

Overcoming knowledge gaps regarding gamification implementation

A practical investigation into improving parcel sorting at PostNL

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Abstract

Businesses are continuously looking for innovative ways to improve their business processes. This is where gamification can be of added value, since it is an increasingly popular strategic instrument, which can influence behaviour and enhance performance and productivity. Currently, there are numerous knowledge gaps concerning the implementation of gamification. In order to overcome these challenges a roadmap for structured implementation of gamification is developed. The development of this roadmap is based on findings occurred by synergizing business needs and existing knowledge. In this paper the realization of the roadmap is described and also future research areas are identified to improve the knowledge concerning gamification in business processes.

Keywords

Applied gamification, roadmap development, game elements, motivation, target behaviour, feedback.

1 Problem definition

In recent years, gamification has become increasingly popular in businesses (Groh, 2012) as a strategic instrument to engage people, to influence behaviour and increase performance and productivity. In literature gamification is defined as the use of game design elements and game thinking in non-game contexts (Deterding, Dixon, Khaled, & Nacke, 2011). It could reduce costs and subsequently increase revenues by improving performance of employees (Singh, 2012). Something that is needed by businesses which continually try to improve their performance to remain successful (Becker & Gerhart, 2014). Therefore, businesses are continuously looking for innovative ways to improve business processes. According to Singh (2012), any process that needs to motivate human users, is candidate for gamification. Therefore, it is expected that gamification will play an important role in the future throughout different sectors (Hamari, Koivisto, & Sarsa, 2014).

Even though many claim that gamification has become a worthy player in business improvement (McGonigal, 2011), there are also some challenges to overcome. Firstly, current gamification **literature does not have a very high scientific level** and most literature is written in a general way (Hamari et al., 2014). Insufficient difference is made between gamification for internal gamification (for the employees) and external gamification (for the customers). Also, **academic evidence of the benefits** of

gamification is lacking. Secondly, since gamification is a **relatively new concept** it is largely unclear how an effective design can be realized (Deterding et al., 2011). Burke (2013), a research analyst of Gartner, speaks of the **unrealistic expectations for success** and consequently many businesses are implementing gamification **without proper investigation** into whether or not gamification is the right instrument to improve the business process. Gartner, Inc., an information technology research and advisory company predicts that about 80% of gamified solutions will fail in reaching business objectives by 2014 **due to poor design** (Gartner, 2012). Also, Chorney (2012) stipulates that gamification has its limits and **cannot significantly alter human behaviour**. Thirdly, there is **no uniform approach** to developing and successfully implementing gamification aspects in an existing process. This means that there is limited knowledge on how gamification can be structurally applied in many processes. Furthermore, it is **uncertain if gamification is applicable to all types of business processes** in order to improve the behaviour of employees (Salen & Zimmerman, 2004).

Hence, it can be concluded that there are numerous knowledge gaps. This indicates more research needs to be done in order to bridge these gaps. The coherent challenges need to be faced in order to successfully implement game aspects in business processes. Therefore, the goal of this scientific article is to develop and discuss a roadmap for structured implementation of gamification in business processes. The development of this roadmap will be done by synergizing business needs and existing knowledge. The business needs are investigated by executing a case study. This case study is conducted at the sorting process of PostNL parcels which is a commercial standard process. The case study can provide insight in effectiveness of gamification as an innovative instrument to alter behaviour of employees in standardized processes. The findings of this case study can also indicate differences in theory and practice. Thereby, these findings might be used to reflect on the current gamification literature and to give recommendations on improvement.

This paper is mainly focused on the development of a gameful design. Furthermore, it will focus on gameful (the same as gamification) design elements and not on playful design elements, since commercial standard processes are generally very controlled with little room for autonomy. Additionally, this paper is also limited to internal gamification, gamification of a business process in order to improve the performance of employees. Since the case study is conducted at a commercial standard process, the findings of this paper are also limited to commercial standard processes.

