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Gamification in the Pharmaceutical Industry

Exploring how European Pharmaceutical Organisations can build and use Gamified Mobile Applications to Improve Relations with Patients.

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Aknowledgements

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Abstract · Summary

Gamification in the Pharmaceutical Industry

Concordant with a wider political and cultural emphasis on individual choice and self-care, European patients have during the last decade become empowered stakeholders as a result of digitization. Nonetheless, patient empowerment sits uncomfortable with the prevailing business model pertaining to the majority of pharmaceutical organisations whose PR activities primarily target healthcare professionals, politicians, and patient organisations. This has infused the debate about how the industry can improve their interaction with patients while still complying with restrictive legislation concerning direct communication with patients. This thesis uses a qualitative approach to investigate the possibility of using digital gamification to circumvent this issue and examine how gamification can be designed for patients. Focus is on gamified mobile applications used by Danish diabetics. It is concluded that in order to successfully design and apply gamification in the pharmaceutical industry, several additional features must be incorporated in the design, compared to what is argued in the prevailing gamification theory. If this is appropriately done, pharmaceutical organisation can use gamification to help patients with their illness by motivating them to live healthier lives. Consequently, this will increase the trust towards the industry and thereby strengthening its relationship with the patient stakeholders. Moreover, gamification also permits those organisations that successfully deliver gamified applications to position themselves as market leaders among the future key decision makers, as they provide value beyond the pill. Rooted in the Organismic Integration Theory and with inspiration from gamification theory, psychological theory of motivation, and interviews with patients and industry experts, this study proposes an elaborated model of digital gamification in the pharmaceutical industry by closing the identified gaps in the existing theory.

Keywords: Public Relations, Digital Gamification, Pharmaceutical Industry

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1. Introduction

1.1 Definition of research problem

Patient-centricity has recently become a popular topic within the pharmaceutical industry (FirstWord, 2013). However, despite the seemingly genuine intentions when pharmaceutical organisations place the patient at the heart of the business and claim to be transparent, the reality has manifested itself as being far more complex. Bound by local as well as global legislations that limit what can and cannot be communicated to patients or put in the public domain, the industry has struggled to square demands for more openness with regulatory regimes that actively limit the possibility of interacting with end-users of medical products (FirstWord, 2014). Regardless of what the industry does its motives will inevitably be questioned as long as profit is part of the health equation. Different PR activities such as the funding of patient groups and related patient focused initiatives leaves organisations operating in the pharmaceutical industry open to a variety of accusations such as promoting awareness about illnesses that do not necessarily require treatment (Payer, 1992). Nevertheless, the increased demand from patients alongside their growing level of authority and access to medical knowledge means that pharmaceutical organisations can no longer afford to content them selves with the prevailing business model. The patient as a stakeholder is already a reality. The question remains, however, how communication and trust is best established with these stakeholders.

In the context of strategic public relations, gamification has recently been proposed as a key tool to build relationships. The purpose of this study is thus to contribute to a theory of gamification against the backdrop of a theoretical analysis and with inspiration from qualitative interviews and psychological theory of motivation. This theoretical contribution will outline how gamification can be applied in the pharmaceutical industry and the outcome will be presented in an elaborated model of gamification. The study will scrutinize the implications of patient empowerment on the interaction between European pharmaceutical organisations and patients. A specific focus is put on Danish patients suffering from Diabetes and the ability of the industry to use gamification in mobile applications as a PR tool to enhance the relationship with these stakeholders by helping

them to manage their own health. Patients' experiences with using digital gamification are analysed to establish how the industry can use this knowledge to build successful applications that can improve the interaction with patients. Patients' opinions about gamification in health related apps are compared with the business objectives of applying gamification, in order to analyse the outcome of this specific strategy in the context of overall corporate goals.

This study will take a qualitative approach and review theoretical stances in the area of gamification. Close attention is paid to the distinction between practitioner-theory and empirically tested, academic theory, although both types of theories will be evaluated with respect to their plausibility. At the end of the review of the current state of gamification theory, deficiencies and gaps will be discussed alongside an analysis of whether the assumptions of the authors hold true in the field of healthcare. This analysis and critical discussion of identified gaps will function as the overarching theoretical framework of this study.

1.2 Research questions

While the thesis will be guided by the overall topic of digital gamification in the European pharmaceutical industry, the study will more specifically attempt to answer the following three research questions:

RQ1: *"How is gamification suited for the pharmaceutical industry?"*

RQ2: *"How can digital gamification be applied by pharmaceutical organisations to improve the relationship with patients?"*

RQ3: *"How does the outcome of applying digital gamification in pharmaceutical organisations tie back to the business objectives?"*

The first question inquires about the barriers and opportunities for applying gamification in the pharmaceutical industry. The answer will be based on the information derived from eight interviews together with analysis of theory. The second question addresses identified factors in the interview data that are paramount for digital

gamification to be meaningful for patients and, consequently, will contribute to good relationships with pharmaceutical companies. The focus in the third question lies on the business objectives presented during two expert interviews and on relating these to the perception of the patients to determine how these two viewpoints match. The three questions are interconnected, as the relevance of RQ2 depends on the answers in RQ1 while RQ1 is partially determined by the answers unveiled in RQ2. The answer to RQ3 is based on an evaluation of the degree to which pharmaceutical companies are currently capable of specifying how gamification can be made meaningful for patients as addressed in RQ2. It is conceded that at present no simple answer exists to the research questions and that answering these requires an exploratory approach.

2. Industry background

This chapter serves as a background discussion of the key concepts related to the thesis topic. It will describe and evaluate the history and trends in the pharmaceutical industry and examine the market dynamics in order to create a roadmap for further analysis. Relationships between pharmaceutical organisations and its various stakeholders will be described and challenges as well as opportunities in patient communication will be highlighted.

2.1 Patients, physicians, and pharmaceutical organisations

Less than a generation ago, healthcare professionals like physicians were any community's sole gatekeepers to medical knowledge and insight (Accenture, 2011). One would visit their doctor and either follow the advice given, buy the prescribed medicine or be referred to a specialist or hospital with whom a similar one-way communication model between the patient and the caregiver was quickly established. Results from research carried out in the medical field were delivered to the world in a manner that was primarily accessible and comprehensible to healthcare professionals. Little contact between patients and pharmaceutical organisations existed, particularly due to the strict regulations prohibiting direct-to-consumer advertising (DTCA). To date only two nations permit DTCA, these being the United States of America (since 1997) and New Zealand (since 1981).

This paternalistic model illustrating the asymmetrical doctor-patient interaction where physicians use their knowledge and experience to decide on the requisite interventions to restore the patients' health or ameliorate pain is no longer typical (Chin, 2002). Due to the rapid change in how we communicate and the platforms we use for this purpose, healthcare providers and the pharmaceutical industry alike are now facing a whole new generation of patients who are much more engaged and take a proactive approach to managing their own health (Fokner-Dunn, 2003; Kummervold and Wynn,

2012). Via the Internet ordinary people can access a wealth of medical information and research and share their subjective experiences and thoughts on treatments. Similarly, the strong increased societal focus on health has been important for this growing wish to investigate and self-diagnose among the general public, which has turned healthcare into self-care. This transition has lead to more autonomous patients who advocate for greater control, reduced physician dominance and increased mutual participation (Kaba and Sooriakumaran, 2007). Arguably, the power to decide is gradually shifting from physicians to a new set of stakeholders who take a greater role in healthcare decisions as they actively seek medical information outside their physician's office. This shift is paramount for the public relations strategy in the pharmaceutical industry, as companies operating within this domain must embrace a new kind of stakeholder, commonly referred to as the empowered patient.

2.2 Industry drivers

When examining the political, legal, economic, and social milieu of the pharmaceutical industry, it quickly becomes apparent that a number of drivers currently push the industry towards new horizons. As already discussed, the power to decide is changing with the patient-centred approach gaining ground. As the patients become more influential, pharmaceutical organisations need to acknowledge the need for re-mapping their stakeholders. This also indicates that a sole focus on engaging physicians, politicians, payers, governments, patient organisations and key opinion leaders no longer suffice. This argument is supported by the medical marketing trends and business leaders' forecasts (see for example thepharmaletter, 1996). They bear witness to the fact that the somewhat aggressive sales activities targeting doctors are in decline while more attention is focussed on education and promoting dialogues with the patients via online channels.

Notwithstanding this development, evidence suggests that lobbying of politicians at a local and European level remains necessary, as these people eventually create and adapt the legislations related to e.g. market access, manufacturing practises,

pharmacovigilance[1], clinical trials and procedures for the marketing authorisation (cf. EU Directive 2001/83/EC and regulation (EC) No 726/2004). According to statistics of the EU Transparency Register, spending on lobbying activities in the pharmaceutical industry in the European Union exceeded 40 million Euros in 2012. Nearly half of this budget was spent on local lobbyists whose goal is to influence key decision makers (Nizinska, 2012). It is also noteworthy that many pharmaceutical companies failed to declare their lobby activities in the EU Transparency Register and that if the total expenditures were to be recorded, it is estimated that this would amount to the level of approximately 90 million Euros (Nizinska, 2012). This gap between what is being said and what is being done has caused the entire industry to be accused of being opaque and not open to public scrutiny. Therefore, it is debatable to what degree this traditional way of lobbying will be extant in the future, if not modified to better suit the demands of the patients who in turn influence political decisions.

Apart from adapting lobby activities and constructing a valuable dialogue with physicians rather than merely conducting sales activities, it is apposite to suggest that cooperation with patient organisations will become increasingly crucial. This argument is rooted in the growing emphasis on patient centricity and the fact that patient organisations represent the direct voice and ears of the patients. At the same time, patient groups are currently the most direct link that pharmaceutical companies have with patients.

With patients becoming more empowered and hereby having a greater say in regards to treatment, there is both an economic, social, and political interest for pharmaceutical organisations to engage in a dialogue with this group of stakeholders. Building a relationship with the patients will be beneficial for how the company is socially constructed by the members of the society to which it belongs. This greater amount of trust will be reflected in the political decisions, which in turn will influence the companies' future. However, given the prohibition of DTCA, pharmaceutical organisations have to find other ways of interacting with the patients. Thus although many pharmaceutical companies are fully aware of this growing call for new measures, the solution is not as easy as one could have wished for and patient interaction as well as cooperating with patient organisations has its opportunities as well as challenges.

[1] The pharmacological science relating to the collection, detection, assessment, monitoring, and prevention of adverse effect with pharmaceutical products (WHO, 2002).

2.3 Challenges in pharma-patient interaction

The European Federation of Pharmaceutical Industries and Associations (EFPIA) emphasizes that trust between the pharmaceutical industry and patient organisations is of highest importance and that the industry's primary obligation is to ensure that the medicines it produces benefit society (EFPIA, 2015). They further state that in order to protect patient interests, the interaction between the pharmaceutical industry and physicians must exclude unnecessary non-scientific activities, but ensure that professional and meaningful relationships with stakeholders are improved by providing transparent data and guarantee ethical practices (EFPIA, 2015). Based on the statements of EFPIA, it can be argued that focus ought to be put on creating a relationship with the patients that increases trust. Unfortunately, it is only around one fourth of patient interest groups in most areas who currently trust the PR activities of pharmaceutical organisations (Staton, 2014). But as stated by Stanton (2014) it is essential to win over the patients and despite the rather gloomy numbers, patients as well as patient organisations are getting far more adept at deciphering the degree to which the information they receive rings true to their experiences. Therefore being transparent will increase the level of trust.

Although gaining and maintaining trust is not something unique to the pharmaceutical sector, the process of doing so appears to be far more intricate for this particular industry for a number of different reasons. Firstly, pharmaceutical companies have for many years not regarded consumer trust as being pertinent to their success. After all, many pharmaceuticals (i.e. drugs) are indispensible, leaving patients without a choice and thereby rendering trust inconsequential (Estafanos, n.d.). However, this rather naïve attitude is no longer affordable and as thoroughly pinpointed by the industry media, today's healthcare environment is about choice and patient participation. Additionally, competitive products and biosimilars are claiming more market shares while patients have the opportunity to share their sentiment online, whether it be positive or negative (Estafanos, n.d.). Consequently, the era of instantaneous information and social media suggests that trust must indeed be earned.

Secondly, as also touched upon, there seems to be a historically bad publicity related to the pharmaceutical industry's lack of transparency. The industry has been accused of illegitimate contact with authorities and physicians (Nizinska, 2012). Thirdly,

Moynihan, Heath, and Henry (2002) posit among others that financial interests inspire the industry to make healthy people believe they are sick. They describe the medicalising of ordinary life as disease mongering, or put in other words as the widening of boundaries of treatable illness as a means to expand markets for those who sell and deliver treatments (Illich, 1990 and Payer ,1992). Pharmaceutical companies are actively involved in sponsoring the definition and promotion of diseases and therefore numerous people have argued that the social construction of illness has been replaced by the corporate construction of this (Moynihan et al., 2002).

Another factor that strongly impedes the creation of trust towards the pharmaceutical industry is the opposing interests between the industry and patient organisations. Although enough has been written in the industry press to conclude that alliances between pharmaceutical organisations and patient groups provide mutual benefits (Wyke, 2011), many also indicate that diverse interests hinder transparency (Kessel, 2014, Hughes, 2013). Based on a global survey with 850 patient groups, the research organisation PatientView estimates that despite the fact that millions of patient groups exist worldwide even the largest, most patient-orientated drug companies number their affiliations with patient groups in the low hundreds (Wyke, 2011). From reviewing the results of the survey, it can also be concluded that a communications revolution is gathering pace across the world, with e- and m-health (e.g. microblogs, online diaries and mobile apps) arming the patients with tools that enable them to improve self-management, conditions and clinical outcomes. Meanwhile, however, most pharmaceutical companies still seem to have little idea of how to become involved and instead they develop strategies in isolation without feedback from patients and patient groups (Wyke, 2011).

Finally, there is the balance between providing patient benefits versus meeting business objectives. These two goals are not necessarily contradicting, but if attention is too evidently focussed on the latter, it may impede the possibility of promoting trust with patients. All these hurdles have to be overcome before any pharmaceutical organisation can create a dialogue and a relationship build on trust with its patient stakeholders.

2.4 Opportunities in pharma-patient interaction

Despite its many challenges, communicating with patients also implies a number of opportunities. Although pharmaceutical companies and patient organisations driven by individual patients and experts clearly have some divergent interest, the two parties also have shared interests causing various forms of collaboration to have flourished over the years (Herxheimer, 2003). Some of the resources that patient interest groups lack, but that the pharmaceutical industry can provide, are project funding, information about treatments and diagnosis, lobbying for resources to help patients and business know-how (fundraising, publicising itself and expanding).

Pharmaceutical organisations, on the other hand, need help from patients with market expansion, more efficient and prompt diagnosis, branding its products and image as a socially responsible industry leader and lobbying against restrictive governments or health service policies and regulations (Herxheimer, 2003). As previously mentioned, the two goals of providing patients with benefits contra meeting business objectives are not inevitably at variance with one another. Patient benefits can logically lead to business objectives, as if the distributed product is successful, more patients will prefer this over competitors' products, which in turn will aid the company's brand.

Another opportunity for pharmaceutical companies, which a strengthened dialogue with patients will cultivate, is the potential of growing the pool of knowledge related to e.g. patient adherence and preferred communication channels. If more knowledge is generated, this opens up for better treatments along with improved product development, which will create goodwill towards the industry.

3. Literature review

The literature review will assess major theories about gamification and how these are related to the pharmaceutical industry. It will conclude with an outline of research gaps and propose a method with which this thesis will attempt to close these by originally adding to existing knowledge within the field.

3.1 Gamification: Moving from a broad to an orthodox interpretation

The term gamification originated around 2008 and had by 2010 been broadly applied by numerous industries (Lister, West, Cannon, Sax, and Brodegard, 2014). Because the usage of gamification has recently spread like wildfire, the original definition of the concept has by many users been forgotten, ignored, or simply remains unknown. This has lead to market confusion, inflated expectations, and implementation failures. Gamification has turned into '*something* involving games in serious situations', like for example the usage of computer games in schools; something that has otherwise been known as game based learning (Lieberoth, 2014).

However, there is a need for clarifying exactly what gamification is in order to conduct goal-oriented and critical research. One of the commonly used definitions is generated by Deterding, Dixon, Khaled and Nacke (2011), who describe gamification as: "the use of game design elements in non-game contexts". This is also the definition that will be used in this research. To better comprehend the core elements of gamification Deterding et al. (2011) elaborated on the definition by stating that gamification refers to "*The **use** (rather than the extension) of **design** (rather than game-based technology or other game-related practices) **elements** (rather than full-fledged games) **characteristic for games** (rather than play or playfulness) in **non-game contexts** (regardless of specific usage intentions, contexts, or media of implementation).*" (p. 5).

3.2 Successful design and implementation of gamification

Since the term gamification first originated it has been tested, analysed, and evaluated in a great number of companies within a large and heterogeneous collection of industries. Gabe Zichermann, Chair of the Gamification Summit and CEO of dopamine[2] identifies three drivers of successful gamification: *Feedback* (desired behaviour should be rewarded with e.g. points), *Friends* (by making it *social* and creating camaraderie, users have a personal investment and motivation for participating) and *Fun* (people are more likely to participate in something they find engaging and fun) (Lee, 2013 and Zichermann, 2012). Others have added more features to the list such as *competition* and *leaderboards* (these will promote prolonged participations due to the ability to compare own performance to that of others) (Playgen, 2011), *levels* (these will make the user feel that he or she is progressing) (Sillaots, 2014), *on-boarding* (getting in to the game easily) and *scaffolding* (guiding the user throughout the game experience) (Oxfeld, n.d.). Several people also point to the influence of users' real life perceptions when experiencing something as a character or avatar (see for example Kapp, 2012).

The literature less concerned with the technological game mechanics and tangible guidelines indicates that gamification is a cross-disciplinary activity involving both technology and design, but also psychology and business strategy. Ergo, the technical specifications and design aspects of gamification are not exclusively influencing its success. According to Lieberoth (2014), the legitimacy of gamification is to be understood as a particular form of behavioural design that explicitly or more wilily makes use of some of the same psychological mechanisms as those observed in games. Behavioural design covers the broad range of physical and digital design based actions taken to make people think or behave in a certain manner. He further states that it is crucial to be aware of the target group's typical motives and behavioural patterns in those situations that you wish to influence.

When going through the typical design instructions and checklists available online to guide designers in creating and applying quality gamification, many of the authors appear to ignore these psychological aspects that will inevitably influence the outcome. This study further identifies a lack of cognizance that 'fun', which is described as a

[2] An American agency creating gamified campaigns for employees and consumers.

requirement for success, is an abstract phenomenon, as this emotional response is not uniformly precipitated among different individuals. Similarly, it is important to acknowledge the fact that not all people invariably respond positively to competition (Niederle and Vesterlund, 2011). Besides thinking like a behavioural designer, more recent literature and research conducted in the area demonstrate that motivating the user to change behaviour is a complex series of steps that cannot be ignored.

3.3 Motivation

Historically, psychological approaches have focussed on two primary explanations for motivation. These are basic biological needs connected to survival and protection (e.g. hunger), and extrinsic rewards or punishments (Sansone and Harackiewicz, 2000). Nevertheless, humans (and certain types of animals) sometimes engage in behaviours that appear to be more harmful than functioning as a means to an outcome and thus cannot be explained by either of these two types of motivation. These behaviours seem to be associated with positive feelings of enjoyment and satisfaction. Consequently, researchers began to develop theories about intrinsic motivation in which the rewards are inherent to the activity (Sansone and Harackiewicz, 2000). Accordingly, extrinsic motivation drives behaviour due to external rewards or punishment such as monetary bonuses or withdrawal of these, while intrinsic motivation refers to behaviours for which there appear to be no reward except for the activity itself (Cameron and Pierce, 2002).

Although much research has been conducted to determine the best type of motivation at changing behaviour, the results are ambiguous. In relation to gamification, researchers such as Mekler (2014), Hecker (2010) and Nicholson (2012) point out that the typical use of external rewards in most gamification models can happen at the expense of internal motivation. Although other studies have shown conflicting results, Deci, Koester and Ryan (2001) found for instance in their meta analysis of 128 studies in educational settings, that almost all forms of rewards reduced internal motivation. If, however, the game design elements can be made meaningful to the user through information, then internal motivation can be improved as there is less need to emphasize external rewards (Nicholson, 2012). Further to this argument, Nicholson (2012) has introduced the issue of

'situational relevance'. With this he propounds that: "*having someone else creating goals for a user, is akin to an external judge deciding what is relevant to a query*" (page 2). By not involving the user, it is impossible to know what goals are relevant and interesting to the user. As stated by Detering (2011) a practical way to circumvent this problem is to allow users to customize their own goals. This, however, engenders a new challenge, i.e. to accurately support and guide the user in setting long- and short-term goals that are both challenging, achievable and yield the experience of mastery.

