How key events shape stakeholder perceptions of success and failure

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Abstract

Although literature agrees on the fact that project success is a subjective interpretation of stakeholders, little is known on how stakeholders form their perceptions of success or failure. This paper aims at increased understanding of this process through key events, resulting in the ability to influence the outcomes. Users in HIS-development processes, in this paper healthcare managers and healthcare professionals, were found to construct their perceptions through eight common key events of which four contribute to perceptions of success and four to failure. For developers the key event a good team is especially important, but they ultimately determine the degree of success through evaluation of the quality of their deliverables. An exception was found in the case that all stakeholders perceived as successful, where all stakeholders used the same key events to construct their perception of success. Key events can be used a means to assess the likelihood of a project being perceived as successful. To influence success perceptions and project outcomes, interventions can be designed to facilitate or to prevent the occurrence of key events.
How key events shape stakeholder perceptions of success and failure.

*A multiple case study in HIS-development*

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Key words: project success, project failure, stakeholder perception, key events, healthcare information systems, IS-development
1. Introduction

Projects have become the primary means for organizations to develop and change (Ika, 2009; Pinto, 2010) and organizations initiate projects with the intention to complete them successfully. Research on project success revealed numerous aspects that influence project success. Although the majority of this research has tried to discover objective criteria (Ika, 2009; Collins & Baccarini, 2004) it is widely accepted that project success is in the eye of the beholder and that stakeholders ultimately decide whether a project is successful (Kaplan & Harris-Salamone, 2009; Ika, 2009; Shenhar, Dvir, Levy, & Maltz, 2001; Wateridge, 1995). To increase the number of successful projects, it would be helpful to understand how stakeholders determine the degree of success. This is however not a simple task because perceptions of success evolve over time (Baccarini, 1999; Ika, 2009; Jugdev & Müller, 2005; Lapointe & Rivard, 2006). A complicating factor is that stakeholders shape their perceptions differently because they perceive and judge success from their own frame of reference (Fowler & Walsh, 1999; Shenhar et al., 2001). Various authors support the idea that perceptions of success are constructed during projects (Linberg, 1999; Teixeira, Ferreira, & Sousa Santos, 2012; Thomas & Hernandez, 2008). At the moment, we know very little about this process for this area has been neglected in research. As Ika (2009) suggests “...is time to understand project success as it is perceived subjectively and as it is constructed by stakeholders.” (Ika, 2009: p. 5).

Perception of success is context dependent (Fowler & Walsh, 1999) and the value of the research would be augmented through a context where project success is a rare commodity. The development of healthcare information systems is such a context. Information technology promises many benefits to the healthcare industry: It may contribute to higher quality services, help to reduce the increasing cost and it is seen as a remedy for the expected employee shortage in many countries (Eger, Godkin, & Valentine, 2001; Lau, Price, & Keshavjee, 2011; Trudel, Paré, & Laflamme, 2012). But IT-projects are infamous for their high failure rates, and this negatively influences the confidence of the healthcare industry in IT (Ammenwerth, Iller, & Mahler, 2006; Heeks, 2006; Kaplan & Harris-Salamone, 2009).

The development stage of healthcare information systems (HIS) is especially interesting because this phase is critical for the success of information systems (Hannola & Ovaska, 2011) and the ability to positively influence this stage would be an asset to practice. Previous literature on success of such projects is fragmented. Many articles describe one specific case and focus either on the healthcare perspective or on the perspective of information system development (Ammenwerth et al., 2006; Eger et al., 2001; Eley, Fallon, Soar, Buikstra, & Hegney, 2008; Grant, Campbell, Gruen, Ferris, & Blumenthal, 2006; Lapointe & Rivard, 2005; Linberg, 1999; Procaccino & Verner, 2009; Saleem, Jones, Van Tran, & Moses, 2006). I aim at a comprehensive view and therefore adopt a multiple case
study approach where both the healthcare and the information system development perspective will be explored.

In this paper I research whether key events are a useful mechanism to understand the process by which stakeholders construct perceptions of success or failure. Key events are events that stakeholders perceive as important and that trigger emotions, which in turn influence thoughts, feelings and actions and through which stakeholders construct perceptions of success and failure. The concept of ‘key events’ is supported in literature where they are described as a manner to identify relevant transition moments in change processes (Munir, 2005; Stam & Stanton, 2010). Thus, I come to research question that will guide this study: *How do stakeholders in HIS-development processes construct their perception of success and failure through key events?*

This paper contributes to theory by increasing our understanding of the process by which stakeholders reach the conclusion that a project is successful. There is little research on the dynamics of this process and even less on the influence of key events on this process.

The contribution of this study to practice is that through better understanding of the process by which perceptions are constructed, interventions might be conceived that increase perceptions of success or reduce perceptions of failure. Both the healthcare and the IT-industry would benefit greatly when more HIS-development projects could be considered a success.

This paper is set up as follows. The next section provides current theory on the HIS-development context and on the three underpinning concepts of this study: stakeholders, perception of project success and failure and key events. The methodology section describes the research approach and introduces the cases that were studied. The results section contains the individual case results, which is followed by a cross-case analysis. Then, I discuss the role of key events in the construction of stakeholder perceptions and describe implications for theory and practice. Finally, I consider limitations and directions for further research.
2. Theoretical background

To understand how stakeholders in Healthcare Information System (HIS)-development processes construct their perception of success and failure through key events, I first explore HIS-development as a context, and continue with the concepts that need further definition: stakeholders, perception of success and failure and key events.

2.1 HIS-development

HIS-development is a complex context (figure 1). It inherits characteristics of several, very different fields. HIS are information systems in healthcare and a represent a specific field in healthcare research and practice. Likewise within the field of IS, IS-development is specific area with its own research and practice. Where HIS meets IS-development, one finds HIS-development. In this section I explore the associated fields and determine how they influence the context of HIS-development.

![Figure 1 – the context of HIS-Development](image)

HIS-development is carried out in the healthcare industry. The healthcare industry is a unique and complex domain because of various interacting factors: the growing complexity of science and technology in medical science, the complex legislation and multiple stakeholders each with various goals and objectives (Garde & Knaup, 2006; Sainfort & George, 2004). Healthcare information systems (HIS) promise solutions for this complexity (Teixeira et al., 2012). They create innovative ways of working that allow healthcare practitioners to spend more time with their patients by working smarter, faster, better and more cost effectively (Thakur, Hsu, & Fontenot, 2012). HIS are also seen as means to decrease medical errors and to facilitate learning (Teixeira et al., 2012). The healthcare industry is very skilled at adopting stand-alone technologies such as MRI-scanners, but is less adept at linking technology to business processes (Larsen, 2008). Unfortunately, many HIS-
projects still fail, not because of failing technology, but because of insufficient focus on human and social issues during the development (Teixeira et al., 2012).

The IS in HIS-development refers to information systems (IS). Hevner, March, Park and Ram, 2004: p.78) define IS as “… all hardware, software and processes that support an organization and are composed of people, structures, technologies, and work systems”. The closer to the core of a business, the better the fit must be between the business practices and the IS. McAfee (2006) calls this ‘enterprise-IS’ and the implementation of an enterprise-IS results without exception in major changes in the way organizations work (McAfee, 2006). Because HIS are moving closer to the core of the healthcare processes, HIS-development is increasingly developing enterprise-IS and as a consequence, the implementation of HIS increasingly generates major changes in healthcare organizations.

HIS-development also contains IS-development. IS-development is a complex, emergent process of change with many uncertainties (Markus & Robey, 1988; Orlikowski & Lacono, 2001). During this process, user requirements are transferred into working solutions often through experimentation and by trial and error (Hannola & Ovaska, 2011; Leonard, 2004; Orlikowski & Lacono, 2001).