The outline of this paper is as follows. In chapter 2 current developments in gamification are discussed. Chapter 3 introduces the case study and subsequently chapter 4 describes the development of the gameful design. In chapter 5 the results of the case study are discussed and in chapter 6 the findings through the case study are presented. These findings will be used in chapter 7 for the development of a roadmap

for structured application of gamification. Finally, this paper is concluded with a recommendation for future research (chapter 8) and a conclusion (chapter 9).

2 Current developments in gamification

Before introducing the case study and learning by doing, it is required to discuss gamification in more detail as instrument to improve a business process. Gamification is an instrument that is just about using elements of games and therefore it is much more flexible than a full-fledged game (Groh, 2012). Since this instrument understands the motivational power of goals, reputation, and identity, it can be seen as a useful trigger to perform target behaviour. Furthermore, it is stated by Werbach & Hunter (2012) that there is significant overlap between work and games. They indicate that gamification uses game design elements to solve organizational problems in order to achieve goals effectively.

As already mentioned in the introduction of this paper, no uniform approach for gamification is currently available in literature. It is found by Hamari et al. (2014) that there is a dearth of coherent understanding with regard to gamification. Currently, in literature it is also undecided which game elements can be used in order to gamify a business process. According to Deterding et al. (2011) game elements are characteristics of games (elements that are found in most of the games). It is also stated by Deterding et al. (2011), that there is much room for debate over what appropriate “characteristics” for games are. In this paper game elements of Palmer, Lunceford, & Patton (2012) are used, which are four overarching elements for business gamification. These four elements are:

1. Progress path
2. Feedback & reward
3. Social connection and
4. Interface & user experience

According to Palmer et al. (2012) these game elements are a useful toolkit to facilitate the process of gamification in business. However, the elements seemed to be developed for gamification of online services. Nevertheless, they will be used in this paper and therefore the elements are now briefly explained in order to give a definition that is assumed for this paper.

Progress path

This game element is focused on showing the progress path by providing narrative guides and challenges. The complexity of the challenges, or in this case the task of the employee, could increase over time (Palmer et al., 2012). However, it is important that there is room for challenges in the business process; otherwise it will be difficult to implement this game element.

Feedback & reward

It is already discussed in the previous paragraph, the current status of gamification in business, that feedback and rewarding is a common used game element. By adding hyper feedback to a business process it will be much easier to provide the right reward at the right time. The second challenge will be to design an appropriate reward (Palmer et al., 2012).

Social connection

Palmer et al. (2012) state that with internet and social networks instant access to friends and connection could be provided any time. This enhances the connection with other users. However, in this case it is not about user experience of online services. The gamification is intended to improve behaviour of employees of a business process. Therefore, this game element must be interpreted differently than what was intended by Palmer et al. (2012). In this case the social connection will be found in dealing together with the challenges of the business task of an employee. This can be realised by developing teams, but also by making strategies with colleagues during special meetings might increase the social connection. However, it is important that room for social connection is provided by the business.

Interface & user experience

This game element is also mainly applicable in online services. With the developments in technology services it is easy to develop a platform for considerations. However, also in a business itself, a platform can be developed. This can for example be realised by placing a general whiteboard at the department. At this whiteboard the employees can share their ideas and experiences.

Similar problems occur when an approach must be found for gamification of a business process. In literature there are different steps to gamify a process within a business. Werbach & Hunter (2012) describe in their book 'For the Win' six steps to gamification:

1. Define business objectives
2. Delineate target behaviours
3. Describe your players
4. Devise activity cycles
5. Don't forget the fun!
6. Deploy an appropriate tool

It is acknowledged that Werbach & Hunter's (2012) approach is a useful but too general design since it can be applied to both internal as well as external gamification and every business type. Also, this approach is very limited with regard to the context in which the gamification takes place, the process the employees go through and the environment in which the gamification is set. Consequently, the approach provides insufficient guidance for implementation of gamification and therefore a framework for serious game design by Wenzler (2008) is analysed. This framework is focused on

context identification. Finally, the trains of thoughts of the TIP design of Koppenjan & Groenewegen (2005) are used. This design is very helpful by designing a successful gamified process, since it looks beyond solely technical aspects of gamification. Also, institutional aspects such as norms, contracts between involved actors and rules/control of the system are of crucial interest during the design. Additionally, process design aspects are of great importance since the participants of the gamified process have the power to support or reject changes. Therefore, for successful implementation of gamification it is crucial to develop a process design that results in broad support for the new design.

