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Gamification – A Novel Phenomenon or a New Wrapping for Existing Concepts?

Completed Research Paper

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Abstract

Adding game elements to products and services has become a popular approach for enhancing users' experiences. Accordingly, gamification is widely considered an important method for intrinsically motivating users toward a preferred behavior. But what exactly about gamification is actually novel? In a broad literature review, we compare and contrast gamification to similar concepts such as hedonic, persuasive and intrinsically motivating information systems. By decomposing and classifying game elements found in the literature, we distinguish between already existing elements and ones that can be considered new. In order to drive this area of research forward, we develop an extended framework for gamification, identify gaps in the literature, and propose future avenues for research.

Keywords: games, persuasive design, intrinsically motivating software, playful software, hedonic software, flow

Introduction

Gamification has become a popular approach to improving products and services in order to enhance users' experiences, increase employees' engagement, and intrinsically motivate customers toward preferred behaviors (Deterding et al. 2011; Huotari and Hamari 2012). This popularity is underlined by estimates that more than 70 percent of the top 2,000 global organizations were expected to have at least one gamified application by 2014 (Gartner 2011).

Gamification has also garnered increasing academic publications in recent years (Huotari and Hamari 2012; Thiebes et al. 2014). The original term "gameification" and the more common term of "gamification" were first used in 2008 (Thiebes et al. 2014) and subsequently appeared in academic publications in 2010 (Huotari and Hamari 2012; Thiebes et al. 2014). Since that time, the addition of game elements has been considered a novel way to engage users and customers (Hamari 2013).

But to what extent is gamification actually novel? Gamification, or the addition of game elements to systems (Hamari 2013), has been contrasted with related concepts. For example, serious games are considered complete, full-fledged systems, while gamification only makes up parts of systems (Deterding et al. 2011). Similarly, Liu and Santhanam (2015) distinguish gamification from games, serious games, and simulations, and propose that gamification is generally added to instrumental tasks such as job completion. Gamification has also been contrasted to wider concepts such as *ludification of culture*, games manifesting in and pervading culture (Bouca 2012), and with *storification*, or creating narratives out of non-narrative elements (McGonigal 2011).

We propose that there are even closer connections with previous concepts studied in information systems (IS). Over the years, three other streams of research have investigated similar topics using different labels. First, Malone (1981, 1982) introduced this topic to the IS community using the labels of 'intrinsically motivating' software and 'enjoyable user interfaces'. Subsequently, researchers built on his work to propose guidelines for designers (e.g., Starbuck and Webster 1991) using concepts like engagement, flow and playfulness to describe user experiences with this type of software. Second, the notion of captology or persuasive technologies (Fogg 1999) has been used, with researchers drawing on this concept to propose persuasive systems design principles (e.g., Oinas-Kukkonen and Harjumaa 2009). Third, researchers have drawn on marketing research on hedonic products (van der Heijden 2004) to suggest features that can be incorporated into utilitarian software (van der Heijden 2004; Lowry et al. 2013).

But how are these topics similar or different to gamification? As IS researchers, are we simply reinventing the wheel by using the term gamification or is gamification a novel concept? Clarifying this question represents the first goal for our research. Developing a plan to drive future research is the second goal. To address these goals, we review the literature to find journal articles pertaining to gamification and similar concepts. Unlike the two previous gamification reviews (Hamari et al. 2014; Thiebes et al. 2014), we conducted a wider search for contributions in related areas, focused only on peer-reviewed journal articles, and examined computer-related gamification. By doing so, the contribution of our work is fourfold. First, by comparing gamification with intrinsically motivating, persuasive and hedonic IS, we determine commonalities between these concepts and highlight areas in which gamification differs. Second, we draw on and critique current gamification models in order to develop a more extensive framework to categorize and assess past research. Unlike previous research, we categorize design elements into sub-categories in order to help guide future research. Third, we suggest a consistent terminology for researchers to use and apply when referring to gamification. Finally, using the insights generated from the literature review, we highlight gaps in research and propose potential questions for further studies on gamification in the IS discipline.

Describing Gamification

The literature demonstrates no clear consensus on how what exactly is meant by gamification. A wide spectrum of different understandings exists, starting with very general descriptions such as the addition of game mechanisms (Hamari 2013) and moving to more specific elaborations such as "the application of lessons from the gaming domain in order to change stakeholder behaviors and outcomes in non-game situations" (Robson et al. 2014, p. 352). However, most understandings are derived from two sources. The first by Huotari and Hamari (2012, p. 19) considers gamification to be "a process of enhancing a service

with affordances for gameful experiences in order to support user's overall value creation". This description has its roots in service marketing and implies two things: gamification is about creating overall value for the user but has only a supporting role in this process (Hamari 2013). The second way of understanding the term was coined by Deterding (2011, p. 2) and refers to gamification as "the use of game design elements in non-game contexts". Unlike the first understanding, this one does not limit gamification's application to services but also extends to gamified products. Thus, we draw on this notion as it allows for a broader area of application, and – for the purpose of this manuscript – refer to gamification as: *the application of game design elements in non-game products or services to steer users' behaviors toward preferred outcomes*.