3.4 Academic theory

A number of academic theories and models have been developed since gamification first gained attention. Despite gamification yet being in its infancy some of the theories are grounded in vigorous research and bear potential for furthering our understanding of effective gamification. Amir and Ralph (2014) propose the gamification effectiveness theory. The theory posits four key drivers of effectiveness: intrinsic motivators related to the Self-Determination Theory (feelings of autonomy, relatedness and competence), extrinsic motivation (points, badges, levels and trophies), game mechanics (space, objects, actions, rules and skills) and immersive dynamics (factors such as a storyline that affect the user's immersion in the system).

These drivers are modelled as a multidimensional construct and formative factors of feedback, purpose, and user alignment refer to its dimensions. Ergo, to engage effectively with the gamified system, feedback must be given to the user after certain inputs. Poor feedback can lead to reduction in user participation. User alignment is defined as the process of aligning the purpose of the gamified system with the goals of the user. Amir and Ralph (2014) further suggest in relation to intrinsic motivation, which must not be eclipsed by extrinsic motivators, that autonomy can be realized when users choose their own goals. Competence can be supported by providing the user with challenging tasks and encourage further training while relatedness can be supported by urging communication on a social level.

Kappen and Nacke (2013) have designed a cumulative gamification model called The Kaleidoscope of Effective Gamification by deconstructing gamification in business

applications. The authors draw on a number of academic theories including the Self-Determination Theory (Deci and Ryan, 1985), the mechanics-dynamics-aesthetics framework (Hunicke, LeBlanc and Zubek, 2001), which establishes the relationship between the designer's intent and the user's experience, and game design lenses constructed by Shell (2009), which are heuristics that enable gamification designers to build purposeful and engaging games. Based on this research they have created a layer-based model to illustrate the interconnectedness of behaviour change in gamification. In a table (see table A) Kappen et al. (2013) describe how the kaleidoscope consists of a core, which establishes the nucleus of the player experience. Layers of motivated behaviour, game experience, game design process, and ultimately the perceived layer of fun surround the core. The outer layer is what the player can see and aesthetically experience in terms of the elements created in the other layers. Unless the player experiences motivation through a feeling of delight or fun when using the gamified system, the gamification is not effective.

Table A

Layer	**Attribute**	**Design guideline**
Motivated behaviour layer	Intrinsic motivation	Autonomy: Evaluate the needs to the demographic profile to identify values of personal importance to users such that their commitments to activities are internalized.
	Intrinsic motivation	Competence: Identify core values, which enable users to enhance their capabilities and skills.
	Intrinsic motivation	Relatedness: Create the possibility of social connectedness, acceptance, and

		validation within the gamification application.
	Extrinsic motivation	Badges, points, leaderboards, incentives and rewards are only of limited value. While the app can have some of these extrinsic motivation elements, ensure that there is an experience of "fun" and the element of surprise in procuring these elements. Tagging along these elements for the sake of reward will add no value to the gamification application. Aesthetic representation is another important factor attached to these rewards.
Game experience layer	Actions	Identify game mechanics, such as rules to stimulate intrinsic motivation, strategies to indulge the user in getting excited about gameplay, and sustaining their interest throughout the game's duration. All the sub-systems must integrate well with the motivated behaviour layer.
	Challenges	Ensure that the rules identifying the game mechanics are

		relevant to the intrinsic motivation elements so that the drive to continue playing the gamification application is based on the user's internal desires and aspirations.
	Achievements	Identify goals and objectives within the game that enhance the personal goals of the user and ensure its conformance to the motivated behaviour layer.
Game design layer	Interface, mechanics, models, principles	Identify goals within each subsystem to maximize the process of integrating sub-systemt to create a fun experience for the user, while ensuring motivation.
Perceived layer of fun	"Fun"	Identify the perceived layer of "fun" such as excitable attributes, elements of surprise characteristics, fun in accomplishing milestones and the of exciting hypermedia effects. These would influence and motivate the behaviour.

3.5 Gamification and patients

As previously discussed, the trend towards making healthcare fun and engaging is being driven by the e- and m-health movements, the rise of the empowered patient and the societal focus on disease prevention and patient centricity (Megget, 2014). The pharmaceutical industry needs to realize that more and more people's lives are supported by electronic processes and communication.

Accordingly there is reason to argue that the industry essentially has to speed up and enter the digital era the same way most other industries have already done, if they want to reach out to the patient where they are. The potential of digital gamification in the pharmaceutical industry is manifold; it can be used to engage, educate, persuade and motivate healthcare professionals, patients and the public. It provides the pharmaceutical industry with the possibility of communicating with patients while still complying by local regulation. It can be applied for crowd sourcing scientific research, detecting illnesses faster, patient adherence and tracking patient health (Megget, 2014). However, attempting to focus on all opportunities at once is not within the scope of this research. Focus lies on the potential of using digital gamification as a PR tool to enhance patient relations and build trust by involving and motivating the empowered patients to manage their own health. Arguably, the industry has several reasons to do so.

For example, a group of scientists from Harvard Medical School reported in May 1998, in the Journal of America Medical Association, that only 52% of patients on cholesterol lowering medication renewed their prescription after five years (Kelstrup, 2006). Pharmaceutical organisations lose a potential income because patients do not finish the recommended therapy. This testifies to the necessity of educating and motivating patients to improving compliance, not only for the benefit of the organisations, but also for the patients' own sake. Consequently, pharmaceutical organisations become meaningful players for the treatment rather than merely functioning as the suppliers of medicine.

Although digital gamification can possibly improve the interaction between the two parties, the paucity of empirical research implies that scholars still only have a vague idea if, how, and why gamification may work differently when applied on patients compared to

healthy individuals. However, some research has been carried out in related fields. Glasemann and Kanstrup (2011) conducted a study to establish how mobile technology can support young people living with Diabetes. The results indicated a concrete importance of these people's emotions and perspectives on their own illness for the design of mobile technology support.

Lister et al. (2014) carried out one of the first comprehensive reviews of gamification use related to exercise and diet. They examined gamification in 132 health and fitness apps as a potential influential component of consumers' health behaviour. Although their results showed that some components of gamification in health and fitness apps have become immensely popular, there appeared to be a lack of integration of important elements of behavioural theory from the app industry, which may impact the efficiency of gamification on behavioural change (Lister et al., 2014).

Although some studies have already examined certain facets of digital gamification in the healthcare industry, these have taken a quantitative approach, neglecting the need for creating a deeper understanding of *how* and *why* patients respond in specific ways to gamification and whether this affects their relation to the pharmaceutical industry. By generating this knowledge, the industry will be much better positioned when creating gamified apps for patients.

3.6 Identified overarching theories

When reviewing the major theoretical positions, it is clear that these are all linked to a number of dominating theories. Through analysis of these, this study proposes that three overarching theories guide the academic arguments. Firstly, the majority of authors base their approach on The Self-Determination theory. This macro theory focuses on the degree to which an individual's behaviour is self-motivated and self-determined (Deci and Ryan, 2002). It assumes that conditions supporting the individual's experience of *autonomy, competence,* and *relatedness* will foster the most volitional and high quality forms of motivation and engagement for activities, including enhanced performance, persistence, and creativity (selfdeterminationtheory.org, n.d.). It states that humans are active organisms with natural tendencies toward growing, mastering ambient challenges,

and integrating new experiences into a coherent sense of self (selfdeterminationtheory.org, n.d.). The theory further suggests that the more internalized the extrinsic motivation the more autonomous the person will be when enacting the behaviours.

Regarding the three core conditions, *autonomy* in gamification describes the ability of users to set their own targets that are of value to them because without some level of freedom it will be tasking to cultivate motivation and perseverance. When the user is a patient it is much more speculative to what degree of autonomy these people can have. Diabetics are restricted by their condition and therefore cannot enjoy the same level of freedom to set goals, as these could possibly compromise treatment. The argument then is whether or not autonomy can be applied on an equal footing in pharmaceutical gamification as in other sectors.

The second condition (*competence*) is related to the feeling of mastery as the player progresses from beginner to expert level. While this may hold true for regular users where focus is on the achievements in the game, this research further proposes that the feeling of mastery in the app must reflect the feeling of mastery in the patients' real lives, as their focus is arguably more on this than on the gamified system per se.

Relatedness, the third condition, is being part of a social network via the app, in which the user can feel accepted. Regarding the pharmaceutical industry, there is reason to believe that relatedness may either be even more crucial for gamification to be meaningful for the patients, as patients are an isolated group with a greater need for feeling that they belong, or less important because they are more preoccupied with their condition than with engaging in social platforms. Arguably, the right social dimension will be beneficial for effective gamification, while relatedness when not applied with respect to the patients' circumstances may be an unessential surplus feature.

The second overarching theory to which this study links most of the theoretical positions is primarily connected to the isolated gamification success criteria suggested by practitioners and experts and not to theories of intrinsic motivation. Most of these are rooted in The Theory of Operant Conditioning proposed by Skinner (1938), who based much of his work on Thorndike's law of effect (Thorndike, 1927). According to operant conditioning a subject is encouraged to associate desirable or undesirable outcomes with

certain behaviours. The theory disregards innate needs and focuses solely on external reinforcement to shape motivation and behaviour.

As seen in gamification, the conditioned reinforcements, which are typically points, badges, or other rewards are learned and thus become motivators. These assumptions may be supported in other areas, but when applied to healthcare situations additional consideration is most likely required. Given the circumstances, external rewards may no longer be sufficient motivators for behavioural change in patients. This argument is based on the conjecture that the external rewards or punishments in the app ought to be supported by rewards and punishments in the patient's real life for the tasks to be meaningful. Although gamification in other industries also links the features of the app to the user's real life, it is here argued that this link needs to be fortified by means of a comprehensive analysis of *all* influencing factors in the patient's life, to understand how their condition and treatment can be tied to the rewards and punishments in the gamified app. This argument rest on the fact that patients oftentimes deal with things affecting their entire life and body, and thus their lifestyle, whereas gamification applied in other industries may only focus on isolated behaviour. This could for instance be keeping your electricity usage below a certain limit for three months consecutively, which will then be rewarded by the electricity company who plants 10 m^2 rainforest in your name (Lieberoth, 2014).

Finally, many of the theoretical positions are connected to a third overarching theory called the Social Exchange Theory (Emerson, 1976). This theorizes that subjects will base their decisions on a cost-benefit analysis. The theory posits that individuals will repeat actions that they are rewarded for if they outweigh costs, which is aligned with the practises of gamification (e.g. go for a run every day and be rewarded with 10 points). Gamification is successful at spurring engagement because it amplifies the worth of engaging in certain tasks and increases the user's sense of personal investment (Jong, 2014).

This theory is not only related to the tangible rewards such as points, but also to the social network described by several authors. If an individual is invested in their social reputation, they are likely to be driven by reputational rewards, which in this instance would be a leaderboard that rewards high performers. In extension to the theory, this

study also argues that the key to driving engagement is identifying appropriate rewards for the target user, which in this case is a patient.

3.7 Summary

Gamification and its potential within the pharmaceutical industry has been discussed. The concept of gamification, which was defined as *the use of game design elements in non-game contexts,* is to tap into the basic desires of all individuals' impulses. These naturally tend to revolve around competition, status and achievement and are something embodied in us all (Playgen, 2015). Experts and academics describe several design and game mechanic elements as crucial for creating successful gamification. These include scoring systems, social interaction, fun, competition, leaderboards, levels, on-boarding, scaffolding, having a storyline, goal setting and having an avatar. It was argued that the gamified system should allow customization, such as choosing your own goals, but that this may prove difficult for patients. Moreover, internal motivation will be improved if the game is made relevant for the user through information.

Academic theories outlined how success depends on various drivers of effectiveness. These included receiving feedback, aligning the purpose of the gamified system with the goals of the user and designing gamification based on interrelated layers of game mechanics, external motivation, internal motivation and a perceived layer of fun. It was also argued that gamification includes a number of psychological concepts, especially regarding motivation. Accordingly one needs to think like a behavioural designer and understand these concepts in order to accurately map target group expectations and scientifically test the effects of gamification (Lieberoth, 2014).

One of the main themes in the gamification literature is that gamification can be used to encourage certain behaviours and increase involvement my means of applying external motivators that relate to our innate drive to compete, to feel part of a network, and to be rewarded. Although motivating behavioural change and increased involvement among patients are desirable, it was questioned to what degree regular, unadjusted gamification systems can be applied in the pharmaceutical sector.

Three overarching theories were identified as the majority of the theoretical positions were related to these. It was further argued that none of these overarching theories could accurately explain how gamification works in the pharmaceutical industry. None of the research about digital gamification and patients gives a detailed account of target groups, addresses how gamification will influence the attitude towards the industry, whether general gamification theory can be applied or how gamified systems ought to be altered according to the patient stakeholders.

These research gaps will be confronted in this qualitative study to create a more comprehensive model of gamification in the pharmaceutical industry and establish the usefulness of this tool in relation to public relations. On an extract level one can argue that for the gamified system to be successful, this externally induced system must be incorporated in the patients' own internal system to restore this, as it lacks the capacity to control health. Once the external system is fully integrated into the internal system, gamification is successful and can become part of a pharmaceutical organisation's PR strategy.

4. Research approach

This thesis takes an inductive research approach by starting with investigating and aims at formulating a model based on the results of the investigation. It moves from a set of specific observations to the discovery of a pattern that represents some degree of order among the given situation (Babbie, 2014). In comparison to a deductive approach that aims at testing a certain theory and starts with a hypothesis, the inductive approach was deemed more appropriate for this qualitative study, as it allows for an exploration of a previously researched topic (gamification) from a different perspective (healthcare).

4.1 Scientific standpoint

For this research, the theoretical contribution takes inspiration from three sources: Gamification theory, psychological theory of motivation, and interviews. While the theoretical contribution is based on these three sources, the interviews are rooted in constructivism. This paradigm was chosen as inspiration due to its' emphasis on real life relevance and the fact that a constructivist researcher recognizes that people form subjective understandings of their experiences and the world in which they exist (Young, n.d.). Whereas a post-positivist may employ deductive methods in order to reduce ideas to a small set of testable variables that constitute a hypothesis, a constructivist will search for patterns of complexity in order to generate new models or theories (Young, n.d.). As stated by Creswell (2003), the constructivist researcher asks general, open-ended questions allowing participants latitude to express meaning therein. Through this dialectic process, these expressions can be compared with other observations to produce interpretive notions of reality. Although inspired by constructivism, this research does not strictly abide by the principles of this paradigm, as two additional sources form the ground on which the theoretical contribution is founded. Rather, the core assumptions are supplemented with other analytical tools to produce more substantial claims (Finnemore and Sikkink, 2001).

Choosing a qualitative method was done deliberately to deepen the understanding of how gamification can be used as a PR tool in the pharmaceutical industry. A quantitative approach and methods pertaining to this would have yielded different findings unable to reveal the underlying factors that form the subjective opinions and attitudes in patients and how these match the expectations of the experts. The chosen research strategy has naturally led to certain techniques offered by the paradigm. True to the constructivist approach and the qualitative methodological underpinnings of this, interviews are being conducted with patients and experts from the pharmaceutical industry.

5. Methodological protocols

Question guideline sheets tailored to each of the participants were made and used by the interviewer doing the semi-structured interviews, to ensure that these were kept somewhat structured and focussed on the relevant topics. The question guidelines can be found in appendix A-C. In order to obtain the sought information without asking leading questions or excessively directing the conversation, the *researched questions* were all answered by means of asking *interview questions*. Below is an example of how the questions asked during patient interviews were structured according to the researched questions, which were not asked during the interview.

Table B

Researched question	Interview question
When does gamification motivate behaviour?	Why does/doesn't the app make it easier for you to live with your illness?
	What is the funniest part of the app? Why?
	How do you feel when your measurements aren't close to your goals or recommended goals?
Does rewards increase extrinsic motivation on the expense of intrinsic motivation?	Have you ever experienced a conflict between what you wanted to do (e.g. eat some cake) and what you had to do to reach your target (not eat some cake)?
	When you use the app, is it then primarily in order to make your graphs or score look better or is it because of your goal to become healthier?
Does the outcome tie back to the business objectives?	Do you think that the developer is trying to help you manage your health?
	What do you think the pharma industry gains from developing apps like this, which are free for patients to download?

5.1 Data transcription

A complete transcription and translation from Danish to English was carried out of one of the interviews (See appendix D). Due to a limited time frame, only relevant sections were transcribed and translated in the remaining seven interviews. The

transcriptions allowed for an interpretation of the material, which made it possible to identify those parts of the interviews that were deemed relevant for the research questions. The interviews were taped and transcribed verbatim to ensure that no pivotal content was lost. Subsequently the data was reduced and organised to identify emerging themes, topics, and patterns (example in table C). The categories are analyst-constructed as the researcher attached labels to observed recurring descriptions or tendencies. Owing to the relaxed tone of the interviews, much spoken language and words such as 'hmm' and 'ehh' were used in the conversation. In the complete transcription these words are retained, while however for the quotations used in the analysis, verbatim transcribed sentences that may cause confusion are slightly rewritten to clarify the true meaning.

Table C

Quote	Topic	Theme
"By making your health information more available to you, then people will take much more responsibility for their own health".	Drivers of digital gamification	Awareness
"Typically, I have an idea as to what may be wrong with me before I see the doctor. If I experience some kind of symptom, I'm usually able to relate it to something. And if there is something I'm unsure about I Google it".	Drivers of digital gamification	Empowerment

5.2 Ethical issues

Throughout the interviews the inquirer did not further marginalize or disempower the participants whose anonymity was protected if they were patients. This was deemed particularly important because the majority of the interviewees belong to a vulnerable population and were encouraged to talk about a personal and perhaps sensitive topic. To

address this matter all participants signed an informed consent form prior to engaging in the research, that they understood the aim of the study and that their rights were protected during data collection. See appendix F and G for copies of the consent forms.

Another ethical principle that is considered in this research involves data interpretation. In qualitative research it is expected that data is analysed in a manner that avoids misstatements, misinterpretations, or fraudulent analysis. The data must fairly represent what is observed (Lichtman, 2010). However, it is here acknowledged that taking a completely objective stance is unrealistic in qualitative research, as the researcher's own lens will influence the data interpretation. Qualitative methods have been criticized for their subjective analysis, but also their inability to replicate observations (reliability), to obtain correct impressions of the phenomenon under study (validity), and the reactive effects of the researcher's presence on the situation or individual being studied (Kirk and Miller, 1986 and McRoy, n.d.). Nonetheless, qualitative research allows for a more detailed scrutiny as long as the researcher engage in self-examination on a continuous basis to ensure that no biases or stereotypes influence the interpretation.

Moreover, quantitative research also accommodates unavoidable weaknesses. Like qualitative data analysis is subjective, so is the interpretation of quantitative findings. Furthermore, there is a lack of detail in quantitative research and the results may be misleading due to missing, influential variables. Accordingly, both qualitative and quantitative methods have strengths and weaknesses and each must be chosen according to the nature of the inquiry.

5.3 Limitations

Although conducting interviews allows the interviewees' subjective understandings to be apperceived, this method is limited by the fact that no conclusions can be drawn based on a single person's statement. This research concedes that statements expressed in interviews can solely be used for validating or rejecting theories and beget new theories, which can then be tested.

5.4 Focus area

5.4.1 The illness

In order to generate the most valid and reliable results attention is only focused on one illness. Diabetes (type-1 and 2) is chosen for several reasons. Total deaths from Diabetes are projected to rise by more than 50% in the next 10 years, with over 80% in upper-middle income countries (WHO, 2006). There are approximately 60 million diabetics in the European Region (10.3% of men and 9.6% of women). The prevalence of Diabetes is increasing among all ages in Europe, mostly due to increases in overweight and obesity, unhealthy diet, and physical inactivity. Diabetes is therefore a serious illness that requires attention. For an in depth description of Diabetes as well as the aetiology, risk factors and possible treatments see appendix G.

5.4.2 The participants

Six Danish patients were chosen for this research, all of who suffer from Type-1 or Type-2 Diabetes. It was decided to limit the interviews to Danish diabetics, to improve reliability. Despite the two types of Diabetes being inherently different these are oftentimes treated identically, like the patients also typically encounter similar challenges. It was therefore decided that both types of diabetics could participate on the premise that they underwent similar treatments. All of the patients currently use or have previously used one of the three gamified apps investigated in this study. To protect the anonymity of the patients, their initials rather than their full names are used for reference purposes. Furthermore, two expert interviews were carried out with relevant people from companies behind gamified apps. This was done in order to reach a deeper understanding of the reasoning and motives behind the creation and design of digital gamification in the pharmaceutical industry and to evaluate how this matches the needs and thoughts of the patients. Both of these experts were chosen due to their expertise in the area. They each work within or with the pharmaceutical industry and have both been part of the design and implementation of tools containing digital gamification. Accordingly they were able to deliver the sought information regarding the intentions and thoughts behind the usage of

gamification. See appendix H for an overview and description of the six patients and the two experts.