In order to develop a persuasive gamification approach the six steps from Werbach & Hunter (2012) are modified with the help of the TIP-perspective of Koppenjan & Groenewegen (2005) and insights of Wenzler (2008). This initial approach is shown in the table below.

Table 1: Adjustments in approach for gamification in business

Sections	Essence	Approach	Questions
Context identity	Current business	Map the current business	<ul style="list-style-type: none"> ✓ What is the business objective? ✓ What are currently the topics of interest of the business?
	Specific process	Look into the specific process	<ul style="list-style-type: none"> ✓ Which process steps form the process and what are the input and output per step? ✓ How do the process steps contribute to the business goal? ✓ Which employees are involved in the process?
Goal & problem identification	Target behaviour	Delineate target behaviour	<ul style="list-style-type: none"> ✓ What is the target behaviour to successfully complete each process step?
	Behaviour deviation	Associate target behaviour with current behaviour	<ul style="list-style-type: none"> ✓ Where does the current behaviour deviate from target behaviour?
	Causes of deviation	Examine how the process steps can be influenced by external and/or personal factors	<ul style="list-style-type: none"> ✓ Can the process steps be influenced by external and/or personal factors?
Development of gamified process	Implementation approach	Identification of implementation approach	<ul style="list-style-type: none"> ✓ What is the ability/capacity of the personnel and process(es)? ✓ How is the acceptance of the employees for a new tool? ✓ How should the tool be managed on the short and long term?
	Gamification design	Devise processes with integrated game elements	<ul style="list-style-type: none"> ✓ Which game elements can be used and how can they be implemented in the current process?
	Deployment	Deploy the appropriate tool	<ul style="list-style-type: none"> ✓ Which steps should be followed for successful implementation of revised process steps?

The approach shows three different sections and their coherent essence. In order to serve these essences several questions will be answered during the case study at PostNL. In the following sections the case study will be introduced.

3 Case study introduction

In order to realise empirical findings on applying this devised initial approach, a case study is conducted. Using these findings in the field the usability of the created approach by van der Kleij (2014) can be examined. The subject of study is the parcel division of PostNL. Currently PostNL, one of the Netherlands largest mail distribution companies, is dealing with sorting defects in their sorting process on the depots (PostNL, 2013). These sorting defects are the results of human mistakes. Since PostNL has the ambition to become the biggest and best parcel company in the Benelux it is important that the distribution of the parcels will be as successful as possible, which means delivering 98% of the parcels within 24 hours. Therefore, it is acknowledged by PostNL that it is desired to examine the current sorting process and find out whether or not gamification can be of added value to improve the sorting process.

The sorting process can be described as standard process, since it has one input variable, predefined rules and identical repetition. Firstly, the input of the sorting process exists of one input variable, which are the parcels. Secondly, these parcels are assessed by their property, which in this case is the zip code. The parcels are placed in the 'right container' based on the first two numbers of the zip code. Finally, this process is repeated over time and this repetition is identical. This makes this work monotonous and somewhat challenging.

The core steps of the sorting process are reading the zip code and the selection of the correct container. In the reading the zip code the employees can make two different types of mistakes, both by negligent reading of the zip code. Firstly, they can place the parcel in the wrong container, which is called a "buurman fout". Secondly, it might be possible that they do not filter the so-called "foutlopers", which can have multiple causes of error before they reach the employee at the outlet. Negligent reading of the zip code can have several reasons, for instance performing the steps without pauses, a poor motivation, etc. In case of a deviation the parcel will be transported to the wrong depot. Within these two steps, it is likely that most of the deviation arises. This assumption is based on observations and not on quantifiable grounds. Therefore, in this research the focus lies on how to realize a behavioural change with gamification within the performance of these two steps.

