Discovering the Process of User Expectating in a Pilot Implementation

Expectations and Experiences in Information Systems Development

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JUNE 2014 ROSKILDE UNIVERSITY COMPUTER SCIENCE RESEARCH REPORT #144

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ISSN 0109–9779

Research reports are available electronically from:

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Ph.D.-dissertation

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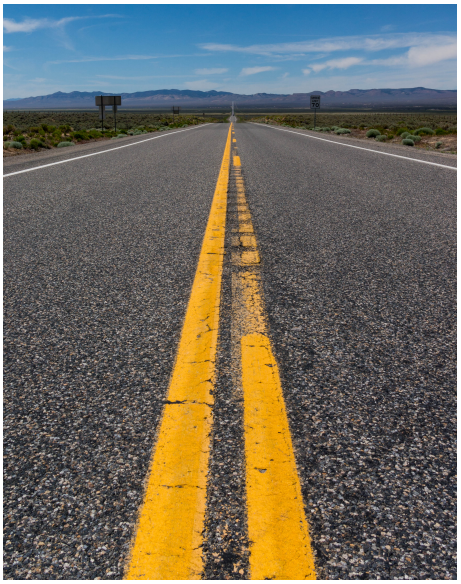

Informatics
Communication, Business and Information Technologies (CBIT)
Roskilde University

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April 2014

We're flawed because we want so much more.
We're ruined because we get these things
and wish for what he had

— Don Draper

Dedicated to my caring parents
and my loving wife who have been through
their share of "expectating" with me.

FOREWORD

The Ph.d.-dissertation at hand is the result of a three year long grand tour of personal and professional change. Suffice it to say that now, at the end of the journey, I am looking back at three years of joy, frustration and growth, finally having come to the conclusion that yes, a Ph.D. is certainly close to how people have described it. I have, too, encountered walls, obstacles, dips in motivation and a total realisation of apathy as I went along. Though I have also realised that this experience needs to be experienced for oneself. Describing the process of a Ph.D. really does not do it justice.

Now why do research on user expectations in Information Systems Development when it is already a subject with much existing research? From a professional point of view, a clever professor once told me: *"Avoid doing your Ph.D. research in an up-and-coming area. Find your own niche within an already established area since you will be able to navigate so much easier*[1]." From an interest-oriented point of view, I came to realise that expectations are expressions of how we construct and perceive the window of how we look out on the world from the very moment we inquire our parents about why the world is as it is and this shapes how we see things the "right" way. Of course, no one likes realising they are wrong and this is especially important to handle in Information Systems Development. In Information Systems Development someone is in charge of projecting, assessing and calculating and these projections influence how we perceive the future. Essentially expecting and perceiving must be viewed as a legitimate learning process in Information System processes that can be harnessed constructively if we want to do any real progress. You might wonder why so many of the quotes in the beginning of the chapters are taken from the book "Discovering" by Robert Scott Root-Bernstein (Root-Bernstein, 1989)). The book was a gift from Dr. Richard Baskerville and was a great inspiration to find my "way of contributing to research". The book is a worthwhile read for any researcher who finds her- or himself trapped in a system with seemingly no exits since it attempts to uncover the personal attributes and motivations behind doing contributions[2].

After having attempted to influence your expectations of this dissertation, I invite you inside to perceive how I have made sense of this and turned it into a contribution to the field of research on user expectations in Information Systems.

1 Many thanks to Mike Gallivan.

2 Although it primarily engages in explaining scientific discoveries from a positivistic angle, I will claim that it is also fully applicable to Social Sciences and Humanities.

SAMMENDRAG PÅ DANSK

Denne Ph.D-afhandling adresserer behovet for mere forskning inden for "hvorfor" og "hvordan" brugerforventninger ændrer sig inden for systemudviklingsområ. I modsætning til tidligere studier om brugerforventninger tager afhandlingen sit afsæt i en kvalitativ, eksplorativ tilgang og adresserer forskningsspørgsmålet: *"Hvordan ændrer brugere deres forventninger undervejs i et systemudviklingsprojekt?"*.

Resultaterne finder frem til at brugere definerer deres forventninger med karakteristika og ikke, som tidligere antaget, som enkelte typer af forventninger og at brugere forventer i adskillige retninger samtidig og ikke kun mod teknologiens funktionalitet og brugbarhed. Afhandlingen frembringer frameworket "user expectating" som forklaring pådet overordnede forskningsspørgsmål ud fra en gennemgang af den eksisterende Information System (IS) litteratur. Afhandlingen foreslår at mange variabler spiller ind på systemudviklingskonteksten. Frameworket lægges kvalitativt ned over et længerevarende casestudie i den danske præhospitale sektor og finder at brugere ændrer deres forventninger ved at omprioritere retninger og karakteristika som "vil", "ønsker", "bør" og "skal". Disse ændringer opstod primært når interessenterne (inklusive brugerne) udførte handlinger i projektet som "udmeldinger", "oplevelser" og "feedback-givning".

Brugerne i projektet karakteriserede deres forventninger som "bør" og "skal" når de oplevede teknologien efter der var kommet udmeldinger eller efter de havde oplevet teknologien efter at have givet feedback. Brugerne ændrede derudover forventningsretningerne efter at have oplevet fx den ønskede funktionalitet. Afhandlingen foreslår derfor at det er en betingelse for et systemudviklingsprojekt at brugerne ændrer deres forventninger løbende når de hører udmeldinger, oplever teknologien eller andre begivenheder i processen eller når de afgiver feedback på deres brugsoplevelse.

De teoretiske implikationer for afhandlingen er at de mest anvendte teorier om brugerforventninger ikke har nok forklaringskraft til at kunne rumme systemudviklingsprojekter. De praktiske implikationer omfatter at på trods af at organisatoriske prototypeprocesser som fx pilotimplementeringer kan bruges til at frembringe læring om organisation og teknologi, såkan de også gøre brugerne trætte pga. den iterative udviklingskontekst. Potentialet i "user expectating" frameworket er at kunne bruge det som indikator for om udviklingsprojektet er på rette vej. Hvis brugere ændrer retningen på deres forventninger kan det ses som et positivt tegn, mens det at ændre karakteristik af deres forventninger uden at ændre retning kan indikere problemer i projektet. Disse praktiske forslag forudsætter dog at frameworket faktisk kan anvendes kvantitativt.

ABSTRACT

This Ph.D.-dissertation addresses the call for more research on "how" and "why" users change their expectations in Information Systems Development (ISD). Contrary to many previous studies on user expectations in the IS literature, the study takes an interpretative, qualitative approach to address the research question of: *"How do users change their expectations in an Information Systems Development (ISD) project?"*

The findings of the study are that users in the case studied characterised their expectations in different ways and did not define an expectation, as previously assumed, as belonging to a single type. Users are also found to direct their expectations in several directions and not only towards product performance or functionality.

The study derives a framework called "user expectating" from the IS literature and uses this framework to explain the phenomenon of how users change their expectations of an IS as a development project. It is proposed that more variables appear in the ISD context than previously believed. The framework is applied qualitatively to a longitudinal case study in the Danish Emergency Medical Services (EMS) Sector and the study finds that users change their expectations by reprioritising the directions of expectations and recharacterising them as both "will", "hope", "want", "should" and "must". These changes happened primarily when stakeholder actions (including those of the users) of "announcing", "experiencing" and "giving feedback" took place in the project.

Users would use the "should" and "must" characteristics when their experiences of the technology followed announcements from management or when users' experiences followed giving feedback to management. Furthermore, users would change the directions of their expectations when experiencing that their expectations of e.g. functionality was met. Thus I propose that in an ISD project where an organisational prototyping approach is chosen it seems to be a basic condition that users change their own expectations when hearing new announcements, when experiencing the technology or project events or when providing feedback on their usage experience.

The theoretical implications are that researchers should be wary of attempting to assess and measure users expectations in an ISD project using prior prevalent theories on user expectations since they do not fully seem to explain the phenomenon in an ISD context. Implications for practice are that while organisational prototyping approaches such as pilot implementations seem to have potential for improving organisations and technology through learning, they should

be used with caution since users can quickly become weary of the iterative development context. The potential of the "user expectating" framework in practice is to use it as an indicator for whether progress of the project is made at all. If users change directions of expectations but not characteristics the project may seem to be on the right track while a project with continuous recharacterisations with no redirections may seem to be in trouble. However, this also assumes that the framework can be applied quantitatively.

ACKNOWLEDGMENTS

Suffice it to say that this "dissertation venture" into user expectations has not been something I have been able to do alone. Not by a long-shot.

First and foremost a big thanks to the prehospital centre of Region Zealand for the time and access granted to the empirical area. Also a big thanks to the two emergency medical service operators in the region and the crewmembers for letting me participate in dispatches and spending their time on interviews the past two years.

A big thanks to Richard and Bobbi Baskerville for housing my wife and I during our time abroad. This dissertation could surely not have been written had it not been for them and their support! A special and professional thanks to Richard Baskerville for socratically schooling me in the ways of what "interesting research" actually is. That was an eye opener of multiple dimensions.

Thank you to Jan Pries-Heje for assisting me in going abroad. It was a life experience to remember!

Also a big thanks to Maria Manikas who has stood by my side as a colleague and dear friend since we ventured out on this Ph.D.-journey together in search of our separate research areas to contribute to. This also goes to the rest of my Computer Science and Informatics colleagues. The social and professional level of this department is indeed outstanding.

I want to express a tremendous amount of gratitude to my supervisor Jesper Simonsen who, for the past three years, has backed me up, supported me and helped me when times looked extremely dim. I owe equally thanks to my secondary supervisor Morten Hertzum for always having a door open and leaving a kind but critical word on my work and ideas.

Finally a big thanks to friends and family for supporting my process despite the fact that I have not always been able to explain what all of this Ph.D. actually was about!

CONTENTS

LIST OF ACRONYMS

CPR	Cardiopulmonary Resuscitation
EAR	Electronic Ambulance Record
ED	Emergency Department
EDT	Expectation Disconfirmation Theory
EMA	Emergency Medical Assistant
EMS	Emergency Medical Services
EMT	Emergency Medical Technician
ERP	Enterprise Resource Planning
GUI	Graphical User Interface
HCI	Human-Computer Interaction
IS	Information System
ISD	Information Systems Development
IT	Information Technology
SCT	Social Cognitive Theory
SUV	Sub Urban Vehicle
SERVQUAL	Service Quality Model
TAM	Technology Acceptance Model

[A] good conversation lies somewhere between boredom and insanity.

— Donald A. Schön
(Schön, 1995, p. 6)

1 INTRODUCTION

The Information Systems Development (ISD) discipline is a rather complex area to map out since it contains many aspects, theories, and methodologies influenced from other disciplines, a.o Information System, project management, software development and Human-Computer Interaction (HCI). An example of such a complex aspect is the *prototyping* technique that can be viewed through the lens of the software developer (to develop software that better meets specifications), of the project manager (to ensure involvement of the users throughout the project and ensure that the project does not go over the budgetary constraints), the usability analyst (to better ensure that the software or IT is actually useable for the end-users), and the management (to gain knowledge of the fit between IT tools and organisational structures and procedures). These complex aspects make it difficult for a researcher to identify when to draw on theories that have emerged outside ISD settings and when to draw on ISD specific theories to explain the empirical phenomena.

The theoretical motivation of this Ph.D.-dissertation is to address an area where there is a *lack* of ISD specific theories, that of how users change their expectations of the ISD project as it progresses. I have labelled this process "user expectating" . The empirical motivation for this study is to address a work area with high user motivation and where users rely strongly on coordinative tools which certainly exists within healthcare (Berg, 1999). With a high reliance on tools there must be a significant drive behind wanting to improve tools and work processes and furthermore to engage and involve the users in processes of change. The practical motivation of this Ph.D.-dissertation is to problematise the belief that involving users through such approaches as prototyping and pilot implementations will lead to positive results in terms of realistic expectations, user acceptance, and in turn, intentions of continued usage (Aggarwal and Rezaee, 1996; Tudhope et al., 2000). I will show that the process of user expectating in iterative development projects can be somewhat problematic for the organisation long-term, in spite of popular (at the time of writing) research literature that encourage putting working versions of an IS into use to enhance user/decision-maker communication and understanding by experimenting with configurational technology. The expectating process specifically focuses on *why* users have expectations

and *how* these expectations are changed through technological and social narratives. I will do this by way of a process model approach that qualitatively explores how users change their expectations based on the context and actions taken as the ISD project evolves through several iterations.

I will argue that the conventional explanation of blaming IS failure on the badly managed expectations allowing users to change is somewhat of a moot point since it is not a question of *if* users' expectations will change but *when* they will change in ISD. The major theoretical contribution of this dissertation is thus a proposal of reconceptualising how users change their expectations within the ISD context.

The methodology of the study is qualitatively interpretivistic and inspired by many contemporary IS papers that recently have called for qualitative studies to go into depth with phenomenons of empirical areas yet undiscovered that:

> *"[...] describe situations rarely observed and for which a better understanding may have important consequences such as [...] how the IS function transforms and why it is not often perceived as contributing to value creation [...]. Beyond the observed reality, there is also a need to understand better how intentions develop and how people take stances or make compromises if one accepts that management is at least partly about paradoxical injunctions."*
> - Rowe 2012, pp. 472–473

This dissertation can be seen as a reaction to Rowe's call for research that will open up empirical areas previously taken for granted or viewed as a "black box". Specifically I will present a longitudinal study of an iterative ISD project in the EMS sector labelled as "an experimental pilot". While the project resembled long-term, evolutionary prototyping, it still differed in a variety of key areas that have not been empirically investigated earlier. These areas included: the IS being used in the real work context involving real patients; the number of users involved in providing informal and formal feedback; the implementation of up to three development iterations; the specific case study of the EMS sector involving the situated and distributed work practices of an EMS dispatch centre, EMS crewmembers and five major Emergency Departments (EDs).

Hopefully, showing how users change their expectations during an ISD process and thus challenge some previously taken-for-granted assumptions about user expectations will make you utter: *"That's interesting"* (to paraphrase Davis (1971)). Examples of these assumptions include the prescriptive practical implications we all have realised and uttered as we are introduced to new consumer products and services that have been over-hyped: *"Next time, I will simply not have any expectations or just set my expectations very low. Then I can surely only be positively surprised!"* In this dissertation, I will show you that this is far more difficult to do as an explicit rational act than it is to simply state.

I have divided the following introduction into two sections that all add up to the motivation for this dissertation with the research question presented.

First, I will shortly draw in on some of the major potential contribution areas for research on user expectations in IS that I will also go more into depth with in chapter 4, p. 21 later. These potential research contribution areas will culminate in showing that there is a need to better conceptualise how users change their expectations, which is my overall research question. Second, I will conclude the chapter with a presentation of the overall structure of the dissertation.

1.1 MOTIVATIONS FOR RESEARCHING USER EXPECTATIONS IN IS AND ISD

As I wrote earlier, ISD as a research area is rather complex since it draws on many other disciplines and is strongly determined by the point of view of the beholder[1]. Thus the research on the nature and importance of user expectations contains a slew of literature, especially from other disciplines that have influenced the ISD field. The vast amount of literature also shows that the area of research is heterogenuous and ambigious in relation to scope, definition and directions of user expectations. Hence I will spend this section elaborating on the intricacies of user expectations and how the concept has been related to the literature on IS in terms of IS performance quality, user satisfaction, the actual usage, and in turn, the success of the IS. I will end the section by revealing the primary theoretical assumptions and showing that the context of ISD needs a separate explanatory model for how users change their expectations, thus the primary theoretical and empirical motivation for this study.

Studies in user expectations, and expectations in general, have drawn on three broad theoretical areas: Expectation Disconfirmation Theory (EDT), Social Cognitive Theory (SCT), and the Service Quality Model (SERVQUAL) literature.

In the EDT literature, the focus primarily lies on how users' expectations, when met or not met, may determine their perceptions of IS performance (Szajna and Scamell, 1993; Bhattacherjee and Premkumar, 2004), usage intentions (Bhattacherjee, 2001a; Hsu et al., 2004; Venkatesh and Goyal, 2010) and last but not least, end user satisfaction (Suh et al., 1994; Mahmood et al., 2000; McKinney et al., 2002; Au et al., 2002; Khalifa and Liu, 2003; Susarla et al., 2003; Bhattacherjee and Premkumar, 2004; Khalifa and Liu, 2004; Au et al., 2008). In EDT, it is believed that users (or any other target group for that matter)

1 I will return to an account and discussion of my own perspective on IS and ISD in chapter 3, p. 15.

compare their experiences with a pre-usage belief, measured through the cognitive standard of "expectations" (Oliver, 1977). Expectations are usually defined as:

> *"....a set of beliefs held by the targeted users of an information system associated with the eventual performance of the* IS *and with their performance using the system."*
> - Szajna and Scamell 1993, p. 494

The users then experience whether or not their expectations are met through the construct of "disconfirmation". The amount of disconfimation is then believed to be the determinant of whether or not users are satisfied with the IS product. Common research models in EDT state that positive confirmation and disconfirmation of product performance (exceeding high or low expectations respectively) influences satisfaction, while negative disconfirmation of product performance (not exceeding expectations) influences dissatisfaction. Despite the broad acceptance of EDT, many later studies have raised doubts as to the likelihood and certainty of the positive disconfirmation scenario (Venkatesh and Goyal, 2010; Brown et al., 2012), criticising the approach for being too narrowly focused (Khalifa and Liu, 2003, 2004; Nevo and Chan, 2007).