Summarizing the above, in HIS-development, healthcare information systems are conceived, designed and built. The process deals with three types of complexity. Firstly, there is environmental complexity because of the highly complex environment of healthcare with conflicting influences from many stakeholders. Secondly, there is organizational complexity, because changing the care processes means changing the DNA of the healthcare organizations. Lastly, HIS-development deals with technological complexity, is innovative and of an emergent nature. To date, HIS-development seems to fail because human and social aspects are not sufficiently taken into account and the approach is too techno-centric (Heeks, 2006; Rinkus et al., 2005; Samaras & Horst, 2005; Zhang, 2005).

2.2 Stakeholders in HIS-development

Stakeholders in HIS-development inherit their characteristics from stakeholders in healthcare and stakeholders in IS-development. In this section I explore the associated fields and determine what that means for stakeholders in HIS-development.

In healthcare four stakeholder groups are identified: administrators, physicians, nurses and patients (Lyons et al., 2005; Lapointe, Mignerat, & Vedel, 2011). Administrators are the non-medical and financially responsible managers of healthcare organizations (Lapointe et al., 2011). Physicians are a highly independent, powerful group with focus on providing care, in line with the standards of their occupational group (Governance Institute, 2009; Lapointe et al., 2011). Nurses are the medical professionals who provide day-to-day care. They are the interface between physicians and patients
and focus on patient care (Lyons et al., 2005). The fourth stakeholder group are the patients who are the recipients of the care (Heeks, 2006; Lapointe et al., 2011; Lyons et al., 2005).

In an IS-development context, stakeholders are defined as any individual, group or organization that can affect or be affected by an information system and who have direct or indirect influence on its requirements (Ballejos & Montagna, 2011). The two most prevalent stakeholder groups identified in literature are users and developers (Agarwal & Rathod, 2006; Ballejos & Montagna, 2011; He & King, 2008; Hsu, Liang, Wu, Klein, & Jiang, 2011; Lapointe et al., 2011; Leonard, 2004; Subramanyam, Weisstein, & Krishnan, 2010). Many authors describe the gap between users and developers. They seem to come from different worlds, to speak different languages and to have different motivations and goals (Hannola & Ovaska, 2011; Heeks, 2006; Lapointe et al., 2011). Users express their needs in their own terms filled with tacit knowledge and developers use the vocabulary of systems development (Hannola & Ovaska, 2011). For users, the world of information technology is often new and unknown. They have no idea of what can be achieved, have limited technological literacy (Dewan, Lorenzi, & Shaohong, 2004) and as a result are unable to articulate their requirements (Pitts & Browne, 2007).

Close user involvement improves the quality of the IS and is especially important when systems are close to the core of an organization (Ammenwerth et al., 2006; Harris & Weistroffer, 2009; Jiang, Klein, Wu, & Liang, 2009; Subramanyam et al., 2010). The emerging practice of co-creation makes users partners in the development process and gives them a sense of control over the outcome (Fernandez & Fernandez, 2008; Harris & Weistroffer (2009); Prahalad & Ramaswamy, 2005; Teixeira et al., 2012). The scarce literature on HIS-development concurs on user involvement and co-creation as important ways to generate user acceptance (Eger et al., 2001; Heeks, 2006; Leonard, 2004; Saleem et al., 2006). The challenge in HIS-development seems to be merging the healthcare-specific, functional expertise of users with technical expertise of developers (Cheng & Atlee, 2007; Saleem et al., 2006). A different solution comes from Heeks (2006) who suggest an interpreter, someone who contributes to HIS-development success because he understands both worlds and is able to bridge the gap.

Summarizing these explorations, healthcare literature identifies stakeholders by their role in the healthcare organization and in the care processes. Four stakeholders are generally identified: managers, physicians, nurses and patients. (H)IS-development literature identifies two stakeholders: users and developers where users provide requirements and functional expertise and developers provide the technical expertise. All healthcare stakeholders fit the user-profile, depending on the HIS that is developed. Healthcare managers bring expertise on general business goals and finances, physicians and nurses bring functional expertise on clinical effectiveness and knowledge of the care processes. Patients may be users if the HIS is part of their treatment.
2.3 Perception of success and failure

In this section I explore what is known about perceptions of success and failure in general and determine what is relevant for the context of HIS-development.

In project management and IS-literature there is agreement on the fact that success is difficult to define and as a consequence difficult to measure (Jugdev & Müller, 2005; Kaplan & Harris-Salamone, 2009; Tomas & Fernandez, 2008; Wateridge, 1995). There is little research on this subject from the healthcare perspective. Two relevant studies on HIS success and failure agree that defining HIS success is complex, that there are different definitions of success and that better understanding of different stakeholder views is needed (Heeks, 2006; Kaplan & Harris-Salamone, 2009). Heeks (2006) defines success as a situation in which most stakeholder groups reach their goals and do not experience significant undesirable outcomes and Kaplan and Harris-Salamone (2009) define success as “simply getting the application or system turned on, getting people to use it, and getting at least grudging acceptance” (Kaplan & Harris-Salamone, 2009: p.294).

There is also agreement that success is a perception of stakeholders (Agarwal & Rathod, 2006; Basten, Joosten, & Mellis, 2011; Ika, 2009; Jugdev & Müller, 2005; Thomas & Fernandez, 2008). Stakeholder perception of success is most commonly operationalized as user satisfaction (Collins & Baccarini, 2004; Jugdev & Müller, 2005; Procarino & Verner, 2008; Shenhar et al., 2001). The rationale is that if users are satisfied with the outcome of a project, they consider the project a success. In IS-literature success is also measured through user satisfaction, which is further specified towards the information system for example as ease of use (Saleem et al., 2006).

Failure is generally mentioned in one breath with success, defined as ‘not successful’ and mainly phrased in terms of the classic project management criteria of time, cost and quality (Agarwal & Rathod, 2006; Shenhar et al., 2001; Wateridge, 1995). Ojiako, Johansen and Greenwood (2008) conclude that failure, just as success, is a matter of stakeholder perception.

Perception of success or failure can be influenced. Time is a factor known to influence perception of success (Baccarini, 1999; Ika, 2009; Lapointe & Rivard, 2006). Success is typically measured at project closure, when the outcomes of the project are delivered to the sponsor (Munns & Bjeirmi, 1996), but when the products are used, user satisfaction develops and success evolves to become the equivalent of how well the project deliverables meet the users’ needs (Gray, 1999; Jugdev & Müller, 2005; Shenhar et al., 2001). A shared definition of success positively influences the likelihood that a project will be perceived as successful (Hartman & Ashrafi, 2002; Thomas & Fernandez, 2008; Wateridge, 1995). From IS-literature is known that user perception of success is influenced by the technological complexity of the project. The more complex the project, the more users expect benefits compared to old situation (Shenhar et al., 2001). Perceived success is also
influenced by the time a user has to invest in a project. Less time is better, most likely because users have to balance their normal work and their project work (Eley et al., 2008; Subramanyam et al., 2010). Participative development methods and the use of working prototypes positively influence user perception of success because they increase their sense of ownership and their influence over the outcome (Eley et al., 2008; Subramanyam et al., 2010). For developers, perception of success is positively influenced by the innovativeness of the project, whether the functionality was delivered as intended and if there was a small, high performing project team (Agarwal & Rathod, 2006; Linberg, 1999; Procaccino & Verner, 2009). Pereira, Cerpa, Verner, Rivas, and Procaccino (2008) found a causal relationship for developers between teamwork and project success.