It is important to determine the right trigger to realize target behaviour. Different causes for deviation (within the two steps) from the target behaviour requires different triggers, which can be a spark (motivational), facilitator and signal trigger (Fogg,

2009). A developed model for causes of human errors, based on Triadic Reciprocity Model of causality of Wood & Bandura (1989) and Foggs behaviour model (2009) was used as input for investigating the sorting process and its employees. It is found through conducting focus group sessions with the employees, that gamification of the sorting process can be of added value. However, there were more factors that influence the work experience of the employees that are not directly related to gamification and are of facilitative nature. When environmental issues are in place, the applicability and suitability of gamification is limited. For this case numeral environmental factors have an impact on the sorting process, the degree to which is unknown. Furthermore, it also appeared that there are significant issues regarding the motivation of the employees. Keeping the environmental factors in mind, there is definitely room for improvement of the sorting process using gamification.

In order to improve intrinsic motivation of employees (Hackman & Oldham, 1976) suggests focusing on recognition, achievement, responsibility, advancement and personal growth. Since there is limited or no room for responsibility, advancement and personal growth in the process the motivators achievement and recognition remain as options. However, feedback is required to implement achievement or recognition. Furthermore, during the focus group the employees have indicated that they prefer more and individual feedback about their sorting quality. Since feedback is a game element, it could prove to be interesting to provide more and better feedback by gamifying the sorting process, as more direct feedback only could be provided in the actual process and not with external solutions such as special training. Therefore, it was decided to focus on gamifying the sorting process itself.

4 Case study gamification design

An appropriate way to implement the game element feedback in the sorting process of PostNL appeared to be with so-called “dummy parcels”. The dummy parcel is a parcel, which cannot be sorted, since it was wilfully provided wrongly. This means that the zip code of the parcel does not fit the ranges at the outlet and the sorting employee cannot sort the parcel. The dummy parcels idea has been derived from a well-known technique the mystery shopper (Harvey, 1998). The main goal of this technique is to improve the quality and to provide understandable feedback (Wilson, 2007). However, this situation is different since it is not about measuring the service quality, but about improving the quality of a standardized process. Nevertheless, the following aspects of the mystery shopper are also interesting for the sorting process:

1. Provides direct feedback
2. Random assessment
3. Link to game dynamics (such as achievement and competition)

In order to verify the developed gamified design eight requirements were determined. It was found that the dummy parcel tool meets most of the design requirements. Nonetheless, an intervention was required in order to obtain knowledge about the impact of the gameful design on the sorting process. More information was needed about to what extent the developed gameful design provides immediate and understandable feedback. Additionally, the degree to which the gamification hinders the process and whether or not the employees experience more fun in their task was examined. The intervention was running two weeks at depot Breda in the Netherlands. Hundred and twenty unrecognizable parcels and labels were developed and transported to depot Breda. The two weeks of the intervention, which is limited to working days, includes the preparation of the intervention. The following three phases were go through:

1. Baseline measurement (without any announcement)
2. Intervention without feedback
3. Intervention with feedback

For each of these phases forty dummy parcels were sent into the process. Furthermore, at each depot there are four quadrants at which, dependent on the workload of the depot, two or more employees are working. During the intervention each quadrant received a similar number of dummy parcels.

5 Case study results

The results, shown in this section, were found by analysing data and conducting interviews. Interviewing is a useful method to gain qualitative data, whereas a survey produces quantitative data. By interviewing empirical findings can be obtained (Silverman, 2013), something that is desired in order to get more insight in the experience of the process managers and sorting employees. During the intervention the following three factors were used to measure the effectiveness of the dummy parcel gamification during the intervention:

Performance

During the intervention 120 dummy parcels were sent into the process, of which 73 were sorted (not discovered) and 47 were discovered. This was much lower than expected by the process managers, which shows the urgency for PostNL to pay attention to the sorting process. Throughout the intervention the sorting employees became better at retrieving the dummy parcels, with an increased percentage of 28%. This improvement was not the result of specific characteristics of the sorting employees. Both process managers -as well as the sorting employees- were pleasantly surprised by the short feedback loop, which provided quick and focused insight in the quality of the sorting process.