In SCT, computer self-efficacy (the belief that the individual is able to perform a certain behaviour using the technology) is the primary determinant of either personal outcome expectations or performance outcome expectations (Bandura, 1986). The concept of self-efficacy has also been acknowledged by later studies of expectations and included into the variance measures by i.a. Hsu et al. (2004) and Venkatesh and Goyal (2010). Results from SCT studies have found self-efficacy to have a direct contribution to continued usage (Compeau and Higgins, 1995b,a; Compaeu et al., 1999; Venkatesh and Goyal, 2010; Hung et al., 2011). Essentially, SCT moves the focus away from perceptions of the IS product and its quality and closer to the individual belief of what the new Information Technology (IT) tools enable one to do and perform.

A third majorly used model that includes users' expectations is the SERVQUAL model (Parasuraman et al., 1985). The SERVQUAL model differs from previous theories in that it conceptualises how users think of service quality with the attributes of both the product (the physical attributes) and the service connected to the product (the way the interaction between product and people is served or maintained by others, e.g. IT support). The implications of the SERVQUAL model for expectations are that one cannot merely limit oneself to evaluate *one* aspect of expectations such as product performance since this is only a single aspect that users use to judge the quality. Instead, the SERVQUAL model shows that expectations can be directed through various attributes of not only the product but also towards the people who stand behind the product. Furthermore the SERVQUAL model

proposes a number of gaps between stakeholders' perceptions of customers' expectations, primarily between those of management and consumer, and service providers and consumers.

What is surprising is the absence of studies researching user expectations in a broader ISD context and not only as IS implementation and post-implementation. An example of one of the earliest studies is that of Ginzberg (1981) who finds that user expectations prior to development and implementation of an online portfolio banking management system impacted the success of the project.

A minor part of ISD studies do mention the importance of user expectations in a prototyping context, however (Tudhope et al., 2000; Karsenty, 2001; Limayem et al., 2007)[2]. Tudhope et al. (2000) as well as Limayem et al. (2007) found that practitioners would often claim unrealistic user expectations as a recurring problem of prototyping. Despite these results, however, the ISD literature is woefully silent and more often than not does not concern itself directly with user expectations, despite the recommendations and findings of Ginzberg (1981); Keil et al. (1998) and Schmidt et al. (2001) who underlined the importance of taking heed of user expectations as a critical success factor.

This prevalent definition of user expectations as a belief of product performance provides us with a tool to actually characterize the demarcation of how to further examine existing assumptions about user expectations. First of all, by referring to expectations as a belief we get the idea that expectations contain a certain amount of probability, that is, whether or not the expectations will come true when experiencing the area of the product that the expectations are directed against.

Second, working with any kind of concept in time where users consolidate beliefs with experiences (in the case of EDT; confirmation or disconfirmation), this specific point in time is immensely important. In most of the literature, whether it revolves around IS or marketing, these experiences are also called "encounters" and they take for granted that the users try out the product in real life working contexts. Mostly this is because the prevalent use of expectations have revolved around measuring expectations prior usage to post-implementation and into the future using the argument that it is not until after much experience has been had with the product that expectations have stabilised.

2 I should note here that prototyping is a very wide concept and that I am well aware of the fact that many types of prototyping have been proposed, ranging from testing the prototype in a lab to testing in real use scenarios with users. In chapter 4, section 4.2, p. 46 I will more thoroughly elaborate on which type of prototyping I refer to. The reason for not doing this in this introductory chapter is that the specific approach is actually not made clear from the papers referenced.

Third, despite arguments from Szajna and Scamell (1993) and Bhattacherjee (2001a) that perceived performance is more important than the constructs of e.g. perceived ease of use and perceived usefulness[3], this does not necessarily mean that these constructs for evaluation are the only determinants for whether or not expectations are fulfilled, and in turn, for satisfaction and the ensuing usage intentions. The use of product performance as the dependent variable in the EDT factor studies reveals the assumption that expectations contain directions towards an abstract believed outcome. However, measuring product performance is one among many outcomes of where expectations may be directed. This change in focus I have chosen to denote the "directions of expectations" as they are causally believed links between a given tool, a future state or outcome, either believed to be desired or probable. .

Clear indications are thus given that the usual quantitative cross-sectional or longitudinal surveys, have not provided a richer understanding of how and why user expectations change in more process-oriented settings but instead found correlations between variables such as IS performance, IS quality, satisfaction, and usage intentions. Similarly, the qualitative process model approaches have primarily found answers to "what" questions and only very few indications to why user expectations seem to change. Later variance studies of user expectations also acknowledged this phenomenon of changing user expectations and as a result attempted to create variance research models that could cope with this (Bhattacherjee and Premkumar, 2004; Brown et al., 2012).

1.2 RESEARCH GAPS AND POTENTIALS

So, what makes an ISD context different from the "regular" IS contexts? In a review of the studies on EDT Khalifa and Liu (2004) write that most of the studies reviewed "*overlooked the possibility that some unique IS contextual factors may potentially impair the validity of the theory, which is originally developed and tested in contexts that are very different from the IS environment*" (Khalifa and Liu, 2004, p. 43). I will argue that applying EDT to the ISD context is no different. What characterises an ISD project is change and development of the organisational and technical structures, and several unpredictable events that influence these structures, often because a great many internal and external factors will inevitably impact the project as time goes by (Newman and Robey, 1992). This broadens the scope of an ISD project and distinguishes it from many IS implementation studies in the sense that just about any variable in the project are prone to change, and this is a condition that all stakeholders are explicity aware of, users and man-

3 inspired from the Technology Acceptance Model (TAM) (Davis, 1989).

agement alike[4]. In line with Bhattacherjee and Premkumar (2004) that call for more research on "why" and "how" user expectations emerge and processually evolve during an implementation, I argue that these research topics are also of great importance when put into the context of development rather than as a "final implementation". Furthermore I also agree with Brown et al. (2012) that "*It is possible that different types of individuals - i.e., different personality profiles - could react differently, thus resulting in personality playing a key moderating role*" (Brown et al., 2012, p. 485) and that more advanced techniques for understanding the individual values of user expectations are needed. I claim this for several reasons.

The first research gap that I will point to is that users change their expectations over time and this needs to be researched in a different manner than previously. The prevalent approach has so far primarily been a quantitative, behavioural approach where users' expectations have been conceptualized in two or more relatively stable points in time. The process of expecting has broadly been simplified to creation of expectations, experiencing whether or not these expectations are met and then a post-assessment of whether or not this created satisfaction with the encounter. Some authors have in recent years followed up on this and reacted to the simplistically linear understanding of how users change their expectations. This has been done through for example polynomial modeling with independent variables such as magnitude and positive/negative values of expectations (Venkatesh and Goyal, 2010; Brown et al., 2012). However, if user expectations are dynamical and in constant motion, this research approach will not be able to go into depth with understanding how and why users change their expectations[5].

The second research gap that I will point to is that the ISD context requires a broader approach to where users actually direct their expectations. Only focusing on assessing one or two directions of expectations (such as product performance or perceived ease of use) but not on events that relate to how stakeholders react and take actions during the ISD project means that the interrelations and/or co-dependence between how users characterise and judge their directions of outcome expectations are still unknown. One interesting finding that supports this is the finding that user satisfaction actually

4 As a sidenote it should also be mentioned that whether to frame studies as IS or ISD projects are determined "from the eye of the beholder". When researchers characterise a study as a satisfaction study of an Enterprise Resource Planning (ERP) system, this shows that very few actions in the process occurred and that the independent variables were defined and controlled well enough to measure reliably. The same study could be argued to be characterised as an ISD project when broadening the scope to include the software contractor in redeveloping or configuring the ERP packages according to further requirements learned from the initial implementation.

5 Though I do agree that quantitative approaches obviously work well with research questions revolving around understanding "what" correlations.

seems to accumulate over time rather than being a direct correlation between one or two variables (Bailey and Pearson, 1983). This is important because simplifying expectations as being a primary reason for ISD project sucess gives rise to a myth of expectations: that the prescribed solution to what is perceived as a problem of too high or unrealistic expectations in ISD projects is simply to "manage the expectations better", more often than not through pushing out more information and communication in a manner close to dictating what users should believe. I use the word "myth" because we have yet to discover actual examples of this being done successfully.

The third research gap that I will point to is the need to understand what users' expectations actually consist of. From the three primary theories on expectations shown previously in section 1.1, p. 3 the definitions have been moving back and forth between expectations as both desires, norms, and even ideals (Teas, 1993; Boulding et al., 1993; Miller et al., 2008). From this complex perspective it may be just as difficult for users themselves to relate to which types of expectations belong to which when queried about it. This could correlate positively or negatively with how we have also seen that expectations of performance and attributes of the IS are subject to change as the users grow more accustomed to the IS product (Szajna and Scamell, 1993). In this sense the impact depending on the direction and origin of expectations and the value that each individual user attributes to the expectations is yet unknown, as well as how users reprioritise their desires and expectations as they grow more experienced with the IS product. Ergo we need some kind of framework within ISD that is broad enough to encapsulate what expectations are and how users denote and direct the expectations as the project moves on.

The gaps identified in the literature of user expectations so far can be summed up to a neeed for researching *how* user expectations relate to IS usage and how and why this IS usage emerge in the context of the ISD project as it progresses over time.

In other words, I argue that taking a qualitative and interpretivist approach to assessing the usage of user expectations may reveal more concrete and explorative content that can be used to understand how users' expectations, desires and experiences are invoked, assessed, reflected on and addressed during an ISD project. To gain an understanding of how users narrate their expectations, we need to specifically look into those factors that influence expectations and how this relates to the actual usage. I argue that this learning is crucial for development projects of IS in use in order to understand "what" to actually change in the IS product, the organisation or the process, "how" to change it, and "how" to handle the change henceforth in order to balance out the unruly and hard-to-define expectations of the end users.

1.3 RESEARCH QUESTION

Motivated by the above-mentioned research gaps identified in the user expectations literature and shown through an in-depth case study, this dissertation attempts to shed light on the following research question:

> ***"How do users change their expectations in an Information Systems Development (ISD) project?"***

To answer this overall research question, I have divided it into four smaller, sequential sub-research questions. The logic of these four sub-research questions is the following: Before attempting to understand how phenomena change, we need to understand what they are and what the general body of knowledge believe the phenomena to be (sub-research question 1). We need to understand how the specific instances of the phenomena are linked to the case context that is being researched (sub-research question 2). Assuming that change is a dualistic and cyclical process, we finally need to understand how events and actions taken in the case context influence the phenomena and how the phenomena influence the case context back (sub-research question 3 and 4).

1. **"Which areas of research on user expectations in IS are in need of further research?"**

   The purpose of this sub-research question is to draw on the existing body of knowledge to understand the definitions and premises of user expectations. The results of this sub-research question is first and foremost to conceptually frame the research area of user expectations and apply this framework to an empirical context for further validatation and refinement.

2. **"How does the specific work context influence the user expectations that exist prior to an ISD project?"**

   The purpose of this sub-research question is to make known which sources influenced the users' expectations in the specific case context (which will also have to be explored). This also requires a short analysis of the actual case context. The results of this sub-research question will be used to further embrace the dynamics of changing characterisations of user expectations in the next sub-research question.

3. **"How do actions taken influence user expectations in an ISD project?"**

   The purpose of this sub-research question is to make known what types of actions that the users reacted to that made them change their expectations, including for example experiencing the technology in use.

4. **"How do user expectations influence the actions taken in an ISD project?"**

> The purpose of this sub-research question is to ackowledge the dualistic notion that while actions do impact the user expectations, the expectations that users hold also impact their own actions of using the IS. I will use the results of this question to understand the iterative dynamics between taking actions and experiencing and interpreting them.

The overall research question is answered in such a way so that we gain knowledge on user expectations on an abstract level and a specific level, and we use this abstract and specific knowledge on user expectations to understand how they processually change from one state to another state over time.

[T]he logic of presentation rarely corresponds to the logic of discovery. Nobody actually writes out for peer-reviewed publication how they actually got their results, because [...] a lot originate in "perfectly dotty" ideas, which would be laughed at.

— Robert S. Root-Bernstein
(Root-Bernstein, 1989, p. 178)

2 DISSERTATION STRUCTURE

After having framed this thesis I will now present the dissertation structure. Each section summarises the main points of each chapter in the dissertation.

CHAPTER 1: INTRODUCTION

I have now presented some of the theoretical and practical gaps in the IS literature of user expectations. These gaps essentially boil down to that very little knowledge exists on how experiencing technology in use has an impact on the user expectations in ISD projects, as well as a lack of understanding where user expectations originate from and how and why they change during the process. Even though the IS prototyping literature per definition is within the emprical area of ISD and has a focus on technology in use, the implications of user expectations still only limit themselves to proposing that user expectations should be "better managed".

However, the IS user expectation literature still argues that experience with the technology is the determining factor of how the users perceive their expectations as being confirmed but do not analyse how and why they change over time, nor do they emphasise the amount of experience needed. They do, however, assume that users have experience with the technology in a real use context, and not only in for example a lab context.

This shaped my empirical and theoretical curiosity and would eventually lead me to the research focus of this dissertation on *expectations and and experiences shaping development actions* and its consequences for the participants in the project organisation. Thus I have asked the question of: *"How do users change their expectations in an Information Systems Development (ISD) project?"* and divided this research question into four minor sub-research questions.

CHAPTER 3: PERSPECTIVES ON IS

In this chapter I will provide an overview of the different research methodologies that have dominated IS and how these methodologies

have evolved. This is to provide context to my own epistemological and ontological lens of IS and ISD as an inherent socio-technical process where meaning, value, and actions are legitimized, constructed and enhanced through the contextual frame of the organisation in what can essentially be called a technology sensemaking process. I will also define my own understanding of the difference of an "Information System" and "Information Technology". The chapter serves as a background for the following chapters on previous literature on user expectations and on the specific method chosen.

CHAPTER 4: THEORETICAL FRAMEWORK

In this chapter I will go more into depth with the IS literature on user expectations and identify 5 research gaps followed by 5 areas of contribution that I intend to address with the dissertation. The purpose of the chapter is to derive a common understanding of user expectations based on the literature that is specific enough to also let the empirical context of ISD projects enlighten what is already known. The chapter will answer question 1: *"Which areas of research on user expectations in IS are in need of further research?"* by contributing to the 5 gaps through: *"a direct (gap 3), interpretative exploratory research focus (gap 1) on how users change their expectations (gap 5) in terms of directions and characteristics (gap 2) in an organisational prototyping (gap 4) ISD context (gap 3)."*

I sum up the overall theoretical framework by arguing that by performing a structured pilot implementation with the focus of experimening and putting the technology into use quickly, user expectations may be uncovered and understood more effectively than in normal IS development life cycle models. I conclude the chapter by presenting the framework of *user expectating*. I define this process through different types of expectations defined by the literature as "will", "want", "should" and "must" expectations.

CHAPTER 5: METHOD

In chapter 5 I will frame the overall research design. First of all I will argue that a case study in this context may shed useful light on how users characterise their expectations in the process of an ISD project because a case study allows for in-depth understanding over time. I will argue that by taking a process model approach, the actions taken in the ISD project can be viewed as enabling narratives of how the users' changed their expectations where each user story can be viewed as a narrative fragment that pushes forward the overall plot of the project. I will then present the body of co-constructed and triangulated data as it was gathered in a two-tier process before, during and after the three iterations of the IS pilot implementation. I will re-

late to and reflect on my own role as a researcher when presenting the rich data collection that spanned semi-structured interviews, ethnographic observations, unstructured in-situ interviews of EMS work, as well as observations of meetings and gathered minutes of meetings. I will also reflect on the ethical issues when taking on such a complex research project, especially when many of the findings have been censored.

CHAPTER 6: CASE DESCRIPTION

Chapter 6 will answer first half of sub-research question 2 regarding the actual work context of an ISD project: *"How does the specific work context influence the user expectations that exist prior to an ISD project?"*. Following reflections of the overall research design I will outline the case study and its process through events and episodes that influenced how users changed their expectations.

Since the actual work context plays a major role in understanding the unfolding of events, I will begin the case description with a detailed description of the organisational context and conclude it with an analysis of how EMS work both resembles and differentiates itself from clinical work. I will attempt to map the whole process of events in a comprehensive timeline and explain those events that the participants found to be relevant antecedents for actions taken in the project. This timeline is mapped into events and types of actions taken, inspired by respectively Newman and Robey (1992) and Orlikowski et al. (1995).

The purpose of the case description is two-fold. First to provide a rich description of the complexity of the process of the case study pilot implementation that will show the outline of actions taken in the project. Second to provide insights to answer the following sub-research questions of what influenced the users to change their expectations.

CHAPTER 7: FINDINGS

I have chosen to divide the findings into two overall sections to answer sub-research questions 2, 3 and 4. The first section will concern itself with the origins and influence on the desires of the EMS crewmembers. Drawing on the findings from the previous chapter of EMS work, this section will answer the second half of research question 2: *"How does the specific work context influence the user expectations that exist prior to an ISD project?"*.

The findings of the first section divide the influence into two kinds of stories that together form *technological awareness*, a collective knowledge constructed in the organisational mind of the EMS crewmembers. The second section answers sub-research question 3:*"How do*

actions taken influence user expectations in an ISD project?", and sub-research question 4: *"How do user expectations influence the actions taken in an ISD project?"*. I reveal three overall actions called "enabling actions": "announcing", "experiencing", and "giving feedback". The second section of the findings is structured in themes according to these actions rather than in a chronological structure. The main purpose of this abstraction is to convey how the users changed their expectations according to the actions they experienced.

I conclude the findings by summing up with a figure of the process.