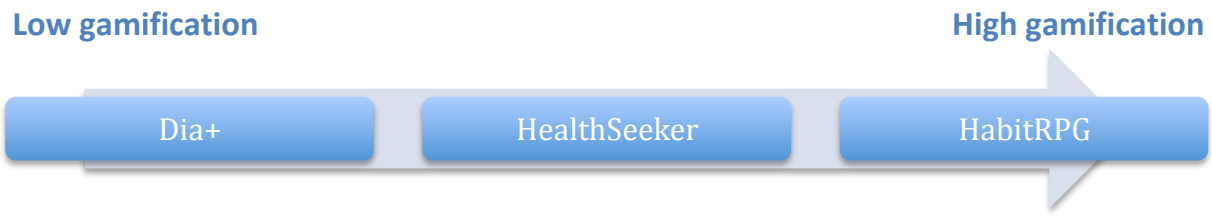
5.4.3 The gamified system

Gamification is not limited to the digital realm. Nonetheless, it is within this domain that it has most often been applied, hence why there is more literature about this and the persuasiveness of games (see for instance Ian Bogost's discussion about procedural rhetoric and the expressive power of videogames (Bogost, 2007)). Due to this, and the fact that one of the driving forces behind patient empowerment is the increase in digital tools, focus is placed on digital mobile applications, otherwise known as apps. This decision is also justified on the rationale that if a broader spectrum of gamified systems was to be explored, the validity of the results could suffer from the heterogeneous nature of the diverse types of activities in which gamification can be applied.

5.4.4 The applications

Three gamified applications were chosen for this analysis. The apps are positioned along a continuum depending on how many gamification elements they possess (see figure B). In the low end Dia+ is placed with only a few factors in the app being related to gamification. HabitRPG is placed in the high end, as this app resembles a normal game to a much higher degree than the other two apps being analysed. HealthSeeker is placed in the middle of the continuum. In depth descriptions about the three applications can be found in appendix I.

Figure B


Low gamification
High gamification
Dia+
HealthSeeker
HabitRPG

6. Empirical data analysis

The analysis of theory along with the formed impressions about the investigated topic during the interview processes has enabled a number of central themes to be identified, which are useful for answering the research questions. The structure of the following chapter is composed on the basis of five main categories under which each of the themes are presented and the interviewees' associated statements are preseneted. The data analysis will provide a descriptive account of the findings, which will be followed by an in depth discussion about the implication of these on the research questions. All quotes that are not directly cited in the text are referenced to in appendix J. In the transcripts the following annotations are used:

… Three dots indicate a pause in speech.

[…] Three dots in brackets indicate that a chunk of irrelevant words has been removed.

6.1 Drivers of digital gamification

6.1.1 Empowerment

It is inevitable that online channels have made it easier for patients to access information about health and treatments. Not only has this made patients more knowledgeable, but it has also qualified them to question diagnoses and therapies proposed by their caretaker, despite these still being commonly perceived as the trustworthy expert. L.E.W.H. states that:

"*Typically, I have an idea as to what may be wrong with me before I see the doctor. If I experience some kind of symptom, I'm usually able to relate it to something. And if there is something I'm unsure about I Google it. But having said that I trust my doctor to know more about these things than what I can read myself. Hypochondria starts one*

place, right, and that's if you seek too much information, because then all of the sudden you have seventeen different illnesses that matches your three symptoms."

There is a clear tendency to seek information online prior to seeking advice from physicians. However, this is not done without precaution. As described by many of the patients, they remain critical of the sources and prefer to gather information from professional websites rather than searching on private blogs or forums (cf. quote compilation A).

6.1.2 Awareness

With the digital development and the concomitant availability of information about illnesses, causes, symptoms, and treatment follows a natural increase in the number of people who become aware of their health. As expressed by Martin Simon Jørgensen:

"*By making your health information data more available to you, then people will take much more responsibility for their own health and go that extra mile, because the less transparent it is, the less up in your face, the easier it is to brush aside*."

The step towards increased awareness accelerates increased action, which is particularly important in the healthcare sector where patients' lives may depend on taking action. However, just because the patients are aware of their condition, there is no guarantee that they follow a treatment. As illustrated in quote compilation B, diabetics encounter numerous every day challenges that keep them from being compliant. The industry needs to be familiar with these challenges in order to create a gamified system that focuses on the right issues. Gamified health apps can be used to further raise awareness and function as a reminder. J.E.S. exemplifies this with the app HealthSeeker:

"*One of the best things about HealthSeeker is its ability to push my focus onto my good habits such as eating many vegetables and a lot of whole grain*".

D.S.P. who uses HabitRPG states that:

"*I enjoy setting goals and creating this overview over, well, my goals, my daily tasks and my habits, so that you can see what you are actually doing during the day. To begin with I actually perceived myself as someone with no bad habits, but when I sat down and started to add them in the app, I suddenly became aware of all these things that I do, which I probably shouldn't be doing. It gives you a better picture of those things and then it's easier to actually do something about it*".

Gamification not only engenders awareness about the illness. It also holds the potential of generating awareness about the organisation, which combined with illness awareness will increase the user base of a particular product. Martin Simon Jørgensen says that:

"*When it's a company like AstraZeneca making the app, then their reasoning is that they can get their name flagged and create some awareness about the company. But it can also be a plus for them to catch the attention of diabetics who don't know yet that they suffer from this illness, getting them started buying the medicine. […] So there is a noticeable sales or market growth in creating awareness. You need to be converted into a patient, or buyer of insulin... This business game, it's a race for the companies about getting this established and creating security and of course getting a critical mass. In every business it's a greater battle to win over clients from competing companies than it is to draw in someone who aren't already loyal to a certain brand*".

Both Martin Simon Jørgensen and Andreas Dam point to the fact that creating awareness is a multifaceted undertaking for pharmaceutical organisations. Awareness about illnesses leads to more patients being detected and awareness about the brand as part of the company's CSR strategy can increase trust and make them the preferred supplier.

6.1.3 Sub-conclusion

As discussed in the literature review, people have become autonomous in relation to their health, which has been driven by increased awareness. The interviewees validated this point. Digital gamification in the pharmaceutical industry is a natural by-product of this development and presents a win-win situation as both the public and the industry has something to gain from it. Pharmaceutical organisations have realised the market potential, while the public embraces this trend that is perfectly suited for their online lifestyles. Ergo, available online information has equalled increased awareness, which in turn has equalled increased action. Patients, however, do not consistently act on the knowledge they gain, as their internal system may fail to fully control the factors that influence their illness and health. Gamification, if constructed with patient challenges in mind, then functions as an external support system by means of creating a platform on which the patient can take better control over their illness.

6.2 Gamification design

6.2.1 Competition

Similarly to healthy people, patients generally find pleasure in competing. However, external rewards such as points and batches do not seem to be the main drivers of this. These features are positively associated with individual goals and tasks where no external competitor is involved, as they function as indicators of progress. Competition between two parties, on the other hand, are motivating due to the positive feelings associated with winning and negative feelings associated with losing. J.E.S. states that:

"*I enjoy the community in HealthSeeker because I can see how other people do and I sort of like to compare my own achievements with theirs*".

R.H.K. also describes that:

"*If I compare my score to my competitors' scores, I tend to sign up for an extra mission if I'm not satisfied with my position in the leaguetable. Being in an good position also makes me eager to keep that."*

As seen in the above, motivation related to competitions primarily stems from the internal rewards and the feeling of joy rather than external rewards such as points, while external rewards appears to be more motivational in relation to individual goal setting.

6.2.2 Customized goals

Defining goals generally appear to be motivating for patients, as they need something to work towards. However, defining goals is a complicated procedure that needs careful consideration. As previously argued, it is problematic if a user is not involved in goal setting as it is impossible know what goals are relevant to a user's background, interest, or needs. In a point-based gamification system, the meaning of scoring points is futile to a user if the activity that the points measure is not relevant to that user (Nicholson, 2012). Preferably goals must be identified to maximize the process of integrating these to create motivation as stated in the Kaleidoscope of Effective Gamification. This issue is illustrated in Dia+, where recommended goals are standard for all users:

"*I think that the recommended goals are good as guidelines, but they don't really say anything about the individual patient. I know for a fact, that because I run a lot, these goals are not really perfect for me. Then it's nice to be able to adjust them, as you can't generalize among diabetics".* M.W.

However, if allowing users to customize their own tasks, this may result in a lack of long- and short-term goals that are both challenging, achievable and yield experiences of mastery (Detering et al., 2011). In HabitRPG users are free to set their own goals, with only a few examples that are preset in the app when you download it. Several of the patients describe how it is difficult to be creative and set goals that are not obvious or dull. Thereby, guidance is a prerequisite for customization. HealthSeeker proposes a golden mean and manages to overcome the issue of individual goal setting by letting the user choose their own goals but only from a predefined range of goals related to one of the

app's four focus areas[3]. This position between the other two extremes appears to be ideal for fostering motivation:

"HealthSeeker lets you define your own goals, or rather, you can choose your goals from a list of different goals. That's pretty great because you have some guidelines and get some ideas, but you can still customize your tasks. It's like having a menu card where you choose a starter, a main, and a dessert. Here's the list, be inspired". J.E.S.

6.2.3 Guidance

As already stated, guidance of the user is closely related to customization. If the patient is to customize goals, then the patient must be guided to do so for the goals to be meaningful. This is particularly important in the pharmaceutical industry because despite many of the users being empowered they are a special group with more specific needs (see quote compilation C). Nicholson (2012) described that game design elements can be made meaningful to the user through information, which will lead to improved internal motivation. Nicholson's view on this is supported by the patient's positive commentaries about HealthSeeker's way of providing information when missions are chosen. For every mission that is picked by the user, information follows about the purpose and benefits of finishing the mission. This way, they are guided through the app's missions and understand why they do should pursue the goals they are urged to pursuing.

6.2.4 Social dimensions

Both of the experts acknowledge the need for social interaction on a two-dimensional level for the gamified system to be meaningful. The two dimensions are related to the interaction and sharing of information; one with other patients and one with healthcare professionals (cf. quote compilation D). For the latter this provides the patients with a storyline enabling them to have a quality dialogue with their physician. For the

[3] Healthy living, maintaining a low weight, controlling Diabetes and eating nutritiously.

former, this allows patients to share their thoughts about their condition with like-minded. Moreover, it creates an environment with shared values and perceptions of success, meaning that the external rewards will lead to more recognition from the others in that environment:

"*If you are in a community, which has some common values about something being good and if you then translate that into for example some point-based system, then it almost goes without saying that those who have the higher score, they get recognition from the others in the community and everybody wants that*". Martin Simon Jørgensen.

This argument is supported by the views of the patients. For example J.E.S. describes that:

"*Seeing how many points other people have makes me feel like I'm part of something. I'm not on the journey alone, you know. Normally I don't have a lot of contact with other diabetics, none of my friends have it, so that cohesion between the players is a good feeling. […] It's fine that you can share your progress on Facebook and earn extra points, I do that sometimes, but what I really like is the sort of data interconnection… There is something called 'cure for you', I think that's the public one, where the doctor can log on and you can log on and then you have your digital journal. And the more the app can incorporate this social dimension or interaction into your treatment the better. I find it motivating to think that my data can also be used in the bigger picture and find out if there is a connection*".

6.2.5 Sub-conclusion

Social networks, one related to other patients and one related to professionals, each leads to motivation to change behaviour but through different routes. Competition amongst patients is reinforced due to the social network of like-minded. Common values result in greater appreciation and acknowledgement from fellow patients, which translates into internal motivation. Interestingly, there is no clear link between external rewards and motivation in situations of social competition. On the contrary, external rewards promote motivation if these are used in relation to individual goal setting, as these are easy to grasp and thus fortifies the individual overview of progress. Goals must be chosen by the patient

but guided by the app. Moreover, the user must be informed of the reasoning behind the goals and their benefits.

6.3 Motivation

6.3.1 Internal-external dichotomy

Contrary to what some academics have suggested, nothing in this research suggests that external motivation happens on the expense of internal motivation. Rather, two things may be concluded about the relationship between intrinsically and extrinsically motivating factors. Firstly, it appears to be of utmost importance that the internal and external motivational drivers are linked. Thus being rewarded or punished externally with e.g. points must be linked to an internal feeling in real life. Secondly, it can be argued that in situations where external and internal drivers are dissociated, gamification appears to bridge the gap between the two, as long as the before mentioned condition is fulfilled.

"*It's easy to think that all actions should be driven by internal motivation but I don't think that that's ever going to happen. Gamification is a bridge between the external and the internal factors so it will never be the doctor who forces you to do something, but you do that same thing on other premises, because it's fun*". Andreas Dam.

J.E.S. describes a situation where the gamified app encourages behavioural change in a situation with dissonance between internal and external motivation, because the two drivers are linked. As seen in the quote, the app enables the patient to align immediate desires with what will create a better feeling in the long run:

"*I do experience conflicts between what I want to do and what I have to do to finish a mission in HealthSeeker. But even though I sometimes do decide to eat that piece of cake anyway, then I think that the first step to changing a bad habit is to make your self aware of its existence… And by having this inner conflict I definitely weigh up the long-term losses with the short-term win and I start to think about something pointed out to me by HealthSeeker that I probably wouldn't have thought too hard about before…I loose*

experience points… And then I start to realize how good I feel when I follow the app's advice". J.E.S.

6.3.2 Game-life connection

Several authors described how having an avatar in the game may help the player in real life. However, much in line with the abovementioned importance of linking the external and internal motivational drivers, it was found that the patients did not value the avatar primarily due to difficulties in relating it's progression or deterioration to the progress and deterioration in their own life. In quote compilation E patients describe their predominantly negative experiences with using the avatar in HabitRPG. It may be argued that using an avatar with no real connection to real life turns the gamified system into a regular game distinct from the life of the player.

Andreas Dam also states that:

"*If we want to keep patients motivated to use the app, it's important to remember that the gamified app isn't a game, it's actually a service that is supposed to help you in some way or the other… And it's important that you as a patient also experience this. So for example if you want to change your lifestyle over the next six months and you use the app for the purpose, then you need to be able to feel the results on your own body. Or at the doctor for example, your doctor prescribes a milder medication or other quality of life parameters. It has to be visual or something you can feel and understand. Even though gamification may be able to boost motivation, perhaps in waves, then I don't think that gamification alone is enough. You need to be able to see some results and it has to make a difference*".

This opinion is supported by the patient view:

"*If I eat an apple instead of candy, it's not like I do it just because of the points. But it's neither due to the feeling of being healthy, I mean, it's more of a psychological thing. I think the two factors complement each other and I guess that's why it feels so good. My health is reflected in the points and because eating an apple right here and right now*

doesn't make me slimmer or any different as I eat it, it's nice to have my good deeds visualized in the app with rewards. […] When I first started using the app I did it mostly for the points and getting better. But as I began to compete and finish missions I felt that they were nicely aligned with what I wanted to achieve in real life. I think that in the long run, it's important that I can feel the effect on my body and that it reminds me about what I can do". J.E.S.

6.3.3 A holistic approach to treatment

One recurring topic amongst the patients was the idea of creating a gamified system that makes allowance for all aspects of the illness and treatment. Living with Diabetes is not only about taking medication. This and most other illnesses require changes in the patients' lifestyle. The more holistic the app is and the better it is at considering and helping the patient with the entire spectrum of influential factors, the more motivated they are to use it.

"What Dia+ does is just pure tracking that you may as well do in Excel in my opinion. It only focuses on the numbers and the insulin and that's a shame. It feels like there's nothing else to it, to the illness, than that, and that's not really the truth with Diabetes." M.W.

The patient describes the app's failure of integrating other aspects of Diabetes than measuring blood glucose levels. J.E.S. who uses HealthSeeker explains how this app is good at taking a holistic approach:

"In the app there is a really good mix of the focus areas exercising, diet and medication. All the things that you need to consider as a patient".

Interestingly, the patient also points out that the app alone, despite incorporating several aspects of treatment, ought to contain or be connected to physical tracking devices:

"*The app competes with other apps in my phone , like Nike run for example. But if you could connect these two apps or alternatively have these monitoring functions in*

HealthSeeker, the functions like those in Nike run, so you know, so it gives you a complete picture of your health. There should be some interconnection of data". J.E.S.

In quote compilation F, the experts elucidate how this holistic approach is becoming a central theme for the pharmaceutical organisations, not only to allow patients to address all aspects of their illness and treatment, but also to create a network of relations between the patient and the healthcare system, rather than looking at the patient in isolation when designing gamification.

6.3.4 Overview

One of the most valued features in all of the three gamified apps is the ability to create a graphical overview of the progress, which allows the user to revisit previously set goals and evaluate if these have been met.

M.W. describes how the graphs easily illustrate your progress:

"*It's something everybody understands, like in school when they replaced numbers with slices of pie, that was something everybody could understand. […] And when I see that my numbers on the graph are too far from the target number, it always turns into a competition for me, I actually start measuring more often*".

In the patient's description it is clear that graphical cause-and-effect illustrations that are comprehensible are far more motivational than construing random progress and regression based on memory and subjective experiences. According to Martin Simon Jørgensen, making your tracking uncomplicated, interesting and interpretable by visualizing the progress is an obvious effect that is warranted. He argues that:

"*If you can stay abreast then you can adapt the necessary things as you go along so you won't get fluctuations in your blood sugar. If you can avoid these by having your finger on the pulse, on the blood sugar level, then you will avoid the harmful effects. […] What Glucodock does well is that it takes care of all the measurements and then it sends it to the app, which shows it graphically so that you can track the patterns of development and receive feedback in relation to the target numbers. So instead of having all these*

isolated occurrences, which you forget quickly and which doesn't teach you anything, then you can trace the patterns and it's made much more transparent when you have some of these unfortunate fluctuations and you can see how you may have been able to stay within the desired intervals for a long time and, you know, sort of tie a history to this."

6.3.5 Sub-conclusion

Internal and external drivers should be linked. Thus rewards in the gamified system must reflect feelings in the patient's real life. This holds true both for digital rewards given directly to the patient and for rewards given indirectly to the patient via an avatar. Digital gamification has the potential of bridging the gap between internal and external drivers, as it may encourage patients to adopt a certain behavioural pattern because they think it is fun rather than because they are being told to do so. Furthermore, gamified apps can be used to visualize progress that cannot be felt immediately by the user, which makes it more motivating to keep engaging in a certain activity with no short-term benefits. One may also argue that the gamified app must produce a complete picture of the user's health in a simplistic way. It must take a holistic approach and be characterized by all aspects of the treatment rather than addressing isolated factors.

6.4 Perception of the industry

6.4.1 Brand value

Both the experts and the patients were asked questions related to the perceived purpose and outcome of using gamification. Several things can be inferred from the responses. From the experts' point of view, they were able to give an account of why gamification may be a useful PR tool that can strengthen the organisation's brand. Although gamification is directed at the patients, Andreas Dam argues that much of the brand value is created via patient organisations and physicians if their views on the gamified digital systems are positive (cf. quote compilation G). Thus gamification, although used by the patients, will potentially also gain value if applied as an indirect PR

tool directed at the patients via their caretakers. Andreas Dam further describes how gamified apps also support the organisations' long-term business strategy. This discussion revolves around the future decision makers within the industry and how creating gamified apps may not depart as much from the original core business of creating medicine as one may think. Although medicine and devices remain the primary business, pharmaceutical sales and marketing in their original senses are argued to decrease massively in the future. The sales activities that pharmaceutical organisations are currently conducting towards physicians will disappear because socio-economics will become the future decision makers regarding prescribed medication. Within this scenario the experts argue that two extremes exist for which the pharmaceutical organisations must prepare:

"*One extreme is that pharma solely delivers medicine and their differentiation lies in their R&D phase… Who is better, faster and more proficient? Because there's nothing else, nothing about the wrapping or having good sales people, all that has been removed so you exclusively look at the effect of the pill. […] In the other extreme scenario, which is much more likely and already starting to happen, we talk about value beyond the pill, which is thinking about health from a more holistic perspective. This means that you as a pharma company don't just deliver the medicine, you deliver a variety of services that enable the patient to for example go to work, be more independent at home and what have you not. In this eco system pharma companies have the possibility of positioning themselves differently. […] Society will pay pharma companies for their expertise, so we have to re-think the whole value chain, where is it pharma should be positioned in the future?".*Andreas Dam.

