



A Systematic Literature Review of Qualitative Gamification Studies in Higher Education

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Abstract. Gamification can heighten student motivation and make learning more engaging. Several literature reviews focus on the effects of gamification; however, no work to date has been done that exclusively examine qualitative studies in higher education. In this paper, we systematically review existing literature on gamification in Information Systems (IS) research to identify qualitative topics studied. We synthesise relevant studies with the concept of an information ecology to show how important sociocultural dimensions and participatory design are for sustainable and successful gamification in higher education. We deploy Hermeneutics as a theoretical lens. The hermeneutic circle, in particular, allows us to understand a complex ‘whole’ of a gamification information ecology from presuppositions about the sociocultural dimensions of its ‘parts’, and their interconnectedness. The paper furthermore argues for iterative methodologies to assist designers, practitioners and users to co-evolve towards a sustainable gamification solution. Iterative methodologies typically take highly participatory and cyclic approaches that allow stakeholders to systematically investigate and develop effective and sustainable solutions.

Keywords: Gamification · Information ecology · Information systems

1 Introduction

Werbach defines gamification as “the process of making activities more game-like” [1]. Gamification practitioners typically extract game elements (e.g. points, badges, leaderboards) customarily found in digital games, and transfer them to education, business and health contexts to increase user engagement with certain underlying activities [2]. In IS education, and education in general, the primary purpose of gamification is to foster similar engagement and motivation which game players have towards games in learners and their approach to classroom learning [3]. We seek to advance our understanding of gamified learning by systematically reviewing gamification related research in Information Systems (IS). We frame this review within the concept of an information ecology. An information ecology is “a system of people, practices and values and technologies in a particular local environment” [4].

This paper focuses only on IS studies that used qualitative research methods to gamify educational information systems. The reason behind this is to illuminate user

experience. Qualitative research tends to focus on social, cultural and subjective experiences [5]. We proceed as follows: In the following section, we justify the systematic review of only qualitative gamification studies. We then discuss Hermeneutics – the theoretical framework of this paper. We proceed with a systematic review of qualitative studies of gamification in higher education.

2 Background

2.1 Information Systems as an Organisation Function and a Scientific Discipline

To justify the systematic review of only qualitative gamification studies in IS education, we start by defining the term ‘information systems’ to provide a clear target for the systematic review related to IS studies. There is a lack of consensus on the ontology of the term information systems, both as an organisation function and as a science. Lee [6] finds the interchangeable use of the term information systems with other similar terms problematic. Information and communication technology (ICT), for example, is often used synonymously with information systems where both terms refer to ‘the computer’.

For Lee, views that overemphasise the ‘technical’ are incomplete because they seem indifferent to reciprocal transformational exchange that unfolds between technical systems (i.e., ICTs) and social systems (i.e., users and organisations). According to Lee, this transformational interactive relationship denotes information systems as an organisation function. Similar to how information requirements of a social system inform a technical system, there are user needs that the technical systems require to support the social system. Following the design and implementation of a technical system to avail information to the social system, the technical system itself would be altered. The altered state would instigate new and different user needs for the social system to satisfy.

Lee’s [6] description of the dynamism of an information system lays common ground for the topic of information ecosystems. If one considers the specifications Nardi and O’Day [4] attribute to information ecosystems, information ecosystems and information systems share an array of convergent theories and practices. In light of the above, we assert that for a gamification system to satisfy students’ learning needs, new learning goal requirements might emerge for the gamification technology to fulfil. Thus, research needs to incorporate student views, attitudes and perceptions in a local context to meet learning needs via gamification. By considering the nature of qualitative research, we advocate the use of its underlying epistemological principles to examine student needs to support an effective gamification system and vice versa.

In light of the preceding discussion, the term ‘information’ suggests that it cannot be compartmentalised as either the technology or the social system [6]. Lee [6] suggests a third system, namely the ‘knowledge system’, to be added to the technology and social system. In terms of the properties, behaviour and design of a knowledge system, researchers can choose from a wide selection of bodies of knowledge, which include Sociology, Phenomenology or Hermeneutics, among many others. These bodies of knowledge typically focus on the interpretation of social phenomena [6].

Sociocultural and contextual aspects are indeed pertinent in the play of games. Prior learning experiences, for example, can affect player performance, depending on when and where they learned to play a game, as well as the number of times they have played the game before [7].