CHAPTER 8: DISCUSSION

In chapter 8 I will answer the questions of "what is interesting?" and "so what?" in a synthesis of the findings and the existing literature on user expectations in IS presented in chapter 4, p. 21. I will walk through each sub-research question and discuss each finding with the existing literature in order to further challenge the three main assumptions that I revealed in chapter 4. I will argue that the assumption of prototyping and piloting ISs in practice as having inherent advantages for an organisation might not be the case due to a slew of contemporary factors, technological awareness being one of them.

I will answer the question of "so what?" by discussing more normative and practical implications of conducting pilot implementations and why and how it may still be feasible despite the challenges shown in the case description and findings.

I will also discuss the quality and validity of the research by drawing on contemporary discussions of qualitative approaches in the IS field since the qualitative and interpretivistic approach was a result of a pragmatic decision to gather as much empirical data as possible. This discussion will include discussing the sample of the research process, the case in general and how I have attained validity through the interpretive selective process of actually mediating the case overall. I will also attempt to discuss how the findings can be applied to other contexts through analytical abstraction.

CHAPTER 9: CONCLUSION

In this final chapter I will sum up the specific findings and the results of the discussion in order to answer the research question. I will show my main areas of contribution in accordance with how the results addressed the main contribution areas that I showed in chapter 4, p. 21 and I will summarise the findings from each sub-research question. I will furthermore conclude on the knowledge that has been gained from this dissertation pre and post as well as the theoretical and practical implications.

We learn paradigms of problem solving and try our damnedest to make them work, even on problems where they can't. Not until we relinquish this acquired set of logical operations by questioning the unstated assumptions underlying them can we solve the recalcitrant problems - and surprise ourselves in doing so.

— Robert S. Root-Bernstein
(Root-Bernstein, 1989, p. 296)

3

PERSPECTIVES ON IS

In this chapter I will attempt to make explicit the epistemological and ontological assumptions of this dissertation. This chapter will thus serve as a building block for the following chapter 4 on previous research that I will use to build the overall theoretical framework. Furthermore this chapter will serve as the point of departure for the method taken and the looking glass of which the empirical data will be viewed through. I will provide you with a short overview of what theoretical streams and practical areas that the literature on IS have been following in recent years in order to position myself within this paradigm. I will also make explicit my way of distinguishing between "Information System" and"Information Technology" and the consequences this had had on ISD.

The methodological assumptions of any study can be seen as a point of departure and should be made as explicit as possible in order to present grounds of the arguments for the reader (Walsham, 1995a,b). Strictly speaking, the epistemological assumptions that theory in the IS area are built upon can be divided into two main perspectives: either as quantitative, objective, nomothetic and belonging to the positivist tradition, or being qualitative, subjective, idiographic, and belonging to the interpretivist tradition (Myers and Avison, 1997)[1]. The objective research methods date back to the positivist paradigm started in the 19th century philosophies of science and concern themselves with predictions and theory for prescribing natural phenomena by measuring and observing the world with as little participation and disturbance as possible (Myers and Avison, 1997, p. 243). In

1 I will let the readers know that I am well aware that this is a very broad generalisation of the theoretical backgrounds and that I am aware that many other epistemological niches exist. Nevertheless, I purely draw on these abstractions as a logical distinction in order to position myself within the IS paradigms of research, rather than unravelling the ontological and epistemological IS history ad nauseum.

contrast, the subjective methods have interpretivism at its core and seek to understand how language is used to ascribe meaning to experienced and interpreted phenomena (Walsham, 1995a). The two research approaches differ from one another ontologically in that positivism assumes that an objective reality and truth exists that can be unravelled while the assumption of interpretivism is to view reality and truth as something that is relative and constructed by the social worlds of individuals. A third branch also draws on a critical perspective where the purpose of research is to bring conflicts between stakeholders into attention, often protecting those who are not in power (the Scandinavian approach to ISD comes to mind as referenced by e.g. Kensing and Blomberg (1998) or Boedker et al. (2004)). However, the critical perspective has also been placed within the interpretivist branch (Braa and Vidgen, 1999).

Traditionally, IS research has taken a positivist, management-oriented perspective (sometimes inspired by the behaviouristic paradigm from traditional psychology) on phenomena relating to IS optimisation, whether it has been on researching decision processes in buying new systems, developing new ISs or implementing new ISs. This makes sense as new organisational ISs are often acquired by stakeholders in power.

In the 90s a strong discussion surged regarding the validity of drawing on interpretivism as a research approach and several prominent scholars argued for the importance of also publishing interpretivistic studies with a focus on qualitative research into the major journals. Checkland (1985) and Hirschheim and Klein (1989) were some of the first to incorporate and recommend the interpretivistic paradigm into ISD, while examples of arguing for the value of interpretivist methodology included Walsham (1995a,b, 1993); Myers and Avison (1997); Myers (1994); Baroudi and Orlikowski (1987). Today this discussion is more or less irrelevant, though a large part of the IS literature is still rooted in the positivist paradigm with a focal point on exploring the phenomena of IS success, and how to achieve this success[2]. Much of the research design of this literature is rooted in factor/variance models (Myers, 1994; Van de Ven, 2007). In factor analysis, quantitative measures of a dependent outcome variable is proposed using a hypothesis-based approach in search of the correlation to one or more independent variables. As a result factor analysis is best used to answer research questions phrased as "what" questions of relations or correlations between phenomena in a relatively stable context or at least in two or more points in time that can be seen as static. An example from the IS literature is Davis' TAM that focuses on what leads up to technology acceptance via the variables of perceived ease of use, perceived performance and usefulness (Davis, 1989). Other famous

2 Though the criteria for evaluating success of an IS is greatly in the eye of the beholder and has also evolved through the years.

models like Delone and McLean's model of IS success (Delone and McLean, 1992) also belongs to this group of theoretical propositions that have been empirically tested and validated (quite thoroughly I might add) through quantitative methods like surveys or structured interviews.

In recent years, with the focus on the impact of an IS on organisations or other social communities, the positivistically minded IS research has slowly moved towards researching how to design and create IS products and artefacts that have a positive impact on the organisation, while the interpretivist IS research has kept a focus on understanding the contextual world that make up the structures and actions taken by individuals. Design Science Research, though primarily of a positivist origin, has also risen in popularity and adopted the approach of creating and evaluating artefacts in order to add to the body of knowledge of how to design general solutions to specific problems (Hevner et al., 2004; Baskerville et al., 2009). Contrary to traditional positivist and interpretivist approaches that seek to contribute to theory by understanding "what" relations, Design Science Research seeks to contribute to "how" and "why" through prescription and intervention.

The interpretivistic approaches have traditionally taken the research design of "process models" that seeks to explain how events take place along a given process (Pentland, 1999; Van de Ven, 2007; Bygstad and Axel Nielsen, 2012). Whether or not the specific research area positions itself within IS development, IS implementation, IS or usage, process models can be used to understand why and how events happened as they did. Pozzebon and Pinsonneault (2005) use the concept of a "path of dependency", meaning that when looking back at a process and knowing the outcome, one can reveal the events to see why they happened they way they did (Pozzebon and Pinsonneault, 2005, p. 34). In figure 1, p. 18 the above-mentioned three aspirations of theory are shown. For each area of the model a specific methodological approach can be identified. An action case approach can be located between "change" and "understanding" (Braa and Vidgen, 1999) as opposed to for example Design Science Research or Action Research that would be placed between "change" and "prediction" (Baskerville et al., 2009) or social science studies taking variance/factor model approaches between "prediction" and "understanding" (Davis, 1989)[3].

In this dissertation, I purposefully position myself as an interpretivist because the focus will be on understanding how a group (users) in an ISD project interpreted and used the concept of expectations. The underlying methodological basis is that of hermeneutics because in order to understand how the conceptualisations change over time

3 I do need to cover my own back here and mention that this is a strongly reduced interpretation of the general methodologies. Proponents of either methodology would most like criticise this broad generalisation, and with good reason too, since reality rarely fits into such shoe-horned boxes.

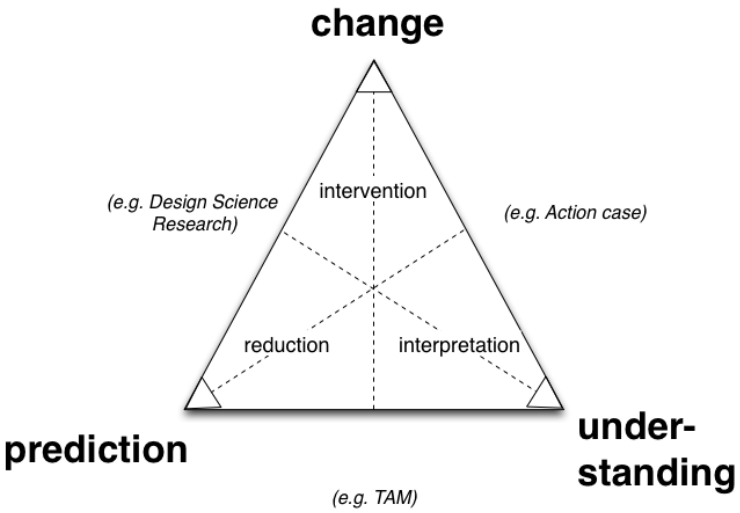

Figure 1: Figure of the three primary theoretical aspirations reinterpreted from Braa and Vidgen (1999). The aspirations of theory are denoted by the arrows pointing to each corner, while the titles on the areas denote the method used to convey such theory.

it is also necessary to understand the context as a whole. Hirschheim (1985) describes hermeneutics as how the language used is an "expression of being", commonly referred to as the "hermeneutic circle" (Hirschheim, 1985, p. 24). Taking my theoretical departure in hermeneutics also results in defining the interaction between technology and individuals in organisations as well as the development and changes within this as a sociotechnical process where it is impossible to divide technology-in-use from social change (Mumford, 2000; Markus, 2004).

3.1 HOW AN IS RELATES TO ISD

To understand an IS, one must first understand the parts comprised by an IS since it can be conceptualised both as a service and a product (McLeod Jr and Fuerst, 1982) but also as a system of roles and relations between organisational participants. I will draw on the clarifications of differences between IS and IT given by Alter (2008). IT is simply tools that are being used by users along with certain information contained or processed through these tools. According to Alter (2008), IT alone does not an IS make. In order to make up an IS, the IT tools must be included in a so-called work system where information products are being produced, consumed and manipulated by multiple participants. As such one must make the delineation between participants of the IS and users using the IT tools. For example, an ERP "system" or an Electronic Ambulance Record (EAR) "system" is not really an IS in itself but merely a software suite running on hardware (which IT is usually comprised of). It is not until we look at IT in use

that it has the potential to be a part of the overall IS. This effectively means that where we choose to scope our focus determines whether we look at IS development and/or implementation or we work with IT development and/or implementation. Also note here that we can also scope the focus differently on purely the software development, but which participants we choose to respectively include or exclude also determine the primary learning potential that we gain from the project. For example, EMS crewmembers inputting data with a new EAR tool and feeling frustrated is definitely a problem on a tool level, while EMS crewmembers feeling frustrated because they can no longer hand over their patients to the ED as well as before they used the EAR tool is a problem on the IS level. Distinguishing between the scopes is difficult because the two definitions often overlap (Alter, 2008, p. 452). I have chosen to distinguish between "users" and "participants" (a distinction that Alter (2008) does not make). This directly ties in with the specific research focus on "user expectations" and not on the broader "participant expectations". The concept of "users" will directly relate to the EMS crewmembers using the IT in the IS setting, and "participants" as those out of this analytic scope (be it management participants or other clinical personnel that are tied into the project).

You will also see the wording "EAR technology"/"EAR units" vs. "EAR IS". I define the difference between the two types such that the EAR technology/units denotes the direct interaction between EMS crewmembers and the EAR software/hardware. The wording of "EAR IS" is used when other participants are included in the overall work system tied in with the EAR tools. This wording is also used when users think of how their work could ideally flow with a new setup of IT tools in use between clinical actors.

Directly related to the understanding of IS as a work system comprised of participants using the information products, I define and use ISD as the development of this particular work system, be it the IT tool aspect, the IS aspect or purely the organisational aspect. Note that I do not strongly differentiate between the outcomes of *development* on the IT or *development* on the overall IS since, from a sociotechnical point of view, changes to the configuration of the IT will also impact the overall IS as long as these changes impact the use of the IT (Markus, 2004). It is just a matter of scope. However, I do explicitly define the software development to be out of scope of this particular research setting since the research focus is on how the users' change their expectations while the whole IS setting is undergoing a development process and the software developers were not an explicit part of this process. This is because participants in an ISD process usually only react to actions taken by other participants that are explicitly visible to them. This also implies that when looking at how users change their expectations, the expectation of product performance is only a part of the overall arc of where expectations can be directed.

3.2 ARGUMENTS OF FIELD-DEPENDENCE OR FIELD-INVARIANCE

I have now positioned myself in the interpretivist research field, seeking to strive for understanding of how users change their expectations in an ISD context. I have further pointed to areas in ISD that differ themselves from IS in terms of static vs dynamic processes on the organisational level. From here it seems only logical to make clear what kinds of contributions this dissertation will provide in terms being field-dependent or field-invariant (Toulmin, 2003). Field-dependent arguments and results do not claim to move beyond the existing research context while field-invariant arguments and results strive to be generalizable and applicable beyond the research context (Toulmin, 2003, p. 32). This dissertation will contain both types of arguments. The next chapters will be theoretically motivated in a field-invariant matter by showing that much of the user expectations research in IS has been performed with a narrow scope on user expectations and I will raise the point that ISD will actually gain very little from performing research on user expectations by drawing on the existing theories since they have all taken place in fields outside the ISD context, essentially creating field-dependent results (at least when compared to the specificities of ISD). As such consumers can rarely be compared to users in an organisation because of different contextual factors such as power relations, purpose, volition etc. that are present in organisations but much more subtle in the consumer world.

I also claim that the findings from the specific case context should be seen as field-dependent. The case study takes place in the EMS sector and thus is reliant on much of the field-dependent processes and practices of healthcare work. However, I still use the findings in the case to abstract those findings and suggestions that seem relevant for how users change their expectations in an ISD context. Specifically this is done by taking the existing body of knowledge on user expectations, generate a framework by taking a new methodological approach to it and apply and explore the framework using the case study.

Data cluster around knowledge. Implication (by contradiction): Scientific breakthroughs could best be stimulated by focusing research efforts away from what we know how to do into areas of ignorance.

— Robert S. Root-Bernstein (Root-Bernstein, 1989, p. 43)

4 THEORETICAL FRAMEWORK

Where I in the introduction of this dissertation only provided you with some brief outlines of the literature on user expectations in IS, I will now go more into depth with previous research on the topic. I will identify 5 gaps for potential research contribution areas that will be the motivation for the overall research question of "How do users change their expectations in an Information Systems Development (ISD) project?". The chapter is structured into three sections. The first section will provide an overview of previous literature on user expectations and identify the five afore-mentioned gaps and subsequent potiental contribution areas. The contribution areas will argue for my interpretative research method of the selected case study presented later. The second section will argue for taking an organisational prototyping approach and review contemporary research arguing for a "pilot implementation", though in an unstructured fashion. The third section will synthesise the literature reviewed and use the contribution areas to build a framework of understanding how users can change their expectations and use it in the analysis in chapter 7, p. 105.

4.1 A LITERATURE REVIEW ON USER EXPECTATIONS IN IS

According to Webster and Watson (2002), the ideal review "*motivates the research topic and explains the review's contributions; describes the key concepts; delineates the boundaries of the research; reviews relevant prior literature in IS and related areas; develops a model to guide future research; justifies propositions by presenting theoretical explanations, past empirical findings, and practical examples; presents concluding implications for researchers and managers.*" (Webster and Watson, 2002, p. xxi). In this section I will do just so by identifying existing gaps in the current body of knowledge on user expectations within the IS discipline through answering the following working questions:

1. What are the most prevalent theories on user expectations (explored in section 4.1.2, p. 26)?

2. How are user expectations defined by the literature (explored in section 4.1.3, p. 32)?
3. Which sub-areas of IS research have been researched with user expectations in mind (explored in section 4.1.4, p. 35)?
4. Which strategies for managing user expectations have been proposed (explored in section 4.1.5, p. 39)?
5. How has the current literature treated the concept of how users continuously change their expectations (explored in section 4.1.6, p. 42)?

Seeing as the amount of literature is huge on expectations outside IS and equally huge within IS I have edited the overall literature review into three bites to show that as much relevant literature has been covered as possible.

In section 4.1.2, p. 26 and section 4.1.3, p. 32 I will answer the first two working questions of which prevalent theories exist and how definitions have been provided by the background and IS literature.

In section 4.1.4, p. 35 I will narrow down the scope to IS literature and address the findings here in terms of which sub-areas of IS research that the concept of user expectations have been addressed in. In section 4.1.5, p. 39 I will also address how the literature has proposed management strategies for addressing user expectations issues.

In section 4.1.6, p. 42 I will answer the question of how the literature has handled that user expectations seem to change during IS processes. All the working questions mentioned above will address the first sub-research question that I asked in section 1.3, p. 9 of "Which areas of research on user expectations in IS are in need of further research?".

4.1.1 *Procedure of the literature review*

It should come as no surprise that the amount of results from simply searching for user expectations are huge and as a result it is necessary to narrow down the queries and continuously ask concrete and abstract questions to the material as it is being disseminated. The literature review was performed with a concept-centric focus (focusing on user expectations) according to Webster and Watson (2002).

The results of the literature review on user expectations in IS culminated with 125 papers considered relevant for walkthrough. Four databases were queried using the generic query (changed accordingly to fit the syntax of the different search engines):

```
((''information systems'' OR ''information systems development''
    OR ''project management'') AND ([abstract=]''user
    expectations''))
```

This meant that papers within either information systems, information systems development or project management literature and papers that mentioned user expectations in the abstract were candidates for walkthrough. The query was selected because it provided an entry point into the literature with a reasonable amount of hits (271 hits).

