The Business of Gamifying School Work

Perceptions of the Gamification Phenomenon and the Services and Companies Behind It

Jorge Oceja and Angel Torres-Toukoumidis

Abstract

If we think about the earliest exposure that we, as individuals, have to schedules, routines, effort, and hard work, most probably it is schooling—and elementary education in particular—that first comes to mind. Historically, teachers have tried (based on learning theory or their own intuition) to motivate students by making learning fun; however, more recently, many schools have become fascinated by the digital gamification phenomenon. This work explores the diverse perceptions of the role of this digital gamification among teachers and principals in urban schools in a city in the north of Spain trying to answer why, besides the lack of theoretical foundations, gamification software, hand in hand with the companies behind it, is colonizing classrooms. Three in-depth, semi-structured interviews with principals (who also work as regular teachers) were carried out and the information obtained was coded and represented through hierarchical trees. Then, the data provided by each respondent was compared. Principal's perceptions range from the enthusiasm of having easy access to these "free" tools, to more critical opinions on their use—from both a political and pedagogical perspective.

Keywords

gamification, elementary education, schools, teachers, playful work

Introduction

In this work, we want to determine why professionals in the educational field, who have historically used games and play to foster learning, are being seduced by companies that claim they will help them gamifying their classes. We start by reviewing academics' attempts to connect the concepts of play and work, focusing on several authors criticism toward gamification and the associated risks. We analyze why, even from a motivational perspective, gamification may present problems when used in learning processes, and we then review some of the

DOI 10.14361/dcs-2021-0109

gamification services that teachers currently use in their daily practice. Through semi-structured interviews with principals who also work as teachers in three public schools in the city of Santander, Spain, we try to understand why, besides the lack of theoretical foundations, gamification software, hand in hand with the companies behind it, is colonizing classrooms.

The use of game elements and game metaphors at work is not new, and, for many years, they have been used as a technique willing to provide productivity, performance, and customer satisfaction. Academics have failed to agree on what a game element is. The CCAE model (Conventions, Components, Actions and Emotions) (Oceja/González-Fernández, 2016: 513) tried to synthetize previous attempted classifications of game elements, such as those of Hunicke, Leblanc and Zubek (2004), Werbach and Hunter (2012) and Brathwaite and Schreiber (2008). This model distinguishes between iconographic conventions (i.e. the most commonly used elements in simplistic gamification practices), components or objectual metaphors of the real world, actions afforded to the players (including their consequences) and, finally, the emotions that they can experience. From those, conventions (which lead to experiences based on rewards and rankings that could foster different behaviours) have been the ones used most frequently. In fact, if we look at classic contributions on work productivity such as Coonradt's (1984), they advocate for bringing some of these elements (scorecards, scorekeeping, etc.) into work environments.

Besides licit attempts to take game elements to other contexts, the relationship between game practices and business has often been configured with the fundamental purpose of maximizing economic production by disguising forced labor into entertainment through superficial incentives as indicated by Kehr, Strasser, and Paulus (2018) or even by establishing entertainment as something compulsory (Mollick/Rothbard, 2014: 4) by imposing games in work environments without the workers' consent.

This trend, related to the success and progressive spread of the so-called gamification phenomenon has been seen by Idone (2016), as a manipulative strategy that may provoke behaviors opposite to those expected (Dale, 2014: 84). In fact, gamification has been relabeled with terms such as *pointsfication* (Robertson, 2010) or *exploitationware*. Bogost (2013) has referred to it as a game-based control system that leads to hidden surveillance of workers' activity and to a potential lack of motivation based on fear of job loss when not meeting the objectives of the "game."

In short, according to these critical voices, gamification practices leave out the essence of games and play, as mentioned by Huizinga in *Homo Ludens* (1949), when he highlights the feeling of joy and the acceptance of being involved in something different (and to some extent, magical) from ordinary life. Instead, they have focused on utility and efficiency, looking for cheap ways to simulate engagement with products and services so that consumers end up buying them without a second thought. Gamification usually proposes replacing real incentives

with fictional ones, such as leaderboards, rankings, and badges, to generate an illusion of satisfaction (Fuchs, et al., 2015: 10). Real incentives have a cost, but at least they provide value to both parties by generating a relationship of trust. On the other hand, fictional incentives reduce or eliminate these costs while generating traceable metrics of customer behavior based on their interactions with the services offered.