2.2 Methodological Deficiencies in Gamification Research

The pertinence of gamification in IS is apparent given that most gamification strategies will involve the development or use of an information system. IS is regarded as an interdisciplinary field [8]; by implication, researchers consult methods distinct to both the natural and social sciences to study gamification [3]. Most studies explore gamification via post-positivist methods [9], which are typically located within the natural sciences [10]. In terms of post-positivism, science is viewed as not certain but dependent on many contingencies; post-positivists explore these contingencies to comprehend social reality better [11].

Post-positivists argue that science can suggest rational hypothesising about a phenomenon by joining logical reasoning with empirical observation [11]. This approach advocates methodological pluralism, i.e., both quantitative and qualitative methods are used. While positivists believe objective reality can be captured and understood, post-positivists argue that truth can never be discovered; evidence is always fallible. Similar to positivists, post-positivists formulate a hypothesis from theory and seek a causal relationship using experimentation and correlational studies. However, with the data collected, post-positivists either support or refute a theory which is then followed by revisions and additional tests [5].

Post-positivists furthermore argue for the inclusion of participants' multiple perspectives [12]; hence they – similar to mixed methodologists – will additionally use qualitative research methods such as interviews to build on their results. Post-positivism and mixed-method research differ insofar as post-positivists use quantitative methods to analyse qualitative data. For instance, content analysis is harnessed to quantify thematic descriptions via frequency rates [13]. This is why Creswell [5] does not consider post-positivism as a philosophical tradition in its own right, but merely as an extension of positivism because its assumptions are more orientated towards quantitative research than qualitative research.

As an example, results from the experiments that Hamari [14], Cheong, Cheong and Filippou [15] and Nehring, Baghaei and Dacey [16] conducted show that the implementation of digital game elements improves student performance. Conversely, Domínguez et al. [17] and Frost, Matta and Macivor [18] – also using experiments – report that a digital gamification strategy did not affect student performance. In light of these incongruent results, Vermeulen, Gain and Marais state that “the fact ... that we expect players to behave as we intend, suggests that our assumptions are flawed” [19].

Post-positivists furthermore seek reproducibility of results to generalise findings (external validity) to a larger population [5]. In a gamification context, this principle is rejected by Bogost [20], who questions the anticipated reproducibility of game elements: “This rhetorical power derives from the “-ification” rather than from the “game”. -ification involves simple, repeatable, proven techniques or devices: you can

purify, beautify, falsify, terrify, and so forth. -ification is always easy and repeatable” [20]. Landers et al. [21] view these remarks as an oversimplification within post-positivism.

Landers et al. [21] defend the positivist perspective on the impact of social constructs (variables) on gamified learning. Social constructs denote gender, age, race, income and other socioeconomic or sociocultural factors. Post-positivists view these constructs as constituent parts which may ‘probably’ affect the outcome of results. Because of the stance that truth is fallible, and that science cannot definitively prove cause and effect, post-positivists prefer the terms *probable causation*. Post-positivists would typically attempt to control and isolate these variables [21]. Moreover, they might conduct interviews to shed more light on a social construct. This, however, still leaves interpretivists dissatisfied; they maintain the view that social constructs such as race and gender are too dynamic and complex to be quantified or explained statistically [12].

3 Aim of the Study

Few studies have explored the sociocultural views that users, and particularly students, have of gamification [9]. We intend to address this gap by exploring the information ecology of gamification in higher education. We ground the forthcoming analysis in the primary research question: How do qualitative IS studies approach gamification implementation within an information ecology? To address this question, we undertake a systematic literature review to determine what evidence-based gamification research with qualitative methods has been conducted.

4 Theoretical Framework

We regard Hermeneutics as an appropriate ‘lens’ for interpreting the information ecology of gamification. Hermeneutics initially dealt with the interpretation and reinterpretation of biblical texts [22]. Gadamer [23] extended Hermeneutics to contribute to the understanding of human behaviour and social phenomena [24]. For Gadamer, the hermeneutic circle lies at the foundation of interpreting social phenomena – it involves a dialectical, interpretational relationship between the ‘whole’ and its ‘parts’.

In Gadamer’s [23] hermeneutic view, human values and meanings reside inside people who project them into the world and that varies across cultural groups [25]. For interpretive researchers, a preliminary understanding of social phenomena is positioned as the parts. The whole consists of cohesive meanings that are produced from interaction between them [24].