Ebscohost, ABI/Inform, Scopus and AIS.net (for Communication of the Association on IS and conference proceedings including American Conference on IS and International Conference on IS). Duplicates, papers that are not peer-reviewed, published prior to 1980, and not conference or journal papers were removed and 271 unique papers were found relevant. These were filtered through the following inclusion criteria: papers needed to explicitly define user expectations conceptually as well as reference and contribute empirically, methodically or theoretically to the understanding of expectations. For example, a paper merely mentioning that user expectations should be met in the conclusion or motivation would be excluded while a paper taking a delphi study approach among IT project managers that points to the importance of meeting user expectations would be included. Papers were coded in a concept matrix augmented with additional concepts in accordance with Webster and Watson (2002) (see table 1, p. 24).

Paper	**Theories**	**Paradigm**	**Research Design**	**IS subarea**	**Research focus**	**Types of expect.**	**Imp. to meet expect.**	**Focus on expect.**	**Changing expect.**	**Expect. management**	**Type of IT usage**
Paper A	(*multiple possibilities*)	(*Positivist/realist* or *interpretivist*)	*Factor, process, review* or *proposal*	(*IT*, *IS* or *ISD*)	(*multiple possibilities*)	(*will, want, should, ideal, must*, or *not mentioned*)	(*yes, no*, or *not mentioned*)	(*direct* or *indirect*)	(*yes* or *no*)	(*proactive, reactive, dialogue* or *not applicable*)	(*mandatory* or *voluntary*)

Table 1: The structure of the table of the augmented concept matrix used to code the review papers.

Based on the following criteria, all relevant papers were then interpreted and labelled either "central", "relevant", or "background":

- *Background*: papers not within the IS discipline yet relevant for their contributions to the concept of user/consumer/customer expectations. This category was primarily of historical nature and will be used to describe the three areas of expectations theory later in this chapter. The category was not exhaustive and only based on references that were mentioned in the relevant IS papers.
- *Relevant*: papers that empirically contributed to user expectations research yet did not theoretically expand the area. These papers primarily used expectations as a means to a secondary research end, e.g. to confirm or validate earlier adoption or satisfaction research. The papers would often not define or ground expectations explicitly. Papers deemed relevant will be used to answer overall working questions such as the sub-areas of IS and the overall background theories for grounding the concept of user expectations in. A full list of all relevant papers can be found in "Appendix A", table 16, p. 211.
- *Central*: papers addressing the above-mentioned working questions and: a) directly researching or contributing to the user expectations concept; b) mentioning how and why users' expectations change or the importance of addressing this in future research. Certain papers were also labelled central due to being cited as some of the first IS research on expectations (e.g. Ginzberg (1981) and Szajna and Scamell (1993)). A full list of all central papers can be found in "Appendix A", table 15, p. 206.

The reason for labelling the results like this was to make it easier to search backwards (papers cited by the current result) and forwards (papers citing the current result) as Webster and Watson (2002) mention should be done. Due to the sheer quantity of relevant results, I instated the following system for forwards and backwards search:

- All papers labelled "relevant" were searched backwards.
- All papers labelled "central" were searched backwards and forwards (using www.scopus.com).
- All papers found from backwards or forwards search were only searched backwards again if they were labelled "central".

Enforcing this system resulted in reading through a total of *786* results. In order to manage the magnitude of the final relevant 125 papers, the following exclusion criteria were used to further exclude:

- papers not mentioning that users change their expectations.
- papers not previously deemed central.

This resulted in reducing the results to 32 papers relevant for the primary research question of "How do users change their expectations in an Information Systems Development (ISD) project?"that could be addressed as the final working question in the review. These papers

	Total amount	Unavailable	Relevant	Central
No. of papers	786	35	125	32

Table 2: Table of the amount of papers being reduced from initial query to final amount. Note that 35 papers could not be procured due to difficulties of access.

will be referenced where relevant in section 4.1.6, p. 42 and in the discussion chapter 8, p. 161. Table 2, p. 26 shows how the amount of results increased and decreased from enforcing the above-mentioned system. See "Appendix A", table 16, p. 211 for an overview of all relevant papers and table 15, p. 206 for an overview of all the 32 central papers.

4.1.2 *Three theories used to define and ground user expectations*

This section answers the first working question proposed in section 4.1, p. 21. Interest in user expectations in IS has been massive ever since Ginzberg (1981) showed that user expectations prior to IS implementation have a significant impact on IS success. He determined that the realism of users' expectations in relation to other stakeholders before implementation could be an important indicator for determining whether or not users would reject or accept the IS. However, user expectations have been researched much earlier in other disciplines that predate IS studies, primarily from social psychology and marketing.

The following section will show the findings of the three primary theories of user expectations that have been applied to the IS discipline. From each of these theories I will accordingly draw on papers that fall into the "background" relevance to inform about the historical backgrounds to these theories.

Three primary theories have been used to directly or indirectly research users' expectations: Expectation Disconfirmation Theory (Oliver, 1977), the SERVQUAL model (Parasuraman et al., 1985) and Social Cognitive Theory (Bandura, 1986). 50% (63) of all relevant were found to draw on EDT, 12% (15) of all relevant papers were found to draw on SERVQUAL, and 14% (18) of all relevant were found to draw on SCT (see also table 3, p. 27 for an overview). EDT and SCT originated from cognitive psychology, more precisely cognitive dissonance theory and expectancy theory respectively. EDT moved early on to be further researched in the marketing discipline while SERVQUAL was conceived from marketing originally. SCT has remained in use in psychology as a way to assess self-performance in work satisfaction and motivation.

Theory	No. of papers	% of total
EDT	**63**	**50%**
SCT	18	14%
SERVQUAL	15	12%
Other	10	9%
None	19	15%

Table 3: Table of the various theories used by the 125 relevant papers. The table summarises the number of papers pointing to Expectation Disconfirmation Theory (section 4.1.2.1, p. 27), Social Cognitive Theory (section 4.1.2.3, p. 30), Service Quality Model (section 4.1.2.2, p. 28).

15% (19) were found to use neither of the three above-mentioned theories while 9% (10) were found to draw on other theories not relevant to user expectations. However, one paper grounded their study in sensemaking which differs from the above-mentioned studies in that it is a qualitative and descriptive theory (Zamani et al., 2013). The definitions of expectations given in this particular paper closely resembles that of EDT though with users predicting something to happen based on his/her mental model.

4.1.2.1 *A product-oriented approach: EDT*

EDT has its theoretical roots in cognitive dissonance theory (Festinger, 1957). EDT was proposed and brought to the marketing discipline by among others Olshavsky and Miller (1972) and Anderson (1973) and later on discussed and refined by Oliver (1980, 1993). The theory has been used in marketing to propose that the higher expectations consumers have, the bigger the risk is for the consumers to become dissatisfied through *disconfirmation* of their initial expectations (see figure 2, p. 28). The theory requires a factor-based research model and the construct of disconfirmation of users' expectations (independent variable) are assessed through an inferred calculation or a direct measurement of the consumers' expectations towards anticipated product performance (used as independent and control variables) and satisfaction (dependent outcome variable). The research models used vary depending on the settings and whether the expectations can be manipulated or not. For example, both Anderson (1973) and Olshavsky and Miller (1972) manipulate expectations to be low or high depending on the performance attributes of the products and confirm that meeting or exceeding expectations creates the most satisfaction. In real-life settings, however, it is difficult to control expectations prior

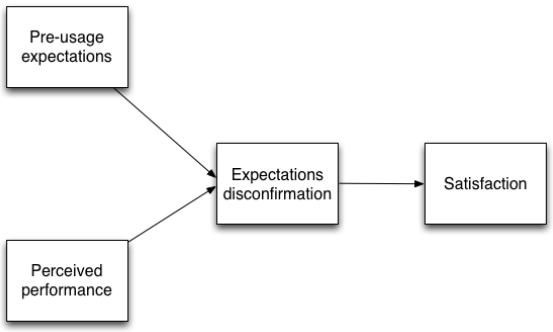

Figure 2: Simplified version of the EDT model with a focus on product performance. The figure shows that experiencing the product will (either positively or negatively) disconfirm the users' expectations and create satisfaction or dissatisfaction. Adapted from Nevo and Chan (2007) and Halilovic and Cicic (2013a).

to the product encounter and studies researching existing products have thus relied on cross-sectional measurements performed after the product encounter has taken place (Oliver, 1980, 1993). The standard for measuring expectations in EDT is generally always directed at attributes of a product that the overall product performance can be compared against. These attributes change along with the product and requires another set of attributes depending on if the product is durable (e.g. radios or computers) or non-durable (e.g. food or disposable napkins) (Churchill and Surprenant, 1982). Measuring expectations thus requires a lot of focus on the specific attributes (typically performance) of the product. This has been criticised as a limitation since this narrow scope on *extrinsic* aspects of the product through performance attributes can result in researchers overlooking other relevant attributes(Tanlamai and Ritbumroong, 2010).

The relevant papers found were dominated by EDT studies, shown by 50% (63) of all relevant papers were found to draw on EDT. This can be explained by a general view on an IS as a product that is provided to users, consumers or customers very similar to e.g. buying a household appliance.

One of the earliest IS satisfaction studies using EDT was performed by Szajna and Scamell (1993) who combined with the *perceived usefulness* construct from TAM and cognitive dissonance theory to experimentally manipulate users' expectations of spreadsheet information technology to be either unrealistically high, realistic or low. They found that users with high expectations had a higher satisfaction rate than those with low expectations.

4.1.2.2 *Introducing services: the SERVQUAL model*

Parasuraman et al. (1985) proposed the Service Quality Model model as a measurement instrument for understanding how customers per-

ceived service quality. Services are defined as a product made up of actions of interaction and assistance provided by a firm or other actor to a client. The SERVQUAL model was initially empirically conceived from a multitude of focus groups that included consumers and executives from various service providers. Perceived service quality is calculated by subtracting the customers' expectations from their perceived service quality (see figure 3, p. 29). The model focuses on the differences, or gaps, between expected service and perceived service, originating from nine determinants of the service: access, communication, competence, courtesy, credibility, reliability, responsiveness, security, understanding of customer needs, and tangibles (Parasuraman et al., 1985, p. 4). It is worth noting that the dimensions between

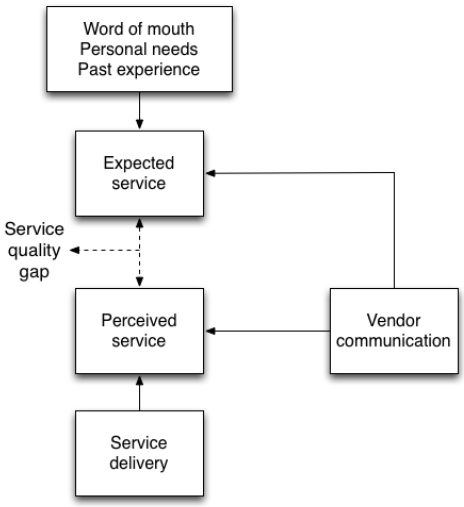

Figure 3: Simplified version of the SERVQUAL model (Parasuraman et al., 1985). Service quality is inferred from the difference gap between expected service and perceived service.

actual product and the service delivered are blurry. Only the last determinant of "tangibles" can be exclusively viewed as product attributes.

These expectations are influenced by stories from word-of-mouth, past experience and personal needs (Ryker et al., 1997).

Due to the broadness of the IS concept, IT in an organisational setting can easily be perceived as a product supported by services. In an IS setting it is almost impossible to not include actors and their actions when focusing on technology use or satisfaction. Any kind of technology use, implementation and users' concurrent satisfaction and intentions of continuance will include users' perceptions of those actions that are taken to enhance the performance or experience with the technology (Pitt et al., 1997). This is true whether the focus is on managers, salespersons, developers or IS service support personnel.

12% (15) of the relevant IS papers took a SERVQUAL approach, though 8 of these grounded their expectations definition with EDT as well.

Conflicting views on the versatility of the SERVQUAL model in IS have been drawn up to the point where direct disagreement has occurred. Pitt et al. (1997) for example, are positive toward using the generic model of SERVQUAL to measure ISD processes while van Dyke et al. (1997) and Carr (2002) argue that the generic SERVQUAL model yet has to find those specific areas that service customers actually find important to measure. As a result Carr (2002) claims that "*no variant of SERVQUAL should be adopted by IS practitioners or researchers until such time as adequate redevelopment and retesting can take place. A new instrument should be developed to measure IS service quality based on factors important to IS service customers*" (Carr, 2002, p. 292). The discussion on the usefulness of the SERVQUAL model in IS further spurred improvements into an IS-adapted model (the SERVQUAL+) (Kettinger and Lee, 1997) with additional scale items and a *zone of tolerance* denoting a level of adequate service quality as perceived by IS users (Kettinger and Lee, 2005; Gorla, 2011, 2012).

4.1.2.3 *Intrinsic skills and outcome expectations from SCT*

SCT was pioneered by Bandura (1986) and operates with two major constructs defined as individual beliefs: self-efficacy and outcome expectations. Self-efficacy is defined as the individual's belief in the skills or abilities to accomplish an identifiable task while outcome expectations are defined as the belief that accomplishing the task leads to a certain outcome (Henry and Stone (1995), see also figure 4, p. 30). SCT is closely related to the behaviouristic Expectancy Theory that

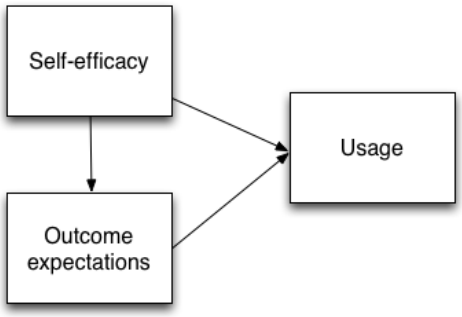

Figure 4: Simplified version of how the two major constructs of SCT (self-efficacy and outcome expectations) influence users' decisions to use or continue using the product. Adapted from Compeau and Higgins (1995a).

claim that individual behaviour as well as effectiveness, efficiency and effort can be predicted based on the expected benefits which that individual holds (Hackman and Porter, 1968; DeSanctis, 1983). The role of expectations in SCT thus differs from EDT and SERVQUAL as the

directions of expectations are more focused on the behavior of the individual based on *intrinsic* motivations. Intrinsic motivations are defined by the perceptions that are not physically visible until after experiencing product consumption or technology use (Tanlamai and Ritbumroong, 2010).

14% papers (18) of the relevant papers were found to use SCT (including expectancy theory) as theoretical grounding for their research. In the IS literature SCT has been used to correlate the level of anxiety of users to positive expectations when using computers (Compeau and Higgins, 1995b). In a later longitudinal study Compaeu et al. (1999) find that performance outcome expectations have a negative effect on the usage of technology and they explain this with users having unrealistic expectations in line with prior EDT research (Compaeu et al., 1999, p. 154). Surprisingly though, Compaeu et al. (1999) also find that individual belief in computer skills prior to technology use also will determine later usage. The same results were uncovered in a longitudinal, interpretive study by Lim et al. (2005) who find that users' expectations of the performance outcomes of an ERP implementation leads to resistance due to cognitive dissonance if management does not react to this resistance as early as possible. This leads Henry and Stone (1994); Compaeu et al. (1999) and Lim et al. (2005) to underline the importance of management introducing training sessions with users to increase users' expectations and assure them what they can achieve in order to decrease dissonance and feelings of insecurity.

Outcome expectations from SCT can play a part in ISD processes when the topic for example is the extent of users' involvement in the process compared to the amount of work that the users put into evaluating or assisting designers and developers. Outcome expectations can also play a role in ISD processes when users direct their expectations at actions taken by IS professionals or management during presentations of new versions, involvement at workshops or training events.

Research gap no. 1: the IS literature on user expectations is dominated by EDT complemented by the SERVQUAL model and SCT. As a consequence the concept of user expectations has primarily been researched through quantitative factor-based research models and very little interpretivist research has been conducted (with a few exceptions). The drawbacks of the factor-based approaches are that they are well-suited for explaining correlations between methodological constructs but do not go very deep into explaining why and how. Furthermore, none of the three primary theories are well-suited to explain the contextual factors that play an important role in ISD such as different stakeholder actions and the prospect of a dynamically changing organisational and technological environment.

Research contribution area 1: There is a need for more exploratory research on the user expectations concept with a theoretical awareness defined well enough to hold a strong research focus on the concept yet open enough to make the empirical context inform and enlighten the concept.

4.1.3 *Definitions and ensuing criticism of expectations*

This section answers the second working question proposed in section 4.1, p. 21. As noted earlier the theories and definitions of expectations have been inspired by some of the central theories from marketing and psychology. In the IS literature, user expectations have primarily been defined as individual belief that holds some kind of probability of a future aspect of the IS, attributes of the IS itself, or performance of outcomes from using the IS (Szajna and Scamell, 1993).

However, having a single definition of user expectations has been criticised in e.g. the marketing literature in the early 90es where a theoretical discussion erupted about the definition of expectations and the following validity of measurements of SERVQUAL (Brown et al., 1993). Cronin and Taylor (1992) criticised the original SERVQUAL model for assessing only experience-based norms, defined as how customers believe the service "should" be. The standard was important because it was not known beforehand whether or not certain aspects of service leading to customers' assessment of service quality were vector-based or had ideal points. If an aspect was vector-based it would mean that a higher rating was better while an ideal-point would mean that a hitting a certain point on a scale would create the biggest assessment of service quality. It is for example easy to imagine that it is more appropriate to assess communication as an ideal

point since too much communication may seem overwhelming for a customer.