Beyond business, gamification has been incorporated into other fields, such as communication (Torres-Toukoumidis/Romero-Rodríguez, 2018: 12), health (Lister, et al., 2014: 2) and, of course, education. Even though formal schooling is among the earliest exposure to schedules, routines, effort, and hard work, historically, teachers have always tried (based on learning theory or their own intuition) to motivate students by making learning fun; however, in recent years many schools have become fascinated by digital gamification, with apps such as Kahoot (https://kahoot.com/), Duolingo (https://www.duolingo.com/), and Class Dojo (https://www.classdojo.com/) being intensively used by teachers at all stages.

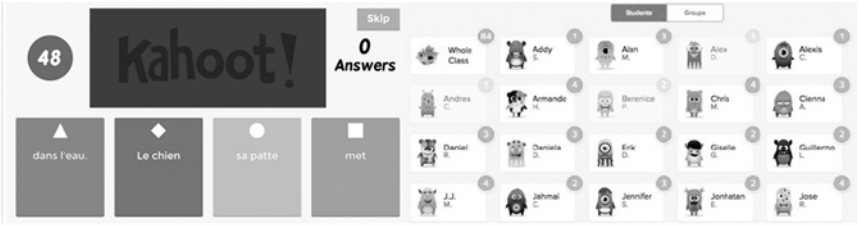
Learning theories in general and self-determination theory in particular (Deci/Ryan, 2008: 182) have shown that individuals are naturally proactive and that they are guided by some inherent needs (competence, autonomy, and relatedness) that can be fostered by providing supportive environments. In fact, theory explains that the introduction of elements that focus on extrinsic motivation (such as points and rewards) in the learning process may be counterproductive for intrinsic motivation. Toda, Valle, and Isotani (2017) have stated that gamification is not applicable in educational contexts, highlighting the difficulties of balancing the use of game elements and the objectives of academic curricula. Furthermore, there are data pointing out negative consequences of gamification, even on performance and discipline, produced primarily by the lack of long-term student engagement. In addition, Sitzmann (2011) has mentioned the pitfalls of gamification when applied in learning environments—often, the use of rewards is not realistic and differs from real-world mechanisms. Regarding methodological issues, Yefeng et al. (2011) showed that students are less interested in the activity than in the game components per se, while Dicheva, et al. (2015) have shown that many works supposedly showing successful cases of gamification do not contain valid assessment methods but only exploratory studies and speculations.

Besides the criticism, the aforementioned teachers' fascination for gamification can be seen in the success of apps such as Kahoot, Duolingo, or Classdojo, which are consistently ranked among the top 10 most downloaded apps in the field of education. As mentioned in the companies' sites "Kahoot is used by 7 million teachers globally", "Duolingo is the most downloaded education app with over 500 million total users and around 40 million monthly active users", and that "Class Dojo is used by at least one teacher in 95% of pre-kindergarten through eighth grade schools in the United States."

Kahoot, besides its origins in the university world (the first prototypes were created in the Norwegian University of Science and Technology), is a proprietary

commercial platform that allows teachers to easily create colorful quizzes and make them look like contests. Students participate in these fast-paced competitions normally through their mobile devices, and, based on the number of right answers and their speed (while frenetic music plays), the software creates real-time rankings to foster competition. All data is saved so teachers can run, through a simple interface, statistical analyses for each question or student.