Klein and Myers [26] discuss how Hermeneutics can be used to interpret text analogues (e.g. organisation culture), improve systems development, and assess how technologies are adopted and how they impact society and organisations after implementation. Within the scope of this paper, an information ecology of gamification represents the whole. Our goal is to attain a more comprehensive understanding of this ‘whole’ by engaging in a pre-understanding of its parts.

As Nardi and O'Day [4] state, “an information ecology is a complex system of parts and relationships”. Coevolution, keystone species, system, diversity and locality denote the strong dependencies and interrelationships among the different parts of an information ecology. We seek to conceptualise and develop new IS knowledge of the mentioned parts that typify gamification practices.

5 Systematic Literature Review

Systematic literature reviews are used as follows: to summarise prevailing evidence regarding a phenomenon or technology, e.g., in the context of this paper, we summarise existing empirical evidence on qualitative research on gamification practices; identify gaps in current literature in order to propose areas for future research; and to give a background in order to fittingly locate novel research activities. Systematic literature reviews, however, are also means of supporting or contradicting theoretical assumptions. We argue for the importance of those social and cultural factors that affect the adoption of gamification [26].

5.1 Resources and Search Criteria

To increase relevance in identifying primary studies, we applied selection criteria. Kitchenham and Charters [26] describe selection criteria as a multistage process of including and excluding found studies based on certain conditions. From the onset, we limited our focus on papers published from the year 2010. This follows from Thiebes, Lins and Basten's [27] observation that 2010 is the year that gamification studies began to appear in reputable journals from related domains such as education, IS, and technology-based teaching and learning.

Furthermore, our review is limited to evidenced-based gamification studies within the boundaries of the IS discipline. According to Webster and Watson [28], primary contributions to a discipline are likely to be contained in leading journals. We started by conducting a keyword search in top-ranking IS journals. To cover a broad set of papers, we queried the search string “gamif*”. We surveyed eight IS journals, which, according to the Association for Information Systems (AIS) [29], are rated as the top eight journals in IS.

These journals, listed from highest to lowest ranking, are the Management Information Systems Quarterly (MISQ), Journal of the Association for Information Systems (JAIS), Journal of Strategic Information Systems (JSIS), European Journal of Information Systems (EJIS), Information Systems Journal (ISJ), Journal of Information Technology (JIT), Journal of Management Information Systems (JMIS), and Information Systems Research (ISR). To broaden the reach and strengthen the dataset for analysis, Webster and Watson suggest that researchers also examine “conference proceedings, especially those with a reputation for quality” [28].

We decided to confine our search to conference proceedings in the AIS electronic Library (AISEL) and the Association of Computing Machinery (ACM) Digital Library. We discarded papers based on the following exclusion criteria: papers not written in English [30]; papers which are a keynote, panel discussion, book chapter, book,

dissertation, work-in-progress, review, editorial, or workshop [31]; papers which do not contain the “gamif*” search string in the title, keywords or abstract [27]; papers that focus on serious or full-fledged games [27, 31]; studies of papers not conducted within a higher education context [27].

5.2 Database Searches

The journals contained little gamification research, lacking especially focus in educational settings. We therefore decided to include the Computers and Education (C&E) and Computers in Human Behavior (CHB) journals hosted in the ScienceDirect database and published by Elsevier (cf. Table 1). We subjected these papers to further exclusion criteria. Papers containing no empirical studies on gamification were not included [27]. Here, we draw on Vermeulen et al.’s [19] inference that theories and methodologies suggested so far do not align with the complexity of practical gamification phenomena – hence the incongruent findings in gamification studies conducted within positivist philosophy. Based on the inference above, we eliminated all papers which used quantitative and mixed-method data collection approaches. The exclusion criteria, hence, allowed us to select papers based on the following inclusion criteria: papers on gamification published in the identified journals and conference proceedings; studies that used purely qualitative methods to collect empirical data; studies conducted in higher education.

Table 1. Publications in selected journals and conferences from 2010 to 2019.

