

Why and How Gamification Contribute to Information Systems Success in the Workplace: An Action Research Enquiry in B2B

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Abstract

Despite years of rich academic production of research on information systems success, companies are still struggling to achieve expected return from their internal Information System (IS) implementations. Billions of euros are spent in projects, which too often fail to deliver the expected returns on investments (Nelson 2005). In the meantime, researchers have noticed that the game industry is able to tap into human psyche to get players to engage voluntarily with some unparalleled intensity and duration (Przybylski, Rigby, and Ryan 2010). In this context there is growing interest on how organizations can learn from gaming to foster similar levels of interest, enjoyable experience and commitment in non-gaming IS (Robson et al. 2015).

Initially emerged in digital media industry before becoming an academic topic (Deterding et al. 2011), the concept and practice of Gamification consist in applying game elements to utilitarian applications. This paper examines how gamification of utilitarian information systems in B2B can contribute to achieve greater benefit from IS investment. More specifically, it aims to answer the following questions: how does Gamification impact utilitarian IS success? What roles do motivation levers play in that process? What are the design principles for effective gamification of utilitarian IS? For this purpose, we used a 2 cycles Canonical Action Research design to introduce gamification features in a customer relationship management software (CRM) utilized by an European Sales organization at Hewlett Packard Enterprise.

This effort resulted in conceptualization and adjustment of a research model inspired from the Information Success Model (ISM) (DeLone and McLean 2003), and Self Determination Theory (SDT) (Deci and Ryan 1985). The model highlights 4 main situated motivational affordances of gamification and clarify inter relations between concepts, resulting in description of 7 design principles.

Keywords: Gamification, Game elements, Motivational affordance, Information System Success Model, Self Determination Theory, Enhanced use, intrinsic motivation, extrinsic motivation

Synopsis

Purpose

Gamification consists in applying game elements to non-game contexts. It typically aims to drive changes in behavior and to increase user commitment and motivation towards the gamified application. An example of gamified services is Fitocracy, a gamified website that encourage users to exercise to improve their physical condition. In 2013, Gartner included gamification in his “Hype Cycle” study, bringing together the most significant technologies that have broad, cross-industry relevance, and are transformational and high-impact in potential. Gamification idea has since been spawning very rapidly in numerous sectors including education, health, sustainability, productivity, news and entertainment, for internal use as well as with customers or external users. In particular, many companies are interested in using gamification in the workplace in order to accelerate and deepen adoption of enterprise information systems, like CRMs, ERPs or knowledge management. On the well-known CRM Salesforce (SFDC) website, in April 2017, no less than 12 compatible gamification apps were referenced. Companies are struggling to achieve expected returns on investments and consider gamification as a valid option to achieve better engagement of their workers to perform more than mandatory tasks.

In this context, this paper has two main objectives. First, it aims to improve our understanding of the contribution of gamification to accelerate the adoption of enterprise information systems. Second, it aims to derive from there some design principles for practitioners willing to take advantage of gamification features to improve the engagement of system user.

Problem of practice

There is growing interest on how organizations can learn from gaming to foster similar level of interest, enjoyable experience and commitment for non-gaming applications. Many business books have been published to encourage and guide practitioners in the last years, including game experts like Gabe Zimermann (Zimermann and Cunningham 2011), founder of Bunchball gamification company Rajat Paharia (Paharia 2013) or Gartner consultant Brian Burke (Burke 2014), however their approach is often one-sided, and they emphasize the potential of gamification rather than its limits.

Their advocacy for gamification in the workplace are not fully confirmed by academic research so far. A number of empirical studies have scanned a number of gamification cases (Hamari, Koivisto, and Sarsa 2014). So far, the results of those studies suggest mostly a positive impact of gamification on the workplace. They point towards a variability of impact, depending on the context, users and challenge to sustain initial impact. There is therefore a need for further understanding the mechanisms underlying the positive outcomes of gamification, which would allow to refine the design criteria for successful implementation of gamification, in particular in the context of enterprise information systems.

Results

Based on rigorous implementation of canonical AR design, this research confirms the positive impact of gamification on several important dimensions of the information system, including information quality, enhanced use and user satisfaction, as well as the materialization of net benefits for the user and the organization.

It also offers a more detailed understanding of the psychological mechanisms explaining this impact. Specifically, it demonstrates the role of 4 attributes of gamification including team spirit, playfulness, competition and real time feedback, and their impact on intrinsic motivation. The research sheds also some lights on the condition to leverage extrinsic rewards like incentives and social recognition to increase motivation rather than inhibit it. Finally, comparing the results from the two cycles and between sites and their contexts, this work also provides seven design principles for successful leverage of gamification for utilitarian IS.

Conclusions

This paper confirms a tangible impact of gamification on information systems, generating enhanced use and improving user satisfaction. It results in greater perceived benefits at the user, manager and organization levels. This research has also confirmed the volatile nature of gamification impact. Impact on enhanced use seems to disappear when the gamification trigger stops, while the enjoyment impact remains. Gamification cannot be “switched on”, it is a managerial process that is best performing when leveraging participative style of management empowering teams to shape and control their game.