Fig. 1: Kahoot and Class Dojo are among the most used apps in the classroom



Kahoot **Class Dojo**

Class Dojo has been one of the most used apps in education, especially for gamifying classroom management (García-Velategui, 2015: 11). This management platform allows teachers to create avatars for their students (in the form of little monsters) and then set up behaviors to be rewarded or punished through either web or mobile devices. The evolution of these "little monsters" can be tracked in real time by their parents who are enabled to execute a constant supervision that deprives students of privacy and eventually pushes them to work under constant surveillance. In addition, teachers can display and share students' products by adding photos and videos to the Class Dojo social network so parents can check them. These approaches towards learning have been strongly criticized as they involved risks such as the hedonic adaptation of the students (Frederick/Loewenstein, 1999: 302) or the overjustification effect of their responses mentioned by Tang and Hall (1995).

In the next sections, we present the way we have set up our study with three schools in the city of Santander by conducting in-depth, semi-structured interviews with principals who also work as teachers. Our main purpose was to explore how these professionals perceive the euphoria that schools are experiencing for these services, to understand how they interpret this phenomenon, and what implications they think it might bring about.

Methodology

Sample

This study is of a qualitative nature. As mentioned by Creswell (2011) the main idea with these approaches is not to generalize results for a population but to explore in-depth a particular phenomenon with an intentional selection of the individuals and spaces considered most relevant.

Based on the purpose of our study, we decided to work with public schools in the city of Santander and, specifically, with school principals. This decision was based on the fact that school principals in Spain, even though they do not teach a full course load, do have teaching duties. This peculiarity made them a perfect subject for our study as they combine both leadership skills and teaching experience.

Santander is a city in the north of Spain and the capital of the autonomous region of Cantabria. With a population of 171,951, it is one of the most important cities on the northern coast. It has 22 public schools that cover both pre-school and elementary education. Based on the researchers' knowledge of these centers (supervision of student teachers as part of their academic duties in the university, previous work experience coordinating educational projects, etc.), we contacted those schools where digital gamified practices had been implemented. After exchanging several mails and phone calls, we obtained the consent of three schools, each agreeing to participate in the study, whose principals were open to being interviewed by us.

The first school (School 1) is located in the city center, with most students living in the surrounding areas. It is part of a larger educational complex with two other public schools. It shares some common spaces with them, such as a playground and an assembly hall. Built in the 1960s, it has seven floors and is split into two halves (one for each school. It is an accessible building with ramps and elevators. Besides a class for each group, the school has standard facilities, such as a gym, canteen, library, speech-therapy room, physical-therapy room, music room, and computer room. There are two units for two-year-old pre-school education, six units for regular pre-school education (three, four, and five years old) and 12 units for elementary (1st to 6th grade). It has 460 students enrolled. Families of the students come from a number of different backgrounds and, generally, have average incomes. As a consequence of the increase in immigration in Spain in recent years, diversity in the school has grown, with 18 different nationalities represented by more than 60 students. Since 1986, the school has been involved in a project for integrating students with special needs. The school is very connected to its community.

The second school (School 2) is not located in the city center but in the outskirts of Santander. The neighborhood historically has had a large Roma population, and several families have been living in shacks only a few years ago. The school has

won numerous awards for its work toward inclusion and for improving the school environment by opening the school to the community, putting the students in the center of the learning process, and placing great importance on emotional education. Today, the school has around 400 students, 25% of whom are Roma, 9% are immigrants, and about 20% are students with autism spectrum disorders. It has 35 teachers and 13 units: one for two-year-old pre-school education and one unit for three-year-old pre-school, two units for regular pre-school education, and 11 units for elementary (two classes for grades 1 to 5, and one for grade 6). The school has three floors, and, on the third, there is a closed space of 400 square meters that is used as a gym and as an assembly hall. It has three playgrounds, a library, a computer room, and dedicated rooms for all the specializations: foreign language, music, physical education, etc.

The third school (School 3) is located in the western part of the city, with students coming from several neighborhoods around it. In many of these areas, the population has decreased due to the stagnant birth rate, though there has been a small recovery recently due to immigration, especially in pre-school education. Often, these students arrive with academic deficits, as Spanish is not their first language. The sociocultural level of the families can be described as average. Being in a highly populated area, the management team must overcome the lack of space for students through creativity, as the school building is very small. The school has 147 students enrolled in four units of pre-school education, six units of elementary education (grades 1 to 6), and 19 teachers, including a speech-therapy teacher and a physical-therapy teacher.