Journals/Conference proceedings	2010–2011	2012–2013	2014–2015	2016–2017	2018–2019	Total
MISQ	0	0	0	1	0	1
JAIS	0	0	0	0	1	1
JSIS	0	0	0	0	1	1
EJIS	0	0	0	0	0	0
ISJ	0	0	0	0	0	0
JIT	0	0	0	0	0	0
JMIS	0	0	0	1	0	1
ISR	0	0	0	0	0	0
C&E	0	1	4	6	10	21
CHB	0	1	4	23	8	36
ACM	3	40	78	60	56	237
AISeL	0	5	16	36	18	75
Total	3	47	102	127	94	373

5.3 Concept Classification Scheme

To summarise the relevant articles, we used Webster and Watson’s [28] concept-centric matrix. The authors maintain that concepts organise the framework of a review. In the ambit of this study’s hermeneutic underpinning, we map the parts of Nardi and

O'Day's [4] (cf. Table 2) information ecology to Webster and Watson's [28] concept-centric matrix to analyse relevant papers (cf. Table 3). We then proceeded by reading each relevant paper thoroughly and synthesising them to the concepts (parts) of an information ecology.

Table 2. The parts of an Information Ecology [4].

Parts	Description
Diversity	Reference diverse sociocultural dimensions of technology use
Locality	Users should have the agency to claim technology to be designed according to their needs
Keystone species	People who possess unique skillsets to support the proficient technology use
System and coevolution	Interrelationships among an information system's different constituents are important; via an iterative process, these constituents jointly reflect on how changes might affect the information ecology

Units of Analysis. Webster and Watson [28] suggest that reviewers isolate concepts by 'unit of analysis' because a concept might have a different meaning when considered from different levels of observation. We subcategorised each concept with sub-concepts. Strong concepts evident in locality and diversity are 'design' (D), 'use' (U) and 'social or cultural engagement' (S&C). Although not explicitly stated by Nardi and O'Day's, we assign an 'iterative process' as a subcategory to the coevolution concept. 'Participatory design' is positioned as a subcategory for keystone species, signifying the inputs of various other parties other than system designers for the sustainable use.

Table 3. Concept matrix supplemented with units of analysis (adapted from [29]).

				Concepts							
				Diversity			Locality		System and coevolution		Keystone species
				Units of analysis							
Citation	Journal/Conference	Publisher	Year	D	U	S&C	D	U	S&C	Iterative process	Participatory design
[32]	SIGUCCS	ACM	2013	x	x		x	x			x
[33]	C&C	ACM	2015		x		x	x			
[34]	PerDis	ACM	2015		x			x	x		
[35]	AMCIS	AIS	2018		x		x		x		x
[36]	CHI	ACM	2018		x		x	x			
[9]	CHB	Elsevier	2018	x	x	x	x	x	x	x	x

6 Discussion

The review provides insight into empirical studies using qualitative methods to analyse gamification use in higher education in the IS field, published between January 2010 to January 2019. In general, few qualitative papers with empirical evidence has been published over the identified period. Table 3 illustrates only one paper published in 2013 while no papers were published in 2014. 2015 shows an increase of two published papers. In 2016 to 2017, no papers were published. 2018 shows an increase in publishing rate since 2015 – three papers. As expected, 2019 produced no papers.

6.1 Diversity

In this paper, we regard ‘diversity’ as a gamification solution to satisfy diverse learning needs by unifying multiple social viewpoints on games [9]. We reconcile this inference with Klein and Myers’s hermeneutic [24] Principle of Multiple Interpretations in IS research. This principle denotes that IS research should support inquiry into multifaceted issues raised by the take up of digital technologies [37]. As expected, the qualitative data collection techniques used in all found studies produced diverse participant perspectives. It appears that diversity in gamification research is broad and depends on a study’s research purpose. The majority of the found studies focused on the use of game elements.

But because IS is a transdisciplinary field, it is apt for providing insight into a specific problem from multiple perspectives [8]. This is consistent with information ecology’s emphasis on the design of a system for diverse user needs. For example, Wallis and Martinez [32] compare open source gamification platforms with commercial gamification platforms; commercial systems might provide better technical support, but an open-source platform allows practitioners to customise gamification according to the needs of their users.

In terms of usage, Wallis and Martinez [32] only seek diverse perspectives on the use of the game component, badges; Kaiser and Schmitz [34] elicit diverse views on avatars and points; Van Roy et al. [36] uncover views on points and badges. Different to these studies, Talaei-Khoei et al. [35] analyse diverse views on the game dynamic, ‘competition’ between teams. Aldemir et al. [9] investigate diverse perspectives of both game components as well as game dynamics.