Concluding from literature, success is difficult to define and measure and success is a perception of stakeholders. Failure is defined as the absence of success and also a perception of stakeholders. Perception of success or failure is time dependent and facilitated by a shared definition of success. Different factors influence users and developers. User perception of success or failure is influenced by technological complexity, invested time, the use of participative development methods and having access to a working prototype (Eley et al., 2008; Shenhar et al., 2001; Subramanyam et al., 2010). Factors that influence developer perception are innovativeness, delivering the product as intended and teamwork (Agarwal & Rathod, 2006; Linberg, 1999; Pereira et al., 2008; Procaccino & Verner, 2009). In the field of healthcare no literature has been found on perceptions of project success and failure. For HIS-development the starting point therefore must be what is known from project management and IS-development literature.

2.4 Key events

The final concept in the research question of this paper are key events, which will be defined in this section.

To understand project success as it is perceived subjectively one must attempt to look through the lens of a stakeholders’ frame of reference, as if looking through his eyes. In literature success criteria and success factors are commonly used to describe project success; success criteria are standards or principles that are used to evaluate the success of a project and success factors are conditions or circumstances that facilitate the achievement of success (Collins & Baccarini, 2004; Ika, 2009; Jugdev & Müller, 2005; Pinto & Prescott, 1988; Shenhar et al., 2001). Client consultation, for example, is a success factor and defined as “communication, consultation, and action listening to all impacted parties” (Pinto & Prescott, 1988: p.7). This definition, however, does not consider the stakeholders’ perspective. It describes what should be done to achieve project success, but it does not explain how and when a factor results effect and who should act the factor towards whom.

By identifying factor and process research approaches, Newman and Robey (1992) provide a
missing angle in the research on project success. Research so far has taken a factor approach where success criteria and factors describe predictors and inferred outcomes but do not explain how one leads to the other (Newman & Robey, 1992). Process approaches describe series of events which explain how and why results occur (Newman & Robey, 1992) and allow to understand a process as stakeholders experience it. Therefore, I will use a process approach to search for events that explain how stakeholders construct their perceptions of success and allow for understanding their perspective.

Critical encounters or key events are the focus of study in a process approach (Newman & Robey, 1992). Isabella (1990) and Dutton and Dukerich (1991) used the concept of key events to similar effect as they tried to learn as much as possible about stakeholders’ emotions, thoughts and responses to these key events. They used these as a means to understand the unfolding processes that they researched (Dutton & Dukerich, 1991; Isabella, 1990). Key events have been defined as events that are important to an individual (Isabella, 1990; Schein, 2010), not necessarily large or spectacular events. Key events are also described as a manner to identify relevant transition moments in change processes (Munir, 2005; Stam & Stanton, 2010).

To identify key events I will search for the emotions that were triggered by these events. Emotions are the fitting search criterion because emotions arise in response to events that an individual perceives as relevant and important (Beaudry & Pinsonneault, 2010, Stam & Stanton, 2010). The emotions will help stakeholders to identify such events because these events are characterized by the fact that an individual can recall exactly how he felt when the event occurred (Bagozzi et al. 1999).

The theory above supports the underlying assumption of this paper that key events are a useful mechanism to understand how stakeholders construct their perception of success or failure. Integrating the statements above, I define key events as events that stakeholders perceive as important and that trigger emotions, which in turn influence thoughts, feelings and actions, and through which stakeholders construct perceptions of success and failure.
3. Methodology

The goal of this study is to increase our understanding of the way stakeholders in HIS development processes construct their perception of success or failure through key events.

I chose to conduct an interpretive study, based on three arguments. Firstly, positivist research on stakeholder perception of project success has not been able to capture the complexity of this subject (Ika, 2009) and interpretive research could complement our understanding by filling in knowledge gaps (Orlikowski & Baroudi, 1991). Secondly, this study aims at increased understanding of human interaction and therefore fits within interpretive research (Orlikowski & Baroudi, 1991). Finally, I do not believe that that researchers are impartial observers who can evaluate objectively (Paré, 2004), and I share the opinion of Quek and Garcia (1997) who believe that a researcher’s interpretations play a key role to bring quality arguments (Quek & Garcia, 1997). I chose to conduct an exploratory case study because, according to various authors, exploratory case studies allow for inductive development of theory by the letting patterns and underlying logic emerge (Benbasat, Goldstein & Mead, 1987; Darke, Shanks, & Broadbent, 1998; Paré, 2004). A multiple case study was chosen to gather more compelling evidence (Dubé & Paré, 2003), to go beyond initial observations (Eisenhardt, 1989), to allow a cross-case search for patterns (Eisenhardt, 1989), and empirical testing through pattern-matching (Yin, 2009).

The cases were selected from applied research projects in the professorship New Business and ICT in the research area Health and ICT at Hanze University of Applied Science, Groningen in the period 2010-2013. These projects allow healthcare organizations to explore the application of new technologies and innovate through student projects. The projects are generally semester assignments.

According to Paré (2004), a researcher looks in case studies for a particularly good story that illuminates the questions under study. The HIS-development research projects provide such stories, because the HIS that are developed are enterprise-IS where technology is embedded in the care processes. During this stage users and developers interact to ensure that the functional knowledge of users becomes part of the systems (Cheng & Atlee, 2007; Hannola & Ovaska, 2011; Saleem et al., 2006). Differences between the stakeholders will inevitably surface (Heeks, 2006; Lapointe et al. 2011) and provide a context filled with interaction where much can be learned.

The functional knowledge that users should bring in HIS-development processes could be provided by all healthcare stakeholder groups. For this study I chose to look at the user perspective through two stakeholder groups: healthcare managers and healthcare professionals. Healthcare managers provide the perspective of business goals and finances. Healthcare professionals are
physicians and nurses who provide the care perspective. The third stakeholder group in this research are developers; teachers and students in computer science.

To find particularly fitting stories, I used criterion sampling (Paré, 2004) based on three criteria: 1. the case concerns a HIS-development process of enterprise-IT, 2. the three stakeholder groups under research (healthcare managers, healthcare professionals, and developers) were involved, and 3. the case delivered a working prototype. The selection process was performed by the leading professor and the researcher. From a first long-list of eight potentially suitable cases four cases were selected. Of the four cases that were not studied, in two cases the HIS development process did not fit within this study and in two cases the required stakeholder groups were not available for interviews.

To ensure reliability and consistency, the main data collection was done through interviews using a case study protocol (added as Appendix A). To ensure validity, multiple sources of data were used: project documentation, observations and publicly available information on the participating organizations (Eisenhardt, 1989; Paré, 2004; Yin, 2009). One case was used as the pilot case and because no adjustments to the interview script were required, this case was included in the study. The average length of the interviews was approximately one hour. The interviews consisted of open questions, aimed at understanding the stakeholders’ perception of project success and failure, his identification of key events and effects of these events on his actions and thoughts related to his perception of success or failure. A total of 16 interviews was held, four healthcare managers, six healthcare professionals and six developers. Interviewees reviewed their transcript and the case description of their case. During the data processing stage some further clarification was obtained through follow-up e-mails and interviews. Information was collected between 1 and 18 months after the projects were completed. All stakeholders were interviewed individually to avoid group think bias.