An Initial Comparison of Gamification to Related Concepts

As just described, gamified systems include game design elements. However, this begs the question of what these elements might be? Researchers have examined such game elements as goals, rewards, and storytelling (Kapp 2012) and have explored user-system dynamics that can result from these elements such as challenge and curiosity (Domínguez et al. 2013).

Similar to gamification, Malone (1981) proposed that *intrinsically motivating software* needs to encourage challenge, fantasy, and curiosity. For example, software can be made more challenging by incorporating goals with uncertain outcomes; fantasy can be included by evoking mental images of physical or social situations; and curiosity can be encouraged by providing an optimal level of informational complexity (Malone, 1981).

Although a wider concept than gamification, *persuasive systems* are also designed to reinforce, change or shape attitudes or behaviors (Fogg 2003; Oinas-Kukkonen & Harjumaa 2008). A set of design principles has been developed that draw on social-psychological theories of persuasion, such as providing monitoring, feedback, and suggestions to users.

Like related concepts, *hedonic systems* can provide value to users by incorporating game elements such as aesthetically appealing interfaces (van der Heijden 2004). For example, multisensory images or fantasies can intrinsically motivate individuals to use systems (Lowry et al. 2013).

Table 1 provides an initial comparison between gamification and these related concepts. It demonstrates some similarities across the concepts. For instance, all systems pursue the same type of goal: to change users' behaviors toward a preferred state or in a predetermined way[1]. Next, comparing the four concepts in terms of participation, we see that deciding to use a system is generally voluntary. However, gamification is applied in non-game contexts, whereas other concepts are not limited in application. All concepts can be designed as a means to an end, but some, especially hedonic systems, are often created as ends in themselves. All concepts, but gamification, can be either standalone or part of another system. Finally, we propose that the features of systems, that is their game design elements, demonstrate similarity and that gamification studies can therefore benefit from findings in these other areas. We turn to these elements next by presenting a framework to classify past research.

[1] This comparison for goals highlights an inappropriate contrast made by some: for example, Deterding et al. (2011) argued that playful designs are different from gamified ones because playful ones do not have rules and goals. However, decades ago, researchers such as Malone (1981) and Starbuck and Webster (1991) demonstrated that this distinction is a false one

	Gamification	**Intrinsically motivating IS**	**Persuasive IS**	**Hedonic IS**
Goal (of system provider)	Change toward a preferred behavior or attitude	Make the use of information systems captivating and enjoyable	Change, reinforce, shape behavior or attitude in a predetermined way	Change behavior (promoting prolonged use of system)
Participation	Decision may be voluntary (or mandatory if an organizational system)	To be intrinsically motivating, systems should be used voluntarily	Implied voluntary (because of no coercion and no deception)	Decision to use is voluntary
Application area	Non-game product or service	(no indication in definition)	(no indication in definition)	(no indication in definition)
Means/End	Means to an end	Means to an end	Means to an end	Both end in itself or a means to an end
Standalone capability	Needs to be part of a product or service	Can be both part of a system or standalone	Can be both part of a system or standalone	Can be both part of a system or standalone
Example elements	Goals, rewards, storytelling	Uncertain outcomes, fantasy, informational complexity	Monitoring, feedback	Aesthetically appealing interfaces

Table 1. An Initial Comparison of Gamification with Related Concepts

Developing a Gamification Framework

In order to further assess whether gamification indeed demonstrates similarity to related concepts, we developed a framework to categorize articles. To create the framework, we first drew on previous models of game design and then adjusted and extended them to improve their conceptualization of constructs. This is because, as highlighted below, we found that researchers use terms inconsistently or inappropriately.

Concerning previous models used to classify game design elements, we began with the most well-known model, the MDA framework developed by Hunicke et al. (2004) in which game elements are grouped by: (1) *mechanics*, i.e., the representation of game data and algorithms (e.g., points, progress)[2], (2) *dynamics*, or players' behaviors or behavioral states resulting from how players manipulate or react to mechanics (e.g., challenge), and (3) *aesthetics*, which are "emotional responses evoked in the player" when playing the game (Hunicke et al. 2004, p. 2). Although we adopt similar descriptions for mechanics and dynamics in our model, we utilize a different conceptualization for aesthetics. This is because the MDA confuses users' experiences with aesthetic elements; that is, it conceptualizes immediate user experiences as aesthetics. In contrast, aesthetics represent independent components of a system encompassing "art, beauty, and visual elements" (Kapp 2012, p. 46). What Hunicke et al. (2004) call aesthetics would be better termed (aesthetic) processes (Tractinsky 2004). Thus, consistent with Tractinsky (2004), our

[2] Although most gamification researchers conceptualize mechanics in this way, others have used it differently: e.g., Liu and Santhanam (2015) use the term in two ways, consistent with this definition (e.g., points) and as a dynamic (e.g., competition and collaboration).

framework separates aesthetics as design characteristics from users' immediate interactions or experiences with these aesthetic elements.