As seen in this argument, current key decision makers will be replaced and pharmaceutical organisations must adapt to this change. One way to deliver value beyond the pill and embrace the holistic approach to treatment is to create digital solutions that make use of gamification to motivate the users. Andreas Dam further posits that:

"*The best pharma companies right now are building some uniqueness and some differentiation via great digital solutions. Gamification, if applied correctly is one way of making the digital better and unique. Right now, the companies doing this may not get credit for this among socio-economics, but what they get right now is branding and goodwill with doctors and patients. So in the long run the socio-economics will look at*

these services along with the medication and incorporate it in their algorithm and at that time it's all about whether or not pharma companies have done a good job at building a critical mass and increased the quality of life and things like that, which make socio-economics want to invest in it as they can see the positive effect on society or the individual. These companies will win in the long run".

The idea that gamified apps provide brand value is not limited to the experts' thinking. In quote compilation H patients describe what they believe the pharmaceutical industry gains from creating these gamified apps that are free to download. Despite resolute assertions that the industry is, and always will be guided by economic interests, the patients accept this without letting it influence their opinion about the use of gamified apps. They appear to value the companies' effort to approach them on a frequently used platform in a way that is fun and engaging. One of the patients, however, also depicts how the use of gamification is not invariably beneficial to the corporate brand, as a poorly designed gamified app will also link the user experience to the organisational image:

"I became aware of Astra Zeneca through the app. Both in a good and a bad way, I think. For me it's positive that they try to help and not sell, but given that their app isn't really very helpful… Well, that isn't exactly positive, is it?" D.S.P.

6.4.2 Trust

As described in the previous theme, there is a wish to generate brand value with digital gamification. One of the corner stones that will engender value is trust towards the organisation.The majority of the interviewed patients state that they are confident in the information they receive through the apps and that they see the development of these as a sign of the industry's attempts to help patients. However, they also propound that pharmaceutical organisations are partially driven by monetary gains. Moreover, patients and patient organisations are getting better at interpreting the information they receive regarding health (Staton, 2014). Accordingly, one may argue that transparency and truth telling are the superior methods with which to win over the patients. Digital gamification denotes a situation where both the industry and the patients benefit from it. If done appropriately, this is a means to advocate greater trust towards the industry.

6.4.3 Sub-conclusion

The value of digital gamification in the pharmaceutical industry not only lies in the relation that is created directly with patients but expands to value that is created through communication with caretakers and patient organisations. These are still a trusted source for patients, hence why a recommended app from healthcare professionals is likely to be taken seriously by the patients. Despite patients saying that pharmaceutical organisations are driven by monetary gains, they also believe that the gamified apps are created to help them, consequently increasing their trust towards the industry. The landscape is shifting and creating value beyond the pill will influence the future decision makers' choice on preferred suppliers. Digital gamification is a method to deliver this value as it increases trust towards those companies engaging in it. Arguably, this will affect the position of the organisations, as those who successfully create value beyond the pill now will become more powerful industry leaders in the future.

6.5 Digital gamification and the pharmaceutical industry

6.5.1 Gamified apps for patients

Contrary to deeming patients' needs and their special situation as barriers for applying gamification in the pharmaceutical industry, these circumstances actually provide a strong incentive to employ gamification:

"Even though everyone is a gamer to some degree, I think it's easier for me as a diabetic to relate to these gamified elements because if you can combine them with something that is actually important then I think it's even more motivating. I gain something extra from it and the results that you get, they are not just graphs or points or a score, they mean something for you and you can see and feel the physical results if the score fits the results. I don't think very differently as a patient contra a healthy person when subjected to games and fun, but I do need the app to be more specific and explanatory, I think that's necessary for me as a diabetic where everything isn't necessarily obvious or easy". M.W.

The patient describes how digital gamification is superior at spurring motivation because the changes that follow with using the app are highly important for his health. However, as stated by Andreas Dam, and which is also pointed out by patient M.W. the gamified app will only be successful if the gamification elements truly mirror the patient's real life:

"*That's the hardest thing about applying gamification to pharma, the whole process of ensuring that the elements like scoring systems are linked to, or that there is some clinical evidence linked to something relevant in the patient's real life".* Andreas Dam.

J.E.S. further explains that being part of a social community, like the one the apps provide, is even more important for diabetics than healthy people, who have access to this outside of the digital realm.

6.5.2 Target group

Using gamification in the pharmaceutical industry requires apprehension about the target group's natural diversity. As argued by the patients and agreed upon by the experts, not all patients fall into the same category in terms of personality, needs, and emotional and motivational triggers:

"*There is a huge diversity in the patient segments, some are what we call empowered, some are very strong and want to be involved in the course of their disease while others are still, I don't think that they have changed during the time I have been working with this, these are typically elderly or socially deprived or vulnerable groups*". Andreas Dam.

Patients may come from various backgrounds and feel that this predicament is not something normal that other people struggle with, so why should they? This potentially obstructs the patients' interest in engaging with gamified systems designed to motivate behavioural change. Accordingly, Andreas Dam argues that for the gamified system to work, it is crucial that the target groups are involved when designing gamification:

"*If you look at the process of creating gamification solutions they often end up pretty lousy. Many of these gamified activities or apps never really fly but rather become some marketing gimmick. Involving the right target group in the right way is extremely crucial when you design gamification and you can say that when just making information services then it's easier to shoot in random directions, but when you're making something that's meant to motivate people then it's important that you get it right regarding what motivates that specific group of people you work with. It mustn't become a push activity, it has to be co-creational*."

6.5.3 Sub-conclusion

Gamification has the potential of altering behaviour amongst patients if a number of requirements are met. The developer has to co-create the app with the patients in order to accurately align the system with the situation and characteristics of the target group. These findings support those previously discussed by Glasemann and Kanstrup (2011), who concluded that patient's emotions and perspectives on their own illness are paramount for the design of mobile technology support. Factors possibly perceived as obstructing digital gamification in the industry actually appear to induce motivation because the changes that follow with using the app are highly important for the patients' health.

7. Discussion

This chapter will relate the findings in the empirical data analysis to the research questions and theory discussed in the literature review. Table D recaps the questions that this study seeks to answer.

Table D

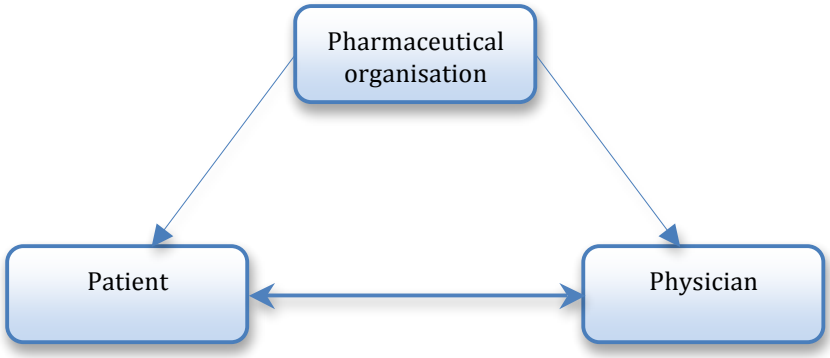
RQ1: "How is gamification suited for the pharmaceutical industry?"
RQ2: "How can digital gamification be applied by pharmaceutical organisations to improve the relationship with patients?"
RQ3: "How does the outcome of applying digital gamification in pharmaceutical organisations tie back to the business objectives?"

The first question inquires about the appropriateness of applying gamification in the pharmaceutical industry. This question was asked in order to provide a breading ground for further investigation into how this can be done. It was discussed in the background chapter that if gamification can be used on patients, this would enable the industry to achieve numerous goals such as improving the relation with the patient stakeholders by means of motivating them to manage their own health and thereby being perceived as trustworthy. According to this research, using gamification to motivate certain behaviour amongst patients does appear to be possible. Although patients do constitute a special group of individuals with certain needs, they respond to features of gamification similarly to healthy individuals. Patients also seem to be even more motivated to engage in gamified systems because they have more at stake.

What is especially intriguing about applying gamification in the pharmaceutical industry is the fact that it furnishes pharmaceutical organisations with the possibility of expanding their scope of communication while complying with the legislation. Using

gamification allows indirect interaction with patients without involving third parties, something that is otherwise strictly regulated in Europe. This interaction, which may engender brand awareness, can potentially affect the patients' communication with their caretaker and eventually their choice of therapy. Likewise, communicating with patients can also happen via the caretakers, if the gamified system has been properly branded, so the caretaker will recommend the gamified app to the patient. Accordingly, a triangular communication model is created where pharmaceutical organisations can communicate with several stakeholders directly or indirectly through each other (See figure C).

Figure C



As argued in the background chapter most patients feel more at ease with technology than ever before. This information was supported by the findings in the data. Patients have become more empowered, they communicate online and have access to all information related to themselves and their network on their phones. Accordingly, it is intelligible to communicate with them on digital platforms. A gamified mobile application is a way for pharmaceutical organisations to move into their consumers' lives, as this is where much of their life is happening.

While a number of challenges for pharma-patient interaction were described in the background information, several additional challenges were here identified. Patients live with every day issues that organisations must be able to understand, like they need to be able to understand their target groups' divergent nature with many different types of people being classified as patients. So while the improved self-care has engendered more awareness about illnesses, which in turn has increased the wish to take action, every day challenges for diabetics may hinder that action is actually taken. Gamification has the

potential of both increasing awareness and making the patients' lives with their illness easier, but only when the system is designed to accurately target those challenges. Therefore, the development of gamified apps should be built on the fact that patients are individuals. Moreover, certain factors addressed below in the answer to RQ2 should also be accounted for. Thus although various barriers complicate the process of creating interaction through gamification, considerable opportunities suggest that gamification is well suited for the pharmaceutical industry.

Second question seeks to establish what it requires for a gamified mobile application to function as a successful PR tool that will improve the relationship with patients. A number of theories were discussed in the literature review, which all described different elements such as points, leaderboards and competition that are necessary for gamification to be successful in forging long-term systemic changes where the user feel positive about engaging in the non-game activities. From analysing the interview data, several things can be concluded about gamification in the pharmaceutical industry versus regular gamification. Many of the elements result in similar reaction patterns in patients as in healthy people. Thus no features or approaches can be classified as unreservedly inapposite. Rather, a number of additional conditions must be incorporated in the design of gamification in the pharmaceutical industry.

As argued by Zichermann (2012) and in the Theory of Gamification Effectivenes (Amir and Ralph, 2014), feedback to the user is required for the gamified system to function. This argument is supported by data derived from the interviews in this research. For patients, it appears that the feedback functions as a reminding friend or coach, who keeps track of the patients' progress. Zichermann (2012) also states that the gamified system must contain a social network of friends. Although this also holds true in the pharmaceutical domain another social layer appears to be equally important for the gamified system to be optimally engaging. Having a social layer that encourages interaction with your caretaker and provides the possibility of sharing information with these will facilitate an improved dialogue between the patient and the physician, where focus lies on details and correlations that were previously invisible.

As already mentioned, patients respond positively towards the majority of external rewards that academics, who build their theory on Operant Conditioning, describe as

being the fundamental principles on which of gamification is based. Nevertheless, two additional things can be concluded about external rewards in pharmaceutical gamification. Firstly, this research suggests that rather than it being the scoring system per se that engenders motivation, the motivational feelings stem from the overview that is created. This is then supported by an external-based reward system as these scores, batches or levels further magnify the overview of progression. Secondly, external rewards must be applied only to the extent that they truly match the goals of the user. This was particularly clear when examining the patients' experience with using the avatar in HabitRPG. The lack of connection between the avatar's level and the patients' own progress in life has a discouraging effect on behaviour.

These arguments relate to The Kaleidoscope of Effective Gamification, which states that external rewards are of limited value and that adding these elements for the sake of reward will add no value to the gamification application. It is also in line with the situational relevance described by Nicholson (2012). The activities that patients are urged to engage in can more clearly be linked to their life if these are supported by explanations. Information therefore appears to be a centrepiece for patient gamification.

Although most gamification designers ignore it, many academics point to the importance of scaffolding and guiding the user to understand the purpose of the gamified system and how to use it. One method with which the usage complexity can be made less convoluted is by providing sufficient information and by using a simple design. A simplistic design is key to successful gamification when targeting patients whose lives are already wrapped in complexity related to their illness and treatment. The gamified app needs to make their every day life with Diabetes easier and not be a confusing element.

In the Self Determination theory, which focuses on what drives individuals to make choices without external influence, it was argued that conditions supporting autonomy, competence and relatedness would foster motivation. Although this cannot be entirely rejected, additional circumstances related to patients arguably complicate the original outline of the theory. In the literature review it was questioned how patients could be autonomous and set their own targets considering the intricacy of their situation. From analysing the data it is clear that patients must indeed feel autonomous for the gamified system to be engaging, but that detailed information must follow to guide the patients

when setting goals and explain how this relate to their health. The patients must also feel competent, but as stated in the Social Exchange Theory, the key is to identify the most appropriate rewards for the target user, so that the patient's progression in the game is linked to progression in life. The third condition, relatedness, was argued to be either much less or much more important for patients. As many patients are without a physical support network of other patients, the digital network appears to be of utmost importance. Furthermore, the abovementioned additional layer of relatedness with the caretaker, who uses the overview in their evaluation process, also strengthens motivation.

Consequently this research suggests that none of the three overarching theories of gamification or academic models are able to stand alone without moderation when applied in the pharmaceutical industry. Besides the additional conditions that have been mentioned, this study proposes a strong link to the Organismic Integration Theory (OIT) suggested by Deci and Ryan (1985). This theory is a sub-theory of the Self Determination Theory and explores how different types of external motivation can be integrated with the underlying activity into someone's own sense of self. Rather than stating that motivations are initially internalized or not, this theory introduces a continuum based on the amount of external control that is integrated along with the desire to perform the activity (Nicholson, 2012).

As seen in this analysis gamification for patients has the potential of bridging the gap between internal and external motivation, thus facilitating the internalization of external rewards. Initially, the individual patients may learn to introject a behaviour that was first extrinsically motivated by for example points. But over time, as patients see the outcome of the induced behaviour, they may begin to internalize it, due to the positive feelings associated with it. At this stage, the patients will identify with the behaviour rather than merely introject it and thus engage in this particular behaviour to align it with the identity (Deci and Ryan, 2000).

In addition to suggesting the OIT as being connected to gamification in the pharmaceutical industry, in-depth analysis of the qualitative data has qualified the framing of a model that is here proposed for digital gamification in the pharmaceutical industry. The model is rooted in traditional gamification theory and psychological theory of motivation, but incorporates some of the additional conditions that are found with

patients. The model, which is illustrated below and described in table E, attempts to demonstrate how various elements of gamification affect each other and how they are connected to motivation in patients.

Figure D

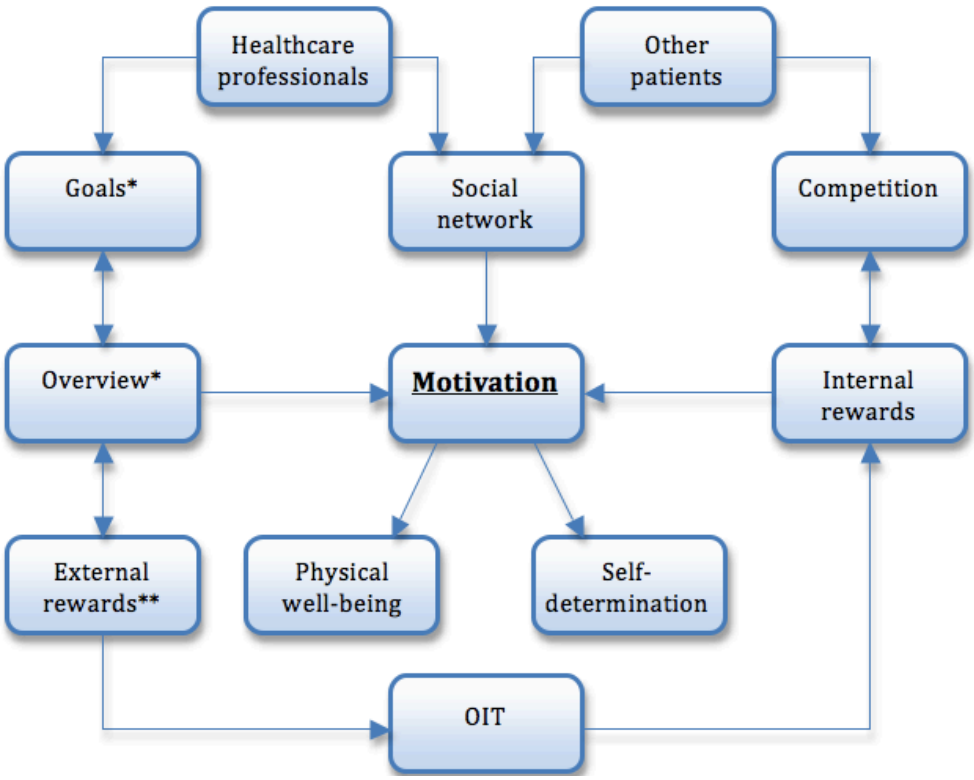


Table E

* Goals must be customized by the patient but guided by the app, which must provide information related to the goals. The types of goals must take a holistic approach and be varied to address all aspects of the patient's illness and treatment.

** External rewards must be linked to the patient's real life.

In the core of the model is the ultimate goal of digital gamification in the pharmaceutical industry; motivate behavioural change in the patient. With changed behaviour will physical well being follow, which in turn will cause behaviour to be self determined due to internalization of previously externally motivated actions, as stated in the OIT. Three primary parameters are concluded to have a direct link to motivation. Having an *overview* that highlights progress and regression makes the process more transparent and easier for the patient to work with. When the overview shows sign of improvement, the patient is motivated by the good work. When the overview shows sign of regression, the patient feels motivated to improve. *External rewards* such as points function as an indirect motivator that gamification ties to motivation via the overview. These tangible rewards reinforce the transparency in the overview. They are easy to grasp and illustrate progress very clearly, hence why the external rewards box feed into the overview box. *Setting goals* is also an indirect motivational feature that is related to the overview. They illustrate the direction in which the patient want to move in relation to the current overview, like the overview shows how far away from the goal the patient currently is. The second direct link to motivation is *internal rewards.* These are linked to the subjective feeling of joy, which is fostered by *competition*. Winning in turn stimulates the desire to further compete due to the positive associations, while losing may stimulate the desire to improve. Competition is also linked to the *social network* of other patients, which is another direct link to motivation. The social network of other patients consists of like-minded people with similar values and issues, meaning that the feeling of acknowledgement when winning or lack of this when loosing is more strongly shared between the members in the network. The other dimension of the social network is linked to healthcare professionals. They are not connected to competition and internal rewards, but are rather linked to goals and the overview, as the overview provides the

facilities for a quality dialogue with the caretaker, which can then, together with the patient, set some realistic goals. The external rewards are connected to the internal rewards via the OIT to illustrate how this theory lets the patient introject a behaviour that was originally motivated extrinsically due to the positive feelings associated with the outcome of conducting the particular behaviour.

After establishing that digital gamification is suitable for patients and how it has to be adapted for these stakeholders, the third research question was asked to investigate whether the outcome of using gamification on patients was compatible with pharmaceutical organisations' business objectives in the context of overall corporate goals. In order to answer this question, the business objectives initially had to be identified. This was done through a dialogue with the industry experts who were asked to pinpoint the purpose of using gamification with patients. It was discovered that the aim of applying gamification in the pharmaceutical industry is twofold. First objective can be perceived as part of a short-term PR strategy that will increase awareness, trust, and create a positive attitude towards the companies that apply gamification. This strategy is fruitful to the extent that the gamified app provides patients with a feeling that the company behind the app demonstrates a sincere wish to make their every day life more tolerable by means of providing motivation based on information wrapped in fun.