Practical relevance

For practitioners, in addition to offering an articulated explanation of the mechanisms at play with gamification, this work provides design principles shedding light on the managerial dimension of the gamification process, which can impact strongly, both negatively and positively, the success of gamification experience.

This is particularly important while companies recruit a number of young employees, born at digital age, and members of the Millennials generation and following. The design principles can help organizations to leverage gamification to improve their engagement and compliance with standards and processes. It can also help achieve greater fit between the culture and expectations of this new workforce, which will replace progressively retiring generations.

An unexpected result was the importance of real time feedback and visual representation in user satisfaction and use of the IS. Gamification can fill in a gap in traditional Enterprise Systems compared to user expectations coming from the consumer world where everything is visual and real time.

Methods

Research questions

- Question 1: How does Gamification impact utilitarian Information Systems Success?
- Question 2: What roles does motivation levers play in that process?
- Question 3: What are the design principles for effective gamification of utilitarian IS?

Research Design

Research questions are directed to solve a practical problem, leveraging well established SDT and ISM academic theories. This work responds to it through the introduction of gamification elements

in a utilitarian IS, in a specific social setting. For this, the Action Research (AR) methodology is particularly well suited for conducting this research.

The identified problem is situated in the researcher's organization. It relates to superficial adoption of SFDC CRM, limiting the benefits of this application considered among practitioners as "state of the art", user friendly, while it is expected to drive improved sales performance.

From the several variations of AR, we selected the canonical approach (CAR), which combines the rigor driven from iterative cycles with the relevance obtained through a collaborative process with the research participants (Davison, Martinsons, and Kock 2004). This research has been conducted in two cycles, the second integrating the learnings from the shortfalls of the first cycle, during a 3 years period from 2014 and 2017.

This research design implies an insider position, which has the benefit of pre-existent knowledge but becomes a filter that distorts the information captured based on pre-conceptions (MacIntosh, Bonnet, and Coghlan 2007). To avoid this distortion, we've worked in a rigorous process on the qualitative information collection and interpretation, and have also triangulated the qualitative analysis with the primary data on usage capture before and during the pilot.

Sample Size and data collection strategy

During Cycle 1, a subset of the overall team of 700 employees, including 72 participants, located in 3 locations : Erskine (Scotland), Prague, Barcelona, are in scope, with an average age of 28 years old, which is fairly representative of the overall organization which is relatively recent. In this phase, we conducted one focus group and 12 exploratory interviews with first line managers and end users. For Cycle 2, we worked with a team of 159 users across the 2 sites, fairly distributed between the 2 sites Erskine (Scotland) and Prague, while Barcelona was excluded due to limitations in the technical infrastructure. The average age was 30 years old. We have run 6 focus groups and 42 interviews during this second cycle. The total number of participants was 96, including a few individuals participating twice, at different time of the project.

Main body of paper

Practical problem

In 2014, Candy Crush revealed in his official filing, that only 2 years after its introduction, the internet game reached an average of 93 million daily active users in a month. In 2017, the global market of digital games should exceed \$100B, growing >6% per year during the period 2015-2019 as per prediction of Newzoo Games, specialized in market intelligence on the segment.

While the gaming industry attracts millions of regular users, companies are still struggling to succeed in their internal applications implementations. As per a study from ANACT conducted in France in 2013, only a third of IS projects were considered successful. According to a study by Merkle Group Inc., 63% of CRM implementations fail. The Altimeter's (2014) research shows that only half of the enterprise collaboration tools implemented in organizations are regularly and effectively used by employees.

Meanwhile, hedonic IS, developed for pleasure and enjoyment, have rapidly gained popularity among a very large and engaged audience from all ages and gender. In the gaming industry for instance, new games commonly catch the interest of millions of users in a very short time after their launch. According to the Entertainment software Association (ESA), the US gaming industry sold over 135 million games and generated more than US\$22 billion in revenue in 2014. Games are attracting players of all age, gender and social group. They are particularly pervasive among

the generation now moving into workforce. As per ESA report, 42% of Americans play video games at least 3 hours per week.

In fact, the game industry is able to tap into human psyche to get players to engage voluntarily with some unparalleled intensity and duration (Przybylski et al., 2010). In contrast, in the non-gaming IS, traditional approaches such as adoption scorecards, newsletters or management role modeling, often fall short to generate the level of engagement that an organization expects from its workforce, communities or customers. In this context there is growing interest on how organizations can learn from gaming to foster similar level of interest, enjoyable experience and commitment in non-gaming Information Systems (Robson et al. 2015).

A potential answer to this question emerged with the concept of “Gamification” which was first discussed in high tech at the intersection of the sectors of computer game, social media and cloud computing, before catching increasing interest from Academia (Deterding, et al. 2011), and generating heated debates between supporters and detractors.

Many business books have been published to encourage and guide practitioners in the last years, including game experts like Gabe Zimmermann (Zichermann and Cunningham 2011), founder of Bunchball gamification company Rajat Paharia (Paharia 2013) or Gartner consultant Brian Burke (Burke 2014), however their approach is often one-sided and emphasize the potential of gamification rather than its potential limits.