Next, we turned to Ralph and Monu's (2014) MTDA+N (mechanics, technology, dynamics, aesthetics plus narratives) model. It combines and extends the MDA framework and the Elemental Tetrad (Schell 2010) to emphasize the importance of technologies and narratives, in addition to mechanics, dynamics, and aesthetics. Another contribution of their model is separating out the user from the user-system experience. Therefore, from the MTDA+N model, our framework adds in technologies as an important component of gamified systems and conceptualizes users as separate from their user-system experiences. In addition, we include narratives in our framework based on their model. However, we do not emphasize narratives to the same extent as Ralph and Monu (2014): this is because their model focuses on complete games that may need a storyline to be effective, whereas our framework examines gamified components as part of a larger system. That is, gamification is usually applied in a non-fiction context (Zichermann and Cunningham 2011) in which narratives often do not play a major role. In addition to drawing on these previous models[3], our framework is wider in that it encompasses both immediate (e.g., engagement) and longer-term (e.g., performance) outcomes.

Figure 1 diagrams our framework, which includes high-level constructs and the links between them. A variety of theoretical perspectives support the links between these constructs, such as motivation and flow theories, and we illustrate several of these in our description that follows.

Starting on the left of the model, our framework includes three categories of game design elements, namely mechanics, aesthetics, and technologies. Mechanics are the main building blocks of gamification and represent "algorithms, rules, objects, actions and other game components, which are manipulated by game designers to create challenges for players" (Ralph and Monu 2014, p. 5). For example, they may include bars for tracking and visualizing progress (Oinas-Kukkonen and Harjumaa 2009) or badges to provide information about users' expertise (Mutter and Kundisch 2014).

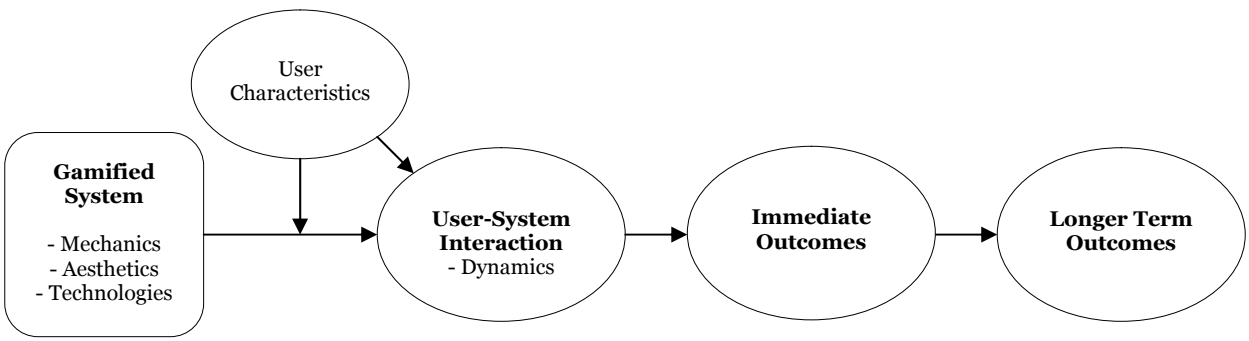

Figure 1. Proposed Framework

Mechanics can influence user-system interactions, or dynamics as they are termed in the gamification literature (Hunicke et al. 2004, Ralph and Monu 2014). Examples of dynamics include individual challenge and competition with others. Motivation theory helps to explain these links. For example, a gamified system may provide private feedback as a mechanic. This feedback may enhance the user's intrinsic motivation if it improves his/her sense of competence (Deci and Ryan 1985). In contrast, another system might utilize mechanics that enable direct comparisons of the user's progress to others (e.g., through badges or leader boards). These external rewards make the user's performance public, triggering extrinsic motivation (Ryan and Deci 2000). However, we know from decades of research on motivation (e.g., Deci et al. 1999) that extrinsic can interfere with intrinsic motivation: when rewards are removed,

[3] Other related models have been proposed, such as Aparicio's (2012) and Thiebes et al.'s (2014) frameworks.

the interaction with the gamified system often stops. Thus, motivation theory holds potential to help to explain any contradictory results in gamification research.

Aesthetics represent design features such as visual, audio, or fantasy elements. For example, fantasy elements may draw on metaphors, analogies, or simulations (Malone 1981) to help build an illusory world (Holsapple and Wu 2006). Aesthetics can play an important role in the generation of dynamics: this is because of the emotionally appealing nature of aesthetics which encourages the user to keep using the system, ensuring enough interaction time for dynamics such as curiosity to unfold (Malone 1981, 1982).

Technologies represent "tools and systems used to implement or deliver gameplay" (Ralph and Monu 2014, p. 5)[4]. Examples of technology elements include a system's degree response latency or the amount of interactivity in a system. For example, systems with an optimal level of interactivity may allow for more user control, increasing intrinsic motivation (Yi, Jiang and Benbasat 2015).