The debate was followed by among others Zeithaml et al. (1993), Teas (1993) and Boulding et al. (1993) that distinguished between various types of expectations: ideal, desires and predictive expectations. The most well-defined distinction of expectations was that of Boulding et al. (1993) who claimed that ideal expectations closely resembles what customers desire and "want" to happen, their ultimate desires for the best product imaginable. "Should" expectations show what customers think ought to happen based on their experience with the service or product and what they think is feasible. "Will" expectations are what the customers predict is most likely to occur based on information available. This was further developed on by Santos and Boote (2003) who provided a conceptual hierarchy of expectations of expectations, moving from ideal, should, desired, predicted, minimum tolerable, intolerable and worst imaginable expectations. The debate ended with Grapentine (1998) urging researchers to "*avoid sweating the small stuff*" (Grapentine, 1998, p. 18) instead of focusing " *[...] too much on measuring customer satisfaction or expectations and too little on connecting customer needs to business processes*" (Grapentine, 1998, p. 18).

The definitions of expectations in the IS literature have been more rigid and primarily based on "will" expectations. Ginzberg (1981) drew on users' belief of the reasons why the IS was developed as well as how it would be used and the impacts it would have organisationally. Szajna and Scamell (1993) defined expectations as "*a set of beliefs held by the targeted users of an information system associated with the eventual performance of the IS and with their performance using the system*" (Szajna and Scamell, 1993, p. 494). The reason for having primarily based the definition as the "will" expectations standard is most likely due to the IS literature being dominated by the EDT literature. However, as user expectations studies have also been influenced more and more by SCT and expectancy theory, outcome expectations have gradually been introduced in terms of "desired" expectations as well (Woodroof and Kasper, 1998). As a result Suh et al. (1994) propose to completely substitute "will" expectations with "want" expectations instead. Less rigid are the findings of Khalifa and Liu (2003) who note that it becomes gradually more important to consider both "will" and "want" when assessing satisfaction. Later Khalifa and Liu (2004) and Nevo and Chan (2007) both point out that no strong contenders on which kind of standards assessment should be used for accurate measurements of satisfaction have been found yet. A further criticism that has been raised towards dividing expectations into standards of assessment has been from Pitt et al. (1997) who claim that when expectations are directed at people (such as much of the literaure revolving around IS services or ISD), it becomes messy to at-

tempt to measure expectations because they are entangled with social relations and actions and reactions.

The directions of where the users' expectations actually point to or find important is furthermore an area of great discussion. EDT is strongly focused on perceived performance and thus on the extrinsic attributes of the IT as a product. Swan and Combs (1976) call these either instrumental (the physical specifications or attributes of the product) and oppose them to *expressive* directions (the product or service in use). Nevo and Wade (2007) find that stakeholders do not believe the pitches of sales people. Rather, stakeholders focus on other aspects of expectations that are not based on product performance alone but instead on very specific directions:

> *"[E]xpectations reflected a number of factors, ranging from technical details to user-oriented features, to high-level organizational needs."*
> - Nevo and Wade 2007, p. 46

Though when the SERVQUAL model includes "should" expectations as well this is actually a representation of comparisons with existing experience with classes of the same service or product as well as earlier experience with comparable cases Woodruff et al. (1983). Multiple directions have also been researched by Ginzberg (1981) who identified five areas directed at the actual IS: reasons why the system is developed; the importance of the problems that are adressed; the way the system will be used; and the criteria of its evaluation (Ginzberg, 1981, p. 463-464). Pitt et al. (1997) also still argue that the SERVQUAL model can encompass ISD by inferring training events as an *assurance* item, communication between IS staff and users an *empathy* item, and time as *reliability* item on the SERVQUAL scale. They do, however, acknowledge the differences between types of expectations:

> *"Most importantly, what exactly do "will" and "should" expectations mean in an IS context, and how can IS professionals* ***differentially*** *measure and influence the two types of expectations?"*
> - Pitt et al. 1997, p. 216, (original emphasis)

Studies drawing on SCT have directed the measurement of user expectations both towards users' belief of their own skills (via self-efficacy and personal outcome expectations) as well as toward expectations of IS professionals' skills in both IS implementation studies (Compeau and Higgins, 1995b) and ISD studies (Green, 1989; Tesch et al., 2005). This shows that in IS there is a no agreed-upon definition of where users' expectations are actually directed and it is to a large degree up the to the researchers.

One reason why it may be difficult to find a focus on directions is that of indirectly creating a bias with users in longitudinal studies where multiple measurement points are taken. Where before users had no, little or non-spoken expectations, after an initial assessment they will now be directly informed of several other performance indicators that they might expect.

Research gap no. 2: User expectations are defined as beliefs with two inherent attributes: a type and a direction. First of all the IS literature has typefied or categorised user expectations into a variety of measureable standards: they belong to a certain type that can be measured (either as "will", "want", "should", or "must"). However, there has yet to be found which types are the most relevant where, when and with which technology. Second of all user expectations have been assessed as having a certain direction towards some kind of future state, either the product itself (performance, usefulness, ease of use), the contextual environment (personal and organisational benefits or outcomes), the stakeholders that are deemed responsible for making this happen (communication, support, involvement and training sessions), the skills and expertise of the users themselves (self-efficacy and effort). It is still not known which directions of expectations are important to assess in ISD projects.

Research contribution area 2: I contend that it might seem that users expectations might belong to *one* type and/or *one* direction at *one* point in time (in the case of factor-based research models), though whether this is the case when researching users' expectations over time is still up to debate. As a result I will contribute to research on user expectations through an explorative approach where it is not a given constant that expectations belong to a single type or a single direction over a longer period of time.

4.1.4 *Sub-areas and empirical areas of IS research on user expectations*

This section answers the third working question proposed in section 4.1, p. 21. The papers on user expectations in IS broadly fall into three sub-areas: voluntary use of products of IT, mandatory use in organisational settings with the implementation of an IS and ISD projects with a future prospect of change into an organisation. It was necessary to distinguish between these categories because there was a clear differentiation between the type of use of the technology (mandatory or voluntary) as well as the scope of those involved in the use of the technology (organisational stakeholders, developers, users, customers or consumers only). 40% (49) of all relevant papers were found to fall into the IT category and focused on voluntary use of technological tools not revolving around a social setting of a coherent work system (according to the IS definition of Alter (2008)). EDT was the domi-

Sub-research area of IT	No.	With direct focus
Continuance	30 (61%)	3
Satisfaction	9 (18%)	2
Adoption decision	5 (10%)	0
Expectations	2 (4%)	2
Other	3 (6%)	0
Total IS papers	49	9 (18%)

Table 4: Table of the prevalent research focuses of the found IT papers sub-research area.

nant theoretical grounding with 30 papers (61% of all IT papers). The dominant research focus has been on *continuance of use* (30 papers, making up 61% of all IT papers), *satisfaction* (9 papers, making up 18% of all IT papers), and the *adoption decision* (5 papers, making up 10% of all IT papers). Only 18% (9) of the relevant papers had a *direct* focus and contributions to the user expectations (Khalifa and Liu, 2003; Szajna and Scamell, 1993; Venkatesh et al., 2011; Shi et al., 2004; Bawden and Vilar, 2006; Zamani et al., 2013; ONeill et al., 2003; Edwards and Browne, 1995; Hsu et al., 2006) concept and only 4% (2) included "user expectations" in their research question (Szajna and Scamell, 1993; Edwards and Browne, 1995).

Mandatory use of IT in organisational settings with a clearly defined work system that ranged from implementation to post-implementation were categorised in the IS sub-research category. 45% (56) of relevant papers were found to fit this category. These papers focused on mandatory use (with a few exceptions) in an organisational IS setting. Here too was the use of EDT the dominant one with a percentage of 56% (26). The dominant research focus in the IS category is shared between that of continuance (17 with a 30%), satisfaction (14 with a 25%), and expectations (11 20%). 13% papers (7) have researched IS as services in organisations. The number of papers with a direct focus or use of expectations is higher than that in the IT category, with a total of 48% (27). 9 papers researched user expectations directly while the numbers were 8 papers on satisfaction, 7 on services and finally 3 papers on users' continuance intentions were found to directly contribute to the user expectations concept.

The amount of papers falling into the ISD sub-research category was modest (16% with a total of 20 papers). The ISD category was defined so studies with a focus on IS staff, system analysts or design-

Sub-research area of IS	No.	With direct focus
Continuance	17 (30%)	3
Satisfaction	14 (25%)	8
Expectations	11 (20%)	9
Services	7 (13%)	7
Critical success factors	2 (4%)	0
Other areas	4 (8%)	0
Total IS papers	56	27 (48%)

Table 5: Table of the prevalent research focuses of the found IS papers sub-research area.

Theories (within ISD)	No.	% of ISD papers
None	10	50%
EDT	7	35%
Other	3	15%
Total ISD papers	20 (16% of 125 relevant)	

Table 6: Table of the prevalent expectations theories used in the ISD papers sub-research category.

ers or focusing on configurational IT or organisational structures in a mandatory use setting would be placed here.

Surprisingly, 65% (13) of all ISD papers did not ground the concept of user expectations in theory (papers from both the "None" and the "Other" category were all added together, since papers from "Other" did not contain theory explaining or defining expectations), while 35% (7) unsurprisingly drew on EDT. See table 6, p. 37 for an overview. The sub-research areas of the ISD category were much different from the IT and the IS category. 7 papers focused their research on user expectations (6 of these focused directly) (Ginzberg, 1981; Aggarwal and Rezaee, 1996; Tesch et al., 2005; Petter, 2008; Zheng et al., 2010; Saeed, 2012; Jackson and Fearon, 2013), while 25% (5 papers) focused on user satisfaction in the development context (0% of these had a direct focus on expectations) (Green, 1989; Lawrence and Low, 1993; Mahmood et al., 2000; Jiang et al., 2003; Tesch et al., 2003). 20%

Sub-research area of ISD	No.	With direct focus
Expectations	**7 (35%)**	**6**
Satisfaction	**5 (25%)**	0
Critical success Factors	4 (20%)	0
Communication gap	1 (5%)	0
Project failure	1 (5%)	1
Project management	1 (5%)	1
Prototyping	1 (5%)	0
Total ISD papers	20	8 (40%)

Table 7: Table of the prevalent research focuses of the found ISD papers sub-research area.

(4) the ISD papers presented user expectations as a critical success factor for the ISD project (though with an indirect focus) (Klein and Jiang, 2001; Schmidt et al., 2001; Keil et al., 2002; Baccarini et al., 2004).

One of the central points that can be drawn from many of the ISD papers not taking a direct focus on user expectations is that user involvement is the key to align users' expectations more realistically with the developed IS in order to create better satisfaction (Lawrence and Low, 1993; Aggarwal and Rezaee, 1996; Tudhope et al., 2000). The exception is the study by Petter (2008) who pointed to several management strategies for aligning user expectations. These also supported involving users early and taking very specific and practical actions to let them try out prototypes as early as possible. However, no studies have conclusively been able to show positive effects from involvement and prototyping. See also table 7, p. 38 for an overview of the ISD category.

4.1.4.1 *Areas of interest within the sub-research categories*

The small percentage of direct contributions and research on user expectations in the IT category can be explained with the general consensus that voluntary IT products to a much larger degree can be considered "consumer goods" than IT that is being developed from scratch or reconfigured through negotations between a client and a developer in an organisational context.

The large amount of resarch on user expectations in the IS category can be explained with the fact that this is the oldest and most mature sub-research area. Papers in the IS category focused primarily on IS

implementation and post-implementation which is also the areas that are easiest to access.

The research on user expectations in the ISD category is the most modest and in most need of more research. Despite many studies (40% of 20) taking a direct focus on user expectations, the lack of theoretic grounding of the concept seems to be a hindrance to move the field forward.

While a high percentage of all relevant papers were theoretically grounded (85%), it also became clear that the number of papers with a direct focus on technology usage and contributing to user expectations was low (48%). This can most likely be explained with the strong penetration of theories outside the IS discipline like EDT, SCT and SERVQUAL that have predefined instruments for assessing user expectations as independent variables, thus "removing" the need for being critical towards the existing concepts.

> Research gap no. 3: The primary focus of research on user expectations in the IS literature so far has been *indirectly* using the concept as a means for measuring *satisfaction* and *continuance intentions*. IS studies have focused mostly on implementation and post-implementation phases while ISD studies have focused on the client/vendor releationship arguing that prototyping and user involvement early in the process may be viable solutions for solving the problem of unrealistic user expectations.
>
> Research contribution area 3: I will contribute to research on user expectations in ISD by focusing *directly* on users' expectations.

4.1.5 *Strategies for managing users' expectations in IS*

This section answers the fourth working question proposed in section 4.1, p. 21. Overall, the IS literature has a strong consensus that unrealistic user expectations in relation to IT is a general problem. 80% (100) of the relevant papers found were found to refer to or claim the importance of this. However, *how* this should be solved is much less clear. As such, 47% (59) of the relevant papers were found to **not** propose a strategy for managing user expectations. Second to this, 35% (44) in the literature proposed to take a *proactive* management strategy to handling expectations. The proactive strategy is defined by using the influence of power of management to communicate and inform (one could even use the word "dictate") what the users should expect from the technology or the IS project. A common consensus (and very common sense mind you) has been that management should

keep expectations as high as possible within what is achievable, since not meeting expectations results in dissatisfaction and eventually discontinuance (Szajna and Scamell, 1993; Ryker et al., 1997). Because internal sources in an organisation are often considered more trustworthy by users, Ryker et al. (1997) propose that:

> *"In general [managers] should seize the initiative and set user expectations because if they don't others will."*
> - Ryker et al. 1997, p. 536

Another example of this strategy is proposed by van Dyke et al. (1997) who acknowledged the differentation between "should" and "will" expectations in service quality assessment and pointed to the importance that management attempts to reduce "should" expectations and increase "will" expectations. Findings from Venkatesh and Goyal (2010) indicate that above a certain threshold of high expectations, users will choose to use the technology but will then discontinue its use due to disconfirmed expectations. This makes them conclude that managers "*[...] should always attempt to set and achieve* high *expectations because behavioral intention to continue using a system is higher when pre-exposure expectations of usefulness are high and met, compared to when expectations of usefulness are low and met.*" (Venkatesh and Goyal, 2010, p. 299)

Later studies have proposed a more *reactive* management strategy. The reactive management strategy also sets out to propose that management sets accurate user expectations from the beginning though they should then assess and correct users' expectations as the process continues. 11% papers (14) were found to promote this strategy. Bhattacherjee and Premkumar (2004); Brown et al. (2012) are proponents of this strategy by proposing that management should set accurate user expectations and measure expectations continuously and react by hosting training and management sessions.

The third strategy found was to take a dialogue-based approach by listening to users and creating a consensus of taking actions, informing users and also changing the functionality of the IS in accordance with expectations. 11% of papers (14) were found to propose this strategy. Proponents of this strategy were a.o. Lim et al. (2005) who note that in order for an the IS process to work smoothly, the IS "*[...] must be aligned with the expectations of end users, and this in turn can only be accomplished with managers' willingness to listen attentively to their subordinates in order to cultivate mutually reinforcing communicative and collaborative organizational practices*" (Lim et al., 2005, p. 146). Au et al. (2008) also find that without also acting on the feedback from users in order to change functionality in the IS, users become resistant to the changes brought forth by the IS. Zamani et al. (2013) use sensemaking theory to argue that the actions of users with the IT are very important to assess because they hold the key to how to improve the IT product.

Strategy	Yes	No	NA	Total papers
Meet expect.	**80% (100)**	17% (22)	3% (4)	125
Proactive	**44% (44)**	0% (0)	0% (0)	**35% (44)**
Reactive	9% (9)	10% (2)	75% (3)	11% (14)
Dialogue	5% (5)	14% (3)	0% (0)	6% (8)
No strategy	**42% (42)**	76% (16)	25% (1)	**47% (59)**

Table 8: Table of the consensus of importance (top row) and the various management strategies proposed. The "NA" column should be read to indicate papers where a strategy was not relevant, such as reviews or research proposals.

Several papers in the IS sub-research area has proposed solutions to the issue of unrealistic user expectations. However, user expectations papers in the ISD literature point to an inherent complex relationship between outcomes of the events that take place in the process and from using the technology eventually. As a result, Ginzberg (1981) proposes that management should "*[...] hold seminars or training sessions throughout the development process, beginning even before the system has been designed*" (Ginzberg, 1981, p. 476). Tudhope et al. (2000) define the problem with user expectations as:

> *"[...] often due to a mistaken view of the capabilities of the system being developed or the underlying technology"*
> - Tudhope et al. 2000, p. 358

Shand (1994) argues that this is due to a divergence between the mental models of both developers and users and that the more communication, representation and experience both stakeholders have during the process, the narrower the gap between their mental models will eventually become. What I will argue is that it is in ISD it is important to balance the use of all three strategies during the ISD project, for example a proactive strategy prior to the project, and a reactive and dialogue-based strategy during the project that calls for changing the functionality of the technology as it goes along. Petter (2008) underlines this by finding that ignoring resistant users or failing to address functionality desired by users are not very useful strategies for management of the ISD project. The primary strategies proposed to decrease high user expectations were as simple as involving the users in the process, communicating and letting them make the tough decisions in the project Petter (2008). The different types of strategies are shown in table 8, p. 41.

Research gap no. 4: The *management strategies and implications* of user expectations in IS and ISD studies have primarily proposed that management take *proactive* strategies of influencing users' expectations early on in order to steer users' expectations. However, many papers in the ISD sub-research area have proposed to involve users through prototyping techniques as it will create more dialogue between stakeholders. I find that this prototyping technique can be interpreted to encompass all three strategies.