Their advocacy for gamification in the workplace are not fully confirmed by academic research so far. A number of empirical studies have scanned a number of gamification cases, and so far their results, also leaning towards a positive impact of gamification, are not consistent and pointed towards a variability of impact dependent on context, users and challenge to sustain impact over time after the initial hype at adoption. This literature lacks so far a comprehensive, solid explanation of the effect gamification and limited insight for practitioners related to conditions for successful implementation in the workplace.

Literature review

Definition and antecedents of Gamification

The first structured academic attempt to provide research-based definition of gamification (Deterding et al. 2011), based on work conducted jointly with industry practitioners and academics, defines gamification as : “ the use of game design elements in non-game contexts”.

Gamification is connected and can be seen as extension of the rich field of Game studies. Before computer age, games have been explored from an historical and sociological perspective by Johan Huizinga, who introduced the concept of “homo ludus” and positioned play as critically important to humanity and culture, and separate play from ordinary live (Huizinga 2014). Roger Caillois further discussed the importance of gaming and play to a society's culture (Caillois and Barash 1961). Caillois furthermore defined game characteristics and offered a theory of the structural complexity of games: "paidea" are freely organized games, whereas "ludus" means highly organized games.

More recently, game studies have been centered around emergence of video games and their immersive power, with the concept of “flow” introduced by Csikszentmihalyi (1996), and research in Game Design and Funology informed by practice of star game designers. This stream of research has generated a number of constructs and frameworks leading to conceptualize the “fun” quality of good games. Gamification is picking in those game elements those which can most easily

integrate in the process to gamify, like points, badge and leaderboards, but also game levels, activities under time limits or avatars.

Expanding beyond game design to the broader area of ludification of culture (Raessens 2006), defined as the manifestation of a broad evolution of western societies, where games become the dominant cultural form because they match both the evolution of the society and of information systems. As such, gamification can be viewed as an extension of 21st centuries companies mantra “ Work hard , play hard” and contribute to a more playful but productive society.

Academic research on gamification

Gamification can refer to hedonic or dual-purpose information systems in voluntary use contexts, like Fitocracy, which is expected to drive adoption and sustained use over time. The concept can as well be applied to utilitarian information systems, developed to improve individual and organizational performance.

In one of the first literature reviews published on the topic (Hamari et al., 2014), a search hit for “gamification” is catching almost no response before 2011. A growing number of papers with gamification mentioned both in the document and in the title can now be found. At the time of their search, and with relatively broad search criteria, they identified already 8050 papers or articles, including 809 peer reviewed academic papers.

Empirical studies tend to confirm that gamification has an impact on several behavioral outcomes, however their validity is limited by research design weaknesses in term of samples, control groups and non-standard metrics (Hamari et al. 2014; Ferreira et al. 2017) and in the limited grounding in theory (Seaborn and Fels 2015).

Some studies concluded that the effects are not always positive or they seem to be dependent on the context or on the proficiency of the users. Similar research on gamification in different domains seems to drive to different results, which seems to make gamification outcomes very context-specific. The outcomes of gamification also seem to vary amongst individuals (Robson et al. 2015). Furthermore empirical research so far, while they suggest a positive-leaning impact of gamification, only provided so far piecemeal evidence to confirm that gamification is more than a new hype (Seaborn and Fels 2015)(Hamari et al.,2014). Some studies for example raised concerns that the result of gamification may not be long term but could be caused by a novelty effect and removal of gamification can cause detrimental effect on users engaged in the gamification experience (Thom, Millen, and DiMicco 2012). For this, there is a call for more academic research to offer a conceptual framework to better understand gamification impact and derive conditions for successful adoption, (Seaborn and Fels 2015).

While gamification, using techniques from computer gaming industry, typically relies on information technology, it has not been evaluated specifically as a lever to achieve greater Information System Success (Przybylski et al., 2010). Can gaming features like points, badge and leaderboard, which could be considered as relatively trivial, drive IS users to behavioral changes, to develop richer usage of the IT and user satisfaction and foster greater job performance and eventually contribute to IS delivering on expected return?

Positioning gamification in ISM Theory

Information System Success Model (ISM) theory defines IS Success as the dependent variable for Information Systems Research (DeLone and McLean 2003) . ISM offers an integrated model which initially articulated System Quality, Information Quality, Use, User Satisfaction, Individual Impact and Organizational impact , for better understanding of IS success determinants. In 2003, in a follow up work analyzing 10 years of empirical studies, DeLone and McLean have reviewed their original model, adding the dimension of Service Quality and introducing the variable of Net Benefits, which account for benefits at multiple levels of analysis, as the key IS success variable. Net benefits represents the IS contribution to the success of individuals, groups, organizations, or higher levels of analysis, resulting for instance from increased sales, cost reduction, or improved profit.

Gamification as such has not been taken into account in the ISM from DeLone and McLean success model specifically. However, arguably, it can be potentially be seen as a facet of “System Quality”, defined as “*the desirable characteristics of an information system. For example, ease of use, system flexibility, and ease of learning, as well as system features of intuitiveness, sophistication, flexibility and response time*” (Petter, DeLone, and McLean 2008 p238). As gamification also provide concise and timely information through real time scorecard and feedback, we expect that it will also improve “Information Quality”, while the quality is improved by the timeliness and accessibility of the information.