So far, we have described dynamics that result from gamification elements. However, dynamics are actually the result of the "emergent behavior of both the game and the player during player-game interaction" (Ralph and Monu 2014, p. 5). That is, we cannot speak of dynamics without understanding the users. They bring to the gamified system their experiences, personalities, and backgrounds. For example, some users are high in altruism (Hsu et al. 2013), which should result in higher cooperation dynamics. In addition to affecting dynamics directly, these user characteristics can also interact with game elements to amplify or suppress dynamics. For example, if a system introduces leaderboards as a mechanic to compare the performance of several players, and some users are high in their need for achievement, this could moderate the relationship between mechanics and dynamics, making competition stronger for such users. Similarly, user characteristics can interact with aesthetics and technologies, such that, when there is a fit between the user characteristics and the game elements, the relationship between the elements and the dynamics will be strengthened.

For our framework, we extend previous models by distinguishing between immediate outcomes, which arise from users' interactions with the gamified system, and longer-term outcomes, which are the ultimate goals of gamification. One way to look at outcomes is to assess whether they are hedonic or utilitarian in nature. For example, hedonic outcomes may include aesthetic or sensual sentiments whereas utilitarian outcomes may be characterized by the instrumental and functional value (Hirschman and Holbrook 1982, van der Heijden 2004). Accordingly, engagement, enjoyment, and flow are considered immediate hedonic outcomes, while performance and behavior improvements are viewed as longer-term utilitarian outcomes (Liu and Santhanam 2015).

Our framework suggests that gamification dynamics will relate to immediate outcomes. Several theoretical perspectives support this relationship. For instance, typical user-system dynamics such as perceived challenge will relate to immediate outcomes such as flow. Flow, a state representing the extent of pleasure and involvement in an activity (Csikszentmihaiyi 1975), is a multidimensional construct encompassing perceptions of user control, attention focus, arousal of curiosity, and intrinsic interest (Webster et al. 1993). Flow will be enhanced when users are optimally challenged; in contrast, if the interaction is too demanding it may produce anxiety, and if it is not challenging enough, boredom may result (Csikszentmihalyi 1975). This is because optimal levels of challenge result in perceptions of user control, contributing to the flow experience. Empirical research has supported this relationship (e.g., Novak et al. 2000).

Finally, several theoretical explanations exist for the relationship between immediate and longer-term outcomes. For instance, flow theory again supports this link. As described in Webster and Ahuja (2006), flow relates positively to longer-term outcomes such as performance and continued use. For performance, this is because the increased focus of attention during flow can lead to more effective work. Similarly, flow relates to continued use because of users' intrinsic interest: engaged users enjoy the system, which makes them want to use it again (Webster and Ahuja, 2006). Further, a body of empirical research supports the relationships between immediate and longer-term outcomes (e.g., Nel et al. 1999; Trevino and Webster 1992; Webster and Martocchio 1995).

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[4] Unlike the MTDA+N Model that considers technologies as both computer-based and physical (Ralph and Monu, 2014), our framework considers only computer-based gamification.

In the remainder of this publication, we use this framework to help categorize the articles that we review next.

Methodology

After having developed our overall gamification framework, we are now ready to search for relevant articles encompassing the four related concepts of gamification, intrinsically motivating IS, persuasive IS, and hedonic IS. To do so, we conducted a systematic literature review across a wide set of journals and gamification topics.

To identify the relevant literature we conducted a literature search along the guidelines of Webster and Watson (2002). Specifically, we searched for peer-reviewed journal publications on computer-based gamification through EBSCO host (Business Source Premier), ScienceDirect, ProQuest (ABI/INFORMS), AISel, Emerald Insight, Web of Science (core collection), and IEEExplore (only IEEE). That is, we did not narrow our focus to IS journals or to IS topics.

We searched on gamification and related terms. Further, because we are interested in computer-related gamification (that is, we did not review research on non-computer-related gamification such as physical board games), we included at least one computer/technology term. Accordingly, we applied the following search terms to the titles, abstracts, and keywords of publications:

(game OR gami* OR play* OR ludification OR fun OR pleasur* OR arousal OR "motivational affordance*" OR "intrinsic* motivat*" OR hedon* OR persua* OR captology)*

AND

(computer OR online OR web OR internet OR "information system*" OR "information technolog*" OR system OR software OR digital OR virtual)*

The searches were conducted in the last week of February 2015. Using the described search strings, the initial number of findings amounted to a total of 15,997 publications (EBSCO: 1,836; ScienceDirect: 1,042; ProQuest 1,292; AISel: 324; Emerald Insight: 1,048; Web of Science: 2,031, ACM: 5,071; IEEE: 3,353). Subsequently, we removed 1,874 duplicates and screened the titles and abstracts of the remaining journal articles manually.

