of extrinsic motivation could limit the focus and opportunity to gamify activities [10]. The use of gamification by using extrinsic motivation could drive the user to gamify a task and try to reach the highest score and not to focus on the work task [15]. The use of gamification might in some settings motivate the user to become more competitive against other

Table 2. The seven problem domains of gamification

Problem domain	Paper ID	Total
1. Motivation	[9, 10, 15, 20, 22, 38, 49]	7
2. Addiction	[5, 31, 61]	3
3. Competition and collaboration	[2, 3, 5–7, 20, 50, 61]	8
4. Manipulation	[4, 33, 47, 61]	4
5. Data integrity	[4, 30]	2
6. Surveillance and privacy	[6, 7, 16, 50]	3
7. Ethics and exploitation	[16, 18, 24, 29, 31, 32], [34, 46–50, 56]	13

users and in the end result in demotivation [20, 49]. Gamification could introduce the possibility of cheating, hence, demotivate users [22, 38].
A major problem is that once the extrinsic rewards stop, users tend to reduce or stop using the gamification. The designer of gamification needs to pay attention to this problem domain and find the right balance to keep the user motivated and continue to use the gamification.

2. *Addiction*, could be connected to the gaming experience. Unfortunately, for some people, the gamification turns into an addiction, similar to other addictions, and this could work against the intention of the gamification or at least hurt the well-being of the user. There seems to be a lack of research that connects addiction and well-being [31]. Gamification might introduce the sensation of flow which can increase the risk of addiction [5]. Yamakami [61] sees a need of awareness of the addiction-promoting process.
   The gamification designer should be aware of the addiction problem and could safeguard and protect the user by for example introduce interruptions every 20th minute or have a maximum daily allowed user time. Xu et al. [60] gives some example how prevent game addiction and harm e.g., parental monitoring, attention switching, and education.
3. *Competition and collaboration*, there could be a negative outcome on collaboration. The users want to compete (individual or team-based) to top the leaderboard and/or get badges [2, 3]. Intense competition among the users could damage overall goals, e.g., production, and learning etc. and result in less collaboration, this risk should be assessed [2]. A good designing of the gamification could increase collaboration [6].
   The designer of gamification should keep the competition at a reasonable level that does not impact the collaboration negatively and thereby jeopardize the overall goal of the gamification.
4. *Manipulation*, in some of the papers the users describe a feeling of being manipulated by the gamification into doing something they otherwise might not do. Some users felt that they were being stupid because easy cues could make them react and act. Gamified consumption could be seen as manipulative [47], manipulation could be seen as an imbalance between the provider

and player [33]. Anderson and Raine [4] warns about insidious gamification-fueled consumer culture aimed at children. An exploration of manipulation in a gamification context shows its complexity and needed consideration [33]. Yamakami [61] argues for gamification literacy to help people understand manipulative elements that can be used in a gamified context.
Manipulation can be defined as "imposing a hidden or covert influence on another person's decision-making" [55]. The gamification designer must act ethical and not manipulate the user, this also follows Fogg's definition of PT as a voluntary change of behavior or attitude without using coercion or deception [23].

5. *Data integrity*, sometimes it might not be as simple as splitting the outcome of gamification into a dark and white side, because there is also a gray area. This gray area includes whether the original intention was benevolent but the outcome was not. One example is how data collected from gamification could be used in future settings not perceived by the user [4]. The information could be sensitive e.g., necessary healthcare data that is later used for other purposes [30].
The designer of gamification should take care of the trust given by the user and be transparent on how the collected data might be used. If a new setting for the collected data occurs in the future then have the user's well-being in mind and if possible, ask the user for consent. The security and protection of sensitive data needs extra attention from the designer.
6. *Surveillance and privacy*, users sometimes feel scrutinized and pressurized by themselves or by peers to continue using the gamification, e.g., in one gamification setting bikers felt monitored and a pressurized to compete [7]. Another concern among the users was regarding privacy, depending on the context sometimes the users do not want their points, badges or leaderboard to be visible to other users [6], e.g., very private data or the shame of being ranked last. When gamification is conducted at work the data collected could be used by management for surveillance and monitoring [50]. Hence, privacy and transparency must be considered. Gamification could collect sensitive intimate data about the users or be used for tracking a partner's data [16].
The designer should avoid making the user feel surveilled since it will impact both the gamification and the user's well-being negatively. The gamification should allow the user to choose what data and results that is to be shared with others.
7. *Ethics and exploitation*, thirteen of the papers belongs to this domain and makes it the largest. A few of the papers suggest that the ideology behind gamification is an extension of neo-liberalism, economic man, and Taylorism [29, 34, 47]. Gamification could be seen as an ideology that enhances the performance for the ruling system and could be used for exploitation [24]. This has implications on the gamification and the rationale to design and implement a gamification. The ramification of gamification could result in the exploitation of labor e.g., difficulty for a user to separate work and labor and not to get the proper compensation for actual work [32, 48]. Raftopoulus [46] calls for ethical considerations when designing gamification of enterprise sys-

tems to achieve a better responsibility, Shahri [50] mentions that gamification could be exploitative and labeled as exploitation-ware and used to make workers do more than the work require. Gamification in the context of higher education calls for awareness of ethical impediments that the persuasion of student could bring [49]. Hyrynsalmi et al.'s tertiary literature review raises concerns of a lack of research about gamification and its negative sides connected to ethical consideration and ethics [31]. Thorpe and Roper [56] found there could be a need for regulation when gamification is used as a marketing tool that could be used for manipulation and exploitation.
The designer of gamification ought to avoid exploitation since it will have a negative impact on the user's well-being. An ethical consideration should be mandatory when designing gamification and an ethical evaluation of an implemented gamification could be beneficial and highlight eventual problems. It is important to continue the research regarding gamification and ethics, also schools that teach gamification should make the students aware of ethical questions connected to gamification.