In a recent meta-analysis about the determinants of Information System Success (Petter, DeLone , McLean 2013), research on subjective variables have been compiled to summarize current academic understanding of the various factors of influence towards IS success. Among those, the “Enjoyment” variable, has been identified as antecedent of IS Success with strong evidence. Enjoyment is one of the expected outcome of games, and offer a potential connection between gamification and information success which I will explore in this research.

Beyond the positive feeling of enjoyment, we also look at the actual impact of gamification on IS usage. In the IS Success model, this variable is often differentiated as “Intention to Use” and “Use”. In Utilitarian IS, usage is often compulsory, and intention to use is not fully relevant, so in the context of my work I will focus on impact of gamification on usage. In order to define the most adequate usage metric in this specific context, I will leverage the recent concept of Enhanced Use (Bagayogo, Lapointe, and Bassellier 2014) to categorize different type of extension of task and feature usage.

While ISM offers a rational model to conceptualize gamification impact on IS success, it doesn't address yet the question of the motivational mechanisms at play with gamification. As gamification aims at increasing engagement in specific tasks and activity, motivation is a key concept to leverage to understand the mechanisms at play in gamified services.

Introducing SDT to explain the role of motivation in gamification

The broadest and most powerful motivation theory in the context of games and gaming is in my view the Self Determination Theory, from Ryan & Deci (Deci and Ryan 1985). Also SDT has not yet been used to analyze gamification issues as such by its authors, it has been applied to video games successfully (Przybylski et al., 2010) . It is also referred to by several gamification scholar (Hamari et al., 2014), (Seaborn and Fels 2015) for providing a solid framework to analyze how specific gamification artefacts (e.g., badges, game levels, leaderboards etc.) may impact intrinsic and extrinsic motivation of individual users and therefore behaviors. Indeed, some

Gamification elements can be related to several SDT concepts such as need for competency, autonomy and relatedness and to intrinsic and extrinsic motivation (Aparicio et al. 2012).

In order to understand the contribution of gamification to IS success, this research intends to combine ISM model and SDT theory and build a conceptual model surfacing the psychological mechanisms at play in gamification which can be leveraged to improve impact workers' motivation to use utilitarian IS. ISM provides a comprehensive understanding of IS success by identifying, describing, and explaining the relationships among the most critical dimensions of success along which information systems are commonly evaluated, while SDT offers a framework to analyze its impact on motivation.

Accordingly, in order address those theoretical and practical gaps and building on the learning from literature, this research explores how game elements, integrated to utilitarian IS in a gamification process, can impact user motivation and satisfaction, and therefore help to achieve a greater and richer use of IS and subsequently improve the benefit from IS projects.

Findings

Based on rigorous implementation of canonical AR design, this research confirms the positive impact of gamification on several important dimensions of the information system success, including information quality, enhanced use and user satisfaction, as well as the materialization of net benefits for the user and the organization. We could confirm an Enhanced system use of the CRM, on the gamified features, a feeling of “fun” or enjoyment, which makes even routine tasks in the CRM less boring and work more interesting. As a result of the collective improvement of CRM use, the information quality has also improved with the more frequent and qualitative updates from the users.

This enquiry also offers a more detailed understanding of the psychological mechanisms explaining this impact. Game elements from gamification (in our case, teams, points, contests with time constraints, scorecard updated real time, leaderboard, TV display with pictures and sounds, platform) enables 4 main motivational affordances of gamification emerged as most impactful from the empirical research: team spirit, playfulness, competition and real time feedback. Playfulness seems to act as an “adjuvant” to the team spirit and competition. It helps for instance to keep the competition “healthy” rather than fierce, and competition (if not taken too seriously thanks to the playful context) stimulates intrinsic motivation for competence. Real time feedback fuels the intrinsic motivation, both for competence by providing visibility on performance against targets and against peers, and for autonomy by making users more independent from managers' feedback and able to drive their trajectory by themselves. Real time feedback contributes as well to the CRM information quality by providing up-to-date and concise information. Extrinsic rewards can either stimulate or inhibit the motivation, depending whether the external motivation well understood and integrated in individual motivation system, and whether they are not taking too much importance. If individual feel controlled and pressured, we can expect that their intrinsic motivation will be negatively impacted. In our case, we got more comments trending towards a positive perception of the pressure, as stimulating, than negative.

Based on the learning from the two cycles of action research, and building on the sum of academic knowledge summarized in my literature, we have summarized 7 Design Principles to maximize the impact of gamification as follows:

1. *Activate all 4 motivational affordances : Team spirit, Playfulness, Competition, Real Time feedback*
2. *Keep participation voluntary*
3. *Empower teams to customize their games*
4. *Keep a light hand on rewards*
5. *Full integration in Enterprise IS is required*
6. *Fairness is key and requires permanent attention*
7. *Gamification requires a legitimate purpose*

This paper therefore confirms a tangible impact of gamification on information systems, generating enhanced use and improving user satisfaction, resulting in clear perceived benefits at user, manager and organization level. This research has also confirmed the volatile nature of gamification impact, while results on enhanced use seems to disappear when the gamification trigger stops, while the enjoyment impact remains. Gamification cannot be “switched on”, it is a managerial process that is best performing when leveraging participative style of management empowering teams to shape and control their game.