6.2 Locality

We perceive ‘locality’ in the context of gamification as designers or practitioners who apply gamification in a specific context, and where social and cultural views are incorporated in different learning contexts [27]. We revert to Klein and Myers’s [24] Principle of Multiple Interpretations in IS research to draw a correlation with Locality. The Principle of Multiple Interpretations denotes multiple interpretations involving multiple social agents, and in addition, an examination of the role of social context.

Surprisingly, all studies, except Aldemir et al. [9], neglected to address the social dimensions of gamification use. This is because of their choice of gamification strategies, which lack social features and exclude the social dimensions of gamification.

Understanding social views and social experience allowed Aldemir et al. [9] to appropriate game elements pertinent to learners' contexts. For example, the course structure followed the narrative (a game dynamic) based on the popular cultural phenomenon, the Harry Potter series.

6.3 Keystone Species

We identify system designers, practitioners (educators) and users (students) as essential role-players in the information ecology of educational gamification. We posit that collaboration between these 'species' is important for the implementation and use of an effective gamification system. The aforementioned postulation is based on Nardi and O'Day's [4] emphasis on participatory design of digital artefacts to improve the success of technology in a local context. We frame the concept of Keystone Species within Klein and Myers's [24] Principle of Interaction between the Researcher(s) and the Subjects in IS research. The principle holds that interpreters of technology-related phenomena interact with social actors who experience the phenomena as a means for co-interpretation and -analysis. This principle furthermore allows the interpreter to gain profound understanding of the views of social actors.

Three studies [9, 32, 35] contained elements where both instructors and students contributed to the implementation of gamification. Moreover, in these studies, open-source gamification platforms are used which give its users agency to customise game elements according to their needs. We do not foresee the direct involvement of system designers in the participatory design. Instead, we argue that their involvement in the form of technical support and the provision of customisable functions for a localised, user-centred gamification strategy is sufficient.

6.4 System and Coevolution

In the discussion of Keystone Species, we highlighted how collaboration is important for a sustainable gamification system. Once-off collaboration, however, might not be sufficient. Sustainability of an information system requires an iterative process to deal with systems that are undergoing changes. Thus, participatory design could require engaging many and even endless iterations to coevolve user needs and system changes, and vice versa [4].

Klein and Myers [24] advance the hermeneutic circle for qualitative IS research because of its iterative nature, i.e., moving back and forth between the whole and parts. We therefore suggest methodologies such as Participatory Action Research and Design Science Research, for they are iterative in nature and sound research strategies in IS [10]. Aldemir et al. [9] are the only researchers who made use of an iterative process, namely the 6D gamification design framework (cf. [38]), to refine the gamification process with all stakeholders and to deal with changes in the gamification system.

6.5 The Information Ecology of Qualitative Gamification in IS: The Whole and the Parts

We drew from the principles of Hermeneutics to determine the present role of gamification in the information ecology of institutions of higher learning. We posed the following research question: How do qualitative IS studies approach gamification implementation within an information ecology?

First, qualitative gamification in IS emphasises the importance of analysing the needs of students based on diverse sociocultural factors that affect students' learning capability. Second, qualitative IS research places prominence on an information system's ability to be highly adaptive and customisable in order to meet learning needs. Lastly, gamification solution designers should support and collaborate with instructors and students in an iterative process to sustain its ongoing use (cf. Fig. 1).

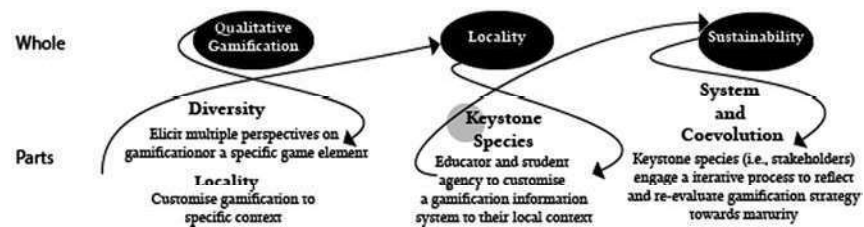


Fig. 1. Hermeneutic interpretation of a gamification information ecology (adapted from [40]).

7 Conclusion

This paper reports on a systematic review of gamification research, specifically in higher education. We illustrate the potential of qualitative IS research on gamification to meet the conditions of an information ecology. However, we recommend empirical studies of gamification that combine the parts of an information ecology in a coherent manner. More research is needed to explore the sociocultural factors that influence the adoption of gamification.

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