The interviews were recorded and transcribed, except for one where the recording technology failed. Field notes were taken. Data analysis in qualitative research is the result of an iterative process of data reduction that leads to data displays which allows for data analysis and conclusion-drawing and verification (Huberman & Miles, 1984). The data analysis in this study was done in a five-step process. During the first step stakeholder responses were coded and placed in an overview per interviewee by interview question and the individual overviews were aggregated into an overview per case. In the second step the aggregated overview was used to create the individual case descriptions. The information was dissected in the three dimensions of Pettigrew and Whipp’s model of strategic management of change (Pettigrew & Whipp, 1991): content, context and process. This model was used to create rich case descriptions (Yin, 2009) and was chosen because it has been used for this purpose before (Stetler et al, 2007). During the third step of the data analysis, key
events that according to stakeholders contributed to success or failure were collected from the case overviews and placed in an overview which visualizes the events per stakeholder and per project phase. The fourth step covered the within-case analysis, which resulted in a description of the process by which each stakeholder constructed his perception of success. The final step consisted of the cross-case analysis. Pattern-matching was used to generate a cross-case overview of key events. Through a search for patterns and dissimilarities eight common key events and two approaches to constructing perceptions emerged. These were the basis for the conclusion-drawing and verification in the discussion section of this paper.
4. Case descriptions and within-case analysis

This section presents the within-case analyses of the four cases that were examined. In the general idea of the project and the involved stakeholders are described. The content describes the envisioned HIS and what stakeholders consider a success. Under process, the story of the project is told. For each case the within-case analysis presents an integrated overview of key events, a description of the perception construction process, and concludes with the answer to the research for that particular case.

<table>
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<th>Reliving memories</th>
<th>Mobile treatment support</th>
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<td>Developers</td>
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<tr>
<td>Total interviews</td>
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<td>3</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

Figure 2 – Case overview

4.1 Case 1 - Exercise stimulation

Context

In a protected home environment for clients with visual and mental deficiencies a project was started to research whether clients could be motivated by music to exercise at a higher level of intensity, and whether a relation between an external motivator and exercise intensity could be learned. Many clients have physical disabilities as well and are wheelchair bound. Motivating these clients to exercise is a challenge, but it is important because exercise contributes to health and wellbeing. Constant supervision is required to reach the desired level of exercise. External motivation might help to reach results with more clients at the same time and reduce the need for one-to-one supervision. In this case a professor-physiotherapist and a motion therapist from the healthcare organization were involved. From the applied research projects, a healthcare and a computer science teacher and student groups of various backgrounds were involved.

Content

The HIS would be an exercise stimulation system where music and other sounds are used as motivators. The system must allow for individual definition of the desired level of exercise intensity. A stimulant might be a favorite song or the voice of a therapist or a loved person. Sound stimulants should be tailored to each client. Different sound stimulants must be available to start activities, to
stimulate continuation and to increase the intensity of the exercise. A heart rate belt would be used to detect exercise activity. Activity data would be logged to monitor the effects of exercising over time.

All stakeholders defined success as a working HIS that would stimulate clients to reach higher levels of exercise intensity. For the healthcare manager success would also be a scientifically proven approach and more knowledge on motivation of their clients. For the healthcare professional an important criterion was added value in the care for the clients; “The system must not replace our relation with the client. It should be an extension of or an addition to the relation.” The developers defined success as a product would exceed customer expectations resulting in a satisfied customer and considered reduction of the intensity of the care a success criterion.

**Process**

Project duration was 15 months and consisted of three phases. During the first phase a prototype was build and demonstrated in a lab environment. During the second phase, the prototype was tested in the healthcare environment with clients. The prototype worked and the intended effects were observed, but the heart rate sensor did not provide the effects consistently. Based on the test results with clients, an implementation advice was delivered which proposed functional fine tuning and the use of a different sensor, for example a rotation counter. During the third phase this advice should have been implemented. This however, did not happen. The project ended with a partially installed sensor on a home trainer.

**Within-case analysis**

Stakeholders in this case identified 12 key events, six contributing to success and six contributing to failure.
The healthcare manager experienced key events contributing to success during all phases of the project. The enthusiasm of the developers made him think the idea was feasible. The excellent prototype augmented that feeling and increased his own enthusiasm. When the intended effects were observed, he felt that implementation was close at hand. He realized that the project was more complicated than he anticipated when the third phase did not deliver, and communication from the developers stopped. This led to disappointment and the realization that implementation would require more time. His final perception is that the project is neither a success nor a failure but that it is not finished; “When I saw the prototype I was really impressed. The product was nearly ready. And I still hope to get a working product. I am not satisfied, because it is simply not finished yet.”

For the healthcare professional the project organization was unclear from the onset of the project. He found the enthusiasm of the developers very important because it made him feel heard. He was impressed by the prototype. During the second phase he felt no longer part of the project because communication stopped and because it was not clear why it stopped. When no working product was delivered, his perception of the project was failure.

One of the developers developed the prototype. He experienced excellent teamwork as a key event contributing to success and delivered an excellent product, which for him resulted in a perception of success.
The other developer was involved during the whole project. He delivered a working prototype according to agreed specifications, which he considers a success. He evaluates the key event that the sensor did not work as expected outside his influence although it caused him not to be able to deliver to his quality standards; “I am a developer and I cannot doubt the knowledge of the expert in his field, because if I did, I would have to become an expert in that field myself. I don’t want that and even if I wanted to, it would be impossible.” As a consequence of these key events he modified his perception from success to partial success.

Concluding, the stakeholders in this case constructed their perceptions of partial success and failure in different ways. For the healthcare manager, the key events contributing to success were so powerful that he continues to believe that the end-result is within reach. He does not accept partial success or failure and therefore did not form a final perception. The healthcare professional experienced key events contributing to failure during the whole project. Although he identified key events that contributed to success, they were not strong enough to modify his perception of failure. One developer only experienced key events that contributed to success and he perceived the project as a success. The other developer considered the project a partial success, but this perception was not formed by the interaction of key events. His perception came from the fact that he considers the causes for failure outside his influence.

4.2 Case 2 – Independent living support

Context

In this case the healthcare organization started a project to find out if and how smart technology could support independent living of clients with minor mental deficiencies. These clients have difficulties in certain areas of self-organization, for example keeping a regular day-night pattern. They receive outpatient care mainly through home visits by counselors. The smart technology would help to reduce the amount of care and the number of people involved in the care because counselors would be guided to provide the right care at the right time. The smart technology would allow clients to retake control of parts of their lives. In this case a team manager responsible for the outpatient care and an outpatient counselor were involved from the healthcare organization. From the applied research projects a healthcare teacher, a computer science teacher and different groups of students from various backgrounds were involved.

Content

The HIS would be smart technology, in and around the house, that would help clients in three known problem areas: maintaining a regular day-night pattern, home-work-traffic and managing energy cost. The system consisted of various sensors in client homes. Sensor output was transmitted
to a central system where SMS-messages were generated. The system could be tailored for each client: which messages should be send, when and how often and whether a counselor was informed or not. A portable demo case was developed during the project.

All stakeholders described success as the smart technology having been implemented with a number of clients and supporting the three identified problem areas. The healthcare professional and the developer considered added value for clients and counselors an additional measure. For the developer success also meant a satisfied principal and a learning experience.

**Process**

The project was duration was 24 months and consisted of two phases. During the first phase, preliminary research was performed on useful sensors and a baseline questionnaire was to be developed, but neither product was delivered to satisfaction. During second phase, the project approach was changed, so that learning in the healthcare organization would be supported. A series of short development cycles were executed. At the end of every cycle the healthcare professionals could experiment with the system and suggest improvements. During one of these cycles a portable demo case was conceived, which became an important tool in explanatory meetings with clients and counselors. This phase concluded with the installation of the system in the clients’ homes.

The project faced innumerable problems with technology. Although the sensors were known to work in a different environment, time and again they did not function as expected. There were many technical and organizational issues with suppliers. Fault tracing was complex and time consuming because of the number of organizations involved, because of privacy issues and because the geographical dispersion of the involved locations. All stakeholders concluded that the complexity of the HIS was underestimated and that the chosen pilot environment had increased the complexity.