Research contribution area 4: I will contribute to research on user expectations by exploring users' reactions to the organisational prototyping technique that seems to encompass all three management strategies.

4.1.6 *Users dynamically changing their expectations*

This section answers the fifth and final working question proposed in section 4.1, p. 21. I have now shown the tendencies of the three primary theories, definitions, management strategies and sub-research areas of IS user expectations based on the 125 papers that were deemed relevant. However, not all of these papers contributed to the user expectations concept, to how users seem to change their expectations, nor were they directly relevant to the sub-research area of ISD. I will now answer the final working question of how the literature has covered how users seem to change their expectations. For this I will draw on and go into depth with the central papers that I narrowed down, shown previously in table 2, p. 26.

The primary issue with the current literature on user expectations in IS is that neither of the theories being used (EDT, SCT or SERVQUAL) are very good at explaining change, simply due to the fact that they are based on factor-based research models. Factor-based research models show correlations between independent and dependent variables yet do not have a very strong qualitative explanatory power, especially not in processes where phenomenons change over time. With this said, however, the existing literature has already pointed out the fact that users are changing their expectations over time. Szajna and Scamell (1993) were some of the first to point out that users change their expectations after experiencing the product in their experimental study of user satisfaction of a spreadsheet IS. They juxtapose user expectations as a belief similar to satisfaction and cite Bailey and Pearson (1983) for pointing out that satisfaction cumulates over time. As a result they also find it reasonable to believe that expectations do so as well. These findings were later supported by findings from Tanlamai and Ritbumroong (2010) and Liao et al. (2009) who research users'

continuance intentions in respectively the post-implementation process of an ERP IS and in computer-based learning IT at a university. Khalifa and Liu (2003) (as well as in a later publihed paper (Khalifa and Liu, 2004)) note that "*Future research should examine the evolution of expectations and desires over time and the possible convergence or interaction between the two comparison norms*" (Khalifa and Liu, 2003, p. 47). Alruwaie et al. (2012) propose a framework combining EDT with SCT to assess extrinsic (e.g. performance) as well as intrinsic expectations (e.g. outcomes), noting that it is necessary to take into consideration the individial cognitive changes of belief that occur after initial technology adoption. Nevo and Chan (2007) find that due to the different assessment of expectations and desires, "*satisfaction will initially form based on expectations (dis)confirmation and will be later modified based on desires (dis)confirmation.*" (Nevo and Chan, 2007, p. 310) and leads them to conclude that assessments of IS beliefs form over longer periods of time in contrary to consumption products.

Within the ISD research area Shand (1994) and Zheng et al. (2010) claim that when developers deliver the IS to the client and realise that "requirements have changed" this is actually a direct function of users changing their expectations during the ISD process. In one of the rare (and at the time of writing; recently published) interpretative studies taking a process-model approach, Jackson and Fearon (2013) suggest that:

> *"[an interpretative case study] approach incorporates a temporal element, assuming that expectations are not fixed and enduring, rather are constructed and reconstructed as people respond to circumstances around them over time"*
> - Jackson and Fearon 2013, p. 249

Some attempts have been made in answering the above-mentioned calls of researching how users change their expectations. Bhattacherjee and Premkumar (2004) find that pre-usage belief and attitude affect post-usage belief and attitude towards the technology due to experience. Their findings are clearly findings from a post-implementation stage of IS however, since the directions of expectations are confined to the performance and perceived usefulness of technology. Hsu et al. (2006) determine the differences in pre-usage expectation and post-usage expectations as *indirect experience* (determined from affect) and post-acceptance expectations that become more realistic (Hsu et al., 2006, p. 893). Lim et al. (2005) find that the user perceptions of actions taken by management would reinforce their earlier expectations. Specifically users are afraid to lose their jobs with the introduction of a new ERP system and all announcements made by management are henceforth judged in that context.

Mendoza et al. (2010) also support the findings that expectations are prone to changes over time as users gain experience and choose to appropriate the IS in different ways. Even more important, Mendoza

et al. (2010) directly perceived that the user expectations would also impact the types of actions taken with the technology over time, as well as finding that expectations would play a significant role for the users' actions with the technology. Mendoza et al. (2010) concluded that:

> *"It is therefore important that information systems researchers gain deeper understanding of changing influences on the process that leads to longer-term use in respect to different technologies by different cohorts, in order to gain in-depth understanding of when, how and why expectations and perceptions change over time."*
> - Mendoza et al. 2010, 19

Venkatesh et al. (2011) find that experience influences belief of the performance of the technology and further that "*Social influence was highly correlated [...], although the post-usage measure was still lower than the pre-usage measure, suggesting that it was the most stable over time.*" (Venkatesh et al., 2011, p. 539). In recent years Hung et al. (2011) find that users make causal attributions to explain decisions and actions taken after experiencing the technology in use and this in turn influences the intention of continuance of the product. Saeed (2012) find that initial expectations are based on visible features of the technology (direct factors) while later expectations are more abtract and based on how experiences of the technology have been used (derivative factors). Zamani et al. (2013) take a sensemaking approach to understand post-adoption of tablet use and find that users also change their expectations according to the technology they are now using. Important to note here is that the paper by Zamani et al. (2013) is one of the few investigating expectations with a qualitative and interpretive approach, yet also indicated that users reframe their extrinsic expectations according to the use. This is in line with previous research yet fails to also take other directions as well as types of expectations into account. Like Zamani et al. (2013), Jackson and Fearon (2013) also take an interpretative approach and note that a variety of implementation events were central in order to change and convince users of a virtual learning environment, including actions taken by management as well as issues of training sessions where feedback was also provided by the users. This directly contradicts the findings of Szajna and Scamell (1993); Spathis and Ananiadis (2005) and Zamani et al. (2013) who find that the users' perceptions of expectations change over time to decrease cognitive dissonance as they grow accustomed to using the IT.

While some of the central papers (e.g. Szajna and Scamell (1993); Bhattacherjee and Premkumar (2004) and Saeed (2012); Sokura et al. (2012)) directly explore the changes of user's expectations, they do not provide much qualitative and deep insight into the process and do not scope their research as ISD where expectations can be directed at not only usefulness of the technology but also IS stakeholders, IS

Paradigm	% of total papers	No. of papers
Realism	**86%**	**108**
Interpretivism	7%	9
Mixed	1%	1
Not applicable	6%	7

Table 9: Table of the different methodologies that have been applied to researching user expectations.

staff skills and events that occur leading up to system delivery and implementation. Common for most of the papers reviewed is that they go very little into depth with "how" users' actually change their expectations, "why" they change their expectations, and "what" they change in the ISD process. This can be explained by the fact that most of the reviewed papers are located in the realist/positivist paradigm and take a factor-research approach (80% of all relevant papers opposed to 6%). Of all the relevant papers reviewed, 86% (108) papers took a realist approach while 7% (9) papers took an interpretivist approach. A realist approach will typically think in lines of: "*Because customer expectations can be measured, then they can be managed.*" (Pitt and Jeantrout, 1994, p. 172). While this type of research design may be very good for understanding "what" and to a degree "how", it is not very strong in going into depth with "why" (Myers, 1994). For understanding why an outcome of a process came to be, process models are often better (Van de Ven, 2007). See also table 9, p. 45 for an overview of theories of sciences applied to the relevant papers.

Research gap no. 5: The literature on IS have acknowledged that users do in fact change their expectations during an IS or ISD process. The studies exploring this phenomenon, however, have been very few. Studies exploring the phenomenon directly have either fallen outside the sub-area of ISD or have taken a factor-based approach with very little qualitative, explanatory power.

Research contribution area 5: I will contribute to research on user expectations by identifying how users change the type of expectations or by the direction of their expectations in the ISD process up to system implementation and beyond.

4.2 EXPERIENCE, CHANGE AND STAKEHOLDER ACTIONS THROUGH PILOT IMPLEMENTATIONS

I will now digress from the structured review that I have presented so far and move into 'unstructured review' territory in order to go a little more into depth with the solutions of involving the users and letting users experience technology products as early as possible in the IS process that have been proposed in the previous sections by for example Brown et al. (2012) and Bhattacherjee and Premkumar (2004).

"Experience" is a broad term that has been used to indicate what happens when users watch vendor presentations of the technology, when they take actions with the technology in the actual IS use setting, and when they experience events in the project process that leads up to the use of the IS (Chin and Lee, 2000). The idea is that it is not until after implementation of the IS that users' engagement will increase and more specific ideas for change etc. will occur. This has been applied to the IS discipline using terms like "going live" early on (Wagner and Piccoli, 2007; Pozzebon and Pinsonneault, 2005), "emergent IS use"(Truex et al., 1999) and last but not least "technology in use"(Brown et al., 2012). In the Participatory Design area, Boedker et al. (2004) proposed the importance of experience in the model of ISD where both developers and users need experience with both the existing work practice, future work practice, and the possibilities of technology rather than relying on abstract knowledge (Boedker et al., 2004, p. 62). Boedker et al. (2004) differentiate between abstract knowledge and first-hand experience as an important distinction. Abstract knowledge can be gained by hearing and reading about the IS while specific first-hand experience is just as important. This is similar to the determinants of expectations denoted as "word-of-mouth" by Parasuraman et al. (1985) which further can be divived into internal and external sources (Ryker et al., 1997). I further argue that the first-hand experience can be divided into two minor types as there is also a difference between being presented to and testing the technology at a training course or using the technology in an actual use setting. As I will show later on, the distinction of first-hand experience which I term "hypothetical technology use" and "actual technology use" is important to draw on in the wake of how expectations are influenced.

Viewing IS implementation as a dualistic adaptation between both organisation and technology, Orlikowski and Hofman (1997) also underscored how the implementation phase was not the end of an IS implementation but rather the beginning of an ISD project since new organisational practices would always be designed by the users post-implementation.

The idea of using configurable IT has shown valuable promises but shows itself as a blessing in disguise since many hard learned and needed configurations come still too late in the process, complicating further redesigns down the road (Pozzebon and Pinsonneault, 2005).

One of the more recent ISD approaches is the concept of "pilot implementations" (Hertzum et al., 2012). A pilot implementation approach builds on the idea of technology in use that we know from prototyping and from structurational-inspired IS implementation theory (Orlikowski, 2000). I draw on the definition by Hertzum et al. (2012) that a pilot implementation is: "*a field test of a properly engineered, yet unfinished system, in its intended environment, using real data, and aiming – through real-use experience – to explore the value of the system, improve or assess its design, and reduce implementation risk*" (Hertzum et al., 2012, p. 315). Pilot implementations are derived from the basic practical assumptions that since implementation of an IS creates new organisational opportunities for change, effectiveness (Orlikowski and Hofman, 1997), and, last but not least, learning (Robey et al., 2000). Stakeholders in a pilot implementation approach must acknowledge that the design of the IS is never truly finished because once technical development stops, organisational design will take over and new patterns unpredictable at the time of conception will be discovered (often whether stakeholders want it or not). The theoretical assumptions are based on the notion that an IS is an inherent social practice and rarely performed in isolated individual units within the organisation. Users will often engage in a community of practice together and engage in problem-solving activities and thus influence one anothers' further actions. Furthermore, users' work tasks are nearly always situated in the sense that a certain level of contingency simply comes with the job.

4.3 TOWARDS AN UNDERSTANDING OF THE 'USER EXPECTATING' FRAMEWORK

In this section I will synthesise the findings so far and show how the body of knowledge on user expectations in IS and the ensuing research gaps can be consolidated into a research framework. As Root-Bernstein (1989) mentions by quoting McFarlane's law:

> *"[...] when a number of conflicting theories co-exist, any point on which they all agree is the one most likely to be wrong."*
> - Root-Bernstein 1989, p. 173

Inspired by how the prototyping approach has been growing throughout the 80es I draw on a definition similar those given by Floyd (1984); Alavi (1984); Boehm (1988) and Tudhope et al. (2000): it is a process-oriented, iterative approach (thus different from *a prototype*) to developing a technology product that engages end-users with an experience of how a technology is to use in a specific setting. When

engaging in prototyping approaches in ISD one of the basic conditions of the process is that technology will continuously be changed and the users will continuously gain experience with the technology in an IS setting. This basic premise somewhat complicates the use of theories to assess expectations as the three primary theories used to research users' expectations because they are: a) factor-based theories assessed through cross-sectional or longitudinal studies with few measurement points; b) they all focus on only a few of the aspects that constitute an ISD project.

EDT will for example be able to explain users changing pre-usage and post-usage expectations of the technology in question, though the theory is limited in turns of multiple directions presented as it primarily focuses on how users perceive performance. SERVQUAL will be able to assess the perceived service quality and thus the relations between users' and other stakeholders, though it fails to take into account that the tangible dimensions of the technology product will also keep changing in an ISD process. SCT will be able to explain users' usage intentions based on their self-efficacy and the expectations of what kind of benefit they will gain from usage, as well as how this changes during training sessions but will not be focused towards stakeholder relations, the perceived performance or the changing functionality of the technology product.

Where the literature converges is that they disagree on which standards of expectations to use but agree that expectations can be classified into many different types depending on these standards. The types of standards range from predictive expectations ("will"), desires ("want"), experience based norms ("should"), minimum tolerable ("must"). The literature further disagrees on the role of directions of expectations, in that in certain studies, the performance of the technology is used while in other studies the relations between client and vendor or quality of training is used as the direction of users expectations. I argue that since experience is the determining factor to how users seem to change their expectations, an organisational prototyping approach should be researched since the purpose is to involve and engage users with a changing technology product as early as possible.

This ultimately leads me to draw the following model of what can be concluded from existing knowledge (see figure 5, p. 49), with a relatively stable expectation pointing in a direction to an abstract outcome with multiple possible characterisations. What is not known, however is how and why users change directions or characterisations in the ISD *project process*, since this is a much more dynamic environment than voluntary technology acceptance or classic IS implementations (see figure 6, p. 49 for an example of how this process could look). I denote this process as "user expectating" and I intend to contribute through: *"a direct* (gap 3, p. 39)*, interpretative, exploratory research focus* (gap 1, p. 32) *on how users change their expectations* (gap

5, p. 45) *in terms of directions and characteristics* (gap 2, p. 35) *in an organisational prototyping* (gap 4, p. 42) *ISD context* (gap 3, p. 39)."

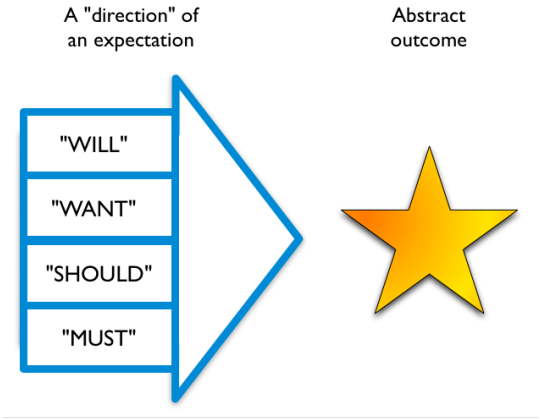

Figure 5: Showing a synthesis of previous theories and literature and their definition of an expectation derived into one single model.

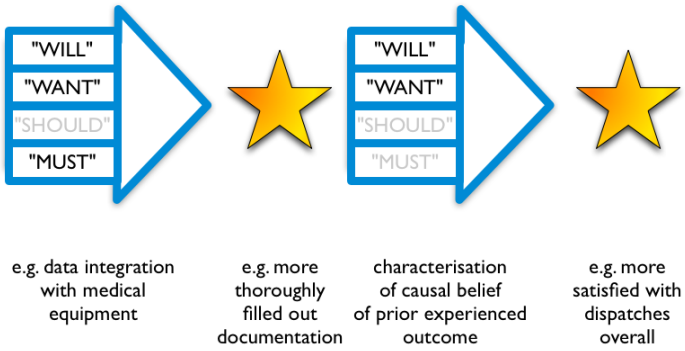

Figure 6: Showing an example of how the process of "expectating" can be chained together as causal belief prior to experiencing.

If you're always meticulously careful
and everything is planned, you can only
see what you expect to see. And if you
do see what you expect to see, it isn't worth
doing the experiment. So you've got to inject
some chaos into the system to create the
conditions under which the unexpected becomes probable.

— Robert S. Root-Bernstein
(Root-Bernstein, 1989, p. 148)

5 METHOD

In the following chapter I will describe the overall research design and argue for why a case study approach is especially useful. I will further discuss the benefits of viewing the case study as a process model (Newman and Robey, 1992; Van de Ven, 2007) and how this is inherently a narrative network of social actions (Pentland, 1999).
The section will end with a comprehensive presentation of how I conducted the data collection by combining classic case study techniques and ethnographic field study (Myers, 1999), and present how this data was analysed using grounded theory (Strauss and Corbin, 1990).

5.1 CHOOSING A CASE STUDY - A PROCESS MODEL OF EVENTS

As stated in the research question, this study revolves around how social phenomena change over time. Since the case study approach provides possibilities for an in-depth research focus on human interpretations and meanings (Myers and Avison, 1997; Walsham, 1995a,b), this makes it an ideal choice for researching the research question of understanding the process of how users in an organisational ISD context change their expectations over time. While single case studies have been criticised for not being easily generalisable (Lee and Baskerville, 2003), they also offer unique opportunities for exploring phenomena more deeply than in cases of multiple case studies. I have further chosen to combine the case study with an overall research design revolving around a process model. In process models, a chain of "events" is typically used as a descriptive tool to signify how the process has moved along (Van de Ven, 2007).