It was found that progress in dummy retrieval was not evenly throughout the different quadrants. Quadrants with a majority of people with a non-Dutch nationality showed to make no noticeable progress. Therefore, it is recommended to do more research on the effects of gamification for this particular group and to which degree this background influences the overall performance. Furthermore, it is recommended to do more research on which type of employees are susceptible – and which not – for gamification.

Since the dummy parcel tool is about finding “foutlopers” and not about preventing the so-called “buurman fouten” it is difficult to predict to what extent these “buurman fouten” will be influenced by the dummy parcels tool and thus the sorting quality. However, it can be assumed that the dummy parcel tool also influences the “buurman fouten” since the tool is likely to cause the employees to be more focused on reading the zip code.

Motivation

Interviewing the involved employees has shown that they found the dummy parcel tool stimulating and a good way to measure quality. Moreover, the employees are very confident about their own abilities and less about the abilities of their colleagues. Since several employees work at a single quadrant it was impossible to link the performance results to the findings of the interviews. Additionally, in this research it was not examined how the sorting employees react on immediate feedback. It could be useful to do more research about the best way of giving feedback and whether or not the motivation of the employees will be influenced by the immediate and individual feedback. All employees did indicate to find feedback interesting. They were very curious about how they had performed during the intervention. Therefore, it is assumed that the dummy parcel tool can definitely be stimulating and all interviewed employees would like to search for dummy parcels in the future.

Implementation process

The process of execution of the intervention has given insight in the implementation process of the gamified design. It can be concluded that no severe problems occurred during the execution of the intervention. However, three important main lessons were learned. Firstly, it is important to be sure that the label information is correct, especially since errors on the label result in errors by employees, which might be assessed accordingly. This also concerns adapting barcodes to changes in ranges at the outlets. Secondly, social connection and/or group competition elements cannot be used in the current system, as it is impossible to work with regular teams. Also, employees do not unanimously agree on using competition elements in the sorting process. The two older interviewed employees were against competition. Thirdly, it was found that it is a disadvantage that undiscovered dummy parcels currently go into the distribution process of PostNL. The degree to which this is interfering with the

daily process was not particularly researched, but ways were found to minimize this nonetheless.

It was found by this intervention that PostNL highly valued the dummy parcel tool in order to deal with sorting errors. However, during this intervention different focus points were found, such as the influences of process managers, employment agencies and the management of the gamified design. Therefore, it is recommended to execute a pilot in order to test the dummy parcel tool for a longer period of time. During the pilot a solution for the dummy parcels which go into the distribution process can be tested. Additionally, a pilot will also give the opportunity to further research the possibilities with competitions and rewarding. During this intervention the focus was mainly on the game element feedback, since there was insufficient time to pay attention to all the game elements. However, it can be useful to found out what the impact of competition and rewarding will be on the sorting employees.

6 Findings through the case study

During the case study at PostNL, it appeared that the proposed approach (section 2) did not completely fit the steps of the development of a gamified design. In the third section of the initial approach (table 1), *the development of a gamified process*, the majority of – and most important changes had to be made. In the table below the original approach is given as well as the adjustments, according to new insights found during the case study. The types of changes can be indicated:

1. Questions are removed (red colour)
2. Questions are reformulated (orange colour)
3. Questions are added (green colour)

The grey colour indicates a question that was rightly posed and is therefore not changed or excluded from the table.

Table 2: Adjustments in approach for gamification in business

Sections	Essence	Approach	Questions
Context identity	Current business	Map the current business	What is the business objective? What are currently the topics of interest of the business? <i>Which process of this business is to be examined?</i>
	Specific process	Look into the specific process	<i>Which process steps form the process?</i> <i>What are the input and output per step?</i> <i>How do the process steps contribute to the overall process?</i> Which employees are involved in the process?
Goal & problem identify-cation	Target behaviour	Delineate target behaviour	What is the target behaviour to successfully complete each process step?
	Behaviour deviation	Associate target behaviour with current behaviour	Where does the current behaviour deviate from target behaviour?