**Within-case analysis**

Stakeholders identified 12 key events, six contributing to success and six contributing to failure.
To construct his perception, the healthcare manager carefully revisited the key events he identified and considered their impact. The continuing issues with technology and the fact that suppliers were unable to adjust their ways of working to the clients were major sources of irritation and frustration. In his perception these key events ultimately caused an unreliable HIS and he perceived that as failure. He modified his perception to partially successful through the key events that contributed to success. The demo case and the excursion to the supplier facilitated and stimulated learning with both clients and counselors; “People have become more attuned to technology as an aid to organize things.” He also felt that his personal involvement showed commitment to the original ideas; “I am still convinced that it could work and I often thought about another location that would have been a better fit.”

In the perception of the healthcare professional the project was a partial success. The process by which he came to the conclusion was similar to that of the healthcare manager. The key events contributing to failure in his case led to dispiritedness, because every technological issue and every issue between suppliers and clients reduced the likelihood of a working HIS. In this process he could indicate precisely when he missed a person in charge; “I would have liked to have one person who was really in charge, who understood all steps and had time to communicate everything with everybody”. He then considered the joyful learning experience which for him was a key event.
contributing to success. He considered the useful information that was gathered and concluded that in his perception that the project was partially successful.

The developer also perceived the project as partially successful, but through different reasoning. His first key event contributing to success was the realization that he had a good team of developers. This allowed for pleasant, effective teamwork and the delivery of a better product. For him the inability of the organization to formulate requirements was a key event contributing to failure. This could have stopped the project before it started. In response he decided to start development based on common sense. He felt this was a key event contributing to success, because with the first prototype the healthcare organization was able to start their contribution to the development process. Like the healthcare professional, he also could precisely indicate when he had missed someone in charge. When the supplier backed out, he felt that project success was out of his hands. Weighing the key events he evaluated the project as partially successful. “My approach at least led to the delivery of some tangible results and considerably improved the mood of the people in healthcare organization.”

Concluding, stakeholders in this case constructed their perceptions in different ways. They all started the construction of their perception with the observation that the project did not deliver a working HIS. The healthcare manager and the healthcare professional then remembered key events contributing to failure and felt those were the reason that the project could not deliver. They continued with key events that contributed to success and remembered joy, enthusiasm and learning. They finished the construction of their perception by carefully taking stock of both types of events and the scales tipped to a perception of partial success. The developer did not construct his perception of partial success through the key events he had identified. He considered the positive results of his assignment, then he explained that the causes for failure were outside his influence, and concluded that the project in his perception was partially successful.

4.3 Case 3 – Reliving memories

Context

In this case a nursing home where elderly, demented people are cared for, wanted to add reliving memories to their care program. For any type of care it is important to fit the care program to the client. With demented people this is difficult because clients have forgotten much about themselves and caregivers have to turn to the family for relevant information. The care program includes physical and social activities aimed at stimulating clients such as singing and walking. Reliving memories would add an activity to the existing palette. In this case a team manager and caregivers were involved from the healthcare organization. From the applied research projects various teachers and different groups of students from various backgrounds were involved.
Content

The HIS would be a care intervention for elderly, demented people where they could relive memories through a virtual reality of images, sounds, light and fragrance. Reliving memories would be a pleasurable experience contributing to the wellbeing of a client. It would be a place where clients and their families could relive the past. It also would help caregivers to get to know their clients better and use this knowledge in the day-to-day care. A lifeline assessment was developed to collect personal information. For every client a base line measurement was taken. A sensor belt and camera were used to monitor responses during the intervention and the collected data were stored to study the effects of the intervention.

The healthcare manager described success as a situation where the environment would be embedded in the day-to-day care; “.. an environment in our building where we or the family could go with our clients and enjoy the experience.” One healthcare professional described success through an example; the benefits he imagined for a specific client. Another healthcare professional described success as an environment that allows complete immersion in the experience with proven results and accumulation of knowledge on the intervention; “An environment where clients can have life-like experiences and we would know if the experience is meaningful for clients.” Developers described project success as delivering a product that satisfies the principal, but it would suffice to reach the technical goals. Success for the developers is also a pleasant working experience and to deliver something that they can be proud of, as one developer explained; “ I like to be able to point to a product and say to friends that I was part of that project.”

Process – the story

The project duration was approximately 18 months and covered three phases. During the first phase the lifeline assessment was developed, the virtual environment was installed and an application prototype was built. The intended effects were observed with clients. The second phase was characterized by organizational and technological setbacks. The healthcare organization was moving which occupied caregivers and clients, leaving little time and attention for the project. The data and technology of the first phase were virtually non-existent. The second team was hard pressed to deliver anything but managed to continue the project. The healthcare organization was somewhat disappointed in what was delivered during this phase. Communication was unstructured. A few times, the healthcare organization organized extra personnel to accompany clients and the project could not deliver. This was not taken lightly because funds are scarce. Another issue were the families who had invested time and energy and did not receive what was promised. The technology
turned out to be more complex than anticipated. During the third phase a robust system is developed and the first working prototypes have been delivered.

Within-case analysis

Stakeholders identified 11 key events, five contributing to success and six contributing to failure.

<table>
<thead>
<tr>
<th>Contributing to success</th>
<th>Identified by stakeholder</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong> This is an interesting project and a lot of fun</td>
<td>Healthcare manager, Healthcare professional 2</td>
</tr>
<tr>
<td><strong>2</strong> The observed effects with clients</td>
<td>Healthcare manager, Healthcare professional 1, Healthcare professional 2</td>
</tr>
<tr>
<td><strong>3</strong> Active, positive, personal involvement</td>
<td>Healthcare manager, Healthcare professional 2</td>
</tr>
<tr>
<td><strong>4</strong> A good team</td>
<td>Developer 1</td>
</tr>
<tr>
<td><strong>5</strong> Clear directions from principal</td>
<td>Developer 2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Contributing to failure</th>
<th>Identified by stakeholder</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong> Unavailable results from phase 1, no transfer to phase 2</td>
<td>Healthcare manager, Healthcare professional 2</td>
</tr>
<tr>
<td><strong>B</strong> Really complex technology</td>
<td>Healthcare manager, Healthcare professional 1, Healthcare professional 2</td>
</tr>
<tr>
<td><strong>C</strong> Results from students are not always good</td>
<td>Healthcare manager, Healthcare professional 1</td>
</tr>
<tr>
<td><strong>D</strong> Unclear ownership</td>
<td>Healthcare manager, Healthcare professional 1</td>
</tr>
<tr>
<td><strong>E</strong> It takes so much longer than originally expected</td>
<td>Healthcare manager</td>
</tr>
<tr>
<td><strong>F</strong> Inconvenient timing</td>
<td>Healthcare professional 2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare Manager</td>
<td>1, 2, 3</td>
<td>1, 2, 3</td>
<td>1, 3</td>
<td>C, D</td>
<td>A, B, C, D, E</td>
<td>B, E</td>
</tr>
<tr>
<td>Healthcare professional 1</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>B, C, D</td>
<td>B, C, D</td>
<td>B</td>
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<tr>
<td>Healthcare professional 2</td>
<td>-</td>
<td>1, 2, 3</td>
<td>1</td>
<td>-</td>
<td>A, B, F</td>
<td>-</td>
</tr>
<tr>
<td>Developer 1</td>
<td>-</td>
<td>-</td>
<td>4</td>
<td>-</td>
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<tr>
<td>Developer 2</td>
<td>-</td>
<td>-</td>
<td>5</td>
<td>-</td>
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</tbody>
</table>

Figure 5 – Overview of key events Case 3

To construct his perception of success, the healthcare manager first remembered the observed effects with clients, which for him was the single, most important key event. Then he considered the four events contributing to failure and described how these had affected his expectations. He realized that the project would take longer and that working with students was more complex than anticipated; “There is a lot of work to be done before it will be embedded in care processes, the way I envisioned it”. He then considered his active personal involvement, which allowed him to spread his belief in the project. Finally he considered the whole project as very interesting and something he enjoyed; “It simply is a lot of fun.”