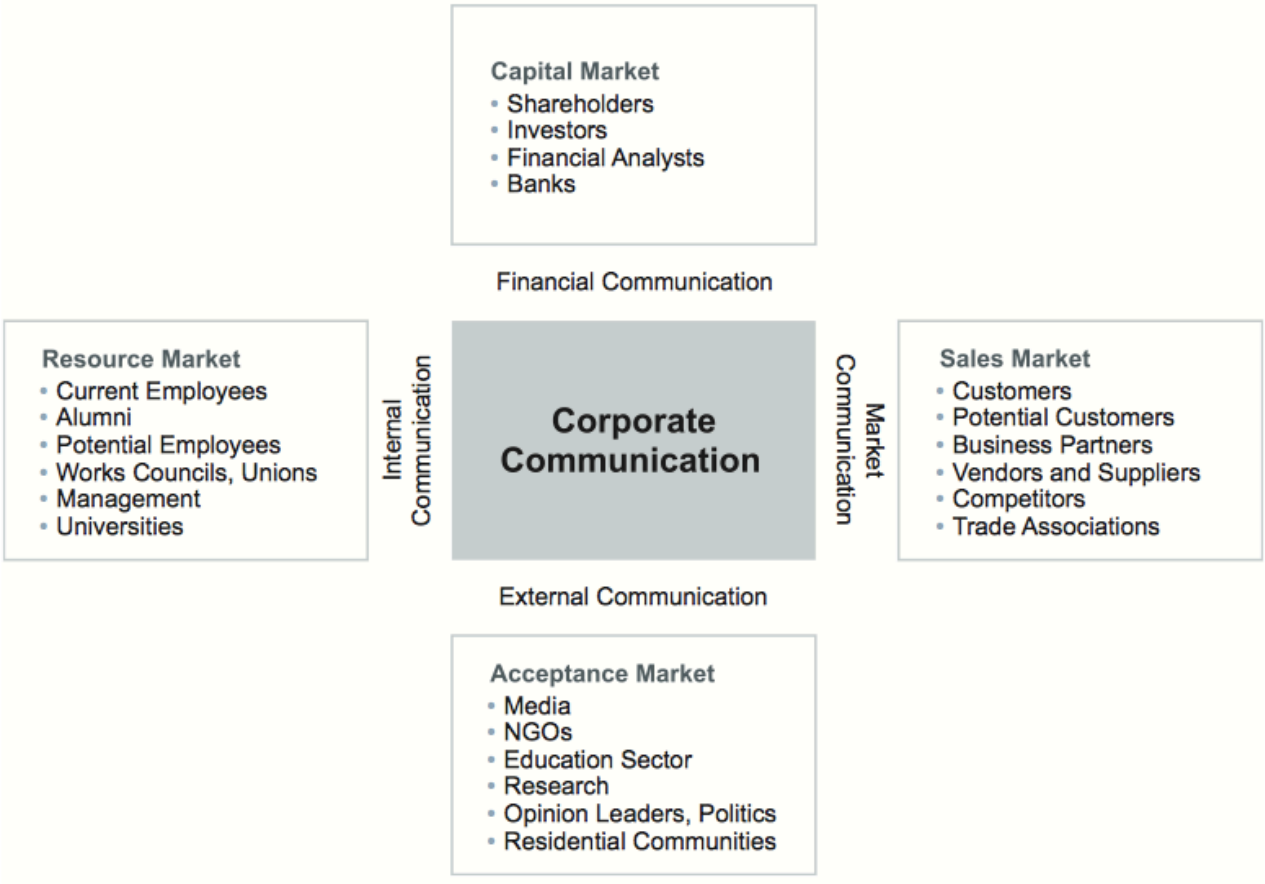
The first objective's success criteria also depend on the answers to the second research question, which attempts to answer how digital gamification can successfully be built to foster motivation and consequently enhance patient relations. Stating that the first objective is successfully met only partially reflects reality. From the interview data, it is clear that the companies have managed to generate a certain level of awareness. However, if the app provides no real value to the patient, no attitude or behavioural change will be induced.

The second business objective for pharmaceutical organisations using digital gamification is linked to a long-term strategy rather than relying on short-term benefits related to the end consumers. As argued by Andreas Dam, the industry can win credibility among the allegedly future decision makers by demonstrating thought leadership and the ability to provide a more holistic solution that will increase quality of life. Thus, the

organisations prepare for the future market by not only creating awareness and trust among the patients but also among politicians, socio-economics and patient organisations. Whether or not this objective is being met is yet unknown and future research into this matter is warranted.

These different, yet connected business objectives of using digital gamification in the pharmaceutical industry can be illustrated in the stakeholder model proposed by Huhn, Sass and Storck (2011), which is a tool to indentify key stakeholders.

Figure E



The model illustrates four classic stakeholder markets of corporate communication, which can be assigned to different communication functions (Watson and Noble, 2010). The long-term strategy of using gamification is related to financial communication where

the dialog unfolds between the organisation and the target groups representing the capital market including investors and analysts such as socio-economics. However, the long-term strategy also depends on external communication functions, which take care of the acceptance market, including politicians, to legitimize the social license to operate and to secure the organisational leeway. The short-term strategy is positioned within the market communication, which primary function is to create a corporate image and to build and ensure a sustainable relationship with e.g. customers and associations.

8. Conclusion

In this thesis a previously researched topic (gamification) has been studied from a different perspective (healthcare) to explore how European pharmaceutical organisation can build and use gamified mobile application to improve relations with patients. Several conclusions are reached.

Patients and industry experts both argue that awareness is important; constant reminders about healthy habits are pivotal for an improved lifestyle. Patients furthermore need to be motivated to act upon this and actively implement the required lifestyle changes. If pharmaceutical organisations succeed in helping the patients with overcoming challenges related to their illness by motivating them to enact the needed life style changes, it will increase the perceived trust towards their brand and thereby strengthen their relationship with the patients. This research argues that digital gamification is suited for this purpose, hence why it may be advantageous for organisation to incorporate digital gamification in their PR strategy. Nevertheless, the results also indicate that none of the prevailing models or overarching gamification theories sufficiently cover how digital gamification functions in the pharmaceutical industry. Although these theories provide relevant insight into the requirements and effects, certain conditions were found to be more important for patients than what is implied in the existing theories. These conditions include simplicity, guidance and adopting a holistic approach to treatment.

Some of the most important factors, which are also addressed by other academics are having a social network and creating a link between the gamified system and the user's real life. The additional social dimension with healthcare professionals, which is discussed in this research, highlights the strong need for creating an overview of the patients' health and goals. This is something that is otherwise ignored by current theories but which ought to be incorporated in gamified systems for patients. By acknowledging these additional elements, positive communication effects can be achieved and a relation can be created with the patient stakeholders. Accordingly, successfully designed gamification is connected to the Organismic Integration Theory, as gamification will foster motivation and allows the patients to integrate externally induced behaviour into their internal system. This introjection occurs due to the positive outcome of the specific behaviour in the patient's real life, which will be experienced in the long run. As such gamification is capable of bridging the gap between externally motivated behaviour and internally motivated behaviour.

It is concluded that using digital gamification is tied to two primary PR business objectives; one related to short-term benefits with a focus on creating awareness and trust with patients, another to a long-term strategy with a focus on market positioning in relation to politicians, patient organisations and particularly socio-economics; the future key opinion leaders. How the outcome of applying digital gamification is tied to these objectives depends on the ability of the organisations to acknowledge the additional elements of the gamified system that this study defines as essential when it is created for patients. If applied appropriately, gamification may be a useful PR tool to alter the perception of pharmaceutical organisations, which may give them a future competitive advantage in a market where new key opinion leaders and empowered patient stakeholders are shaping the landscape.

However, future research is needed about the implications of the proposed additional elements of digital gamification and how gamification influences the perception of the industry among patients as well as socio-economics. This research has laid the foundation for further analysis and provides an elaborated model of digital gamification. This model outlines a number of proposed interrelated factors that influence the effect of digital gamification on the motivation to change behaviour in patients, which will in turn strengthen their relation with the pharmaceutical industry.

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10. Table of appendices

Appendix A

Question guidelines, patients

- Please start by telling me a little bit about who you are, for how long you've had Diabetes and what kind of treatment you are in.

- Do you do any thing else to stay in control of your Diabetes? (exercise/diet?)
- Tell me a bit about the life with Diabetes; what challenges do you face in your every day life?
    - What does this mean for your social life?
    - What do you feel when this happens?

- How much research on symptoms do you do yourself when you have, or think you have any? (Do you have an idea about what may be wrong before you see you doctor?)
- Do you use the Internet to search for information about symptoms, treatments, good advice and so on?
    - What websites do you use?
    - Do you trust the information you get online?
    - To what degree do you trust the information you get from your doctor?
    - Why/why not?

- Please, tell me about Dia+/HabitRPG/HealthSeeker
- Why not/why does the app make it easier for you to live with your illness?
- Is there something about the app that annoys you?
    - What and why?
- What is the funniest part of the app?
    - Why?
- What do you think about the different graphs and scoring systems?
- How do you feel when you see your goals in such graphs or layouts?
- How do you feel when your measurements aren't close to your goals or recommended goals?
- What do you think about the reminder or the push messages?
- What do you think about the fact that you can share your progress and numbers with your phycisian? (Ask in cases where this is applicable).
- Who do you/don't you use the social functions in the app?
- What do you think about the fact that you can set your own targets? (ask in cases where this is applicable)
- Have you ever experienced a conflict between what you wanted to do (e.g. eat some cake) and what you had to do to reach your target (not eat some cake)? Describe.

- When you use the app, is it then primarily in order to make your graphs or score look better or is it because of your goal to become healthier?
    - Why?
- Do you feel that there is a link between what you see and learn in the app and your improved life style?
- Do you think that the app helps you control your lifestyle?
    - Why/why not
- Do you think that this app can help all types of people with improving their health?
- What would make the app better?
- Do you think that the developer is trying to help you manage your health?
- What do you think that the pharma industry gains from developing apps like this, which are free for patients to download?
- What is you general opinion about the pharma industry?
- Do you think that patients in general are just as/less/more susceptible to game elements?
    - Which ones and why?
- Is there anything you want to add?
- Thank you.

Appendix B

Questions guidelines, Martin Simon Jørgensen

- Please, start out with telling me a bit about who you are and what you do.
- For how long have you been working within this area?
- Do you think that there has been a development in the way patients gather knowledge and information about symptoms, illnesses and treatments? (Elaborate with example)
- How do you think this affects the pharma industry?

- Tell me about Glucodock and Vitadock – what is this all about?
- What is the purpose of Clucodock and Vitadock?
- What did your company want to achieve with this device?
- What thoughts did you have about the design and the different elements/funtions of the app? (personalised comments, comparison, mood, feedback (star rating) and adverbs)
- Why did you decide to focus on these things in particular?
- What thoughts did you have about the target group? (Age/personalities/etc.)
- What kind of effect do you want Clucodock to have on the target group?
- What is it about Glucodock that will motivate the patients to keep using it?
- What is it about Glucodock that will make the patient stick with the changed behaviour or attitude?
- Do you think that Clucodock has an effect with regard to building a relation between the patients and the pharma industry?
    - Which? How?
- What did primarily drive the development of Clucodock? (Who expressed a need?)
- Do you think that the motivational factors of gamification can be copied from other industries to the pharmaceutical industry without further alterations?
    - Why? How?
- How do you see the balance between making the patients do something (eg. Eat healthy food, workout, measure blood sugar levels) because they want to and because they have to?
    - Can you/how can you change that balance?
- Where is Clucodock placed in relation to your corporate strategy?
- What do you think companies gain from investing money in such devices or apps that are free or relatively cheap for the users to download/buy?
- What does the future look like for gamification and the use of fun/game elements in the the pharma industry?
- Do you want to add anything further?

Appendix C

Question guidelines, Andreas Dam

- Please, start out with telling me a bit about who you are and what you do.
- For how long have you been working within this area?
- Do you think that there has been a development in the way patients gather knowledge and information about symptoms, illnesses and treatments? (Elaborate with example)
- How do you think this affects the pharma industry?
- Tell me about your services – do you have an example where you use gamification, e.g. in an app?
- What is the purpose of this (example)?

- What can a pharma company achieve with this?
- What thoughts did you have about the design and the different elements/functions of the app? (personalised comments, comparison, mood, feedback (star rating) and adverbs)
- Why did you decide to focus on these things in particular?
- What thoughts did you have about the target group? (Age/personalities/etc.)
- What kind of effect do you want the app to have on the target group?
- What is it about the app that will motivate the patients to keep using it?
- What is it about the app that will make the patient stick with the changed behaviour or attitude?
- Do you think that the app has an effect with regard to building a relation between the patients and the pharma industry?
    - Which? How?
- Do you think that the motivational factors of gamification can be copied from other industries to the pharmaceutical industry without further alterations?
    - Why? How?
- How do you see the balance between making the patients do something (eg. Eat healthy food, workout, meause blood sugar levels) because they want to and because they have to?
    - Can you/how can you change that balance?
- Where is the app placed in relation to the corporate strategy of the company who is making app made?
- What do you think companies gain from investing money in such devices or apps that are free or relatively cheap for the users to download/buy?
- What does the future look like for gamifiation and the use of fun/game elements in the the pharma indutry?
- Do you want to add anything further?

Appendix D

Complete transcript of interview with Martin Simon Jørgesen

The highlighted text is what the researcher deemed particularly important and the accompanying text in the left column is the researchers own notes that was later used for data reduction and coding of themes.

NB: Okay, please tell me a little bit about your self, who you are and what you normally do, perhaps.

MSJ: Yes, my name is Martin Simon Jørgensen, I ehh work for Novo Nordisk with IT. I don't know if you know it, but we have NNIT, which is the old part of Novo Nordisk IT and which was been outsourced, and there are some who are left, which, you can say ehh not call IT, but are a little more anchored in the business, so we deal with, or I deal with many different people in Novo Nordisk who help diabetics in different ways, all the way from doing reserach ehh early research where you identify molecules to where you actually try to sell the products and

Municipalities require that the things projects they accept are user friendly.

MSJ: Yes, it is ehh a German manufacturer who makes these and have had focus on the bigger market and Denmark with its small population isn't super interesting to invest in, ehh but I helped them create and translate the app to Danish, which is at least the first requirement if you want to be in on the bitting rounds that the municipalities have this thing where ehh, well they ask the manufacturers to, you know, ehh throw in some good deals so that you can get for example cheap test strips and measurement apparatuses and the like, and as cheap as possible, and there is this requirement that it has to be ehh, it has to be an easily understood product, it is to be easy to use and such and then of course it has to be in Danish… Ehh, yes, so I had the app translated for them and worked on these practicalities such as the standard, ehh in Denmark we have agreed that it has to be millimol that is the standard measure unit whereas other countries use milligrams and things like that, so there is a pre-setting that I created in the app as well. Ehh… And then I have… Then I have begun to sell these on to eh MediDenmark. You can say it's kind of a partnership, and they take it seriously and throw in deals on these offers that the municipalities have. Ehh, and ehh, now we are also in dialogue with them regarding whether we should also do it with its successor, which ehh is more platform independent, this, the Glucodock, is connecting to your iPhone while this (holds up another model), can be used independently of the the control system, it also works with Android, and you can measure without having placed this, the measurement device, into the phone, so you can measure it and then you simply transfer it with ehh I think it is with a cable, but with the next generation it will be wireless. And from the app you will be able to gather all information, just like Steno has this site where all health information is saved, this app actually does the same ehh, where it will connect with some of the other devices that Medisana makes ehh, like instruments that measure blood pressure, fat percentage, temperature and those things, so everything, all these devises that you can use to measure your health and ehh treat yourself with, it will be able to gather in the app.

The future gamification apps connect with all platforms or devices and gather all information.

NB: Are you thinking about the new generation?

MSJ: Yes, you see, the drawing will obviously not be on the recording (drawing on a A3 paper)…

NB: That's okay.

MSJ: If we take ehh, Gluckodock, ehh (drawing), so you can say that this is a device. When you measure something with this then ehh, these measurements go into the app, Vitadock. And from this it goes… you can synchronize it so the data goes into… well… the cloud. Its just a web service, really, containing all the health information. And in there you can log in online ehh and see all these printed reports, which you can share with your doctor and things like that. But then, the next generation ehh or (turns back to drawing), you also have devices for blood pressure and fat percentage that are also connected and the arrows

The health information can also be accessed in the app.

Pharma companies want access to the information on patients.

The data can be used to explain health status with the patient's life and mood.

European legislation on data protection impeeds the possibilites of using private data.

Pharma companies must be fast leaders in establishing this to secure the future market.

can go both ways, so that you from the app itself too can see the other measurements. But then, with the next generations, Meditouch its called, which also connects with the same ehh you know, Vitadock online ehhh… And then imagine that as more and more devices are developed and we find more and more ways to ehh measure our health in an easy way ehh, then databases will flourish around us ehh, from public institutions to private companies trying to put the foot on the speeder and ensure that all those devices that they make can all feed information into this database and the company how has… Who can deliver the best service ehh that is user-friendly and complete ehh… With such a picture of your health ehh and maybe also able to add some functionality so that it actually works and it can interact with the databases or something… insureanceinformation or something, you can brainstorm about what you can use health data for. I'm sure that some companies would want to pay ehh to get access to these data because… pharma companies, because they could get an idea about kind of population we are actually dealing with and ehh that is almost the dream scenario that we can get a complete map of how ehh how the health situation is ehh… Based on real measurements, which are… For Vitadock you can also use different smileys so that you for each blood sugar measurement can note if you have just eaten or just have woken up or if you are happy or angry and ehh… When you then add up these data you will begin to see how it is connected with these… life quality parameters… What role or same variation there is in relation to the blood sugar and stuff like that. Ehh anyway, there are some really interesting perspectives in it but at the same time its also dangerous right, in Europe we have, what do you call it, we have legislations concerned with private data, which is being tightened more and more and the organisations can get fines if they are a little too careless with this information. And ehh in a world where even Visa and Mastercard and ehh Nasa and others can get hacked, then how well… you know… How well equipped are the companies actually, right, will you be able to blame them for not doing enough ehh so you see, there is a huge potential for the companies, those who will end up winning this game… Or yes, this business game, it is a race for the companies about getting this established and created security and of course get a critical mass so they can actually use it.

NB: You already explain a lot, but I need to ask you about something you said earlier. You said something about smileys…

MSJ: Yes

NB: Ehh this information is this also something that can be passed on to the doctor or is that only the measurements? Is it everything you tell this app?

MSJ: Ehh, I can't remember in detail what information goes into the rapport for the doctor. Have you used the Vitadock app yourself?
NB: I have tested it.

MSJ: Okay what you do is to put this thing into the phone…

NB: That looks smart.

MSJ: You don't have diabetes yourself?

NB: No, I don't.

MSJ: You put this one in, and ehh, then you take, it is just this finger prick tool, which is basically like a pen, however here you have a needle, and then you make a little whole in the skin and press out a drop of blood. That drop you put into this (holds up a strip) like a little testm and then you take it, and the blood is placed here, and then you put it in here (puts strip into device, which is placed in the bottom of the iphone) and then there is a small diode, which sends light through the strip and then depending on how well the light penetrates ehh the strip it will be able to measure ehh your level of blood sugar. Ehh, the more blood sugar there is, well yeah the more or less the light will be able to penetrate. Ehh, and then it can transform this into some conclusion and then ehh for each measurement you choose four to five smileys and click through them and then that is glued together with that point of data. Ehh, and then it can create some graphs based on this, where you will be able to see on the peaks or the valleys whether these ehh, what do you say, it's called something… kinds of psychosomatic parameters that are grounded in emotions of content. But I am actually… That was a long explanation, I can't remember exactly if you can send these data to your doctor, whether they also get all the other things, but you can always bring you phone and then navigate through these graphs and then edit them a little bit and use them as a storyboard to tell and be reminded what happened when I crashed completely and almost tore the head of my partner because you had low blood sugar or something like that. Even though you aren't diabetic you still know the feeling of having low blood sugar and then being short-fused. Ehh, with diabetics this feeling is just much more extreme.

Psycosomatic parametres are compared to measurements.

Data overview funtions as a storyboard that allows the patient to see when he/she is healthy/unhealthy.

NB: Okay, back to the design a bit later. Do you think that something has happened in the way patient gather information about symptoms, illness and treatment?

Patienterne are empowered

MSJ: Ehh yes, definitely. There is a clear movement towards taking greater responsibility for your own health. It's a little difficult to say what pushes this, but the medias' focus on health and ehh all these diets and such ehh, there er innumerable tv shows where overweight people are on this speed diet with Chris McDonald or what have you. Ehh, and ehh the positive, ehh or, most of these pep talks are about doing something about it, doing something yourself… If you think about it, it is sort of an implicit reason that you are where you are, because you haven't done anything, so actually it is your own fault in some way. And that may feel a bit uncomfortable, you may really disklike it, but ehh, yeah

The development partially takes place due to the medias' focus on health.

We are encouraged to take action our selves.

people start taking responsibility. And then you can say, that if that's what it takes, then that super positive.

NB: And do you think that something has happened in the way patient deal with their illness to?

The Internet has made data more available, which means that people acknowledge their health situation and allows them to find out how to change it.

MSJ: Ehh yes, ehh. The development of the internet and the fact that data is, information is available, results in people being able to more easily go from thinking that its okay, when they first realize that they have a problem and that this probably is due to their own actions or lack of actions, then its much easier to find that information and then find out what the best thing to do is, and then do it.

NB: How do you think that this affects the pharmaceutical industry, that there has been a mental shift with the patients?

Patient empowerment means that hard sell is not necessary because patients are already aware of their health.

The phycisians must be educated rather than being sales targets.