During the manual screening we applied an iterative set of exclusion criteria (Okoli and Schabram 2010) shown in Table 2: that is, we excluded publications which were not peer-reviewed or published in academic outlets; we disregarded publications which were not completed journal articles (e.g., conference publications, research-in-progress papers, editorials, panel summaries) and ignored publications that did not address game design or related elements and that did not involve computers in any way. Once we had selected the journal articles, we then looked at their reference lists to identify additional publications. By going through this selection process, we eventually identified a total of 64 articles, which were read in-depth and considered for this literature review. The references for these 64 articles are marked with an * in the reference list. As outlined in Table 2, this search process contrasts with the previous two gamification reviews.

Inclusion criteria	**Exclusion criteria**	**Differences to extant reviews**
Peer-reviewed, academic outlet	Practice outlets	
First part of search term: gamification and potential synonyms	Game design elements or similar elements are not discussed	Our review includes publications which discuss gamification without actually using the term
Second part of search term: computer and potential synonyms	No relation to a computer-based system	
Full/completed research publication	No editorials, forewords, RIPs, panels	Only journal outlets were included (e.g., no conference publications)
No limitation on publication year		We included a longer time frame (previous literature reviews only include publications published in 2010 and later)
No limitation on context or environment		We included a wider context (e.g., Thiebes et al. (2014) only investigated gamification in the workplace)
No limitation on method		Both theoretical and empirical research was reviewed (e.g., Hamari et al. (2014) focused only on empirical studies)
	Duplicates	
	Not written in English	

Table 2. Criteria Applied in Searches and How They Differ From Extant Reviews

Results

We coded the articles based on our conceptual framework, adding in new sub-categories to our framework when required. We also referenced the wider game design literature to see if any elements could be added based on that literature. In addition, we further assessed the articles based on other criteria, such as their theoretical perspectives, applications, study designs, and types of participants. The results of this process are reported next.

Mapping articles against the theoretical framework

Table 3 summarizes the articles based on the framework. As can be seen, we have extended the framework to include more fine-grained categories – adding in sub-categories to group specific design elements which share similar characteristics or functions. In the following, we briefly describe these sub-categories and point out gaps and interesting elements.

Category	**Sub-category**	**Game design element** (# of articles)
Mechanics	Feedback	Progress bar (10)
		Points (23)
		Leaderboard (11)
	Representation	User profile (4)
		Avatar (5)
	Game advancement	Goals (20)
		Levels (8)
		Timing [prolonged/shortened/terminated/do-over play] (0)
	Rewards / Punishment	Badges (21)
		Bonus [items / abilities] (14 / 0)
		Gifting to others (4)
		Removal of abilities, shaming (0)
	Number of users	Single user (1)
		Multi-user (15)
	Other	Chance / Randomness (3)
(not indicated: 14)		Location [for system interaction] (3)
Aesthetics	Sensory	Audio / Smell / Taste / Touch / Visual (14)
	Narratives	Storytelling (2)
		Fantasy (7)
		Drama (1)
		Humor (0)
	Exploration	Knowledge (10)
		Discovery (10)
(not indicated: 41)		Escapism (3)
		Puzzle (1)
Technologies	Platform	App (8)
		Website (29)
	Software	Enterprise software (3)
		Game software (7)
(not indicated: 16)		Learning software (6)
Individual Characteristics		Power (10)
		Altruism (1)
		Achievement orientation (3)
		Gender (1)
		Age (1)
(not indicated: 51)		Experience (1)
		Player types, loss aversion (0)
Dynamics	User-oriented	Challenge (24)
		Curiosity (6)
		Skill improvement (16)
		Ownership (2)

	Social-oriented	Collaboration (10)
		Competition (22)
		Social comparison (10)
(not indicated: 23)		Empathy, grieving others (0)
Outcomes	Immediate Outcomes	Arousal (4)
		Autonomy (6)
		Relaxation (4)
		Flow (12)
		Relatedness (7)
		Self-expression (9)
		Surprise, wonder (0)
		Engagement (28)
		Enjoyment (23)
		Pride, completion, delight in others' misfortune, triumph (0)
	Long-term Outcomes	Attitudes (7)
		Behaviors (13)
(not indicated: 6)		Intentions (9)
		Performance (20)

Table 3. Mapping Research against Theoretical Framework

Examining the elements studied under game *mechanics*, we see that they cluster into several sub-categories. Many systems included feedback to the user (such as points), others allowed the user to set up representations of him- or herself (e.g., through avatars), some included game advancement elements (such as goals), while many included rewards (e.g., badges). The overwhelming majority were multi-user rather than single-user systems (but none was group- rather than individual-focused). One interesting element we discovered was gifting. Although the idea of getting a reward (e.g., a badge for outstanding performance) is not new, gifting represents a different approach: instead of being rewarded, a player can choose to reward other players by complimenting or sharing items (Melville 2014; Simões et al. 2013).

As described earlier, we view *aesthetics* as independent design elements, distinguished from users' reactions to them. Although aesthetics are often viewed as sensory elements, only a small number of articles examined these elements. More than half of the articles focused on different types of aesthetics, and for those that did, we created two sub-categories that we label narratives and exploration. The most frequent narrative element was fantasy, and discovery the most likely exploration element.