5 Evaluation of Gamification

Berdichevsky and Neuenschwander [8] examined the ethics of PT and developed a framework to evaluate the ethics of PT. The focus is on the interaction between the persuader, PT, and the persuaded person. Since, it is the persuader who designs and creates the PT, and the PT is a technical mediation (see Latour [36]) that uses persuasive methods on the persuaded person that could give both predictable and unpredictable outcomes. Nyström and Stibe [42] developed this further into – Framework for Evaluating the Darkness of Persuasive Technology (FEDPT), by using the Visibility-Darkness matrix. FEDPT could be modified to evaluate the darkness of gamification by using the seven problem domains – The Darkness of Gamification Evaluation System (DGES) (see Figure 2).

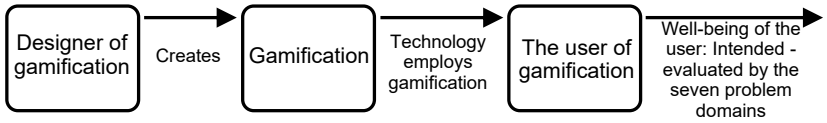

Fig. 2. The Darkness of Gamification Evaluation System (derived from [8, 42]).

The designer of the gamification creates an experience with a set goal. The well-being outcome of the gamification makes up a benchmark to evaluate the gamification. A technology such as gamification should not be regarded as neutral because in a social context gamification is value-laden and aspire values [54] to change the user's behavior.

It would be possible to evaluate the gamification design by using DGES when designing and developing gamification (see Figure 3). One option would be to

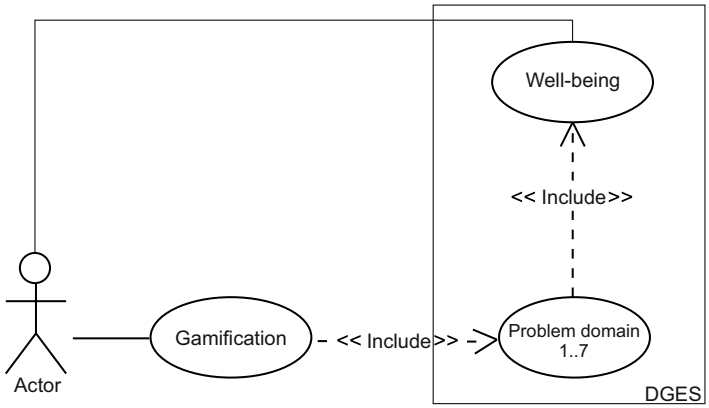

Fig. 3. Evaluation of gamification by using DGES.

rate the gamification by considering the problem domains and give a score based on the performance in each of the seven problem domains. Figure 4 shows an example where the gamification scores high on the 7th domain and is in need of modification.

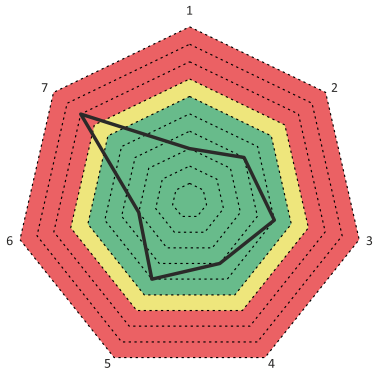

Fig. 4. Gamification evaluation score.

The gamification design could be altered depending on the outcome to minimize the risk of and severity of the darkness. Another possibility is to evaluate existing gamification with DGES and if judged necessary change the gamification to avoid or reduce the impact of darkness.

6 Conclusion, Limitations and Future Work

The research question is answered by the identification and mapping of problems into seven domains. The mapping of the papers into the seven problem domains could help designers of gamification to become aware of the possible negative effects that the use of gamification could cause. The developed Darkness of Gamification Evaluation System (DGES) is one useful outcome of the identification of seven problem domains. Pirkkalainen and Salo [45] look into two decades of IT research and identified four darkness phenomena: information overload, technostress, IT anxiety, and IT addiction. Gamification could contribute to all four, thus, the designing of gamification is crucial to avoid darkness that impacts the user negatively.

A limitation of this research is that by using *ACM Digital Library*, *IEEE*, *Scopus*, and *Web of Science* some relevant papers could be missed. The main reason for this limitation is the lack of access to other database providers. On the other hand, *ACM Digital Library*, *IEEE*, *Scopus*, and *Web of Science* are considered to be high quality indexing databases and together covers most research output. Another limitation is the construction of the search string, it is always possible to change the search string by adding one more word or rebuild the string and test it further to try to optimize the search. The same could be said about the mapping and identification of the problem domains, perhaps the coding could have been automated or some weighted system could have been used. Some papers may not have been written in the English language and were omitted by the inclusion criteria.

One possible application of this research could be to further develop the DGES. Perhaps the identified seven problem domains could also be refined to better capture the darkness of gamification. This refinement process would need the DGES to be tested on different real-world gamifications. This literature review found negative sides of gamification and mapped them into seven problem domains and more research is called upon to further explore gamification and its possible negative impact on users. Interdisciplinary research e.g., contribution from sociology, psychology, pedagogy, and medical science could strengthen information systems research and help in designing gamification that benefits the user's well-being.

The final question to the designer, developer, and user of gamification is – you want it darker?

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