Lessons for practice

For practitioners, in addition to offering an articulated explanation of the mechanisms at play with gamification, this work provide design principles putting the lights on managerial dimension of the gamification process, which can impact strongly, both negatively and positively, the success of gamification experience.

This is particularly important while company are onboarding a number of young employees, born at digital age and members of the Millennials generation and following. Those design principles can help organizations to leverage gamification to improve their engagement and adherence to standards and processes and to achieve the fit between the culture and expectation of this new workforce, which will replace progressively retiring generations.

One of the unexpected discovery was the importance of the real time feedback and visual representation. Not only this feature contributes to the motivation dynamics, but by itself it contributes as well directly to the quality of the information provided to the user. Gamification is here filling a gap in traditional Enterprise Systems compared to user expectations coming from the consumer world where everything is visual and real time.

Contribution to theory

At academic level, we aim to add to a growing basis of research aiming to confirm the impact of gamification on business performance in the workplace. In particular, this action research enquiry is filling a gap in the research about the psychological mechanisms at play in gamification.

This is an area addressed with an efforts to open the box of human motivation with the Self Determination Theory toolset. This research confirms the relevance of SDT in context of gamification, and offer some insights to the relation between game elements and motivation levers through context specific motivation affordances, and their impact on information system success.

As a result, we have constructed in several cycles a conceptual model which articulates two major theories, ISM from DeLone and McLean in the field of IS and SDT from Ryan and Deci in the field

of psychology. This model, adapted to the specific context of gamification, could be a basis for further research on gamification. It can also be helpful to address other research problems related to the role of motivation in user adoption and post adoption.

In addition, anchored in the field Information System, this work contributes to the exploration of the recent concept of enhanced use and its operationalization.

Finally, this research contributes to the growing basis of AR academic work in the field of Information Systems. To ensure the academic validity, it has been conducted with a rigorous implementation of the Canonical Action Research Design, including the full evaluation against its 5 principles (Davison et al., 2004), and highlighted the beneficial impact of both theory and empirical experimentation driven by the action researcher.

Keywords

Gamification, Game elements, Motivational affordance, Information System Success Model, Self Determination Theory, Enhanced use, intrinsic motivation, extrinsic motivation

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Appendix

Qualitative evaluation of cycle 2 : validation of concepts from conceptual model

Node name	# ref	% ref	Quote example
Gamification experience			

Competition	65	11,9%	I know when I was doing it, 'cause I was really competitive, another guy on my team, Ken. Me and him were really competitive, and when we were using the previous tool, me and him were staying past half five, trying to update our Salesforce, trying to update our opportunities, trying to generate as much pipeline as possible because we could monitor ourselves against the team and see who was top.
Team spirit	32	5,9%	What it was was people saying, "I've closed this. Catch me if you can." It was a bit of fun, a bit of camaraderie
Playfulness	22	4,0%	We are a generation of guys who played video games in the past, or at least that was valid for me. And I know how it's very addictive, or how the motivation works when you have something measured and you get scores for it, and points. It makes the whole work or whatever, whatever interaction people have together, it makes it more fun
Real time information	23	4,2%	Everybody really likes it, everybody really appreciates it now they can see live results and data as they are progressing throughout the day.
Motivation			
intrinsic motivation - competency	39	7,1%	When I'm really behind in a call time or something like that, I'm trying to be a little bit more effective. It's pretty difficult to explain, but you probably have the feeling as well that sometimes you can do a little bit more. You can fit a little bit more in the day that you previously wanted to.
intrinsic motivation - relatedness	12	2,2%	It also gives you a space for discussion, let's say. Then I can approach of my colleagues and say, "Look, you're doing really, really good today, so have you had any

			troubles, or how did you plan your call time, which is now three hours?" et cetera, et cetera
intrinsic motivation autonomy	30	5,5%	That's what I like, you're kind of the master of your own fate.
extrinsic motivation reward	45	8,2%	For now, we have the small, symbolic things. I think it should more or less stay like that. The awards shouldn't be so big because people can then envy or be jealous.
extrinsic motivation social recognition	26	4,8%	Every time you pass the TV if you go for tea or something, you can see it. You can see it, you can see that you are in the top or you are in the bottom in the call time or opportunities. That stimulates a lot. At least on me, it really works, I know that. I'm 100% confident that in my colleagues as well, because I see them quite a lot that they're stopping by. They had a long call, 20-minute call. After minutes, you see them, "Ah, is it counted?"
Type of Regulation			
Positive pressure, integrated in values	18	3,3%	There is a lot of pressure there. I'm not going to pretend that I don't ... I get told I'm doing really well, I'm on the right trajectory, but I do stress out, I do go home and think. It is a stressful job at the end of the day, but I knew that when I took the role, and I wouldn't want a job where I just come in at nine, do what I have to, just the amount I have to do, go home, and forget about it. This is my career, this is not just my job. If I didn't have it as, literally, a massive majority of my life, I wouldn't feel like I was pushing myself enough anyway.