	Causes of deviation	Examine how the process steps can be influenced by external and/or personal factors	Can the process steps be influenced by external and/or personal factors?
Development of a gamified process	Design constraints	Determine design constraints	<p>What is the available budget to improve the process?</p> <p>What are the technical requirements of the process?</p> <p>What is the degree of acceptance of the involved personnel?</p> <p>What is the ability/capacity of the personnel and process(es)?</p> <p>How is the acceptance of the employees for a new tool?</p> <p>How should the tool be managed on the short and long term?</p>
	Gameful design	Devise processes with integrated game elements	<p>What are the needs of an employee? How can they be motivated?</p> <p>Which game elements can be used?</p> <p>How can they be implemented in the current process?</p>
	Implementation approach	Identification of implementation approach	Which steps should be followed for successful implementation of revised process steps?

Firstly, three questions, considering design constraints, were added to the approach. During the development of a gameful design, it was found that the first step is to determine the constraints of the design. Subsequently, these constraints have provided requirements, which were be used to verify a developed gameful design. The following question, *how to manage the tool on short and long term*, was removed. The short and long term is part of the three design constraints and furthermore it was found difficult, in the stage of the *development of the gamified design*, to make useful statements about management of the tool on the long-term.

Secondly, it was found that more information about the needs of the employees was required and therefore a question was added to the approach. When it is determined how to motivate the employees, appropriate game elements can be chosen. Then, the way of implementing these needed game elements must be elaborated on.

Finally, it was an important finding that the initial approach works towards the deployment of an appropriate tool, while it was found out during the case study that deployment of the tool also requires input from the business and cannot only be executed by the designer. Therefore, it was decided that the improved version stops at the completion of the implementation of the approach.

During the case study also four other important findings appeared. First of all, it was found that proper investigation is required, in order to determine the applicability and suitability of gamification in a business process. When a business process is mainly influenced by external factors, gamification is not the instrument to improve the

process. Secondly, it appeared that the success of gamification is not only dependent on the employees, but also on the person who should go facilitate the tool. During the intervention it turned out that the process managers played a major role by the implementation of the dummy parcel tool. Therefore, it must be noted that not only the acceptance of the sorting employees need to be considered, but also other involved employees. Finally, it was also found by the case study that the development of gamification is very situation specific. This means that only a generic model can be developed. Such universality can result in a decline in robustness of a gamification approach.

In the following section the questions of the improved approach (table 2) will be used for the development of a roadmap to structured application of gamification.

7 A roadmap to structured application of gamification

In order to overcome the discussed knowledge gaps of the previous paragraphs, a roadmap was developed (figure 1 next page). The developed roadmap gives a designer grip during the development of gameful design. With this roadmap a clear overview of the overall process and the steps to take are presented. The entire process, from analysis of the business process to an operational tool is included. In order to realize an operational gamification tool, ready to be implemented, both a designer as well as the business itself are involved.

With this roadmap attention is paid to the process before starting the development of a gameful design, in order to determine whether or not gamification is the appropriate tool to improve the target behaviour of the employees, and subsequently if it is suitable to enhance the process performance (which can be quality or productivity). The roadmap presents in the first box that this will be determined by identifying the context, goal and problem of the business process. Several questions must be answered in order to find out whether gamification will be effective. When a *spark (motivational)* or (and) a *signal* trigger is needed to improve the attention or productivity of the employees, the designer could start the development of a gameful design. Thereby, the chance that “unnecessary” gamification is deployed is reduced (in the first box of the roadmap the needed trigger is determined).

In order to develop a gameful design the questions in the second box should be answered. First of all the three design constraints questions should be answered and subsequently it is chosen which game elements are useful. As already mentioned, for the development of the roadmap it is chosen to use the overarching game elements of Palmer et al. (2012). However, there is much room to debate these chosen game elements and their influence on the development of a gameful design.