MSJ: Ehh… For pharma companies, you can say that… Well the pharma companies deal with many types of products but overall you can say that the business case for taking medicine and so have to actually do something, is ehh, it is not as hard sell because you can, with just a few pointers, then ehh the patient is actually aware about what's going on. Ehh, of course it is a little tricky that direct to consumer advertising in pharma is not legal in Denmark. Like in many other countries, pharma companies recently try to educate the doctors in stead. You will not get very far with hard core sell towards the doctors, because they have a limited amount of time and there are these nominations… they need to see a certain amount of patients and then you are not interested in sitting and listening to all that sales talk. Ehh but ehh, the doctors are on the other hand interested in being educated if are able to twist it correctly, so you can prepare them and get their attention. Ehh yes but… I'm not sure how much it changes the way pharma communicated, exactly because of these restrictions of direct communication, so we don't have all these commercials in the television for eh Viagra and other products.

NB: You have already said something about the device Glucodock and the related app, Vitadock. What do you think Medisana wanted to achieve when they developed this?

By creating apps, pharma helps patients live better lives.

MSJ: If they only sold this one, then you could say that it would be their intention to make a difference for diabetics, but they also sell a lot of other products, so, so, I'm not sure where the main focus is. Basically they wish to sell a lot of devices or drugs, and if they can get a large scale of users by doing this, so more people buy their products, ehh but they have decided to spend energy and time on doing this, and if they get the right certificates, then one can assume that they want to make a difference and provide some better circumstances for living. I guess that's what its also about.

NB: So what you're saying is that they want to make a difference, but they also want to sell more products?

MSJ: It is business after all…

NB: Yes, of course.

Focusing on CSR and being profitable are not two mutually exclusive factors.

MSJ: And my employer is known for being one of the stars when it comes to CSR, where it's a motivation to create a better world and make a difference for diabetics, but even for them, there are some powerful profit forces behind everything, but you know… One thing doesn't necessarily exclude the other.

NB: What thoughts do you think has been made about the design of the app, especially the different elements or functions. So some of the things I have observed, and as you also pointed out, are personal comments, smileys, comparisons, the graphs and then there is feedback I noticed with adverbs such as good, bad and low and then a star rating system.

The gamification must make the life with Diabetes easier.

For diabetics who wish to fit in with everyone else, it's easier to not take their medication.

The gamified app is related to their normal life because it is built into their phone and because other people understand apps better than needles and medication.

MSJ: Well ehh, it has to be easy for the user, it mustn't turn into a hurdle. For many diabetic it is… Well the fact that they have to measure their blood sugar and the fact that they have to do all these things… dieting, work out, Insulin or device and stuff like that… That is sort of a hurdle in their everyday life, which can be filled with all sorts of activities, especially for younger people, where ehh, imagine that you have just eaten or about to play a football match or are in the middle of a football match or stuff like that which for younger people are about performing ahh amoung social relations. In a situation like that it isn't super cool to pull back from everything and perhaps take a break while fiddling with this, which is ehh, different from everybody else. You want to fit in, and it just doesn't work like that, and it very easily turns into a negative experience and then we end up having many young people who decides to just not do it, at least they fit in then, although they may be on the limit of fainting and feel awful during the day or at the end of the day, but at least on the surface they are more like everybody else. Ehh, and with iPhones, even though Apple is on retreat, it is definitely a coolness factor for adolescents, which means that once you put it into this thing that is the most precious that young people have, the phone right, then suddenly it becomes something a little more exiting and if you can show your app and stuff like that, then its kind of high techish you know, ehh, yeah it can increase ehh adaptation, so people get on board faster.

NB: So it has to be easy for them and be something cool rather than a hurdle.

MSJ: Yes.

NB: What about the rating system with the stars? What's the point of those?

MSJ: Well. They function as an indicator for how well it goes, and its supposed to motivate the users. You know it from films and restaurants and such. You would rather watch the films with a high rating because you know they are good. You want a high rating as a diabetic because it will indicate that you have been good.

NB: And what about the descriptive words such as 'good and 'bad'?

You add some goals base don guidelines and get feedback 'verbal' from the app if you do well/badly.

MTJ: Yes well, these comments are based on some intervals that you have entered and ehh… there are some guidelines for those, which Steno has also approved, but it may be that some chose to have a smaller or broader interval, but that is up to the individual, and the comments are then based on how you are placed in each measurement. And the feedback is meant as a positive reinforcement, or as a reminder that things could be done better, and its like having someone to play ball with, like a friend you can talk to about all this and then its easy to feel motivated.

The Feedback gives positive/negative reinforcement like a helping buddy.

NB: Did Medisana think about the type of audience with this app? So personalities, age and so on?

Electronics are complicated for the elderly.

There is potential in the young generation.

It's easier to get new clients than competitors' loyal clients.

Early control is paramount.

There is also potential among the elderly due to e.g. the simple design of the iPad.

MSJ: Well ehh… Yes, but… It's a little curious because it is Powersenior who actually started selling these devices, so that is for the elderly, which are perhaps a little frightened of technology ehh, but even though that iPhones and apple's product in general are popular and get good userbility ratings worldwide, and from seniors too, then this is mostly happening among the younger audience, and its not a coincidence that they are chosen, because there is a potential. In every competition it is a greater battle to win over clients from other competing companies, than it is to draw in someone who aren't already loyal to a certain competitor. Ehh so you would be able to reach that part of the market, which you know, haven't been reached by anyone yet. And that is well spotted because as… As you might know ehh, it is very important to start early and establish the right lifestyle and be in control of your illness early on before the bad habits cement themselves and ehh… They damage the functions of the body, yes, so you might as well avoid them by stopping early on or by being good to your body. But yes, it could easily take the whole elderly group as they, ehh, like the iPad is the great enabler for the elderly who are not comfortable with control systems and laptops and so on.

NB: But doesn't the iPad have the same control system?

MSJ: Have you tried Windows 8?

NB: Yes, I have.
MSJ: They try to have the old Windows control system while at the same time making it kind of touch-ish, and that makes it really hard to navigate in. And if

Large icons and user frindliness are important enablers.

different error messages pops up, then you get confused, while the iPad is… the strength about that is that its user friendly and it has some large, understandable icons and you can easily go back to the previous site and so on. And ehh… It sort of resembles a newpaper, the way you can flip through the pages, and that has resultet in the elderly embracing it… and the digital gap ehh will definitely be reduced by introducing these user friendly devices.

The digital gap is reduced with user friendliness.

NB: It may be that this question is a little related to something we have already talked about, but what is the wanted effect of this device and app on the target group – so both young and older people?

Keeping ajour is crucial. This can be done by making it comprehensible.

MSJ: Well, an obvious effect that is warranted is to make it at easy and interesting to measure your blood sugar, ehh, you can stay abreast, that you can adapt the necessary things as you go along so you won't get fluctuations, its all about having a stable blood sugar. Ehh and ehh if you can avoid some of these fluctuations by keeping your finger on the pulse, on the blood sugar level, by measuring more times, then you'll avoid the harmful effects of the fluctuations. Ehh, so it's recommended by most pharma organisations, and this is backed up by the diabetes ambulatories, that you measure your levels rather often, perhaps up to four times per day, where in reality the average number of diabetics, type 2 in particular, is that you measure twice or maybe only one time per day. So there is ehh, we need to increase the number of measurements and the only way to do this is to make it easy.

Making it comprehensible will increase the number of measurements.

NB: So back to the ease and user friendliness?

Gamification can provide an extra push, so it's both easy and interesting to manage your health.

MSJ: Yes, and interesting! That's the gamification twist, so you actually get that extra pull, so its not just ehh so its not just the hassle you get rid of, but its actually also exciting and you get something out of it, you know.

NB: What is it about these apps and devices that will make it exciting? What will motivate the patient to keep using it and stick with this changed behaviour such as measuring blood sugar several times a day or eating healthy diet?

Gamification can make developmental patterns visible in graphs

MSJ: What Glucodock does well is that it takes care of all the measurements itself and then it sends it to the app, which shows it graphically so that you can track the patterns of development ehh and ehh so instead of having all these isolated occurrences, which actually aren't… You know… Which you forget quickly, and which doesn't teach you anything, ehh so by having this illustrated in some graphs then ehh, you can trace the patterns and you can make it much more transparent when you have had some of these unfortunate fluctuations and you can see how you for a longer period of time have been able to stay within the desired intervals ehh and sort of tie a history to this, ehh, that you can turn to and find renewed faith in you own discipline or hope for the future or what ever it may be… and ehh… I also think that it has a rather positive effect that you can

Having a storyline is positive as this enables a quality dialogue with the caretaker.

share the information like this with your doctor, because then you have a storyline to talk about, making it a quality dialogue about how things actually go rather than going to the doctor and then he asks 'how are you' and then the diabetics answers 'things are going alright' and he or she tries to remember whether 'ohh there was this one time' if he's that lucky that he'll remember, ehh, some of these things, right, ' there was this time where I got really dizzy' and stuff like that... 'And then I ate something and it was a bit better, but otherwise I don't think there has been anything'. Okay, the only thing the doctor can then say is to monitor the blood sugar and to take care of yourself and give some general advice about ehh exercising and things like that, but, but, if you can tell this whole story based on statistics and the points where you can draw lines between the other dimension, then yes, then it all becomes more concrete in some way ehh and then you can put words on those situations where the typical ehh, the bad measurements, right, so you can see every time you had these peaks, that happens at the same time as something else ehh and then, well, then it makes it easier to adapt your behaviour in the long run and establish a better life style or ensure that your eating habits are more stabil or that you get more sleep...

Statestics, points and other dimensions make it more concrete and easier to describe.

NB: People had diabetes before we knew anything digital and the Internet. Couldn't you just keep a good old fashioned diary?

Many diabetics contiously choose not to care too much about their treatment due to the struggle they face between living a normal life and the nuisance of their condition. The goal and the challenge is to create a balance between focusing on other aspects of life and having the condition under control.

MSJ: Yes... Yes. But people don't get it done. You have to be pretty passionate and dedicated to it. And maybe you can't be preoccupied with a lot of other stuff in your life. But ehh... yeah. As you can read in most diabetes groups on facebook and other places, the thing that annoys the majority of diabetics, a battle that they fight, is that an illness, ehh, this condition, mustn't take up too much space and time in their life. That's not what life is all about. Life is meant to be lived and this is just something that you have to handle on the side. Ehh, so ehh, perhaps that also why some patients make the deliberate choice to not care too much about it and the balance, how do you create, ehh, how do you make it possible to focus on all sorts of things at the same time as having this under control ehh and then you can't sit with your pen and paper and write page after page about it, and moreover, its quite difficult to... Or again, it's a hassle to show the trend for how you've felt based solely on the scribbles in a diary. Then you would have to make thorough qualitative analysis about the different entries and that's... it's just not happening.

NB: Do you think that the apps you have worked with have an effect in regards to the relationship between patients and pharmaceutical organisations?

Next step is to increase the use of gamification in apps to get the illness under control and get more patients on board.

MSJ: Hmm... That's also why I said yes to participate in this interview, because I think that's the next step in this blood sugar, ehh apps or diabetes apps we have, that is to focus on even more social dimensions like point systems or something else with how you ehh both get you diabetes under control, ehh that you can get a score on, but it could also be something about how one could help another and

The industry needs to create meaningful scoring systems.

get others on board and ehh… this diabetes journey or what ever you want to call it. Ehh, ther is… The industry needs to ponder over this and find out, what parameters that should be incorporated in this scoring system ehh, that you could compete about, right, see how many points I got and so on, and then you enter this kind of race where you get involved with these functions ehh… Of cause when you have a common goal among diabetics to ehh take more responsibility and you actually get the diabetes under control. And it would be perfect if you could make that happen, ehh then the companies can incorporate or help creating some structure that indicated a certain amount of points if you are in the top or something and then you could get your test strips paid or something like that.

NB: Can they do that?

MSJ: Well, the municipalities pay some of the costs for type 1 diabetics, while for type 2 diabetics, they typically get 150 strips and then they have to pay the rest themselves, which is quite problematic given they recommended number of measurements per day is three to four. Then what? What is 4 times 13, 60 or something 1200, 1300 something, right? Ehh, what about those 150, they barely get you started. Ehh, then you have to grab your own wallet and that may be complicated if you don't have that much money, then it's even more difficult ehh that's also another issue in the society, it's probably people who already have a bad lifestyle who lack money, and then you sort of leave them behind, right. That's another discussion. Ehh, but if had say Medisana who creates the app and sell the strips too, or someone doing the same with an app and a drug, if they could get a lot of extra users on board by using gamification ehh and help people get started with measuring their health cheaply or for free, then everybody wins.

Those groups in society with the least available resources get left behind.

Everybody wins with gamification if pharma can get extra users and the users can take control over their condition.

NB: So do I get it right when you say that this is about loyalty? For example having some strips paid if they got the best score, and they can only do this by using a specific app?

MSJ: The pharma and medico companies want as many as possible to use their products and use their apps, but it could also be that the company making this portal with all your health information has an open standard, which enabled all companies with different devices, if only they complied with different digital gaming criterias to how their strategy is, ehh… the interface with the device, it could be an open standard so that all could upload their info to that. So ehh, well… You can imagine that, if those organisations making this were only interested in creating agloabal community where, well, it could be free or not, but it could also be that they made their money in other ways. I like the idea of the business aspects in it, which ehh, lies behind it all.

NB: Okay, yes. When we talk about this ehh… If it were to be done on this global platform and the patients could use what ever drug, device and app they wanted, what does pharma gain from spending time and resources on developing these cheap or free apps then?

MSJ: Well, it sort of depends… If we take that organisations who create the app… Ehh, it could be the same as the one making drugs or devices, but it doesn't have to be. If we take those organisations who create the app, the interest lies in getting as many users as possible. And regardless of whether the app is free or not, if they have a hundred million users, then they'll be able to sell the app to someone else for a big sum. Ehh, no matter what ehh, if you can gain a critical mass, then this alone is valuable. It sounds a bit like the dot com days where you didn't really think about whether it was a at least somewhat sensible business case, as long as people used it then…

NB: Now you are referring to general companies, right, and not only pharma?

MSJ: Yes, but that was just to describe the motivation, to make it accessible, right. Then we have those organisations selling drugs and devices, they have the same interest, but with more focus on user products, ehh, every time you measure you blood sugar you use a strip for instance, which costs money… And ehh, when they have developed these things, they don't cost much to produce. So yeah, they only make money on every unit they sell. Ehh, no matter what kind of company it is, whether it's the app manufacturer or the app developer, or those who make devices or the consumer products such as the strips, or the taditional pharma companies selling the medicine, then ehh getting more people on board ehh means that more people want this and… ehh… Within economics it's a plus game when everyone can win from this, even the patient who comes in a learns to be in control of his diabetes and can live a better life because he doesn't go into a coma and things like that, at the same time increasing the likelihood of getting a longer life, because they take greater care of their body. Ehh, yes, it surely has potential that everbody can win.

Gamification engenders a win-win situation.

NB: But take an app like Dia+, which is developed by the pharmaceutical organisation AstraZeneca. That app is free to download. Do you recon that they will sell it some day?

Pharma's rationale for spending recources on developing apps is to get their name flagged and create awareness about their brand and make undiagnosed diabtics aware of the illness.

MSJ: No, they probably won't. When it's a company like AstraZeneca who's behind the app, then their reasoning is that they can their name flagged and create some awareness about the company, but it can also be a plus for them to catch the attention of diabetics, who don't know yet that they suffer from this illness, getting them started with buying the medicine. Ehh, in Denmark, I don't remember the exact numbers, but as far as I know there is an estimate saying

) There is profit and
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creating awareness.

) Early identification of
abetes is important and
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) It's a natural
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) It is the adolescents
ıo justifies the
istence of gamified
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d create good habits

that 300.000[1] people in Denmark suffer from Diabetes, and 150.000 of these are unaware of their condition. So there is a, ehh, noticeable growth… sales growth ehh profit growth, market growth in this ehh awareness part, that ehh you need to be converted into being a patient, or buyer of the insulin medication. It may sound a little cynical, but technically it's like that. There are lots of examples where people walk around for years and then perhaps they don't find out when they ehh, when it affect the bodily functions, like impaired vision or numb limbs and ehh… Some of the organs might start to fail in some way or the other and it's some pretty serious ehh, you can say, ehh, results or symptoms on the untreated diabetes. So it's clearly the early detection and identification of Diabetes that is super important. And if an app can make this possible then it's not hard to understand why they don't take 2000 kroner for downloading this app, then it's just about getting as many as possible to perhaps, to measure their blood sugar and begin to wonder about what it's all about, is this us? Gee, it is us!

NB: Did anyone express a need for the development of for instance Vitadock and Glucodock – are we talking about push from the industry or pull from the patients?

MSJ: Well Glucodock wasn't the first product that Medisana developed, they have a long history for, ehh I think that devices for measuring blood pressure were some of the first health measuring devices they made and that is primarily the elderly who need this, but also younger people.

NB: I'm thinking specifically on these apps that make use of gamification.

MSJ: Yes, and the reason I mentioned this with the blood pressure and the elderly, is because people from the organisation has sat down, and they want to sell a lot of things to the elderly, ehh, and then they have been able to see, okay, these are the illnesses that the elderly have, and then they have taken them one by one and ehh then you simply create some treatments, devices and drugs, which enables you to sell more to this segment, which does… Ehh… Old people have lots of money, they are the wealthiest in society actually, ehh the seniors, and they are the ones with the most acute conditions, the gradually impaired functionality, so ehh, it's kind of a natural expansion of the product range in order to address this, ehh, I don't think that they started out with… Ehh, Condititions such as gradually descreasing funtionality, so ehh they didn't go after the younger segment, because this was… it was just… I think it was

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[1] There are 320.545 people in Denmark suffering from Diabetes. This is twice as many as in 2005. 200.000 of these people are currently unaware of the fact that they are type-2 diabetics and it is estimated that 750.000 Danes have pre-diabetes. For the Danish government this adds up to a total daily cost of approximately 86 million Danish Kroner. (www.diabetesforeningen.dk)

It is the adolescents who justifies the existence of gamified apps, because you can identify the illness early and create good habits early on.

Diabetics express a wish. Convincing them is not required and they are a goldmine.

The gamified system should should have a community so patients don't feel alone with their illness.

The use of gamified apps is being boosted because its popular to be healthy.

targeting the elderly perhaps because of this great uptake of apple's products among the seniors and that's also why they have put extra effort into trying to make it user friendly by just touching ehh touching the screen to make these registrations. It may be that it was a little more complicated if it was strictly developed with the young generation in mind, who are little more handy with all these advanced functions. Ehh, but yes ehh, it is the adolescents who I think, that to a large degree, or who actually justifies the existence, who actually give this product the justice to exist, because this is where you can catch it early and create some good habits.

NBI: So no one gas approached Medisane and expressed their need for this, they have done the research themselves?

MSJ: Yeah, you don't have to read that many medical journeys before you have words like diabetes epidemic thrown in your face, and if a lot of people suffer from something specific, well, then there is a huge market potential. Then you don't have to convince them, those who are aware of their diabetes, they want this. And it's not like going out and buying a TV once every fifth year, this is every day, so it's... You see sick people are a goldmine.

NB: Talking about these gamification elements like the graphs allowing you to follow and compare your progress with others, setting goals, getting feedback and other allegedly motivating features ehh, that's something you see a lot of in other industries, especially the consumer industry... Do you think that it possible to take these elements, you mentioned a scoring system with points your self, but to take these and transfer them to the pharma and medico industry, to the patients, without changing the structure or the functions?

MSJ: Hmm, definitely, I think so yeah. Ehh, a lot of patients in general are stuck, they may feel that they are alone with their illness, right, so if they, through this app can connect with others in the same situation, then you quickly become part of this community, which can give, which can both be the source to good advice about how to tackle your illness, but also to... Well, it can provide a lift that you don't... You know, the feeling of hopelessness and being alone and being depressed and these things, but if you're in contact with a lot of other people in the same boat, then it sort of gets easier, you kind of carry the burden in another way. So ehh, it has a huge potential for pharma and we're a still only at dawn when it comes to all this.

NB: Well, the concept itself is not very old.

MSJ: No, and it's also being boosted by the fact that it's popular to be healthy. Ehh, not too long ago... In the 80s for instance, back then it was popular to drink and smoke on a whole other scale than what we see today. Now it has almost turned into something harmful the way we worship our own bodies and it is

completely acceptable to sit and you know, it's like your body is you temple and you do everything possible to get a acceptable body and ehh, it's popular to do an ironman and stuff like that. If you only run a marathon then it's almost insignificant you know, it has to be the triathlon or something before you can even think about calling yourself a serious exerciser.

Gamification elementes like competition can be transferred to pharma, if you create a community with shared values. These values can be translated into meaningful point systems where high scores gives recognition in the community.

NB: What about these competion elements that you often see in gamification and the point systems. Do you think we can use them as easily on patients and that it would motivate them?