We were surprised to see that most publications did not describe the specific *technological* elements of their gamified systems. Rather they reported on their overall technologies, such as platforms (mostly websites) and their software types (such as enterprise software).

Dynamics occur when users interact with game mechanics. We divided this category into two sub-categories, user- and social-oriented. For instance, in user-oriented dynamics, users can improve their skills or become curious through system-generated mechanics. The most frequent user dynamic that we observed was challenge. On the other hand, user behaviors may depend on interactions with other users, e.g. mechanics which require players to work together or compete with another. Here, the most frequent social dynamic was competition.

We were again surprised to find few studies examining *individual characteristics*, even though gamification research suggests that dynamics result from users interacting with game mechanics. Although there is a rich history of studying 'player types' in the gaming area (such as Bostan 2010), this has not translated to gamification research. Rather, we found few studies examining users' characteristics.

As explained earlier, we wanted to make a clear distinction between outcomes, i.e., people's immediate reactions to a system, such as enjoyment or arousal, and their longer-term reactions, such as attitudes and intentions. In our review, we found that engagement was the most frequent immediate outcome, and that performance was the most likely longer-term outcome.

For completeness, we also referenced the wider game design literature, such as Schell (2010). There we found several more potential game elements. For example, Schell describes additional mechanics for punishing players, such as taking away already gained points or shaming players for incorrect actions or behaviors, and mechanics for game advancement concerning the time conditions surrounding a game. Although not specifically addressed as aesthetic elements, he also points out humorous game elements, for example when two unconnected things are suddenly connected which results in a funny notion (Schell 2010). Additional user characteristics are also discussed: For example, he distinguishes between four different types of players: (a) achievers, who want to achieve the goals of the game, (b) explorers, who want to know everything there is about the game, (c) socializers, who use games as an opportunity to build relationships to and stay in contact with others, and (d) killers, who are interested in competing and defeating others. Finally, Schell also identifies awe, amazement, surprise, pride, triumph, and delight over others' misfortunes as desired player feelings (that is, as immediate outcomes). All of these elements seem to be legitimate for games. Some of them, in particular elements with the purpose of punishing the player, are not appropriate as gamification elements in work systems. Yet, for the sake of completeness, we list them with the elements identified in our literature review and indicate when they have not been investigated in gamification research (by indicating 0 publications).

Assessing the design and conduct of research for reviewed publications

In terms of a typical gamification article that we reviewed, it utilizes a survey in the educational/training area conducted with individuals (university students) and measuring immediate outcomes. The system provides game elements of feedback and rewards which result in competition dynamics. The typical theoretical perspectives are the technology acceptance model (TAM) (e.g. Pillai and Mukherjee 2011, Wang and Scheepers 2012) and flow theory (e.g. Browne et al. 2014, Hamari and Koivisto 2014). Other theoretical lenses include goal-setting theory (e.g. Landers and Landers 2014, Mutter and Kundisch 2014) and hedonic theory (e.g. Wang and Scheepers 2012, Wu and Holsapple 2014). In terms of outcomes, immediate outcomes of engagement and longer-term outcomes of performance predominate.

In sum, our assessment of typical articles highlights the large gap in research of potential relevance to organizations – that is, there is little research outside of the individual training area. Consequently, more research is needed on employees interacting with group systems resulting in collaboration dynamics and longer-term behavioral outcomes.

Discussion

This review examined journal articles studying gamification. Unlike previous reviews, we also searched for related concepts and developed a more fine-grained framework to describe gamification elements. We now turn to a more detailed comparison between gamification and related concepts, and then move on to critique the gamification literature more generally and suggest areas for future research.

Game Elements Compared to Related Design Principles

After having compiled a comprehensive list of game design elements, we can now compare the most important of these against design principles for intrinsically motivating, persuasive and hedonic software. As Table 4 shows, there is considerable overlap. This is particularly true for intrinsically motivating systems: each of the features proposed by Malone (1981, 1982) can be covered by at least one game design element within gamification. This is also true for hedonic systems: again, each of the hedonic design principles can be mapped onto at least one gamification design element. Gamification also matches most persuasive design principles well. However, many of the persuasive systems design principles, being a larger area of focus, do not relate to gamification (e.g., system credibility support).

Categories	**Gamification Sub-categories** (literature review)	**Intrinsically Motivating Software** (Malone 1981, 1982)	**Persuasive IS** (Oinas-Kukkonen and Harjumaa 2009)	**Hedonic IS** (Lowry et al. 2013)
Mechanics	Feedback	Performance feedback	Tailoring Self-monitoring Suggestion	
	Representation		Personalization Similarity	
	Game advancement	Goals	Reduction Tunneling Simulation Rehearsal Reminders	
	Rewards		Social comparison Recognition Praise Rewards	Receive approval
	Others	Uncertain outcomes Randomness		
Aesthetics	Sensory	Sensory curiosity	Visually attractive	Multiple sensory channels
	Narratives	Fantasy	Storytelling	Temporal dissociation element
	Exploration	Knowledge structures Hidden information		Discover novel things Obtain knowledge
Dynamics	User-oriented	Challenge Cognitive curiosity Skill improvement		Engage in challenge Satisfy Curiosity
	Social-oriented		Social-facilitation Competition Social-learning Social role Cooperation	Develop peer companionship