Within the IS literature, process models have typically been used to describe the organisational changes that occur before and after the development and implementation of different types of ISs (Aarts et al., 2007; Boulus and Bjoern, 2010), or to describe how the actual

use of a technology evolves over time (Orlikowski et al., 1995; Tyre and Orlikowski, 1994; Mendoza et al., 2010). Of particular interest is the paper by Newman and Robey (1992) who proposed a process model where events are split into episodes and encounters. Episodes are defined as a longer period of time where change is gradually occurring, while an encounter is of more significance as it often will denote the beginning and end of an episode, often through social interaction of significance like meetings, workshops etc. This tool was proposed as a reaction to the growing relationship between users and analysts where long episodes of change would drag out until stopped or started by a critical encounter. At each encounter, the relationship between the stakeholders would then be defined as developer-led, user-led or simply at a stand-still until a new episode would be initiated by an encounter (Newman and Robey, 1992). The study by Bygstad and Axel Nielsen (2012) is a recent example where the same technique was used to research the relationship between clients and programmers in an agile software development setting (Bygstad and Axel Nielsen, 2012).

I will myself use a process model of events to cover the longitudinal case study taking place over 1.5 years. I use episodes and encounters to sum up when episodes occurred and what significant encounters would ring in new changes in the pilot implementation. The divide between what entails an encounter and an episode is determined by the significance that the participants ascribed to these events. In the case description 6, p. 69 I will go more into depth with the overall process of events that made up the case study.

5.2 NARRATIVES AS CO-CONSTRUCTING EVENTS

In many process studies, sequences of events are often described as simply happening on their own volition. This is often because they are presented by a passive narrator in order to show a distance between researcher and the events taking place (though it will always be impossible to extricate oneself fully from the process). However, as far as empirical material goes, the events that occur will always be told by the researcher in collaboration with the research participants. As such empirical "collection" is always an empirical construction of first-order data (told by research participants) and second-order concepts (analysed and communicated by the researcher (Walsham, 1995b). This inevitability of co-construction of empirical material has been addressed by Pentland (1999) who uses the concept "narratives" to clarify that organisational process researchers can enhance their venture into the deep structure of the narrative and produce better theory by actively reflecting on this. The argument here is that stories are examples of containers that carry meaning, culture and explicit and implicit encoding of judgment. A narrative is always shaped by

a narrative voice revolving around one or more focal actors - something or someone (Pentland, 1999). The research participants can then be viewed as narrators of their own stories who simultaneously add meaning to them, thus re-enacting the very same events that they found especially important. By focusing on narratives, Pentland argues that the researcher can go beyond collecting the surface features of facts in a positivistic manner and instead touch on the deep structure of the overall narrative, thus building better theory.

One of the more recently refined concepts of narratives are that of *"narrative fragments"* that, according to Pentland and Feldman (2007), consist of slices of stories told by organisational members that serve to move the overall *plot*. A narrative fragment will often contain some sort of action that is being or has been taken, either by the narrators themselves or other actors in the narrative. These narrative fragments may contain differences in the way the stories are told or meaning is ascribed to them but can ultimately be comprehended through the concept of *"narrative networks"* (Pentland and Feldman, 2007). Narrative networks go further into depth with how each different participant signified what they saw as important for the overall plot to advance into a broader pattern of different narratives. The interesting part of the narrative network is that it provides a broad understanding of the overall plot yet still retains the differences betwen the actors and how they perceived the events going on.

I will use the concept of narrative fragments and networks to describe the many complex and interrelated narratives and stories that make up the case study of this dissertation. Some will have similarities but on the overall plot level it is most likely that many of the stories will differ in terms of the personal experiences with the IS told. I will use narratives two locations of this dissertation: first in the case description next chapter (chapter 6, p. 69) to describe the overall plot of the specific case under study and the chaining of events. This description will resemble regular case descriptions of IS processes with a somewhat distant narrator. In the findings chapter 7, p. 105 I will go more in depth with the narratives and interpret them in relation to how users narrate their changing expectations and the actions that enabled these changes and draw on the user expectating framework presented earlier in the dissertation.

5.3 DATA COLLECTION AND CONSTRUCTION

The main approaches to data collection were through ethnographical observations, interviews, notes from meetings as well as official documents in order to perform a data triangulation[1].

1 I should note here that I view what I refer to as "collected data" as empirical constructions that have occurred through interaction with the participants in line with

The exploratory focus on understanding how users change their expectations over time has certain connotations for the methods chosen in the research design. As I have shown, people attach meaning to events that they experience in order to be able to navigate in an otherwise chaotic world. Actions that seem to cause discrepancies will seem to cause further actions, meaning, frustrations and feelings. These narratives are quite important to uncover in an ISD process, especially in the moment where they occur. I have chosen to take an ethnographical approach in this case study first and foremost in order to uncover the initial reactions as the events are experienced. Second, since with an ethnographical approach "*the field researcher develops an intimate familiarity with the dilemmas, frustrations, routines, relationships, and risks that are part of everyday life*" (Myers, 1999, p. 5), I also argue that this familiarity is central in order to further interpret later empirical data, e.g. in shape of semistructured interviews that also shed light on the users' narratives.

Another core strength of ethnography that Myers (1999) expose is the ability to challenge assumptions and knowledge that is already taken for granted. This is a central point since my focus of this dissertation is to challenge assumptions about expectations, in order to create what Davis (1971) terms as "interesting theories":

> *"Interesting theories are those which* deny *certain assumptions of their audience, while non-interesting theories are those which* affirm *certain assumptions of their audience."*
>
> - Davis 1971, p. 309, original emphasis

Blomberg et al. (1993) describe four main principles related to design in ethnography (Blomberg et al., 1993, p. 125-128):

- Natural settings: attempting to get as close to the action to actually experience the context.
- Holism: understanding and uncovering how the specific settings fits into a larger context.
- Descriptive: describing the action as it is going on as opposed to being presciptive and explaining how things *should* have been done.
- Members' point of view: having a members' point of view means that the ethnographer explores meaning and interpretations rather than having preconceived notions of what it is.

This leaves the question of what type of ethnography I have chosen for myself? I address the basic principles of Blomberg et al. (1993) the following way. Being part of the natural settings was done by observing EMS crewmembers in the ambulances as they were treating patients, using their old ambulance records as well as when they were using the new EAR units. Having the view of holism, being

Walsham (1995b). I choose to use the term "collected data" since it is far more convenient in a linguistic manner than the other, more precise, term, despite the positivistic connotations it contains.

descriptive and taking the members point of view was all done by focusing on the narratives of the participants. The principles were also followed by complementing with semistructured interviews three different points in time with a variety of participants on different management levels. Rather than having a predefined notion of the central focal concepts (e.g. user expectations, clinical work in general), I deliberately used the concepts as subjects of interest and then led the participants explore them however much they wanted to explore them (as will be made clear in the walkthrough of how interviews were performed 5.4.4, p. 61). However, this was not always possible, as the data collection was also an emergent learning process for myself, meaning that early data collection suffered (and most likely always will suffer) from being broad in the beginning.

5.4 ROLE OF THE RESEARCHER

Having positioned myself with an ethnographical approach also further begs the question of what role I have had in the pilot implementation case study. Myers (1999) divides the basic schools of ethnography into holistic, semiotic and critical ethnography. In the classic holistic school of thought, ethnographers will attempt to identify and empathise with the participants being observed, while the semiotic school makes the proposition that empathy is not needed. Rather, the ethnographer should focus on the semiotics that the research participants are using in everyday life. The critical ethnographer however, carries in a little bit of both, but focuses especially on the dialogue between research participants as an emergent process, where hidden agendas and relations of power are revealed and put into the open (Myers, 1999, p. 8). The honest answer in relation to the schools provided by Myers (1999) is that my role as an ethnographer has been a combination of them all depending on the place in the process. I found it nigh to impossible to keep a static and separate role as any ISD project will always keep changing and the participants also change their own attitudes towards the project and the researchers taking part in it. It was thus impossible for me not to impact the ISD project somehow when taking part of it for 1.5 years. The true problem would be not to be aware of this.

Specifically this meant that when problems were identified and I took part in progressing the pilot implementation these could be characterised as taking a critical ethnographic approach, serving to put problems out in the open between stakeholders. The first kick-off workshop was for example facilitated to solve the problem of a lack of communication about expectations between stakeholders, while the second event came to be because of a lack of belief and emphasis on the users' feedback on the usage of the IS. Actual observations of the usage were performed focusing on semiotics of the coordination

and articulation work that the EMS crews performed both with and without the new IS. Interviews, informal as formal, were performed taking a more holistic approach in order to create a level of trust between participants and researcher. This obviously peeled off a layer of formality in the project, from simply being an ISD project to diving into also conflicts between stakeholders. Empirically this would reveal very interesting insights but for ethical reasons these findings were not possible to communicate without also having personal repercussions for my own sources (as a result, all transcribed quotes in context used in this dissertation have been reviewed by their respective owner for acceptance and scrambled so specific quotes cannot be traced back to other quotes). As a result, the ethnographical roles that kept changing were conscious choices that emerged out of a growing empirical need. Table 10, p. 56 shows which types of ethnography I was inspired from when performing empirical activities[2].

Data collection activity	Ethnographical type
Events facilitated by researchers	Critical
EMS work observations	Semiotic
Interviews (formal and informal)	Holistic

Table 10: Table of the different data collection activities and their corresponding choice of ethnographical types

In the interventionist "Engaged Scholarship" tradition, Van de Ven (2007) identified four roles that the researcher could take, depending on the research question and perspective. These ranged from "Detached outside" to "Attached inside" and are depicted in figure 7, p. 57.

While Van de Ven (2007) argues for rigidity of these roles I argue that as a longitudinal case study progresses, the researcher will always learn more about the research context and in turn different problems will emerge that require stakeholders' and researchers' attention. Instead, I take the position regarding roles that: "*Whatever the decision made by the individual researcher, it is essential that the choice is made in an explicit and reflective way, and that the reasons are given when reporting the results of the research*" (Walsham, 1995b, p. 78).

As I noted in prior sections I deliberately made observations of EMS work and interviews with a variety of stakeholders to understand work practices prior to the pilot implementation, effectively

2 Note here that I will surely not claim that I have followed the schools 100% depending on the type of activities and the representations of the table should be taken lightly.

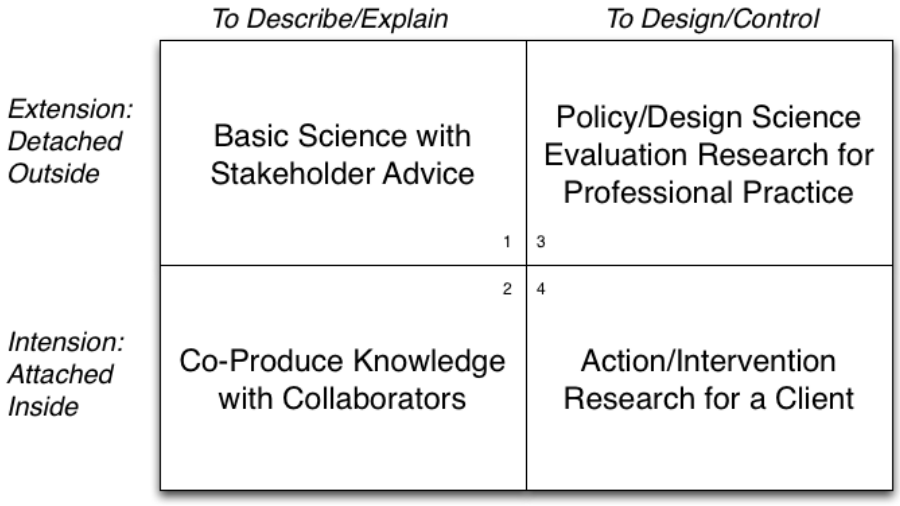

Figure 7: Research perspectives and purpose in the engaged scholarship tradition freely depicted from the book of Van de Ven (Van de Ven, 2007, p. 27)

procuring knowledge with the research participants as "detached outside" with the purpose of describing and explaining in category 1 from the roles framework (see figure 7, p. 57). Upon facilitating the kick-off workshop, the role moved to designing and controlling category 4. I would then position myself with the EMS crewmembers as collaborators in producing knowledge in category 3 in subsequent observations and interviews later on. During the second researcher-facilitated event the purpose was to mediate feedback from the IS technology in use, my role would swing back and forth between mediating information with the project management and provide status updates to co-producing the knowledge necessary in collaboration with the users. Essentially this would make my role balance between being participant observer and assisting in performing interventions along the way. Nevertheless, I prohibited myself from following a stakeholder agenda and I deliberately distanced myself from positioning myself or allowing others to position me as either a representative from the client or from the users. While the point of view of the events are surely seen from a user perspective (as are most of the observations and interviews) this does not include "being on their side". Rather, my goal as a researcher was to mediate between the stakeholders and enrichen their knowledge of each others' work practice, purposes and expectations. This would sometimes include explaining some of the rhetorics used by management to the users interviewed or observed, and certainly explaining use situations anonymously to the EMS management and top management throughout the project, though only upon request.

I should further note that the case study was a collaboration between myself and a second collaborating researcher, a Ph.D.-student by the name of Maria Manikas. Since we were both collaborating with the case organisation, we also shared all empirical material and performed researcher-facilitated events together, though with individual research focuses. In the following section I will make clear who was responsible for the different data collection activities.

5.4.1 *Unit of analysis and scope*

In this study I have mainly chosen to keep a focus on users' expectations since this is one of the areas which the IS literaure has called for more research on. The advantage of this is that I can go into depth with users' stories and experiences. The disadvantage is that my conclusions regarding management actions will only be based on the point of view of the users. As a result I will only peripherally discuss the advantages of management strategies as seen from the point of view of management.

The initial gatekeepers of the project consisted of the top management of an EMS dispatch centre as well as three EMS managers from two different EMS operators.

User participants were selected based on their engagement in the project with a 50/50 division between the two operators (16 from operator "A" and 14 from operator "B"). Observations of EMS work were coordinated on an ad-hoc basis since access to the ambulances was limited[3]. However, since the EMS managers did not have direct management control of all EMS stations, only the stations where the EMS managers had direct contact were selected. One additional station was selected late in the pilot implementation but was not a success due to difficult coordination and agreement. As a result, it was decided that only stations with a close proximity to the EMS managers would be included. Observations of dispatches were selected based on which team had the EAR units with them and which team was dispatched first from the station, and whether or not the teams were willing to bring along an observer.

Observations of meetings were out of the researchers' control and depended largely on if invitations were sent out to the researchers. As such some meetings were missed. Table 11, p. 59 shows the amount of participants from different management levels.

5.4.2 *Observations of EMS work*

Observations of EMS work were scattered throughout the pilot implementation, both before and during. Observations were sometimes

3 Primarily because EMS crews often have students and other observers with them that take priority over research.

Management level	Number of participants
Top management participants	4
EMS managers	3
EMS crewmembers	28

Table 11: Table of the number of participants in the case study who participated in interviews or observations of work.

conducted with the collaborating researcher and recorded unstructured interviews as well as notes were consolidated. Observations were performed taking notes and recording conversations with the EMS crewmembers' consent whenever no patients were present. A typical day of observation would consist of meeting early in the morning at the designated station and presenting the purpose of the observation to all EMS crewmembers present. The researchers would wear an "observer" tag so patients and their next of kin knew that the researchers were not EMS crewmembers. The researchers would then proceed to take notes of the various stages of the EMS dispatches, ranging from time of dispatch to arrival at the emergency address and all the way to the handover at the hospital where notes were finalised and concluded with the involved EMS crewmembers if possible. Seeing that EMS work from time to time could encounter patients in life threatening situations, the researchers would also assist with practical matters in any way possible. This assistance could be from helping carrying out bags, blankets or the stretcher to restrain patients with severe physical traumas. While this can be considered to have schewed the results of the observations results somewhat (especially in those instances where the researchers would help carrying equipment or the EAR units) there was not really much of a choice because lives were sometimes at stake. Table 12, p. 60 summarises the amount of dispatches spread out over the different iterations of the pilot implementation. As indicated from the table, while 10 EMS crewmembers have primarily been observed, due to EMS crews changing colleagues during shifts, an additional 13 crewmembers were also followed providing more variety to the overall dispatches. An additional 5 crewmembers were also followed and interviewed in-context though were not dispatched. As is evident from the table, the researcher that performed most observations of EMS work was the present author due to the initial research focus on EMS work and the involvement of users in the pilot implementation. Both researchers wrote down notes and made debriefings and as more and more was

learned about the dispatches, the focus of the observations gradually moved to the documentation actions taken in the ambulances and with the patients. An observation form was filled out during each dispatch and audio notes were also recorded in addition whenever possible. The end results were a large amount of thick descriptions of the process of EMS work and how documentation procedures fit into this area.

Primary user	Other crew-members	Ite-ration	Obs. hours	No. of dis-patches	Obs. days	Researcher present
"Jack"	1	2	21.5	8	2	A/CR
"Rolf"	1	2	7.5	1	1	A
"Kenneth"	1	1	17	8	1	A
"John"	1	2	9.5	3	1	A
"Thomas"	1	2	2	8	1	A
"Karl"	1	2	11.5	4	1	A
"Karlyle"	1	2	2	1	1	A
"Randall"	1	2	13.5	6	1	A
"Mitch"	3	3	37.5	16	3	CR/A/A
"Tobey"	2	2	12	6	1	A
Total	13		134	61	14	

Table 12: Table of the amount of observations performed during 1st, 2nd or 3rd iteration of the pilot implementation, and divided into days, hours and numbers of dispatches, which researcher was following the participant (A = Author, CR = collaborating researcher, a slash "/" denotes in what order the researchers observed the users per day).