The next table describes the characteristics of these school principals, focusing on their professional background (including the subjects that they actually teach) and their personal interests.

Tab. 1: School principals (also working as regular teachers) interviewed

	Professional background	**Personal interests**
School principal 1	• Teacher since 1978 and school principal since 1987 • Bachelor in Pedagogy • Involved with ICT since 1984 (developer, trainer, etc.) • Teaches a subject on civic values in the 4th, 5th, and 6th grade	• Ecology • Human Rights • Activism and social justice • Books and cinema but always from a political perspective

School principal 2	• Teacher in this school since 1991 • School principal since 2012 • Eight previous years as head of studies • Support teacher (Math and Language Arts) in 6th grade (six hours per week)	• Sports • Cinema • Reading (all subjects)
School principal 3	• Teacher since 2003 • Experience in public administration • Experience in public teacher training centers • P.E. teacher specialist	• Sports • Educational field (even in his free time), particularly health and coexistence • Spending time with his children

Data collection

To collect data from school principals, we prepared a semi-structured interview with eight open questions grouped in four blocks: Interpretation of the gamification concept and other related terms (How would you define gamification in your own words?, How would you differentiate it (if you do so) with other close concepts such as the educational use of games, breakouts, etc.?), relationship between gamification and technology (To what extent do you think that gamification has to be mediated by technology? Can you give us examples of what you consider practices both mediated and no mediated by technology), knowledge and practice of particular experiences (What gamification experiences have you implemented, and which tools did you use?, What is your perception of the main tools used nowadays in the classroom for gamifying the learning process?) and implications of its implementation (What implications do you think that the search for responds based on rewards (as it occurs in many gamification practices) might have? What implications do you think that the extensive use of quantitative data associated with gamification might have?).

After receiving the principals' consent, we arranged the meetings and visited their schools to conduct the interviews.

Strategies for analyzing data

The three audio documents were transferred to software for qualitative analysis (ATLAS.ti, version 1.6.0 for Mac). Even though some references to concepts reviewed in the introduction of this work did appear, the process was mainly

inductive with contributions and categories emerging from the data in the line of Robinson's analytic induction (2000) or Strauss' grounded theory (1997). Even though we did not systematize the procedure with all the protocols suggested by this theory, we followed most of its main characteristics. For instance, following the recommendations of Schettini (2015), we combined an open codification where data "opens to bring to the surface thoughts, ideas and meanings" (37) with a subsequent axial coding through which we established hierarchical relationships among categories. Also, category building was influenced by constant comparison, which recommends comparing the emerging incidents with other incidents, those with categories, and categories with other existing categories.

All the data treatment was exposed to George and Apter's respondents' verification criteria (2004) by making all the coding available to them throughout the research process.

Once the hierarchical trees were created, following the recommendations of Spradley (2016), we compared the data for a better understanding of the messages provided by each respondent and for determining when data was redundant and when it differed.

Results

When approaching the term *gamification*, Principal 1 (P1) stated the need to distinguish between school practices with a deep and real idea of game/play (which have always been there and that some professionals use wisely) and the recent digital trends and services for gamifying the classroom. Regarding the first, he highlighted their value from a philosophical perspective sharing the idea that games and play can have multiple manifestations in the classroom (i.e., board games, project-based learning, etc.), which do not need to be, necessarily, mediated by technology. On the other hand, he presented a founded criticism toward the hype generated by tools such as Kahoot, Plickers, or Class Dojo, which he considered a *fashion* that puts methodologies ahead of educational goals:

> P1: "We need to look at gamification from a philosophy of technology. It seems that these kinds of fashions win teachers over, often without a critical analysis… What are we really trying to achieve through these tools?"