One healthcare professional started with revisiting the events were the student results were not as expected and the effects thereof on care givers and family. He also considered his experiences
with the complex technology. The unclear ownership for him had lead to miscommunication and irritation. He concluded the process with the effects for clients. For him these did not carry enough weight to modify his perception that the project was a failure; “It has not delivered anything, it just cost much time and energy.”

The other healthcare professional started the construction of his perception at the moment when phase two realized that phase one had left nothing; “I see us in the room where the products should have been and there was nothing. No hardware, no assessments, no shows. Nothing. We were stunned.” He considered various events where the team struggled with the complex technology. He then remembered a number of events that illustrated inconvenient timing. He concluded that the project was essentially doomed to fail. Next, he revisited his active personal involvement through a number of carefully chosen interventions. The effect was that the project team rediscovered their motivation and delivered what was feasible given the circumstances. He was pleased with the results that were achieved with the clients. He then considered the project as a whole and described enthusiasm and joy in working in this interesting project. He constructed his perception by deliberately weighing all his key events and concluded that the project was partially successful.

The developers constructed their perception by reconsidering the event that led to a good team and the event where the principal set out clear directions. These key events allow them to work effectively and pleasurable and facilitate the delivery of agreed results.

Concluding, stakeholders in this case constructed their perceptions of success, partial success and failure through different key events. The healthcare manager and one of the healthcare professionals both perceived partial success. For them the content of the project and the observed effects with clients were powerful key events contributing to success. These outweighed the many key events that contributed to failure. For the other healthcare professional, all moments where the project did not deliver what was promised outweighed by far the results for clients. He perceived the project as a failure. The developers only partially constructed their perception of success through key events, because for them a technically sound product ultimately determines success.

4.4 Case 4 – Mobile treatment support

Context

The fourth case is part of a research project on the support of treatment of eating disorders with information technology. Overweight is becoming a societal problem and associated with a higher medical risk profile and lower overall health. This project focused on patients with a combination of mental illnesses and eating disorders. The treatment consists of behavioral therapy, which leads to different and better nourishment and more exercise. Involved in this case were the researcher and a
healthcare organization in mental hygiene. The project was executed by a multi disciplinary group of students and a healthcare teacher.

Content

The aim of this project was to develop a tool to support the cognitive behavioral treatment of people with eating disorders. It would be a website or mobile application, that would not replace the contact between patient and therapist, but support the treatment process when the patient is not in contact with his therapist or coach. The tool would support the process of gaining insight in triggers that induce dysfunctional eating. The tool should be available whenever patients are engaged in their treatment. The healthcare manager and the healthcare professional described success as a high quality functional design. The developers described project success as having delivered a fine product, a satisfied principal and a pleasant working experience.

Process

The project duration was five months. An application was designed that guides patients through the cognitive behavioral therapy process, similar to a therapy session. The team designed a food diary that assists in maintaining descriptive log. The project delivered a high quality functional design and also delivered a partially working prototype. Both products were received enthusiastically and consecutive phases to develop the application and test it with patients are foreseen.

Within-case analysis

Stakeholders identified four key events contributing to success and no key events contributing to failure.
In this case the stakeholders constructed their perception of success in a surprisingly similar manner. As soon as stakeholders started talking about the project, broad smiles and infectious enthusiasm appeared. They described frequent interactions between the stakeholders where the research was aimed towards clearly defined results. They experienced these as key events contributing to success because during these interactions curiosity and enthusiasm was enhanced and learning was facilitated. They described a reciprocal process where the stakeholders jointly constructed a spiral upwards leading to perception of success. The healthcare manager explained: “It is great to see that a project becomes self propelling. That boosts my energy and makes me want to add even more.” The developers also emphasized how working in a good team is experienced as a key event, as one developer put it; “In a good team energy is put into moving one another in the right direction and then I work really hard to give my best.”

Concluding, the stakeholders in this case constructed their perception of success by recounting a process of frequent interactions, where each meeting became an accelerator for the project outcomes and facilitated the emergence of a great team. All perceived the project as successful.
5 – Cross-case analysis

During the cross-case analysis 13 key events emerged, seven of which contribute to success and six to failure. The importance of the events was evaluated based on the number of cases in which the event was identified and the number of stakeholders that identified the event.

Of the key events contributing to success, as shown in figure 7, four were identified in all cases: 

- enthusiasm
- working prototype
- willingness to learn
- good team

This can be considered compelling evidence (Dubé & Paré, 2003; Yin, 2009) that these are common key events contributing to success. Three events: clear direction, building trust and high quality output, were identified in just two cases, indicating a less common occurrence. For two of these, an opposite was identified as key event contributing to failure: clear direction versus lack of direction and high quality output versus low quality output.

Of the key events contributing to failure, as shown in figure 8, four were identified in three cases: low quality output, technology issues, lack of direction and time is slipping. These are considered common key events contributing to failure. Two events: insufficient communication and limited technological literacy, were identified in less than three cases which indicates a less common occurrence.

The cross-case analysis further revealed that stakeholders can experience key events once and recurring. Recurring key events are experienced in two ways. Some events have a clear first occurrence and then continue to occur. Stakeholders indicate that the importance of such a recurring event does not change over time, each occurrence is as important as the first. Examples of these events are working prototype and good team. Other events only become a key event if they recur. Each occurrence adds to the importance and after a number of occurrences they are identified as key event. Examples of these events are enthusiasm, willingness to learn, technology issues, low quality output and lack of direction.
Stakeholders experience different key events and they experience key events in different ways.

**Enthusiasm** is mostly experienced by healthcare managers and healthcare professionals. Stakeholders explain that it creates positive energy and that it is contagious. They experience enthusiasm as a recurring key event and describe it as the source of the energy that is needed to change established ways of working. A healthcare professional voiced this as: “The developer and I were really working alongside and I enjoyed this very much. This helped to stay motivated and focused during all the issues that we faced.”
A working prototype is mainly experienced by healthcare managers and healthcare professionals. Stakeholders evaluate this as a key event because by working with a prototype they start to see what the HIS will mean for them and how it will add value. They experience this as a recurring event because they continue to learn when using a prototype and this contributes to self confidence. One healthcare professional said: “A working prototype makes you understand how it works. When you keep working with it you master the technology and then you really start to understand what it means.”

Willingness to learn is a key event for all stakeholders and has two aspects. One is the individual willingness to learn and it reflects the joy stakeholders experience in learning new things. The other aspect is important for healthcare professionals and occurs when developers show that they are willing to invest time to understand the care processes. Healthcare professionals feel heard and believe that their knowledge will become embedded in the HIS, as one of them said; “The developers were so inspiring and enthusiastic. They wanted to understand our practice and that helped me believe in the project.” Willingness to learn is described as recurring key event.

A good team is an important key event for developers. All developers can exactly pinpoint the moment they realize that they are working in a good team. Developers describe enthusiasm as the result of this event and say that it augments the energy that they are willing to put into the project. The effect is similar to enthusiasm for healthcare managers and healthcare professionals, but for developers a good team is a precondition to enthusiasm. It is a recurring event, because a good team keeps stimulating developers during the whole process, as one developer said; “I felt this most when we were really discussing things, trying to figure things out. I am content when everybody does what he is supposed to do, then you can stimulate each other.”

Low quality output is the key event where products are not delivered as promised or not with the expected quality and was mostly experienced by healthcare managers and healthcare professionals. It results in annoyance and recurrence amplifies the emotions of the stakeholders to the point of irritation or anger. As one healthcare manager said: “The technicians did not believe us, they blamed our clients. That made me so angry.” The opposite event, high quality output, was experienced in one case by the healthcare manager and healthcare professional and increased their believe in project outcomes.