Table 4. Overlaps and Differences between Gamification and Related Design Principles

Although related design principles can be mapped onto many gamification elements, some gamification sub-categories are not completely covered. For example, the hedonic design principles put forward by Lowry (2013) do not explicitly describe elements for feedback, representation, game advancements, or number of users. This might be because hedonic systems do not require these elements in order to be perceived as hedonic. Another example concerns exploration aesthetics for persuasive systems. For persuasive systems, there often is an initial behavior and a preferred behavior at the end of the persuasion process. The process of changing from the original behavior to the preferred behavior is usually known

and does not necessarily require exploration. As a final example, intrinsically motivating systems generally do not focus on reward mechanics because they are fostering intrinsic rather than extrinsic motivation.

Our comparison suggests that the majority of game design elements found in the gamification literature can be recognized in one or more design principles from previous concepts. Taking this into account, gamification does not appear to be a novel concept, but rather a new wrapping of existing design principles. Knowing this, future researchers will need to consider the wider literature when reviewing and conducting gamification research. Otherwise, they will revert to reinventing the wheel when it comes to researching this construct.

Finally, what gamification does bring to the table is a richer framework of categories, sub-categories, and elements from the game domain, offering a larger variety of possible avenues to arrive at the designers' intended goals. It provides designers and researchers with an organized framework for creating gamified systems – and, as described next, we encourage them to consider a more complete set of possible elements and outcomes when creating and studying systems.

Suggestions for future research directions

We hope that our conceptual framework in Figure 1 and our detailed elements outlined in Table 3 will help direct future gamification research. When creating this table, we found that authors often confuse game elements, dynamics, users, and outcomes, and use terms inconsistently. For example, we saw the term 'level' being used to represent: (a) the structure of the game in terms of progressing to higher levels (a mechanic element) and (b) the interaction of the user with the system (a dynamic), in terms of skill using the system (e.g., novice, master). We hope that our table will assist researchers in using terms more consistently in the future.

In our review, we noticed many areas to help direct future research. Table 5 illustrates research avenues based on our proposed gamification framework and presents several other general research gaps surrounding the topic of gamification. For example, studies generally focus on only a few game elements, such as points and competition. This is no surprise, as these popular elements are easily implemented and are often associated with games. In fact it seems that many researchers equate scoring systems with gamification. However, this is what Nicholson (2012) calls 'meaningless gamification' and Kapp (2012) calls 'structural gamification' – that is, tacking game elements onto non-game systems. In contrast, these researchers have called for 'meaningful' (Nicholson) and 'content' (Kapp) gamification, in which the game elements are integrated into non-game systems.

We hope that our review will also encourage gamification researchers to study novel elements, such as gifting to others, and other appropriate elements from the wider gaming literature (like timing advancement mechanics). Another potential research avenue is to look in more detail into the role of technology in gamification. Researchers could investigate technology as the means to implement gamification, asking for example, whether certain technologies are enabling or merely facilitating gamification.

Many other research questions arise concerning game elements: are certain elements or combinations of elements more effective? Should certain combinations always occur or never occur together? Should certain elements be avoided in organizational systems? To this last point, we observed that there is a trend towards using public displays of progress and rewards, like leaderboards and badges as mechanic elements. Accordingly, the most popular dynamic elements are challenge and competition which directly arise from these mechanics. These gamified systems can be harmful in that they encourage individuals to perform behaviors only when they are rewarded for doing so (Nicholson 2012). Although some developers understand this (e.g., Blaney, 2015), many do not. Instead, organizational researchers should be investigating gamification elements that increase intrinsic motivation for individuals and that encourage collaboration rather than competition. We point readers to Nicholson (2012), who describes a set of potential theories to address this issue.

Gamification Area	Findings from literature review	Future research directions
Framework: Mechanics	The majority of gamification studies focus on "traditional" game elements, such as points and competition.	Move away from competition and towards cooperation. Focus on other novel game elements, such as gifting and timing, and compare them to traditional game elements.
	Usually, only a few (and often the same) game elements or combinations of elements are studied.	Instead of looking at the effects of the same elements, they should be compared against each other: are certain elements or combinations more effective? Which ones work well together, which ones do not?
Framework: Technologies	Technologies, especially websites and learning software, are the target of gamification applications.	Instead of treating technology as the target, investigate technology as the means to implement gamification: is it an enabler or a facilitator?
Framework: Individual Characteristics	Most studies utilize students.	How does gamification fare with other demographic groups? Particularly, gamification for employees and consumers should be studied to gain more knowledge of gamification in an organizational context.
	Most studies investigate gamification applications intended to be used by individuals.	Does gamification work better or worse when implemented and targeted at groups? Are the outcomes different when groups are playing against groups instead of individuals competing against individuals? What is the role of relatedness?
Framework: Immediate Outcomes	How do extrinsic and intrinsic motivation interact to create immediate outcomes?	Are there crowding out effects?
General: Disadvantages of Gamification	Gamification is generally perceived as a positive phenomenon.	What are the downsides to gamification?
General: Task	Most gamification applications are in education and training.	Extend research to other organizational applications. Examine the potential of task-gamification fit.
General: Similarity to other concepts	Gamification is quite similar to related concepts of hedonic, persuasive and intrinsically motivating systems.	Can gamification provide more knowledge when applied to areas which, up to now, have been investigated with related concepts?