P1 was concerned about the implications of the extensive use of these tools. From an educational perspective, he noted that the gamification phenomenon promotes very low level learning as it works under a behaviorist lens. To him, these techniques promote rivalry and they are inefficient for dealing with today's challenges, such as working on sustainable development goals or connecting emotions and learning.

> P1: "Looking at any objectives' taxonomy (let us say Bloom's), all these would be targeting the lowest levels (knowing, etc.) being very far from creating, applying, evaluating, etc. All these tools are of a behaviorist nature: 'you answer this and I give you this'. If you have more carrots, you are better: How are these tools let us work on memories, feelings, emotions…? How are they going to quantify to what extent a child is supportive and caring?."

To him, the political and ethical implications are even more worrying. He mentioned how this phenomenon is a powerful metaphor of the widest neoliberal-capitalist context in which it is occurring. In fact, the constant demand of data (both personal data from students and data regarding their performance) was criticized, noting that it involves privacy issues and that it represents a new way of surveillance:

> P1: "[This trend] promotes a neoliberal and capitalist framework orientated toward production and data generation. Parents get constant access to what their children are doing (how many happy faces they are getting, etc.), which is a threat to students' privacy."

For Princial 2 (P2), digital gamification is an appropriate motivational strategy that can be brought to many projects through tools such as Class Dojo, Kahoot, Plickers, Snappet, or Padlet. Even though he admits that the learning experience depends on the professionals behind the tools, he justifies the enthusiasm that they generate, advocating for the need to overcome some clichés and the criticism that sometimes these tools received. In fact, when thinking about the implications of this trend, he mentioned mainly educational benefits. First, he referred to it as a method of personalize learning, which leads to students being more productive and autonomous. He also mentioned that within this autonomy, students do not see the points system as a punishment and that in many ways it has helped teachers to deal with diversity and with different learning styles.

> P2: "In our case it means, primarily, a very powerful motivational strategy… It is not that the digital is 'the present'; it has been around for too long now. Our students go from doing two or three activities in an hour, to students finishing (since the beginning of the year) more than 1000. Before, everything needed to be supervised by the teacher, but not now. It also works with many of our problematic students that cannot be seated two hours and do three or four activities in a regular way."

These advantages, in his own words, reach the teachers, who see many benefits, such as an improvement of classroom management or communication with families. Probably more important than that, P2 thought that these technologies help to overcome the Pygmalion effect, the proven fact that high expectations lead to improved performance.

> P2: "When I get in this classroom and they are working with their tablet, you should hear the silence in the room. The instant feedback calms families down, as they could track their progress. Traditionally there was an assessment by the teacher and assumptions of which could be their flaws, but, now, there is objective information based on data."

Even though P2 understood that there are businesses behind most of these services, he thinks that teachers should take advantage of their products by combining them with open educational resources and free/open source software in order to achieve real project-based learning. In general, most of the threats identified by P1 are seen as advantages by P2, who believed there is great potential in the datafication provided by these tools and on the safe spaces that they generate.

> P2: "We cannot demonize technology... We have access to educational content developed by teachers, many times through public repositories; most teachers' equipment now runs on open source [software]... Everything depends on the use of the teachers. For instance, in some cases, after using these tools, they end up uploading to Google Drive their collaborative projects. The increasing importance of data allows us to do some location-based activities using QR codes.... And everything is done under a security context: content access, teacher supervision, etc."

As we will see in the next section, in many ways perceptions from Principal (P3) represent a balance of the views previously discussed. Admitting some limitations, P3 considered gamification as an important methodology to promote students' self-esteem and that allows teachers to present content in contexts of project-based learning. Even though he referred to Class Dojo and Kahoot as useful tools, he admitted that gamification should transcend the idea of using particular services or software and that real gamification has more to do with an attitude toward the learning process.

> P3: "Here we have teachers using it in pre-school and most of them, even though they use positive and negative reinforce[ments], they do not limit their practice to that. It might help us to rethink the way that we present content... For instance I teach P.E., and I have reorganized everything around challenges. I have been working [throughout] the year on a project called 'Santander, my school'".