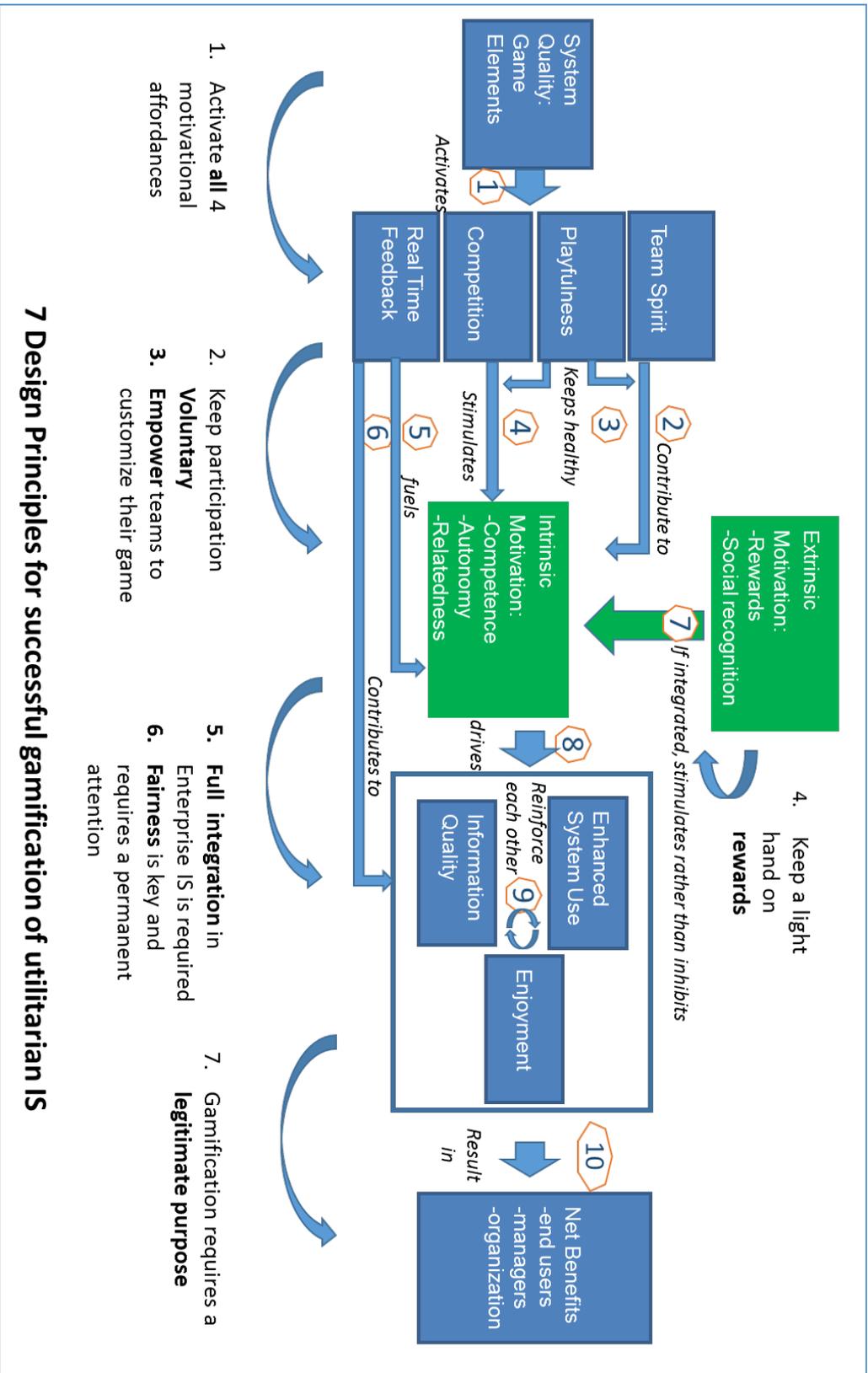
Pressured, introjected	10	1,8%	maybe that the hesitation of rolling this out fully, with standard metrics across the center, creates a bit of nervousness within the team
Do not feel pressured	10	1,8%	Even if we are losing, we can prove it that we did our best to get the deal. I guess this is a good thing as well.
Information quality			
Information quality	13	2,4%	Now, we're actually going that step beyond, and we're actually implementing it. Looking at the opportunity updates, adding the competitor, linking, sinking and quotes the other opportunities
Enhanced System Use			
Using a formerly used set of features for current task	3	0,5%	I'm probably using the dashboards and reporting tabs slightly more
Using a formerly used set of features for additional tasks	1	0,2%	I log every conversation I've had, and the context of that conversation, so I know when I re-engage with the customer, or re-engage with the partner, that I'm exactly at the same point that I left off, and I don't have to go back a step, or go back two steps, because I haven't done the due diligence to remember what stage I'm at.
Using a formerly unused set of available features for current tasks	7	1,3%	Yes, before Level 11. We weren't disciplined at all. We've followed steps to make sure our deals had closure, were audited, and passed. Now, we're actually going that step beyond, and we're actually implementing it. Looking at the opportunity updates, adding the competitor, linking, sinking and quotes the other opportunities.
Using a formerly unused set of available features for additional tasks	6	1,1%	In the beginning I didn't use the reports, now I use many kinds of reports, I cut it into all kinds of reports