Table 5. Findings and Potential Research Opportunities

Most of the reviewed studies utilized students and studied their immediate outcomes. Although students are easier to access than employees, we encourage researchers to study gamification with consumers and employees over the longer-term: if, as Gartner (2011) predicts, gamification is growing within organizations, then we need to study users in organizational settings. We also need to more carefully consider user characteristics – although researchers point to the importance of individual differences, they rarely measure them. Some constructs that might be particularly appropriate to consider are self-efficacy (which could interact with goal mechanics), sensation-seeking (which could interact with aesthetic elements), technology experience (which could interact with technology elements), need for affiliation (which could relate to cooperation dynamics), and so on.

As described earlier, our literature review shows that the majority of gamification studies occur at the individual level, with individuals competing against other individuals. In terms of theories used to study gamification, they also predominantly occur at the individual level, and cover the gamut of expected theories like flow (e.g., Browne et al. 2014) and TAM (e.g., Childers et al. 2001). Given that gamification can encourage collaboration and fellowship, it is surprising that there are not more studies investigating gamified applications for groups and entire organizations. Although we cautioned earlier against encouraging competition between individuals, competition between groups has shown potential in organizations. Thus, we encourage researchers to draw on group-level theories to study gamified systems. To do so, we suggest that researchers draw on group-level theories for gaming in particular (e.g., Tan and Zizzo 2008) and organizational groups more generally (e.g., Nijstad and De Dreu 2012; Park et al. 2013; Sarker and Valacich 2010). For instance, research has demonstrated that relatedness, or the need to identify with others, relates to intrinsic motivation (Ryan and Deci 2000) but it has received little attention in gamification research (Liu and Santhanam 2015).

Future research should also investigate the interplay of extrinsically and intrinsically motivating game elements in affecting outcomes. Both types of motivation can be present in a gamified system, but as described earlier, extrinsic motivation has been shown to negatively affect intrinsic motivation (e.g. Benabou and Tirole 2003, Ryan and Deci 2000). For example, crowding out effects, or the undermining of intrinsic motivation by externally mediated rewards (Deci 1971), has been investigated in other contexts (e.g. Frey and Oberholzer-Gee 1997, Frey and Jegen 2000): it is likely that certain game elements, such as public feedback, would be subject to crowding out effects which in turn can affect gamification's outcomes.

In the reviewed studies, many viewed gamification as positive; however, little research has examined its potential downsides such as the misalignment of mechanisms with individual user characteristics, which can cause unintended, negative consequences. Furthermore, as described earlier, organizational researchers need to be cautious with the use of public displays of individual progress. Another downside concerns the over- or under-use of these systems. Some gamified systems will become addictive like games, such that employees spend too much time interacting with them to the detriment of their other work. On the other hand, if some employees believe that gamification in the workplace is inappropriate, then they may be hesitant to use these systems. These and other potential downsides of gamification need further study.

Many of the reviewed studies focus on education and training. We encourage future research to go beyond this application and examine how gamification can help organizations in other critical areas, such as users' IS continuance intentions (e.g., Hamari and Koivisto 2013) or employees' environmentally responsible behaviors (e.g., Corbett, 2013). For example, Gartner encourages organizations to use gamification to deepen employee engagement in sustainability programs, yet little research has addressed this critically important topic (Mingay and Geschickter 2012).

In addition to going beyond the tasks of education and training, the fit between the task and gamification should be examined. That is, future research should consider whether the choice of gamification elements should be coupled with the task such that a match occurs (Liu and Santhanam, 2015).

Finally, we encourage researchers to integrate the current gamification literature with the related research areas of hedonic, persuasive, and intrinsically motivating systems. By doing so, we can create a stronger research agenda that draws on the strengths and knowledge from each of these areas.

Conclusion

By comparing gamification with related concepts, our work contributes to research in four ways. First, we demonstrate that gamification is a new label for similar research areas that have existed for decades. Second, by compiling a comprehensive list of gamification design elements, we not only identified elements that need more research, we also were able to conceptualize a framework. This framework is more comprehensive than previous ones as it introduces sub-categories of elements, distinguishes gamified system characteristics from user characteristics and dynamics, and explicitly takes immediate and longer-term outcomes into account. Third, we hope that our suggestion for the use of consistent terminology will be embraced and will help to consolidate this research area and move it forward. Finally, we point out gaps and potential future avenues for gamification research in the information systems discipline.

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