Other than the question of using or not using these tools, it is particularly interesting that he considered it more important to have more technology advanced schools. In this context, he noted some pitfalls, such as the lack of infrastructure, which should be solved through political consensus of the public administration instead of partisan decisions:

P3: "We talk about all these things when we have problems accessing the internet. Most times because of political situations, budgets are not ready and this has a great impact on what we can do."

As the other two respondents, he reflected on the educational implications that gamification might have. Even though he concluded that everything depends on the way that these tools are used (as they definitely allow to overcome behaviorist approaches) he insisted on the need for responsible and critical use of the increasing amount of data in education. First, he mentioned the need to surmount the naïf use of international school rankings and competitions (which they do not consider sociocultural differences) with the use of data accumulated to identify inequities and find ways to solve problems. He also remarked how data provided by these apps focus on learning outcomes leaving outside other variables, such as the perceptions that the community and students have of their teachers.

P3: "People look at the results of the semi-private schools and they think they are just better, but which is the sociocultural index of their families? New results will be out soon here in Cantabria, and it is very gratifying to see how teachers are being evaluated [by parents and students]. However, people always say, 'Look at this number in PISA.'"

Discussion and Conclusions

Urban public schools in the city of Santander are open and connected to their surroundings and, besides the interpretation of the data gathered for this work, it must be said that they all show a clear commitment to their work for the students, families, and communities.

The principals participating in this study had very different visions that ranged from great concern to optimism. Three central elements were analyzed in all of the conversations, namely their perception of gamification, the educational implications that they attribute to gamification, and the concerns about the use of data gathered by these tools.

The next table summarizes these differences.

Tab. 2: Principals' views on the main concepts covered in the interviews

	Principal 1	**Principal 2**	**Principal 3**
Interpretation	Negative (Seen as a fad)	Positive (Seen as an interesting motivational strategy)	Positive, with reservations (Seen as a relevant methodology but one that transcends particular tools)
Educational implications	Negative (Leading to simple learning through behaviorism)	Positive (Great opportunity for personalizing learning and facilitating teachers' work)	Positive with reservations (Depending on the professional behind its use, but offering opportunities besides behaviorism)
Considerations on data usage	Negative (Many risks associated with privacy issues, data transfer, and the commercialization of students)	Positive (Possibilities for working under safe environments and drawing benefits from the gathered data)	Positive, with reservations (The data usage of these tools occurs within a context of the increasing importance of data. If used wisely, it can be a tool for equity.)

The principals' visions represented three different scenarios that ranged from enthusiasm (P2) to criticism (P1), including some in-between scenarios (P3).

These different views by principals only affect daily routines in schools to some extent, as regular teachers in Spain, who are public employees, have a high degree of autonomy to try new tools and methodologies on their own. Indeed, teachers at every school had been trying these tools by personal initiative, with the exception of School 2, where the effort was more coordinated, as it was part of a school project.

We can learn some lessons from the study. First is the fact that schools and teachers are diverse and that they operate with freedom and autonomy on a daily basis. This is good news, but their practices (as with other professions) are clearly very permeable to fashions and trends. Besides *gamification*, other terms (such

as *flipped classroom*) and even some tools (like digital whiteboards) are colonizing classrooms, many times hand in hand with private companies that are constantly trying to rename or reinvent the way teachers work without any scientific evidence.

Recent research by Kynigos and Kolovou (2018) and Michos and Hernández-Leo (2020) shows that even when relying on "ready to use" software and apps might work occasionally, teachers gain huge benefits when they co-create their own educational resources. Nowadays, plenty of open-source software is available for teachers to design their own materials, from photo editing software (*Gimp*) and non-linear video editors (*Open Shot*) to content authoring tools (eXelearning). Countless options are available.

Along the same lines, the effort made by many public administrations to create repositories of open educational resources (OERs), many times containing products created and categorized by teachers themselves, offers educators a huge range of possibilities for curating high-quality content.