Using feature extensions for current tasks	8	1,5%	Now, every time I've come off a call, there'll be notes attached to the call with the person's name, and our calls, where they were at
Using feature extensions for additional tasks	3	0,5%	the part that level 11 could do for myself is actually using it as a customer, relationship management tool. Opposed to just forecasting or attaching things as part of the other criteria. I want to be able to take away the hunting specific criteria and actually make it SFDC as being the main tool that they use.
User Satisfaction			
Enjoyment	15	2,7%	It definitely creates kind of a buzz in the team. Yeah, a 100%.
User Expectations	17	3,1%	I think that the in-sales environment could really need something like that, which can show us what is happening with our deals, with whatever is active
Net benefit			
sales rep	36	6,6%	It's important for me to have it clean because otherwise I will get lost. It's important for me of course to know, to make the best for my pipeline, it good for me, good for company, good for everyone, for my managers, for you, for everyone. It's good, it's good thing to have on the side.
manager	25	4,6%	Rather than me, in the morning putting it up on the board. "Right guys, we've got to hit on however many million to go until the weekly incentive." I could use it for that
organization	11	2,0%	the discipline is a lot better than it was six months ago across the board
Success factors			

Fairness	23	4,2%	if you're competing with the likes of, maybe global, on certain things, then it's not going to be a competition really. Because they might be working on big, massive financial sized deals. Depends on what you're competing with each other on
Empowerment, customization	13	2,4%	I think it's part of the success of the tool was that the first line manager really take ownership for it. I think this tool can only work if the first line manager make it their tool.
Communication	12	2,2%	any team communication links to this. Any team meeting, any team briefing, any focus update, we will always cover this
Legitimate purpose	10	1,8%	It needs to be driving stuff that they can influence. Rather than having a situation where somebody is topping the leader board, but with no behavior they've driven themselves.
Creating habits	5	0,9%	We have managed to make it a daily habit. Five minutes, check it when you come in the morning in the office or when you leave the office you check your scorecard. So, at least we have seen a down trend in the Salesforce Hygiene to reach below waterline
Workforce characteristics	4	0,7%	Because you know, we are a generation of guys who played video games in the past, or at least that was valid for me.
Maintain interest over time	3	0,5%	I think as long as everyone knows the expectations and it's consistent, you know, it doesn't drop away for a couple of months and come back and there's a big ra ra about it and then it disappears again. I think if there are certain things and things we should be doing, as long as it stays that way and it continues month on month or

			quarter on quarter it just keep everyone interested and that's the main thing.
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Final conceptual model including guiding principals



Evaluation of AR design as per CAR principles (Davison, Martinsons, and Kock 2004)

1 - Principle of Researcher-Client agreements

Criteria	First evaluation	Second evaluation
1a Did both the researcher and the client agree that canonical action research was the appropriate approach for the organization situation?	The agreement to allow me to run a research based on gamification pilot has been formally achieved with my employer early in my doctoral course My manager-researcher status simplified the Researcher-Client agreement on the design of the research.	
1b Was the focus of the research project specified clearly and explicitly?	I started the first cycle with an exploratory approach, my research model and question was progressively shaped during the first cycle	The focus of the research was clearly formulated as a result from first cycle learning
1c Did the client make an explicit commitment to the project?	Beyond my personal commitment as manager-researcher, my company has also agreed to fund 2 gamification application pilots and staffed the IT project team	
1d Where the roles and responsibilities of the researcher and the client organization members specified explicitly?	The project team had permanent members with a clear charter and less clearly defined support roles. My researcher role was clearly explained and defined to project team	The project team structure was clarified between the 2 cycles and confirmed in a meeting at the beginning of the second cycle
1e Where project objectives and evaluation measures specified explicitly?	We defined distinct but overlapping objectives for business stakeholder and academic contributions. Business objectives were to measure return on investment for gamification and recommendation to expand or disengage. Academic contribution was not defined very specifically initially as I started with an exploration phase.	Project objectives and evaluation measures were clearly defined at the beginning of the second cycle, still distinct and overlapping. Academic objectives were very specific and based on the conceptual model defined during and after the first cycle.

Researcher – Client was reached in both cases with clarity of the pursuit of separate but overlapping goals on the client side and on the research site. My position of researcher and manager of the organization gave me a lot of freedom to shape the project to support both goals.