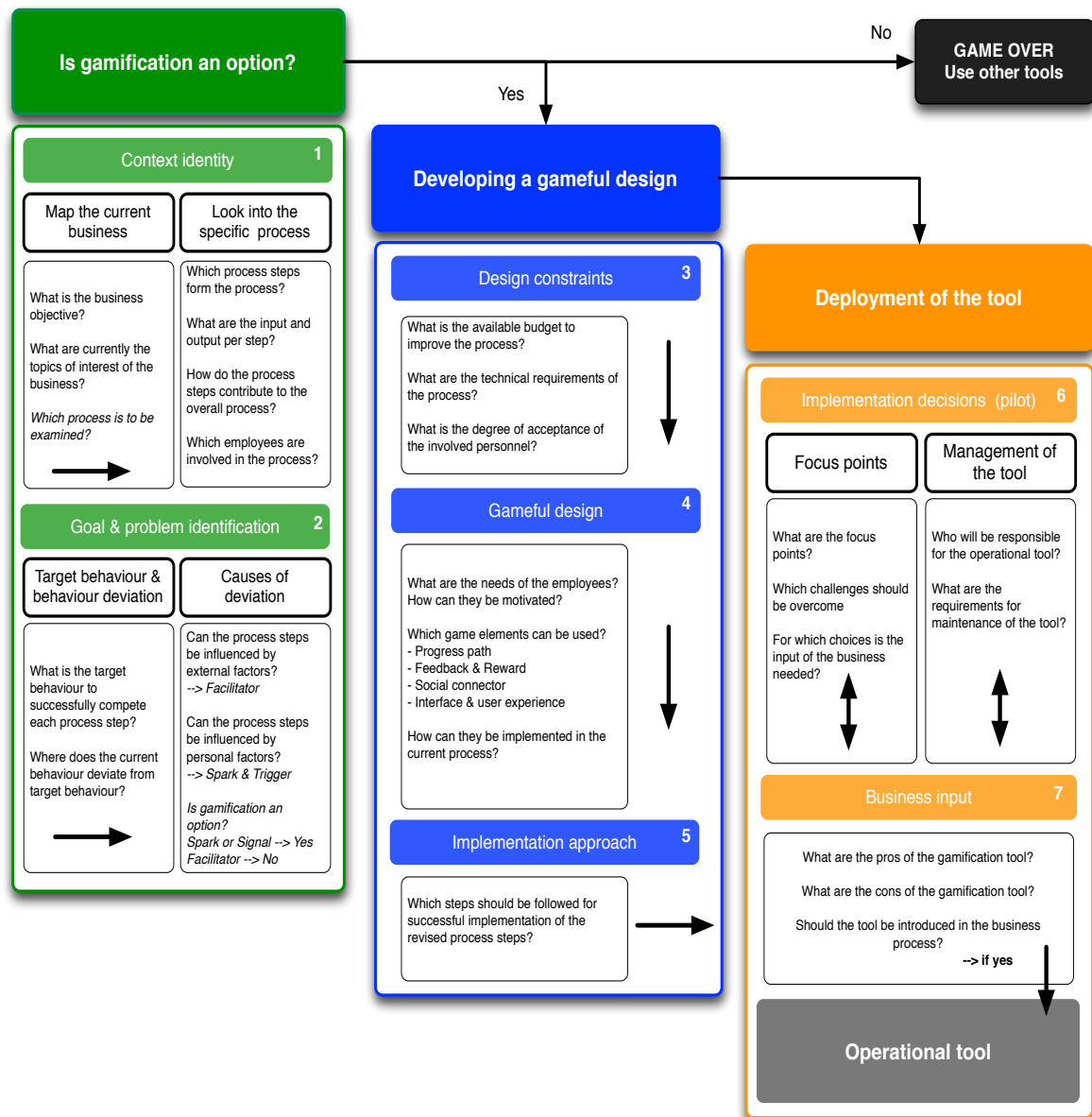


Figure 1: Generic roadmap for gamification of business processes

Finally, the deployment of the gamification tool can be executed. This is an iterative process between the designer and the business in order to make the gameful design a working and operational tool. This can be done by conducting a pilot, in order to measure the effectiveness and acceptance of the gamification of the business process