Technology issues was described as a key event, mostly by healthcare managers and healthcare professionals, as a healthcare manager voiced; “The technology which time and again did not work: frustrating!” Some issues occurred because the chosen technology was not mature or reliable enough, other issues occurred because the interaction between components of the system were more difficult than foreseen. Some issues occurred because of the interaction between the clients and the technology. This, healthcare stakeholders thought, might be explained by the fact their
clients are not the standard users for which the technology is developed. In three cases technology issues resulted in a non-working HIS.

*Lack of direction* was described as a key event, mostly by healthcare managers and healthcare professionals. It was experienced when progress was not according to plan and when it was not clear who had the ability to take decisions regarding progress. The effects are described as feeling doubt and loss of interest. The opposite event, *clear direction*, was strongly experienced in the case that all stakeholders perceived as successful. Stakeholders described the effect as feeling purpose and being able to direct their energy towards a better product. A developer phrased it as: “If you know where you go, you don’t have to spend time to figuring that out. You can put all your energy in what needs to be done.”

*Time is slipping* was experienced by healthcare managers and healthcare professionals when they realized that the original planning was no longer feasible. A healthcare manager explained: “It takes much longer. I had to adjust my expectations quite a bit and it will still take some time before the system is ready.” This event is related to technology issues, and occurs when the technology cannot be made to work reliably within the planned timeframe. As a result, expectations were lowered and expectation adjustment activities were initiated in the healthcare organization. Stakeholders described feeling tension and disappointment.

The cross-case analysis revealed that to construct their perceptions of success or failure stakeholders mentally revisit the key events that they identified, as if replaying a movie, and that they use two different approaches to construct their perceptions of success or failure. In the first approach, stakeholders follow the timeline of the project and evaluate key events as they occurred in time. This approach was found with developers and in the case that all stakeholders perceived as successful. For the second approach, stakeholders revisit key events per type. They start with the key events that lead to failure, and continue with the key events that lead to success or vice versa. Stakeholders then form their conclusion by carefully taking stock of both experiences. Healthcare managers and healthcare professionals mostly used the this approach.

Finally, the cross-case analysis revealed that various practices known to contribute to success were applied in the projects. For example, they tried to intertwine healthcare-specific, functional expertise with technical expertise (Cheng & Atlee, 2007; Saleem et al., 2006) and they used prototypes to make the technology work in the daily care processes (Markus & Robey, 1988; Hannola & Ovaska, 2011). In the case of Mobile Treatment Support these practices seem to have delivered what theory predicts.
In the other three cases a number of known causes for failure were observed. The technology was judged ready, but turned out to be an amalgam of fragile and fragmentary components that had a tendency to break down or fail unexpectedly (Orlikoswki & Lacono, 2010). The interaction between technology and clients resulted in unexpected setbacks indicating a too techno-centric approach and insufficient understanding of human and social aspects involved (Heeks, 2006; Rinkus et al, 2005; Samaras & Horst, 2005; Zhang, 2005). During the projects, stakeholders realized that major changes in the organization were required (McAfee, 2006) which were underestimated and took much longer than originally anticipated. This leads to the observation that on the one hand known mistakes are still made in practice and on the other hand that the relation between success practices and actual project success remains a complex one.
6. Discussion

This section discusses the underlying assumption of this paper that key events are a useful mechanism to understand how individual stakeholders shape their perceptions of success. It discusses the common key events in the HIS-development processes that were found during the within-case and cross-case analysis and addresses the research question: how do stakeholders in HIS-development processes construct their perceptions of success and failure through key events?

6.1 Understanding construction of perceptions through key events

Stakeholders identify key events by searching for the emotions that are triggered by these events. Stakeholders remember exactly how they felt during a specific event and how their feelings influenced their thoughts and actions. They consider each of these events relevant in relation to success or failure and attach more value to events with higher emotional intensity. These findings support what was inferred in the theoretical background section of this paper (Bagozzi et al., 1999; Isabella, 1990; Beaudry & Pinsonneault, 2010; Stam & Stanton, 2010; Stein, 2010).

Stakeholders associate emotions such as joy, enthusiasm, motivation, and being acknowledged, with success and emotions such as irritation, frustration, tension, disappointment, doubt and anger, with failure. Stakeholders perceive that success is facilitated by emotions that are associated with success and hindered by emotions that are associated with failure. This relation was theorized before by various authors (Bagozzi et al., 1992; Stam & Stanton, 2010).

Stakeholders construct their perception by replaying key events before their mind’s eye and they re-experience the emotions that the key events triggered. During the interviews the emotions were observed in facial expressions, tone and volume of voice and expressed in the choice of words. In the case were the project delivered according to plan, the mental reconstruction of key events was very similar for all stakeholders as were the emotions that they experienced with each of these events and the resulting perception. In the cases where the projects did not deliver according to plan, each stakeholder reconstructed his own mental picture. Each event triggered different emotions with different stakeholders and each stakeholder constructed his own perception of success or failure by taking stock of his emotions.

6.2 Common key events and their role in HIS-development processes

From the cross-case analysis, eight common key events emerged. Four common key events contribute to perceptions of success: enthusiasm, working prototype, willingness to learn and good team. The first three are mostly experienced by users in HIS-development processes: healthcare managers and healthcare professionals. The last is experienced mostly by developers. Four common
key events emerged that contribute to failure or hinder success: *low quality output, technology issues, lack of direction* and *time is slipping*. Key events that contribute to failure are mostly experienced by users in HIS-development and not by developers. One developer voiced a possible explanation: “I made sure our part was done well, but there were more interests and those issues were outside my influence.”

*Enthusiasm* was experienced by nearly all users and the related key event *good team* was experienced by nearly all developers. Stakeholders attach great importance to inspiring and pleasant interaction between team members and a shared team spirit. Aronson, Shenhar, and Patanakul (2013) named this phenomenon ‘project spirit’ which they found to increase project success.

The occurrence of *technology issues* is a first sign that project success is at risk because this key event only surfaces when stakeholders have become irritated through earlier technology events. When *technology issues* occur, stakeholders are at the verge of loosing faith in the project. *Low quality output* and *lack of direction* tend to surface alongside or shortly after and are further indicators of the increasing likelihood that the project will be perceived as a failure.

Key events do not have the power to make a project successful. Success in this study was defined by all stakeholders as a working HIS. But when no working HIS is delivered, key events are capable of modifying stakeholders perception from failure into partially successful.

One key event contributing to success had a powerful influence, but was not identified as such by stakeholders. In three cases the healthcare managers were strongly committed to the idea of the HIS. During the interviews they all identified the exact moment that they committed themselves. This key event, which I named *the idea is my idea*, results in the conviction that the idea, eventually, will become reality.

### 6.3 How stakeholders in HIS-development processes construct their perceptions of success or failure during through key events

Stakeholders construct their perceptions of success or failure through mental reconstruction of key events, they re-experience the associated emotions and carefully take stock of these experiences. Two approaches were found for this process: a timeline approach and a type-by-type approach. In the timeline approach stakeholders reconstruct and re-experience following the project timeline. This approach was used by developers and in the successful case. In the type-by-type approach, stakeholders start to reconstruct and re-experience the key events contributing to failure and then the key events contributing to success or vice versa. This approach is mostly used by the users in this study: healthcare managers and healthcare professionals. Developers add an extra step to construct their perception of success. Once they have evaluated the key events, they consider the quality of their results and then construct their final perception of success or failure. This allows
them to construct a perception of success in relation to their own contribution when overall project success is not attainable.

6.4 Implications for theory

This paper contributes to theory of project management and (H)IS-development two ways: It increases our understanding of how stakeholders determine the degree of project success and it increases our understanding of stakeholder perceptions in (H)IS development processes.