2 - Principle of the cyclical process model

Criteria	First evaluation	Second evaluation
2a Did the project follow the cyclical process model or justify any deviation from it?	My project encompasses two cycles following canonical AR process with information from the first cycle embedded in the design of the second cycle	
2b Did the researcher conduct an independent diagnostic of the organization situation?	The decision to change the CRM to add gamification features was the result of the researcher's diagnostic as a manager and interest as a researcher	I conducted a diagnostic following the first cycle collectively with the project team
2c Where the action planned based explicitly on the results of the diagnosis?	Yes, insight gained in the diagnostic phase informed the intervention in both cycles	
2d Where the planned action implemented and evaluated?	Yes, the gamification pilot was implemented and evaluated in both cycles	
2e Did the researcher reflect on the outcome of the intervention?	We evaluated the outcome of the first cycle in collaboration with the project team	I evaluated the outcome of the second cycle when I considered I had collected enough information for my research purpose. The Pilot is still under way and final business evaluation will take place later on.
2f Was this reflection followed by an explicit decision on whether or not to proceed through an additional process cycle?	After the disappointing outcome of the first pilot, the additional cycle was discussed and approved including additional funding	Yes, the decision is to not proceed with an additional cycle
2g Were both the exit of the researcher and the conclusion of the project due to either the project objectives being met or some other clearly articulated justification?	N/A	The reason to finalize the research work is that the findings from the first 2 cycles allowed us to address the 2 research questions

The project has followed the canonical design with two cycles, each of them following the 5 steps, and ended when the information collected was sufficient to address the initial research questions.

3– Principle of Theory

Criteria	First evaluation	Second evaluation
3a Where the project activities guided by a theory or set of theories?	The first cycle started in an exploratory way, allowing me to I test the SDT concepts and confirm their relevance in the context of gamification. ISM theory was introduced as a basis for my conceptual model as a result of the first cycle.	The second cycle was informed by my conceptual model combining ISM and SDT
3b Was the domain of investigation and the specific problem setting relevant and significant to the interest of the researcher's community of peers as well as the client?	The gamification pilot attracted significant interest from business stakeholder funding the two pilots. It was also very relevant to me personally and generated interest from fellow academic students and from the faculty in front of whom I defended my research topic and proposal	
3c Was a theoretical based model used to derive the causes of the observed problem?	I initiated the first cycle prior to defining my theoretical model	The conceptual model was based on findings from the first cycle, and adjusted to reflect the findings from the second cycle
3d Did the planned intervention follow this theoretically based model?	N/A	Yes, the semi structured interviews used in the second cycle were build following the conceptual model
3e Was the guiding theory or any other theory, used to evaluate the outcomes of the intervention?	The first cycle outcomes were inconclusive both from the stakeholder and the academic points of view	The concepts of SDT at the core of the conceptual model have been the main lenses (viewpoints ?) to analyze and understand the information collected

The project has been conducted in two cycles. The first cycle was exploratory and contributed to the selection of the most pertinent theories and concepts to approach the research questions. Based on the learning from cycle 1, a conceptual model was built and used to frame the second cycle evaluation, while still allowing concepts to emerge. The model was then refined to reflect findings from cycle 2.

4 - Principle of Change through Action

Criteria	First evaluation	Second evaluation
4a Were the researcher and client motivated to improve the situation?	My combined manager-researcher position doubled my motivation for this project	
4b Were the problem and its hypothesis causes specified as a result of the diagnostic?	I was faced with a behavioral problem towards CRM in my management organization, common to many sales organizations, and rebellious to traditional approaches	The short falls from cycle 1 have been evaluated in the learning phase and input to the diagnostic of cycle 2
4c Were the planned actions designed to address the hypothesized cause(s)?	Gamification is intended to motivate individuals to change behaviors and therefore addressed the problem.	
4d Did the client approved the planned actions before they were implemented?	The gamification action was approved and funded by my organization	
4e Was the organization situation assessed comprehensively both before and after the intervention?	The organization situation was very well known prior, during and after the intervention due to my insider position	
4f Where the timing and nature of the actions taken clearly and completely documented?	The project plan has been fully documented during the 2 cycles	

The research was framed around the action to introduce gamification to improve CRM infusion. This action was taken in cycle 1 with a first pilot and again in cycle 2 with a second pilot.

5 - Principle of Learning through Reflection

Criteria	First evaluation	Second evaluation
5a Did the researcher progress reports to client and organizational members?	In my specific case I was both the researcher and the main stakeholder. The other client stakeholders in the organization were regularly informed by the project manager in charge	

5b Did both the researcher and the client reflect upon the outcomes of the project?	A debriefing for the first pilot has taken place including project team, funder and researcher	The debriefing for the second pilot with the other client stakeholders will take place at the end of the pilot
5c Were the research activities and outcomes reported clearly and completely?	The research activities are documented in this document and will be shared with client stakeholders	
5d Where the results considered in terms of implications for further action in this situation?	The first cycle was not conclusive.	Design principles are included in the learning section of cycle 2
5e Where the results considered in terms of implication for action to be taken in related research domains?	This step has not been considered yet as the results have not being published yet	
5f Where the results considered in term of implication for the research community?	Those considerations are including in the contribution section of this document	
5g Where the results considered in term of general applicability of canonical action research?	Those considerations are included in the contribution section of this document	

The research includes a learning section and consideration on contribution to academia and practice.