MSJ: Yes, definitely. If you are in a community, which has some common values about something being good, ehh, if you then translate this into for example some scoring system, then it almost goes without saying that those who have the higher score, they get recognition from the others in the community and everybody wants that.

NB: How do you perceive the balance between getting patients to do something because they want to and because they have to? So for example exercising.

Gamification elementes complements the general feel good experience and strengthens the wish to continue the good habits.

MSJ: Well, the gamified app will ehh, the basic motivation for having such an app is to make it fun. It will create a natural drive to do more for it and the reason that you get this drive is because of this recognition and the points and that you get some more out of it than just a feel good experience of having been good to your body that day ehh because there are more to it, there is some identity ehh some confidence that is strengthened and people think you are good.

NB: So you think that these external drivers such as points can be even more motivating than knowing that you have been healthy today?

MSJ: For sure, and in this community you can have dialogue, let's say if you have been on a great wave for a while and then suddenly you get this decrease on your graph, you experience or do something unfavourable to your health and you just want to give up and stop being healthy any longer, then you will be able to use it as some kind of warstory in this community and then talk about what happened, and then there will probably be others who have been in a similar situation and this will have sort of a get-back-on-the-horse-kind-of-effect. Ehh, you cannot deny that, like when the whole fitness wave was topping, then there was someone who went in the complete opposite direction and says now it's time not to go to the gym, instead we need to invent some ehh start this lodge named the eating club or something and big cigar and what have you, and that's something you can't guarantee won't happen, but I think that... with gamification it will be legitimate to honor those who do it a lot. Ehh which is, you know, something else than the health wave, where if you are extreme and seriously worship your body then you might get labelled as shallow ehh what do you call it, yes, you know what I mean. So there is a flip side, which makes it less

legitimate, and bodybuilders they know it too, they may be the victims for much of this, but I don't think that there is the same downside ehh you know with this type of app, the gamified app.

NB: If you take a pharmaceutical company, which primarily earns its money on the drug it produces, or medico on the devises that it makes, and then look at these apps they develop. It's quite a different story, or quite a different product so to say. How are these apps related to the corporate strategy?

Creating gamification in pharma is driven by increased awareness and market growth potential.

MSJ: Ehh, there are two primary drivers. Like we talked about before with awareness, if you don't know that you have diabetes, then you use neither the medicine nor the devices or test strips. Ehh, and the increased awareness is partially driving the growth of the market. Already now there is an insane amount of people, especially in Asia for example, who have Diabetes, but who are unaware of this, and that's because the doctors are under-educated and ehh the patients don't know anything about this either. So there needs to be invested a massive amount of energy in educating both doctors but also the patients in this so they know what it's all about. So this was the one factor this thing about addressing awareness or lack of this, and another thing is this retention that exist if you ehh… If you have… ehh, if there's a link between these positive feelings of ehh getting in control of your Diabetes, if you connect these feelings with the brand you use, for example the devices, the strips with the medicine, the insulin products that you take, well then it sort of retains you, but I also think that ehh… Well for example with the insulin products it may be a little more objective in reality, it's more regulated…Well, most of the way it's the same because you always have a choice, an alternative to choose like Novo Nordisk or Sanofi Avensis among others. But perhaps patients are reluctant to choose what ever they know, and what they are familiar and feel safe with, and if you like that, then why change? You don't want to be the test bonny, you know.

Creating gamification in pharma is also driven be the patients' positive associations between the increased health and the company behind the app.

NB: Okay. How do you think that the future looks like for this digital gamification or the use of fun and game elements in the pharma industry?

Pharma can learn from other industries and incorporate more measuring techniques.

MSJ: I think that we will see more of it. Bout the questions is when they will get it. You know, if you look at Edomondo, they are really succesfull and with something as simple as jogging, right. Ehh, there is a lot to learn from there. But there is no doubt about the fact that there is a hurdle in making data easily available at the same time as you protect it ehh and ehh, one thing is that they are private data that you need to protect in Europe, but if you're also dealing with patient data, then ehh there are different legislations, one thing is that we try at the European level to set a common, shared standard, but within Europe it's a mess because the different countries attempt to put their fingerprint on this and then Germany are running their own race and France are running another one… Maybe these are just classical examples on countries where the laws are just completely different, they have some rules on where the servers can be

placed and things like that, and where the data for French patients has to be in relation to German data and all such stuff. Ehh, and that makes it a little tasking to establish this extensive platform, so there are some ehh IT technical stunts that has to be done to make this work and that makes it tempting to say, okay then we just start in the US where we have a lot of people and ehh many of them have Diabetes or escalating obesity, which also precipitate Diabetes, so it's rather tampting to just start there.

NB: Finally, I just wan to hear if you have anything else you want to add?

MSJ: Hmm, no not really, but I would like to hear more about you hypothesis.

Recording is turned off.

Appendix E

Consent form, patients

Lund University, Department of Strategic Communication
MSc Strategic Public Relations

Informed Consent

This Informed Consent Form is for Danish patients suffering from Diabetes type-1, who are invited to participate in the research project 'Gamification in the Pharmaceutical Industry'.

_____

Name of Principle Investigator

_____

Name of Organisation

_____

Name of Project

This Informed Consent Form has two parts:

- **Information Sheet (to share the purpose of the study with you)**
- **Certificate of Consent (for signatures if you choose to participate)**

You will be given a copy of the full Informed Consent Form

Part I: Information Sheet

I, Nanna Birkedal, graduate student at Lund University, am writing my Master Thesis on the use of gamification in the pharmaceutical industry. Please ask me at any point prior to, during or after the interview has taken place if you have any doubts or questions related to the consent form or the research in general.

This research will involve your participation in an interview that will take about one hour.

Purpose of the research

This research attempts to explore how pharmaceutical organisations can improve the dialogue with patients and help them managing their disease without necessarily doing this through third parties such as physicians. The focus is on the use of gamification (using game-based elements in non-game contexts) and what elements of this are best applied in the pharmaceutical industry.

Participant Selection
You are being invited to take part in this research because it is estimated that your experience as a type-1 Diabetic can contribute much to the understanding and knowledge of gamification practices in the pharmaceutical industry.

Procedures
During the interview, I, Nanna Birkedal, will sit down with you in a comfortable place agreed upon by us both. If you do not wish to answer any of the questions during the interview, you may say so and I will move on to the next question. No one else but me will be present unless you would like someone else to be there. The information recorded is confidential, and no one else except me will have access to the information documented during your interview. The entire interview will be recorded, but no one will be identified by name in the recording. The information recorded is confidential and will only be used for academic purposes.

Voluntary Participation
Participation and the right to withdraw at any time are voluntary, so that no individual will be coerced into participation.

You will be asked to share some perhaps sensitive or personal information, and should you feel uncomfortable talking about some of the topics, you do not have to answer the questions. You do not have to give me any reason for not responding to any question, or for refusing to take part in the interview.

There will be no direct benefit to you, but your participation is likely to help me find out more about how to improve disease management and the dialogue between patients and pharmaceutical organisations by means of gamification.

Part II: Certificate of Consent

I have been invited to participate in research about gamification in the pharmaceutical industry.

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions I have been asked have been answered to my satisfaction. I consent voluntarily to be a participant in this study

_____
Print Name of Participant

_____
Signature of Participant

_____
Date – Day/month/year

I have accurately provided information to the potential participant, and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.

_____

Print Name of Researcher

_____

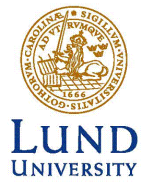
Signature of Researcher

_____

Date – Day/month/year

Appendix F

Consent form, experts



Lund University, Department of Strategic Communication
MSc Strategic Public Relations

Informed Consent

This Informed Consent Form is for Danish employers working with gamification or areas related to this, who are invited to participate in the research project 'Gamification in the Pharmaceutical Industry'.

_____

Name of Principle Investigator

_____

Name of Organisation

_____

Name of Project

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- **Certificate of Consent (for signatures if you choose to participate)**

You will be given a copy of the full Informed Consent Form

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This research will involve your participation in an interview that will take about one hour.

Purpose of the research

This research attempts to explore how pharmaceutical organisations can improve the dialogue with patients and help them managing their disease without necessarily doing this through third parties such as physicians. The focus is on the use of gamification (using game-based elements in non-game contexts) and what elements of this are best applied in the pharmaceutical industry.

Participant Selection
You are being invited to take part in this research because it is estimated that your experience as an expert within the industry can contribute much to the understanding and knowledge of gamification practices in the pharmaceutical industry.

Procedures
During the interview, I, Nanna Birkedal, will sit down with you in a comfortable place agreed upon by us both. If you do not wish to answer any of the questions during the interview, you may say so and I will move on to the next question. No one else but me will be present unless you would like someone else to be there. The information recorded is confidential, and no one else except me will have access to the information documented during your interview. The entire interview will be recorded, but no one will be identified by name in the recording. The information recorded is confidential and will only be used for academic purposes.

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There will be no direct benefit to you, but your participation is likely to help me find out more about how to improve disease management and the dialogue between patients and pharmaceutical organisations by means of gamification.

Part II: Certificate of Consent

I have been invited to participate in research about gamification in the pharmaceutical industry.

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions I have been asked have been answered to my satisfaction. I consent voluntarily to be a participant in this study

_____
Print Name of Participant

_____
Signature of Participant

_____
Date – Day/month/year

I have accurately provided information to the potential participant, and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.

_____

Print Name of Researcher

_____

Signature of Researcher

_____

Date – Day/month/year

Appendix G

Diabetes: Aetiology, risk factors, and treatment

Diabetes is a group of metabolic diseases in which the person has high blood glucose (blood sugar). This is due to either inadequate insulin production, or the fact that the body's cells do not respond properly to insulin, or in rare cases both. Insulin is a hormone that converts sugar, starches, and other food into that energy the body needs to function properly (American Diabetes Association, n.d.).

Normally the two types of Diabetes are labelled type-1 and type-2.

Diabetes type-1

This type of Diabetes is sometimes called "juvenile" diabetes, because it usually develops in children and teenagers, though it can develop at any age. With type-1 Diabetes, the body's immune system attacks part of its own pancreas. The immune system mistakenly sees the insulin-producing beta cells in the pancreas as foreign, and thus destroys them. This attack is known as autoimmune disease. These cells, called islets, are the ones that sense glucose in the blood and, in response, produce the necessary amount of insulin to normalize blood sugars. Insulin serves as a "key" to open cells, to allow the glucose to enter and allow the body to use the glucose for energy. Without insulin, there is no "key." Accordingly, the sugar is not removed from the blood. As a result the body's cells starve from the lack of glucose. If left untreated, the high level of "blood sugar" can damage several bodily functions and organs such as eyes, kidneys, nerves, and the heart. If uncontrolled, the illness will be fatal (diabetesresearch, 2014).

The therapy used for treating Diabetes type-1 is typically insulin injections in combination with a healthy lifestyle. This external source of insulin functions as the missing "key" that brings glucose to the cells. The challenge with this treatment is that it is difficult to know the exact amount of insulin that should be injected. The amount is based on many factors, including food, exercise, stress, emotions, and general health. As these factors fluctuate greatly throughout the day, deciding on what dose of insulin to take is a complicated balancing act. Taking too much the body will burn too much glucose causing the blood sugar to drop to a dangerously low level. This condition is called hypoglycemia. Taking too little, on the other hand, will mean that the body is starved of the energy it needs causing the blood sugar to rise to a very high level; a condition called hyperglycemia, that can also cause long-term complications.

Diabetes type-2

The other type of Diabetes is much more common, and is non-insulin dependent. This is also called "adult onset" diabetes, since it typically develops after age 35. With type-2 Diabetes the body is insulin resistant, meaning that the body does not use the insulin properly. At first, the pancreas makes extra insulin to compensate for this, but over time it cannot keep up and produce the required amount of insulin for the blood glucose to normalize.

Often, type 2 is tied to people who are overweight, with a sedentary lifestyle, although genetics may also be a contributing factor. Treatment focuses on diet and exercise. If blood glucose levels remain high, oral medications may used to help the body use its own insulin more efficiently. In some cases, insulin injections are necessary (diabetesresearch, 2014).

Appendix H

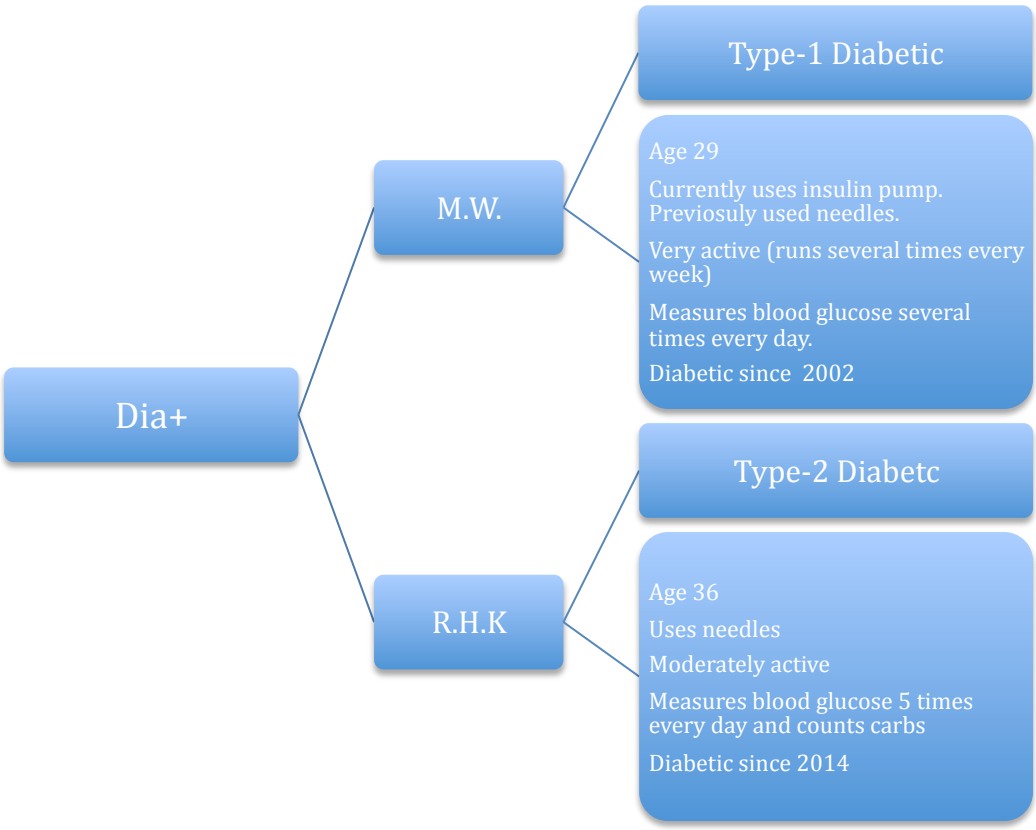
Participant overview

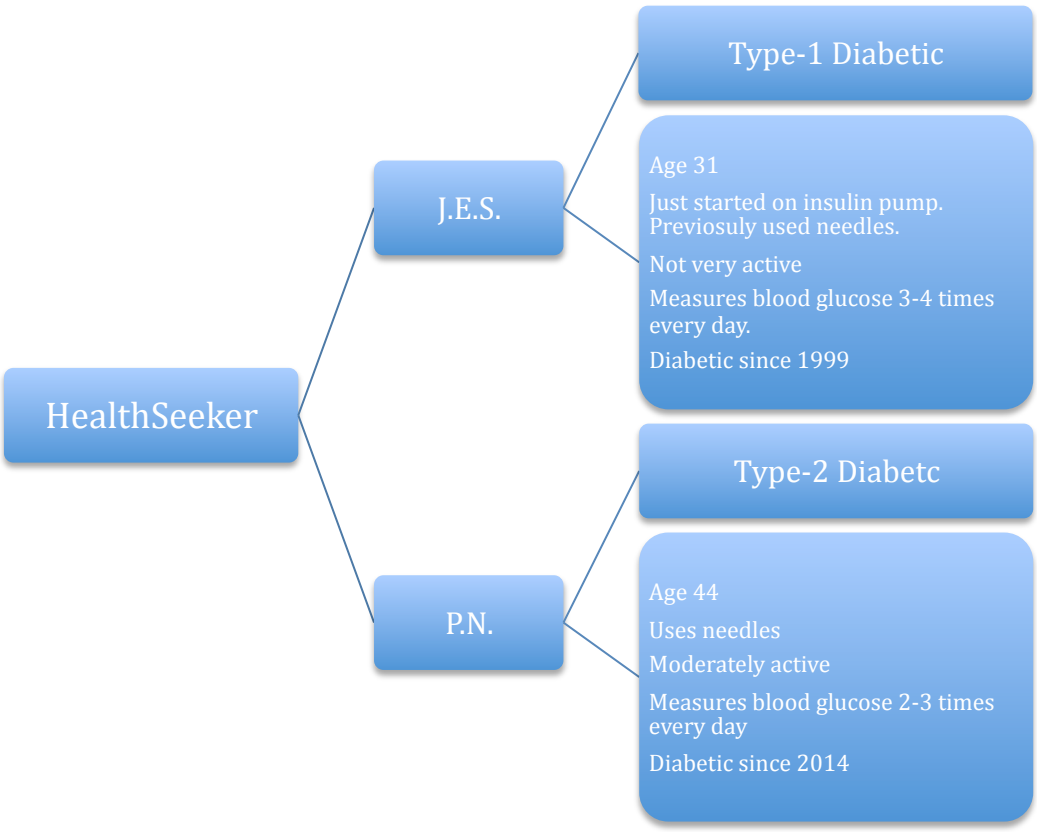
The Experts: One interview was with the System Manager & Advanced Business Analyst, Martin Simon Jørgensen from Novo Nordisk, who has previously worked for Steno Diabetes Center[4] and who was also part of the team that developed and launched the device 'GlucoDock'[5] and the app VitaDock funded by Medisana. The other expert interview was carried out with Andreas Dam, the CEO of Daman; an agency working with design and implementation of digital media strategies for pharmaceutical businesses.

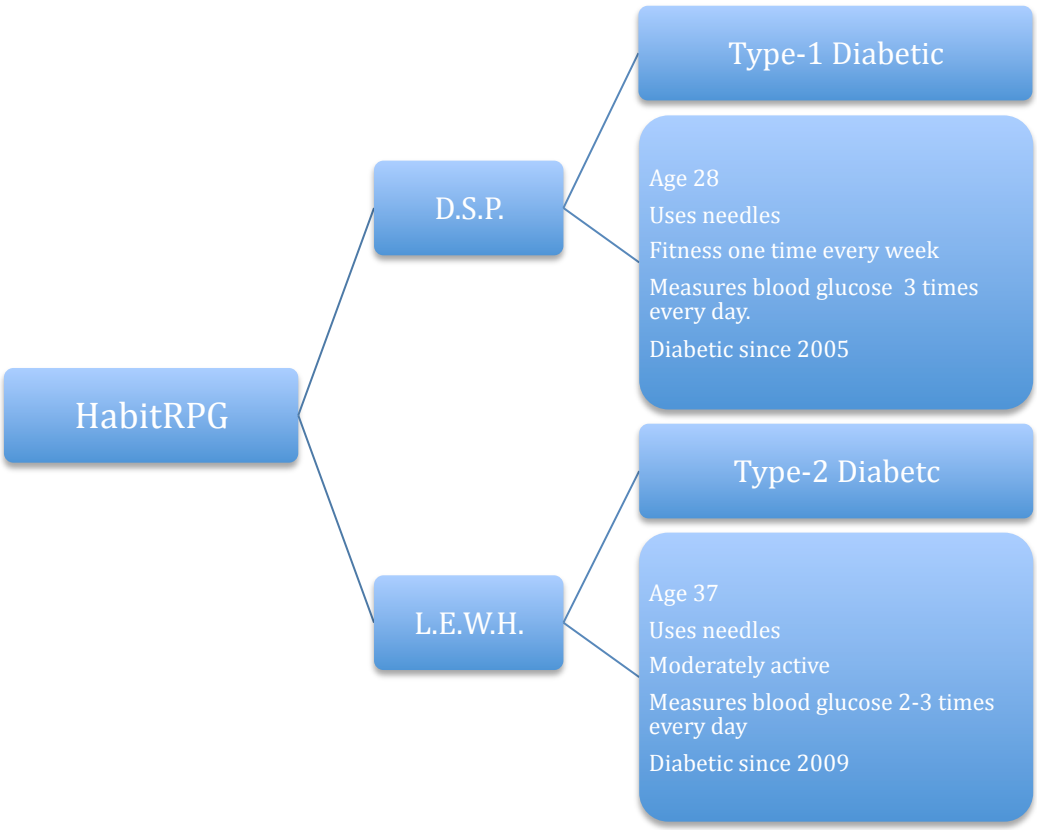
The patients: Six patients were interviewed for this thesis. The participant sample is a mix of type 1- and type-2 diabetics and they were contacted through Danish networks for Diabetes on facebook and on the Danish Diabetes Association's blog. All patients are anonymously participating in this research, hence why only their initials are shown. The three tables below give a short description of their illness, history, treatment, and what gamified app they use or have previously used.