During the case study it was also found that the development of a gameful design is very situation specific, which means that only a generic model can be developed. Therefore, the roadmap is applicable to every type of business instead of only commercial standard processes. Such universality can result in a decline in robustness of a gamification approach. However, it was also found by Hamari (2011) that gamification is greatly dependent on the context in which it will be implemented as well as the users of it. It might be very challenging to develop a roadmap for implementing gamification specific for a particular type of business. Therefore, it is

recommended by the findings of this research -and also confirmed by the findings of Hamari (2011)- to do more research on the design of gamified systems.

Lastly, it can be discussed whether or not this roadmap provides innovative insights and is different from other optimization approaches. For instance, the method Quality Control is also intended to improve a process, in this case by creating an environment in which both management as well as employees strive for perfection within a process. This method goes on through the following steps on a high level: assessment, improvement and control (Beamon & Ware, 2006). These steps can also be found in the roadmap, but are expressed differently. For instance, in the second box the game elements are the input to optimize the process. Due to limitations in scope and time, it is difficult to assess if this roadmap corresponds with other methodologies and tools. It is likely that this roadmap overlaps with other quality methodologies. However, this roadmap is focused on the employees in particular, while for instance Total Quality Control Management is about improving the effectiveness and flexibility of organizations as a whole (Miller, 1996). It is recommended to do more research on what can be learned from the Quality Control approaches for gamification of a process, to improve the quality of a business process.

8 Recommendations

During this research it was found that the current gamification literature does not have a very high scientific level. Several sources do not make a distinction about external (for customers) and internal (for employees) gamification, and write in more general way about gamification. This made it difficult to find sufficient literature that provides a good base for internal gamification. Therefore, it recommended before developing a roadmap to do more literature studies about gamification and the possibilities that it has in order to improve the academic value of gamification.

Proceeding on the previous subject, it is in literature undecided which game elements can be used in order to gamify a business process. It is stated that there is much room for debate over what appropriate game elements for gamification are. Therefore, further research is recommended to discuss the game elements of different scholars and users of gamification and to determine game elements, which can be used for internal gamification in business. Additionally, it will contribute to the gamification literature to distinguish game elements for different purposes and different sectors.

The executed intervention was mainly focused on the game element feedback, since there was insufficient time to pay attention to all game elements. However, there are also possibilities concerning rewarding and competition in this particular situation. Since the interviewed employees did not unanimously agree on using competition elements in the sorting process, it is recommended to do further research on the acceptability and effects of competition and rewarding on employees in processes.

In this research it was already found by the findings of the intervention that employees with a non-Dutch nationality showed to make no noticeable progress by the intervention. Therefore, it is also recommended to do more research on the effects of gamification for particular employees and to which degree their background influences the overall success of gamification.

Lastly, during this research a model for measuring the effectiveness of the intervention was developed. This model is based on logical reasoning and not on comprehensive literature research. Therefore, it is recommended to do further research on how to measure gamification in business. An approach to measure effectiveness will be a useful contribution to the gamification literature. However, not only the literature will benefited by an approach also businesses will benefit because they can assess in a better way whether or not gamification is successful. It can be further examined what will be the difference in gamification in order to enhance behaviour or productivity of employees.

9 Conclusion

The goal of this scientific article was to develop and discuss a roadmap for structured implementation of gamification in business processes. By the development of the roadmap it was found that currently available theoretical information about gamification is not extensive enough in order to develop a gameful design for a specific business process. The first step for this gameful design can, however, indeed be found in literature, but the validation of this initial design approach was found not to be conclusive for the PostNL case study.

In order to gamify a business process a theoretical base is needed. From this base, extensive testing through interventions is needed in order to iteratively shape this initial design approach into a gamification roadmap for similar processes. These interventions indicate (potential) focus points, which need to be tackled before actually implementing the gamification entirely.

Testing theoretical hypotheses in practice and reviewing each finding in theory provides an enhanced knowledge base and possibly a more general and uniform design approach for future gameful designs.

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