This study confirms that success is a perception of stakeholders (Collins & Baccarini, 2004; Jugdev & Müller, 2005; Procarino & Verner, 2008; Shenhar et al., 2001) as different stakeholders were found to form different conclusions of the same project. Previously, failure has been defined as the absence of success (Agarwal & Rathod, 2006; Shenhar et al., 2001; Wateridge, 1995), but I found that the absence of success is not necessarily evaluated as failure, but rather as partial success or partial failure. User satisfaction has been most commonly used to measure stakeholder perception of success, usually at the end of the project (Collins & Baccarini, 2004; Jugdev & Müller, 2005; Procarino & Verner, 2008; Shenhar et al., 2001). Through this study we understand that perceptions of success are constructed during projects and that key events influence this process. This study furthermore showed that a shared definition of success by itself does not facilitate perceptions of success (Hartman & Ashrafi, 2002; Thomas & Fernandez, 2008; Wateridge, 1995), but that shared events through which a shared definition evolves contribute to joint perceptions of success.

Contribution to theory on (H)IS development was found in our increased understanding of how participative methods and working prototypes contribute to perceptions of success (Eley et al., 2008; Shenhar et al., 2001; Subramanyam et al., 2010). They stimulate the occurrence of enthusiasm and willingness to learn, which are both key events contributing to success and increase the users’ capability to articulate requirements (Pitts & Browne, 2007), which is important in achieving successful HIS (Hannola & Ovaska, 2011).

Towards developers, this study increases our understanding of how success the factors teamwork and delivering the product as intended influence the way developers determine the degree of success (Agarwal & Rathod, 2006; Linberg, 1999; Pereira et al., 2008; Procaccino & Verner, 2009). Teamwork positively influences perceptions of success through the key event good team and delivering a product as intended was found to be the ultimate success criterion for developers.

Various authors claim that success is difficult to define (Jugdev & Müller, 2005; Kaplan & Harris-Salamone, 2009; Tomas & Fernandez, 2008; Wateridge, 1995). This I found not to be the case: It is achieving success that is difficult.

Concluding, this study sheds light on the stakeholder view in HIS-development as has been requested by Heeks (2006) and Kaplan and Harris-Salamone (2009) and it contributes to the answer
of the question that was the starting point of this paper: To understand project success as it is subjectively perceived by stakeholders (Ika, 2009).

6.5 Implications for practice

The first contribution of this study to practice is the demonstration that much of the knowledge from theory on practices that contribute to success is applied in the cases under study. The application of these methods does, however, not prevent the occurrence of known causes for failure, such as underestimating the complexity of the technology (Orlikowski & Lacono, 2001) and not paying enough attention to human and social aspects in HIS-development (Heeks, 2006; Rinkus et al., 2005; Samaras & Horst, 2005; Teixeira et al., 2012; Zhang, 2005). Where these authors state that the approaches to these projects are too techno-centric, I found that there was underestimation of complexity and readiness of technology. Looking at these projects as innovation processes, were the technology is new to the organization (Garcia & Cantalone, 2002) may shed a different light on the causes for failure. This type of innovation requires time for adaption and learning. Furthermore healthcare organizations are renowned for their emphasis on reliability and accountability, are perfect candidates for structural inertia and therefore reluctant innovators (Hannan & Freeman, 1984). Practitioners should therefore design projects that allow for learning. Projects should start with the lowest conceivable complexity and increase complexity in small steps. This allows the technology to ripen, facilitates learning in the organization and results in adaptation to the social and human processes in healthcare.

The second contribution to practice is that key events can be used as a means to assess the likelihood for project success and to conceive interventions to increase the likelihood. This approach is supported by Newman and Robey (1992) and Stam and Stanton (2010), who propose that emotionally significant key events are a means to diagnose problems and that practitioners can design events to move projects in a different direction. Practitioners should monitor for key events contributing to failure to surface, because they are indicators that the project is at risk of becoming a failure. In case of the appearance of technology issues, lack of direction and low quality output, a technology focused intervention should be considered to remove the technological causes for these key events. Practitioners also should look for enthusiasm and good team at project startup. When these fail to appear, team building efforts or team reconstruction should be considered. The energy that these events create is a prerequisite to project success.

6.6 Limitations

The most obvious limitation of this study is the HIS-development context and as a consequence the question of generalizability of the findings. According to Lee and Baskerville (2003)
generalizability of the resulting theory beyond domain where the study took place can only be proven by empirical testing in that specific setting (Lee & Baskerville, 2003). It seems however likely that results will hold in IS-development because most of the theoretical background was retrieved there. Similarly the results are likely to hold in project management, because this study builds on earlier studies on success and stakeholder perceptions that originate there. Generalizability to healthcare is difficult to predict, because there is not enough literature available to base a reasonable assumption upon.

I recognize limitations of this research in the fact that some of the projects were finished in the past so that interviewees had to reconstruct and may have suffered from memory recall bias.

The projects were of relatively small scale, which is not unusual for innovation projects. As a consequence it was not always possible to interview more individuals in the same stakeholder role, which may have led to overemphasis of individual opinions.

Finally, the study did not include cases that delivered a working HIS. As a consequence, I might have missed common key events that occur such projects.

6.7 Further research

For further research I propose to continue this research with additional projects in the same context to examine projects along their full lifecycle and to include projects that delivered a working HIS to complete the overview of common key events. Another area for further research is the extent to which perceptions of success may be influenced, for example through the effect of interventions that create or prevent the occurrence of key events. Finally, I would like to examine the effect of this research as an intervention in the tradition of action research, because during this research I experienced that as a possibility. I did not however pursue this, because it was outside the scope of this paper. An interesting approach for action research would be to attach the role of translator (Heeks, 2006) to the researcher.
7. Conclusion

This paper set out to answer the question how stakeholders construct their perception of success and failure during HIS-development processes through key events. This study shows that key events are indeed a useful mechanism to understand the stakeholder perspective. Key events trigger emotions that influence the way stakeholders perceive these events. Stakeholders, in this study users and developers, experience different key events and construct perceptions in different ways. Users shape their perception of success or failure based on key events. Developers consider key events, but ultimately construct their perception of success based on the quality of the products that they delivered.

Key events have the ability to change stakeholder perception of failure into partially successful. The absence of key events contributing to success indicates that important prerequisites for success are missing. The appearance of key events contributing to failure indicates that the project is at risk of not delivering what is intended and being perceived as a failure. The observation of key events that contribute to success without any key events contributing to failure, indicate a project that has a fair chance of being perceived successful and delivering what was intended.

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References


Appendix A – Interview guideline

Introduction

a. Introduction to the interview
   • Introduce interviewer, explain research and confidentiality and recording
b. Introduction interviewee
   • Name, function and work history

Interview

1. Description of the project by interviewee
   • Describe the project in your own words
   • What did, in your opinion, the project aim to achieve?
   • What can you tell about the project approach?
   • What was your role?
   • Why did you participate?
   • What were your expectations?
2. Was the project in your perception a success?
   • If yes, what made it a success?
   • If not, what made not a success?
3. If, at the beginning of the project, you would have been asked to describe success, what would have been your answer?
4. Did your idea of success change during the project?
   If yes, how and by what?
5. Which important event mostly influenced your perception of success?
   • When during the project did this event take place?
   • What in your opinion, exactly happened?
6. How did this event influence your perception of success?
   • How did it influence your thoughts?
   • How did it influence your actions?
   • Why was this according to you an important event in relation to the success of this project?
7. What are, in general, events during a project that make you consider a project successful?

Closing

A. Do you have additional remarks?

B. Is there anything relevant for this project or this research that has not yet been discussed?