[4] Steno Diabetes Center, which is working in partnership with the Danish healthcare system, is a non-for-profit organisation owned by Novo Nordisk A/S. The center treats approximately 5600 people with Diabetes and has four main focus areas: Education, health promotion research, patient care, and biomedical research.

[5] A small device containing elements of gamification. It is attached to an iphone/ipad and allows the user to automatically measure glucose levels, set goals, keep track of food intake, etc. with the connected app VitaDock.


Dia+
M.W.
Type-1 Diabetic
Age 29
Currently uses insulin pump. Previosuly used needles.
Very active (runs several times every week)
Measures blood glucose several times every day.
Diabetic since 2002
R.H.K
Type-2 Diabetc
Age 36
Uses needles
Moderately active
Measures blood glucose 5 times every day and counts carbs
Diabetic since 2014


HealthSeeker
J.E.S.
Type-1 Diabetic
Age 31
Just started on insulin pump. Previosuly used needles.
Not very active
Measures blood glucose 3-4 times every day.
Diabetic since 1999
P.N.
Type-2 Diabetc
Age 44
Uses needles
Moderately active
Measures blood glucose 2-3 times every day
Diabetic since 2014

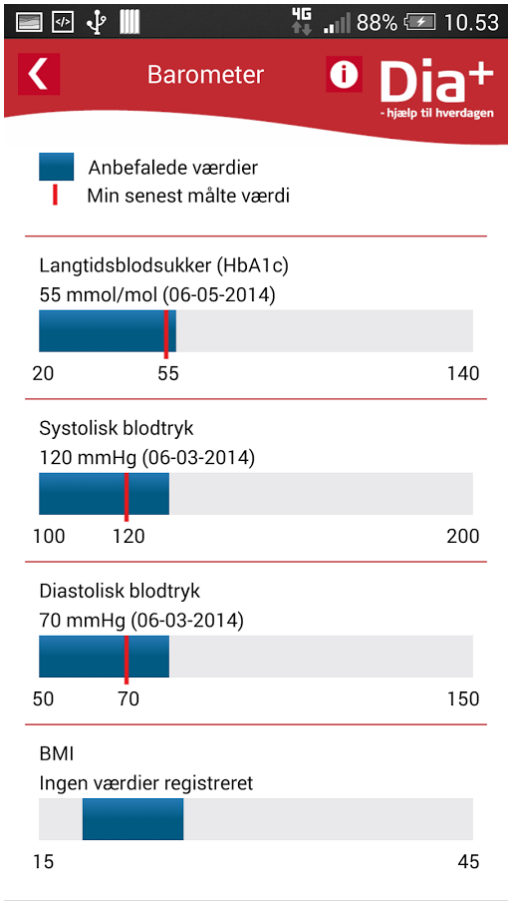

HabitRPG
D.S.P.
Type-1 Diabetic
Age 28
Uses needles
Fitness one time every week
Measures blood glucose 3 times every day.
Diabetic since 2005
L.E.W.H.
Type-2 Diabetc
Age 37
Uses needles
Moderately active
Measures blood glucose 2-3 times every day
Diabetic since 2009

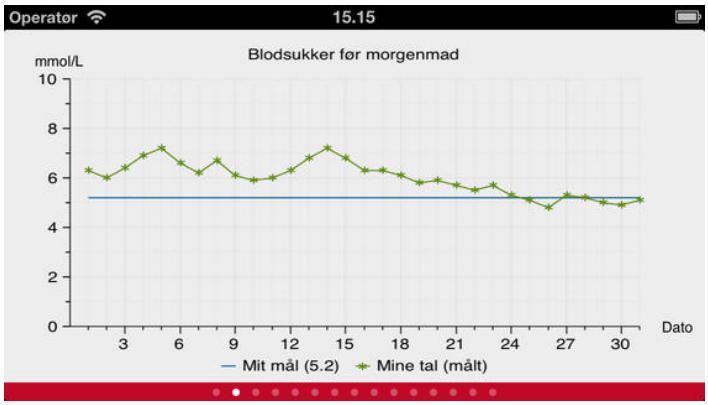
Appendix I

Description of mobile applications

Application #1: Dia+

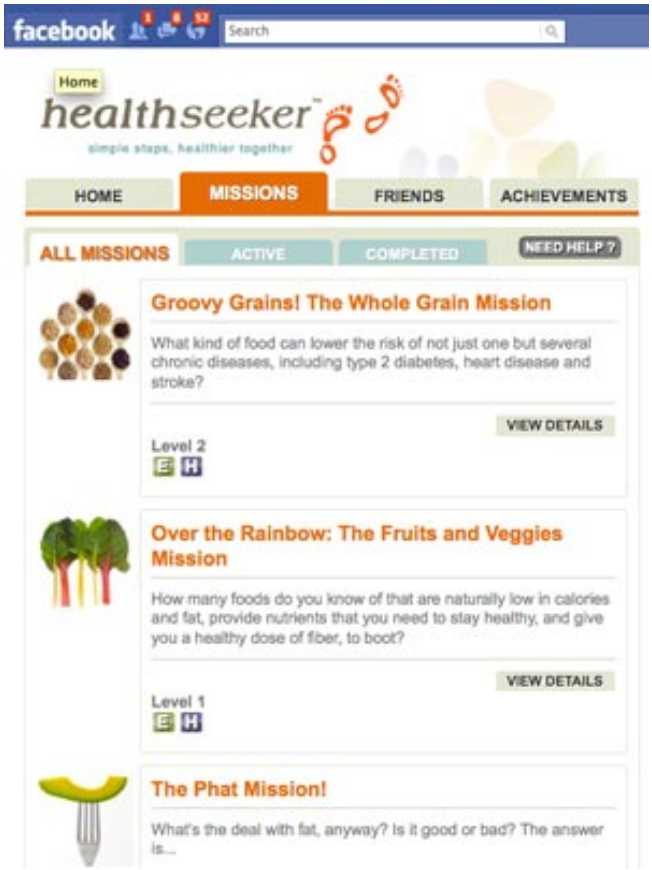
Dia+ is an app created by the Danish Diabetes association and the two pharmaceutical organisations AstraZeneca and Bristol-Myers Squibb. With diabetics in mind, the main functions of this app are to keep a diary of e.g. blood sugar levels, blood pressure, doctor visits, mood, BMI and cholesterol levels. A barometer, graphs, and social sharing opportunities let the users compare their own levels with standard, recommended levels. All data concerned with blood sugar has to be entered in the app every time the user has measured this.





Application #2: HealthSeeker

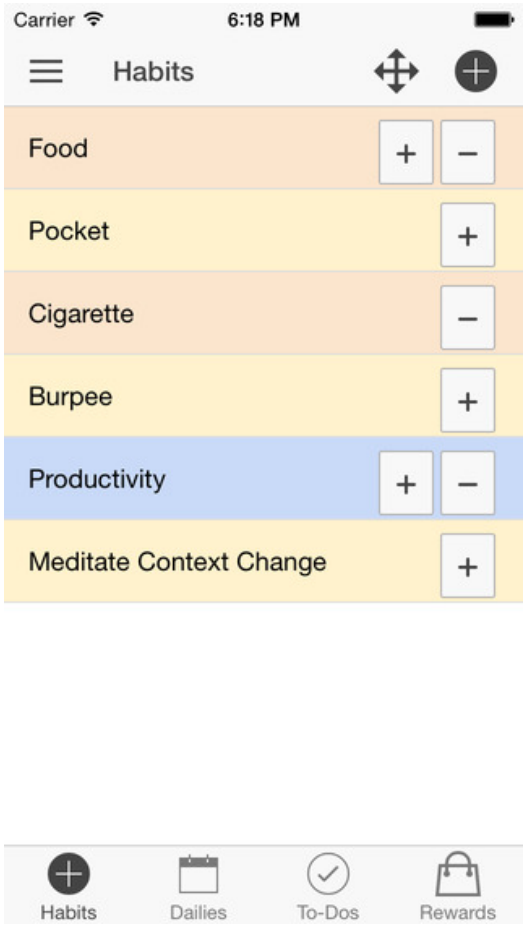
HealthSeeker is developed by the Diabetes Hands Foundation in collaboration with Joslin Diabetes Center to motivate better lifestyle choices by people living with Diabetes and engage them in improving both their nutritional and physical health. It was made possible through financial support provided by Boehringer Ingelheim Pharmaceuticals, Inc. and Eli Lilly USA, LLC. This app allows the user to choose from a number of different action steps and missions, each related to one of four categories[6]. When accomplishing these, the user is rewarded with points and experience, which will allow the user to increase in levels. The user can also collect kudos, which are virtual pads-on-the-backs that only can only be given away to other players as a show of support. Every time a user picks a mission a detailed description follows about the healthy benefits the user will gain from completing the mission and what the specific mission is important for a healthy lifestyle.

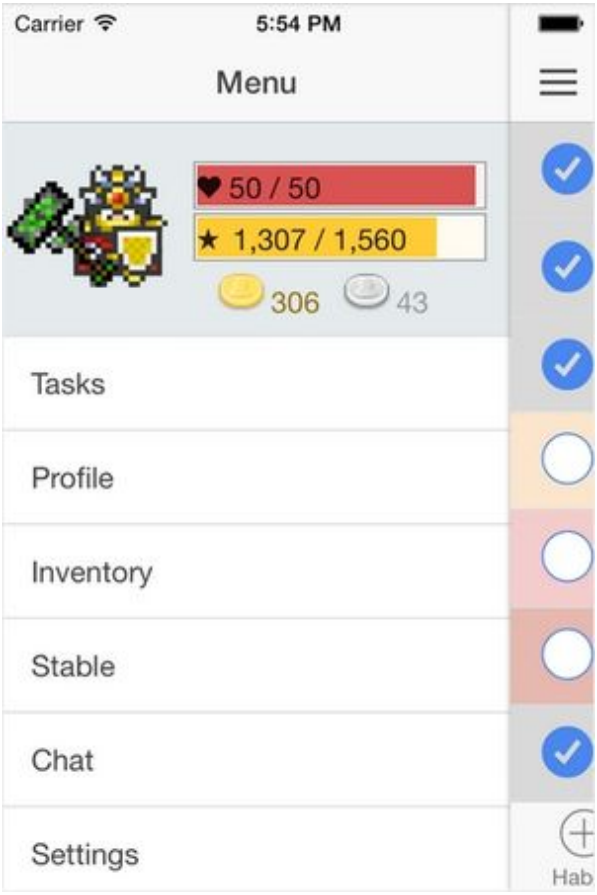


[6] Healthy living, maintaining a low weight, controlling diabetes and eating nutritiously

Application #3: HabitRGP

HabitRPG, which is created by OCDevel LLC, is a habit-building app that rewards users for their successes and penalizes them for slip-ups. It provides external motivation for completing day-to-day activities, contains social elements (competition and sharing) and the app treats the user's goals like a role playing game with each user having an avatar. The users choose their own tasks to complete, which requires that they are able to come up with these themselves. For each tasks that is completed the user levels up and can win badges as well as virtual coins or diamonds with which the user can buy gadgets for his or her avatar. It is also possible to join challenges created by other users. However, if the user is inactive, does not finish the tasks or engage in bad habits, points will be subtracted and the avatar will eventually die.





Appendix J

Quote compilations

The following quotes are included in the appendices to highlight and strengthen the points made in this research.

Quote compilation A

M.W.: "*The last couple of years I have become more aware of various symptoms, especially because of potential sequelae and I usually have some idea about what could be the issue before I see the doctor. Normally I use Google to find out and then I end up on a site where people express their opinions and experiences. But more often I use netdoktor, which I end up on via Google, it appears more trustworthy than some discussion forum on Jubii*."

L.E.W.H.: "*I typically use netdokotor.dk and I also use Google a lot, but I'm always critical. I mean, it takes two minutes to create a website, ten minutes to make it look nice*."

D.S.P.: "*If I hear about illnesses or treatments I don't already know, I normally search online for more information to understand what it is. I usually Google it, but I also use netdoktor a lot. I would say that this gives me a pretty good idea about the condition, but I never really trust the information 100%, I mean… If it's a professional site I usually trust it, but if the info is from a private person I tend to be more critical*."

J.E.S.: "*When I hear about new research or treatment methods I often read about it either online or in diabetesforeningen's*[7] *own magazine, they have a section about this. Like, when I first heard about the insulin pump I, well, at first I didn't think too much about it, but after a while I asked my doctor to get one. He had to determine whether or not I was eligible to get it."*

J.E.S "*I prefer to look at expert's sites, so the manufacturer's website or a Diabetes site. It's not very often I use online discussion forums because even though some of the experiences may be the same among the participants, the underlying reasons to these experiences are not necessarily the same*."

Quote compilation B

J.E.S.: "*Exercising requires and active choice and I often see that as a hurdle […]. I know it's an important part of my treatment, so I try to do as much as possible. But there are so many*

[7] Diabetesforeningen is the Danish Diabetes Association (www.diabetes.dk)

other things that goes on all the time, I have just moved and things like that, so it's hard to… Well, both find the time, but also to remind yourself of the importance of finding the time."

P.N: "*I have some very busy days, I mean, no single day is the same as the one before, with a student job and university and all, and it's pretty easy to forget all these things I have to do. And also to stay focused on it, I mean, there are so many other things that I would rather do than injecting insulin or eating a carrot*."

J.E.S.: "*The biggest issue with having Diabetes is not because it interferes with my social relations, but I think that's because I have a tendency to let it slip to the back of my mind*".

Martin Simon Jørgensen:"*As you can read in most Diabetes groups on Facebook and other places, the thing that annoys the majority of diabetics, a battle that they fight, is that an illness… This condition, mustn't take up too much space and time in their life. That's not what life is all about. Life is meant to be lived and this is just something that you have to handle on the side. So… perhaps that's also why some patients make the deliberate choice to not care too much about it and the balance… How do you create… how do you make it possible to focus on all sorts of things at the same time as having this under control*".

D.S.P: "*I remember this one episode from when I was younger and my class was going to Copenhagen. Then the teacher had to come home to me and learn how to inject the insulin, because my mum couldn't come on the trip… She always had to join the class when we slept over somewhere and I remember that this was pretty annoying*."

Quote compilation C

L.E.W.H.: "*The best function of HabitRPG is the ability to customize. I really like that you can define your own goals… What your success criteria is. But at the same time this is also problematic because as a Diabetic you probably need some guidelines about what goals you should set. There are examples of goals in the app, but these are not really explained or… They stand alone, they are just ideas without a reason*".

L.E.W.H.: "*When I started using the app I remember looking for some sort of introduction that just wasn't there. Only on the computer, which I became aware of later. I mean, I could see that you could add your own tasks and use some pre-added ones like eat junk food and loose points, I have had to do that a few times recently. But why is that bad and other things good? I mean okay, eat junk food is a no brainer, but how does these things affect my Diabetes*? *[…]Let's say I just got extra points for eating fish, a certain type, salmon, that's rich in omega 3 fatty acids, then it should explain to me why this is helpful in relation to my condition or my health. Maybe nut a fun fact, because it's probably not funny, but you know, a fact. That's something I feel is missing*

in HabitRPG, because it is parenting 1-0-1, you know, education, so in general if you tell a child 'do this' then the child will think 'nope'… Or 'why'. If there is no accompanying information telling the child 'because' then the app will loose it's opportunity of educating in some way because if you don't have the underlying understanding then you are not as motivated to try ".

Quote compilation D

Andreas Dam: "*We want to build a social network where the users can talk to each other across boarders and meet like-minded people in a closed and anonymous forum, because it may be a little private to suffer from something and not everyone wishes to share their identity*"

Martin Simon Jørgensen: "*It has a rather positive effect that you can share the information like this with your physician, because then you can have a storyline to talk about, making it a quality dialogue about how things actually go*."

Quote compilation E

P.N.: "*It took me a while to understand what the rise in level meant for my character. Whether it actually affected it at all… But if you actually read and understand the system it makes sense that the different characters have different skills. But I sort of miss the link between my character's skill set and my own skill set. I mean, when I buy gear for my character it gets better equipped for withstanding damage for instance, but I don't always feel better equipped myself*".

D.S.P.: "*Buying the things for my avatar didn't trig me. I mean, I couldn't really see the point or relate it to me. I have my avatar and when you buy something for it with your earned coins, it changes looks. But it's sort of not within any context, there's no landscape or story about it or anything, just a picture and then it doesn't really matter. I don't really feel the connection between the levels and… You know, the connection between my avatar's levels and mine. […]I don't feel that my lifestyle changes in line with the health status of the avatar. It sort of becomes two different things*".

Quote compilation F

Andreas Dam: "*I think it's important that when you think about the design of gamification not just look at the patient in isolation but rather look at the whole network of relations between the patient and the health system and the healthcare professionals. Because even though the doctors no longer have the same degree of authority, there is still some degree of trust in them and people still see them as the experts."*

Andreas Dam: "*The future use of gamification is definitely related to this holistic approach. It's meant to have a motivating effect and it contains some elements that push patients to do things they wouldn't have done otherwise".*

Martin Simon Jørgensen: "*From the app you will be able to gather all information, just like Steno has this site where all health information is saved, the app actually does the same, where it will connect with some sort of other devices that Medisana makes, like instruments that measure blood pressure, fat percentage, temperature and those things, so everything. All these devices that you can use to measure your health and treat yourself with, it will be able to gather in the app".*

Quote compilation G

Andreas Dam: "*Gamification has a great potential as a CSR project or a corporate project where you sell or brand you name, but not your products. It can amend the loyalty issue with patients although the core business is still on a product level, that's where they make their money and if that doesn't happen, then there's no company".*

Andreas Dam: "*The value lies in the perception of the brand among the doctors, which is spread to the patients. The doctors know that they are unable to see the patients all the time, so if something can be done in that time where the patients are left to themselves, then that is really good… And you have all the derived value, like the data you collect, which cannot be used directly by the pharma organisations, but it can be used for research. You can get some insight into the lives of the patients that you don't even know are parameters today, something that influences their condition".*

Andreas Dam: "*What we see is a possibility to influence the relationship between the patient and the pharma company with this app through patient organisations. I don't think that a great gamified app will influence the relationship between the pharma company and the individual patient that much though. Perhaps they will have been made aware of the brand, and awareness is one thing I guess, the first step to changing attitude in the long run, but the short term effects will not be between the individual patient and pharma. Of course there is some brand value involved and the company will probably gain some attention on their CSR investment, but this is here that Novo Nordisk will approach Steno or the doctors and say 'hey, we have this great app' and the next time the doctor sees a patient he may recommend the app for free."*

Quote compilation H

L.E.W.H: *"I think that there are two aspects of why the pharma industry invests money and time in developing these gamified apps that are free to download for the patients. There is CSR,*

that's something you are very interested in as a pharma company, and then of course because you get your name on it. It's an easy way to create a co-relation between your brand name and the fact that you work with an illness".

D.S.P.: *"Making gamified apps as a pharma company is… I see it both as a PR stunt and as a necessity. People are living their lives on their phones so it's sort of the next step for all industries. Why shouldn't pharma involve their users? It's a natural development to include digital games. […] Of course it is also about publicity and it makes sense for pharma to go digital because the patients are digital. Personally I think they are trying to help by using gamification like this, but there's no denying that they care about their image as well. Especially in front of the rest of the world, so the media and the doctors for example If they have a bad reputation and create an app that everyone loves, then it will overshadow the bad publicity ".*

D.S.P: *"I acknowledge that the industry is a money making machine, but that's fair enough, I don't really have a choice. They are the ones who help me live after all. What I don't acknowledge is the moment pharma starts making their money on desperate people. Diets and weight loss is something people are paying attention to and I think you can convince a lot of people about what ever they want to believe."*

J.E.S.: *"I believe that the industry wants the best for me, but I accept that they are also here to make money. That's why it can get a little obscure and you need to make sure that the treatment you choose is in fact your own choice and not only based on the recommendation from someone who has more than one interest in this".*

J.E.S.: *"I didn't know much about Boehringer Ingelheim before I used HealthSeeker. But now I think it demonstrates their commitment to the area and I trust them to genuinely attempt to help people live a better and easier life. That's the signal they send. I think that pharma creates awareness amongst patients that help them and that they want to be where the patients are, the newest platforms."*

M.W.: *[…] They provide the clients with some tools that will make their life easier and more fun. I think it positions them as one of the top players that they are modern and adapt their business model to the patients. They do what they can to integrate the illness into the patients' every day life to simplify things and to encourage them to make the right choices".*