As in most cases, common sense and balance are good. Of course, teachers deciding to use particular apps for creating a quiz and generating quantitative grades faster is acceptable. However, a certain degree of awareness should be demanded from such an important group of professionals, at least regarding risks of homogenization, mid- and long-term monetization, and the data usage made by these companies.

Even though several authors have explored to what extent classes and schools are being gamified through companies such as Kahoot or Class Dojo, this work is one of the first attempts to explore how teachers (specifically teachers that also work as principals) perceive this phenomenon. We think that the scarcity of data is due to the diversity of teachers' educational and political positions. Thus, it would be interesting to continue gathering data (even quantitative) from more principals and, on the other hand, extending this same data collection to regular teachers that are using these tools in their daily practice. In fact, based on the data obtained in this work, we are adapting the instruments to proceed as mentioned.

To a certain extent, we were surprised by the paradox of a profession, historically linked to games and play, becoming so fascinated with commercial services that, under the appearance of games, it reintroduced behavioral methods to education. Even though the vision of these principals helped us to qualify this perception, we think that it is important to keep exploring the success of software that, instead of focusing on content creation or on methodological innovation, is used primarily for evaluation purposes. In a context where standardized tests and policies (*PISA* reports, *No Child Left Behind*, and the subsequent *Every Student Succeeds Act*) have received greater focus in schools, these apparently innocuous software packages and the companies behind them are colonizing the classrooms with colors, frenetic rhythms, and a promise of *entertainment*. As one of the principals mentioned, the question remaining is how these tools are going to let us work through emotions, feelings, and memories. In his own words, "How are these tools going to quantify to what extent a child is supportive and caring?"

References

Brathwaite, B./Schreiber, I. (2008): Challenges for Game Designers. Cambridge, MA: Charles River Media.

Bogost, I. (2013): "Exploitationware". In: R. Colby/M. Johnson (eds.), Rhetoric/composition/play through video games. New York: Palgrave Macmillan, pp. 139–147.

Coonradt, C. (2012): The Game of Work. Utah: Gibbs Smith.

Creswell, J. W. (2011): Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research. Boston: Pearson.

Dale, S. (2014): "Gamification: Making work fun, or making fun of work?". Business information review 31(2), pp. 82–90.

Deci, E. L./Ryan, R. M. (2008): "Self-determination theory: A macrotheory of human motivation, development, and health." Canadian Psychology/Psychologie Canadienne 49(3), pp. 182–185. https://doi.org/10.1037/a0012801

Dicheva, D./Dichev, C./Agre, G./Angelova, G. (2015): "Gamification in education: A systematic mapping study." Educational Technology & Society 18(3), pp. 75–88.

Frederick, S./Loewenstein, G. (1999): "Hedonic adaptation". In: D. Kahneman/E. Diener/N. Schwarz (eds.), Well-being: The foundations of hedonic psychology. New York: Russell Sage Foundation, pp. 302–329.

Fuchs, M./Fizek, S./Ruffino, P./Schrape, N. (2015): Rethinking gamification. Germany: Meson Press.

García-Velategui, A. (2015): "Gestión de aula y gamificación. Utilización de elementos del juego para mejorar el clima de aula". [Final year dissertation, Universidad de Cantabria]. https://repositorio.unican.es/xmlui/handle/10902/7595

George, M./Apter, A. J. (2004): "Gaining insight into patients' beliefs using qualitative research methodologies." Current Opinion in Allergy and Clinical Immunology 4(3), pp. 185–189.

Huizinga, J. (1949): Homo Ludens; A Study of the Play-Element in Culture. London: Routledge & Kegan Paul.

Hunicke, R./Leblanc, M./Zubek, R. (2004): "MDA: A formal approach to game design and game research." In: D. Fu y J Orkin (eds.), Proceedings of the Challenges in Games AI Workshop, 19th National Conference of Artificial Intelligence.Menlo Park, CA: AAAI Press, pp. 1–5.

Idone, V. (2016): "Lude et labora. Notes on gamification at work." Performance Research 21(4), pp. 101–107.

Kynigos, C./Kolovou, A. (2018): "Teachers as designers of digital educational resources for creative mathematical thinking." In: L Fan/L. Trouche/C. Qi/S. Rezat/J. Visnovska, Research on Mathematics Textbooks and Teachers' Resources. Springer, pp. 145–164.

Kehr, H. M./Strasser, M./Paulus, A. (2018): "Motivation and Volition in the Workplace." In: J. Heckhausen/H. Heckhausen Motivation and action. Springer, pp. 819–852.

Lister, C./West, J. H./Cannon, B./Sax, T./Brodegard, D. (2014): "Just a fad? Gamification in health and fitness apps." JMIR serious games, 2(2), pp. 1–12.

Martínez-Salgado, C. (2012): "El muestreo en investigación cualitativa. Principios básicos y algunas controversias." Revista Ciência & Saúde Coletiva 17(3). Retrieved from http://www.scielosp.org/pdf/csc/v17n3/v17n3a06.

Michos, K./Hernández-Leo, D. (2020): "CIDA: A collective inquiry framework to study and support teachers as designers in technological environments." Computers & Education 143. Retrieved from https://www.sciencedirect.com/science/article/pii/S0360131519302325.

Mollick, E. R./Rothbard, N. (2014). Mandatory fun: Consent, gamification and the impact of games at work. The Wharton School research paper series. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2277103.

Oceja, J./González-Fernández, N. (2016). "Actors, Elements, and Innovative Interfaces in Game Experiences: CCAE as a Model for Analysing Game Elements." In: T. Connolly/Boyle (eds.), European Conference on Games Based Learning. Peasley, Scotland: ACI, pp. 509–514. Retrieved from https://www.researchgate.net/publication/308678482_Actors_Elements_and_Innovative_Interfaces_in_Game_Experiences_CCAE_as_a_Model_For_Analysing_Game_Elements.

Robertson, M. (2010): "Can't Play, Won't Play". Kotaku. (10 November 2010). Retrieved from https://kotaku.com/cant-play-wont-play-5686393.

Robinson, W. S. (2000): The logical structure of analytic induction. In: R. Gomm/M. Hammersley/ P. Foster (eds.), Case Study Method. London, UK: Sage, pp. 187–195.

Schettini, P. (2015): Análisis de datos cualitativos en la investigación social: Buenos Aires, Argentina: Editorial de la Universidad de La Plata.

Sitzmann, T. (2011): "A meta-analytic examination of the instructional effectiveness of computer-based simulation games." Personnel Psychology 64(2), pp. 489–528. https://doi.org/10.1111/j.17446570.2011.01190.x

Spradley, J. P. (2016): The ethnographic interview: Long Grove, IL: Waveland Press.

Strauss, A./Corbin, J. M. (1997): Grounded theory in practice. Thousand Oaks, CA: Sage.

Tang, S.-H./Hall, V. C. (1995): "The overjustification effect: A meta-analysis". Applied Cognitive Psychology 9(5), pp. 365–404. https://doi.org/10.1002/acp.2350090502

Toda, A. M./Valle, P. H./Isotani, S. (2017): "The dark side of gamification: An overview of negative effects of gamification in education." In: A. Iona Cristea/I. Bittencourt/F. Lima (eds.), Researcher Links Workshop: Higher Education for All. Springer, Cham, pp. 143–156.

Torres-Toukoumidis, A./Romero-Rodríguez, L. (2018): Gamificación en Iberoamérica. Experiencias desde la Comunicación y Educación. Ecuador: Abya-Yala

Yefeng, L./Alexandrova, T./Najima, T. (2011): "Gamifying intelligent environments". International ACM Workshop on Ubiquitous Meta User Interfaces. Retrieved from http://www.dcl.info.waseda.ac.jp/~yefeng/yefeng/pubs/2011/ubimui11_yefeng.pdf,

Werbach, K./Hunter, D. (2012): For the Win: How Game Thinking Can Revolutionize Your Business. Philadelphia, PA: Wharton Digital Press.