5.4.3 *Observations of meetings and document analysis*

To gain a more diverse overview of the data, observations of meetings were performed and documents analysed afterwards for triangulatin purposes. 3 top management status meetings, 2 full day user workshops and 1 full day training workshop were observed. Notes were written with the collaborating researcher and consolidated af-

terwards, between researchers and with the official minutes of the meetings. Furthermore, 14 copies of minutes of top management status meetings prior to the pilot implementation were also included for contextual understanding, primarily for case description purposes.

5.4.4 *Interviews*

A multitude of interviews were held with the participants of the client organisation in the pilot implementation and consisted of both informal, unstructured interviews and more formal, semi-structured interviews.

Several of the unstructured interviews were held as part of the ethnographical observations performed at the ambulance dispatches and after dispatches had been performed. Total time and number of interviews is close to impossible to procure, though an estimate of around 40 unstructured, informal interviews were performed with the involved EMS crewmembers over the course of the pilot implementation. The interviews lasted between 5-40 minutes and ranged from short inquiries of actions taken in the ambulance to longer discussions for example over lunch. The interviews were held both before, during and after implementation of the EAR units.

Counting participants on all management levels, 32 semi-structured interviews were held throughout the pilot implementation[4]. 12 were held before implementation and 24 were held during and after the pilot implementation. 8 participants (4 users, 2 EMS managers, and 2 from top management) were interviewed several times as they would continue to participate in the later process of the pilot implementation. Table 13, p. 66 shows how many participants were present from management and which researcher was responsible for them. Of the 28 EMS crewmember participants, 12 were interviewed about the process, their expectations and experiences over the course of the pilot implementation for a total of 20 interviews total. Two of the EMS crewmembers further moved on to the last iteration of the pilot implementation as superusers and were subsequently interviewed again.

Semistructured interviews lasted between 45–240 minutes and were audiotaped and transcribed for further analysis. Table 14, p. 67 shows how many interviews were formally held with the participating EMS crewmembers and when in the pilot implementation they were held. The participants have been anonymised per request and in some cases, quotes used in the findings have been scrambled so they are untraceable. I should note though, that in the case of six of the crewmembers unstructured interviews had been performed during observations of dispatches. Furthermore, an additional 11 interviews were held with participants from EMS management and top

4 The total amount of actual interviews are actually higher when counting additional management interviews held by Maria Manikas. However, I have not included these management interviews as they fell out of scope of the research question.

management, though these interviews are only used as contextual background for this study.

The semi-structured interviews were held using interviewguides that covered a wide area, ranging from the participants recalling the events in the process, their own role, their understanding of the purpose, experiences and expectations, and how they communicated with the other stakeholders. The guide was designed collaboratively between the two researchers to cover both research focuses. This had the advantage that a large area of ground was covered. Though what was gained in breadth was lost in depth. Whenever one of the researchers was solely responsible this also meant that certain areas were not elaborated on as much as when both were present, simply because it might have fallen outside of the interest of the researcher. As is evident from the tables 13, p. 66 and 14, p. 67, the collaborating researcher (Maria Manikas) was primarily responsible for most interviews with the management group while the present author was primarily responsible for interviews with the users themselves because of differing research interests on the different management levels. As a result, the interviews with management in this dissertation have been used primarily for background information regarding the overall case study, while actual findings have focused on analysis of the user interviews. Furthermore, the collaborating researcher performed more interviews with management than the ones presented here, though I have chosen to not include them as part of this study since they were not part of the research scope as such. The reason why I note this is that the interviews were a joint collaboration, performed, shared, and discussed between both researchers with a common ownership to the data whereas the analysis for this dissertation was done solely by the present author (more on that later).

While it can be argued that performing interviews primarily after experience have been gained has been known to change over time (Tyre and Orlikowski, 1994) or create a certain amount of confirmation bias (Ward, 2000), I would also argue that this is a relatively moot point of discussion as long as the research focus and its following research method is valid. In this study for example, there is no guarantee that the majority of users have not changed their characterisations of their expectations (it is doubtful that the overall attitude towards the pilot implementation has changed though) if queried again and having to recall the process later on. In the actual interview process for example, many participants did not mention certain events, such as training workshops but would instead sum up an aggregate of their overall attitude and how the quality of training in general would lead them to characterise how they felt that training should have been performed instead.

As such, the general discussion should not revolve around whether or not performing post-experience interviews are valid but whether

or not they have been performed in due time for the participants to have made sense of their experiences (as I have already claimed that this is a retrospective process). For this very reason the interviews were also complemented with artefacts such as screenshots of the EAR units and a timeline where the events were located so that the participants could pick and choose which events they felt were most important to dwell on.

5.5 ANALYSING THE DATA

As noted prior in section 5.4.4, p. 62, data collection activities were performed in collaboration with another researcher, yet the analysis was still performed separately based on the differing researcher interests. The empirical material was loaded into Nvivo9 and coded taking a grounded theory approach (Strauss and Corbin, 1990). Everything was coded in an open fashion to allow for more general categories to emerge during the next process. From here the codes were axially coded, categorised and revised and counted as a means of figuring out what codes the participants would locate most meaning to. At this point in time I would make a large chart of codes that would seem to relate to each other to determine their significance. It was through this chart that the notion of user expectations arose as an important code that would need to be branched out, researched and questioned. Through this selective coding process the tentative core of user expectations as narratives were created. Figure 8, p. 64 shows the iterative process of moving between the codes. Note here that it was not until the selective coding stage and thus late in the analysis process that the research perspective and question relating to "user expectations" emerged. This is very common in qualitative studies where the researcher will learn as the process goes along, though it might seem confusing when viewed in relation to the structure of this dissertation, which I have presented as if the research was focused primarily on expectations all along. This is obviously not so but for the readers' sake I have deliberately structured the dissertation thematically instead of chronologically as it would otherwise seem very long, dull and irrelevant. To understand the ISD project as a process, codes were also coded into the dates of significant events occuring. These dates and events were then plotted into a timeline and coded using the process model approach advocated by Newman and Robey (1992). From here events would be distinguished according to the analytic lens of the four types of activities and their definitions provided by Orlikowski et al. (1995): *"Establishment"*, *"Enforcement"*, *"Adjustment"*, and *"Episodic change"*. Based on the discussion of the theory from chapter 4, p. 21 I have also located events belonging to the fifth activity I labelled *"Technology use"* since the technology was not always in use. Each event would from here on be defined

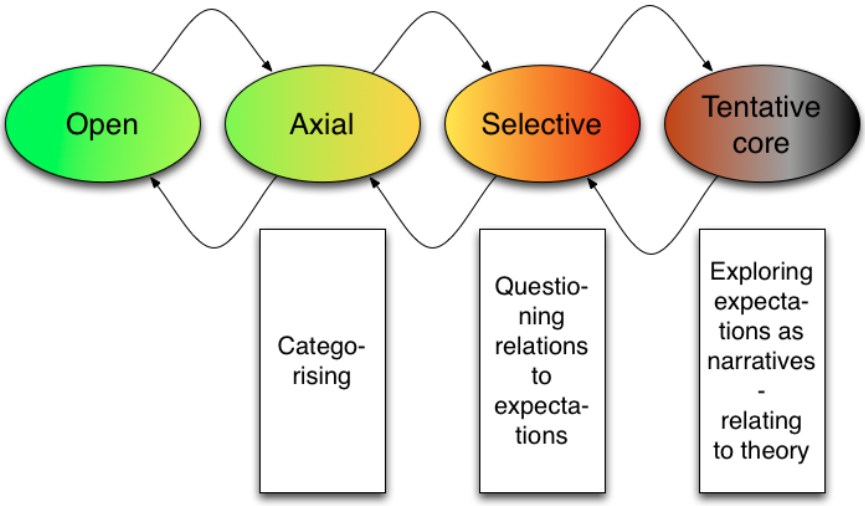

Figure 8: Figure of the grounded theory process of making sense of the codes into the tentative core and categories from open to selective coding.

by its importance for the propulsion of the pilot implementation by denoting it an encounter or an episode (though I will provide a short introduction to this in the case description chapter 6, p. 69 also).

Let me first provide a short example to show the difficulty of extracting quotes and interpreting these quotes into characterisations of expectations in certain points in time. The following quote is taken from an interview taking place after the EAR units had been tested for two iterations and the users were currently awaiting the announcement of the third iteration to begin. In the quote the EMS crewmember sums up his overall attitude towards the project so far. I will try and analyse the quote explicitly using a hermeneutic approach to understand the quote together with the contextual whole that I have experienced myself with the paramedic:

> *"And we were promised that the [integration] with the defibrillator was right around the corner but then we were told that the [integration] with the ED had something to do with the EMS dispatch software and nobody wanted to spend money on that. That's where I thought: "then this whole thing is simply too insincere." If [management] are not even interested then what are we supposed to do with it? [...] what are we going to be using it for? That is the answer I have been missing!"*
> - Paramedic "Sebastian"

The quote can be viewed as the user's way of making sense of the whole pilot implementation process so far. He explicitly describes several directions of expectations, all characterised by "want" expectations at some point. The directions of his expectations point to both in terms what he felt that top management (denoted as "they" in

the quote) should have done and in terms of what he himself had wanted and hoped could be a part of the changed functionality during the pilot implementation. As such he actually characterises his expectations in terms of *actions* that he himself had taken and in turn expected other to react to. The first action lies implicit but is that of inquiring management (essentially providing feedback) into whether or not they would be getting integration with a) their existing equipment in the ambulance and b) the ED for better coordination and communication. The reaction of management were then to announce that their inquiry towards *a* would come in the future (but with no specific date set) and that *b* would not come at all. So, the question now is how the expectations were then recharacterised? First of all the expectations of functionality that he inquired into can be characterised as "want" expectations. Second of all, from the action of feedback given to management and their action of reacting to this feedback (essentially a formal announcement) the two directions of *a* and *b* diverge from each other in terms of the recharacterisations user "Sebastian" provided because of the different content of the announcements. For a brief moment direction *a* is characterised as a promise, thus giving premise to a "will" characterisation while the pilot implementation is still ongoing. However, when the pilot implementation is finished and no sign of the integration of equipment has come, this expectation is recharacterised again to a normative "should". The same goes for expectation *b* but much earlier due to the interpretation of management's announcement as an outright refusal of data integration with the EDs. The recharacterisation thus turns from "want" to "should" immediately upon hearing this, most likely because "Sebastian" had a belief that this kind of integration would be a positive move towards changing the pilot implementation technology for the better. The narrative presented in the quote shows that because of these (for the user) contradictory announcements from management, the purpose of using the IS turns meaningless since it does not *make sense* to him according to his own expectations of what an "electronic ambulance record" is and should be capable of.

This method of interpretation of the users' narratives of their expectations was applied to all 21 interviews. The directions of expectations were analysed and compared to the specific work context to answer sub-research question 2 (*"How does the specific work context influence the user expectations that exist prior to an ISD project?"*), while similar patterns between the users' recharacterisations and reactions to actions were compared in order to answer the sub-research questions 3 (*"How do actions taken influence user expectations in an ISD project?"*) and 4 (*"How do user expectations influence the actions taken in an ISD project?"*).

Participant	No. of interviews	Iteration	Minutes	Researchers present	Researcher responsible
Prehospital centre manager	1	2	109	1	CR
Technical operations manager	1	2	65	1	CR
Medical director	1	2	51	2	CR
Healthcare personnel manager	2	2	217	2	CR
EMS manager "Ron"	3	3	188	2	CR
EMS manager "Dale"	1	2	77	2	A
EMS manager "Winther"	2	3	211	2	CR
Total	11		918 m./ 15.3 h.		

Table 13: Table of the amount of interviews performed with the EMS crewmembers in the case study, in which iteration they were performed in, the total amount of time spent, how many researchers were present, and which researcher was interviewing the participant (A = Author, CR = collaborating researcher).

User	No. of interviews	Iteration	Minutes	Researchers present	Researcher responsible
"Jack"	2	2	172	1	A
"John"	1	3	161	2	A
"Thomas"	1	2	122	2	A
"Karl"	1	2	45	1	A
"Karlyle"	1	2	144	1	A
"Randall"	1	2	78	1	A
"Sanders"	1	2	86	1	A
"Richard"	1	2	60	1	A
"Kenyon"	4	3	227	1/1/2/1	CR
"Sebastian"	1	2	60	1	A
"Mitch"	1	3	91	1	A
"Neil"	2	2	135	1	A
"Rolf"	3	2	195	1	CR/CR/A
"Jones"	1	2	170	2	CR
Total	21		1746 m./ 29.1 h.		

Table 14: Table of the amount of interviews performed with the EMS crewmembers in the case study, in which iteration they were performed in, the total amount of time spent, how many researchers were present, and which researcher was interviewing the participant (A = Author, CR = collaborating researcher, a slash "/" denotes in what order the researcher interviewed the users in).

What we scientists are really faced with isn't a clock we've taken apart, but lots of clock pieces mixed up with pieces from all sorts of other machines. [...] We have to sort these out before we can put the puzzle together.

— Robert S. Root-Bernstein
(Root-Bernstein, 1989, p. 160)

6 CASE DESCRIPTION

I will now describe the case setting by dividing the process of the ISD project into events. This chapter is a segway into the next chapter of EMS work that together will answer sub-research question 2: "How does the specific work context influence the user expectations that exist prior to an ISD project?"*. I will first provide insights into the political and organisational context of the case study and then describe the actual process of the pilot implementation. The purpose of the case description is to provide you, the reader, with a chronological understanding of the overall plot of how the pilot implementation process unfolded through three iterations of gradual development, implementation, evaluation, reconfiguration and reimplementation.*

The case revolved around a collaboration with a public Region in Denmark called Region Zealand that decided to implement an EAR software/hardware suite taking a pilot implementation approach. The pilot implementation project was meant as a precursor to a more widespread nationwide IS implementation that was currently in the process of procurement and planned for implementation two years later.

Denmark consists of five governmentally designated Regions that each are responsible for the healthcare sector within a geograpically located region (see figure 9, p. 70. These Regions are governed by politicians who decide how and where to allocate resources for healthcare projects which are deemed important to focus on in the particular, regional area. Such projects typically involve for example professional caretakers, hospitals, EDs, and general practitioners who reside in the region.

In 2009 all five Regions decided to collaborate in a three-tier project to digitally strengthen the emergency service sector in Denmark by using the same standardised IT for communication and coordination of all emergency service responders, including the EMS sectors. The EMS sector is a subsector of emergency services that intersects with

Figure 9: The five healthcare regions of Denmark, color coded into geographical areas of coverage.

both the healthcare and emergency service sector. EMS includes all acute patient care up until a patient arrives at a hospital (this is why it is also sometimes referred to as "prehospital" sector). The EMS sector of each region is controlled by a "prehospital centre" that, apart from controlling EMS dispatches, also manages the education of EMS personnel as well as controlling and determining regional standards for dispensing medication. EMS dispatches take place in the dispatch centre in the institution of the prehospital centre (the distinction is subtle but important to make between the two).

The three-tier project was the first of its kind because all Regions agreed on procuring and integrating three major ISs in an inter-regional setup. The prehospital centres of the five regions would in a stepwise manner have their communication and radio technology redeveloped and reimplemented. First step took place in 2010 with new radio equipment that would be integrated with a joint radio network technology called SINE (in Danish: SIkkerhedsNEt, in English: Security Network) that would enable all emergency service control rooms and units from police, ambulances and fire departments to communicate using the same radio frequencies, thus enabling better and more efficient communication in case of large-scale emergencies. The second step of the project was to transition to a joint control room IS at all regional prehospital centres that would be used for dispatching ambulances and sending out contextual information about the specific emergencies. This step was planned for procurement in 2011 and im-

plementation in 2012 but delayed due to the large scale of the organisational impact of the technology. This also resulted in postponing the third step of the overall project: implementing EAR technology that would integrate with the control room IS and electronic patient records at the hospitals.

6.1 A PILOT IMPLEMENTATION IN THE WAKE OF THE LARGER PROJECT

While the nationwide EAR tender was postponed, politicians of Region Zealand in the Fall 2010 seized the opportunity to prematurely implement an experimental EAR technology within a limited budget. The political decision coincided with another decision of removing physicians from the ambulances as of March 2011. Removing all physician-manned EMS vehicles from the Region of Zealand spawned a wide-spread debate on both a national and a regional level with strong media coverage[1]. One side of the debate argued that fewer physicians in the vehicles resulted in more patient fatalities while the other side argued that it was a waste of money and simply ineffective since only a few physician-manned vehicles could be dispatched in the largest populated areas but would rarely reach the "right" patients. Instead many of the physician-manned dispatches would arrive at patients who, only realisable at the time of arrival, did not need that high level of clinical competence. The savings that came from not having highly paid physicians were instead used to upgrade EMS crewmembers' competencies from Emergency Medical Technicians (EMTs) to paramedics[2]. As a result it was believed the prehospital centre could provide a geographically broader coverage to the population of the region. Besides saving money, one of the main goals of implementing an experimental EAR was to input and extract quantitative data to assess and evaluate the quality of care and work processes provided by the EMS personnel. In turn this data was supposed to support the political decision to remove physicians from the EMS vehicles.

Hence the EAR technology would replace the paper-based ambulance records that had been in use since the early nineties. The paper-based records consisted of a one page A4 carbon copy used to register basic patient information, cause of emergency, symptoms before and after arrival, treatment and a description of the overall patient trajectory from arrival to emergency address that would later be handed over to the receiving ED. Figure 10, p. 72 shows a replica of the original paper-based record.

1 In Denmark it has been common practice to have dedicated EMS vehicles manned with physicians since 1999.

2 In Denmark three levels of competencies for EMS personnel exist: Emergency Medical Assistants (EMAs) (level 1), EMTs (level 2), and paramedics (level 3).

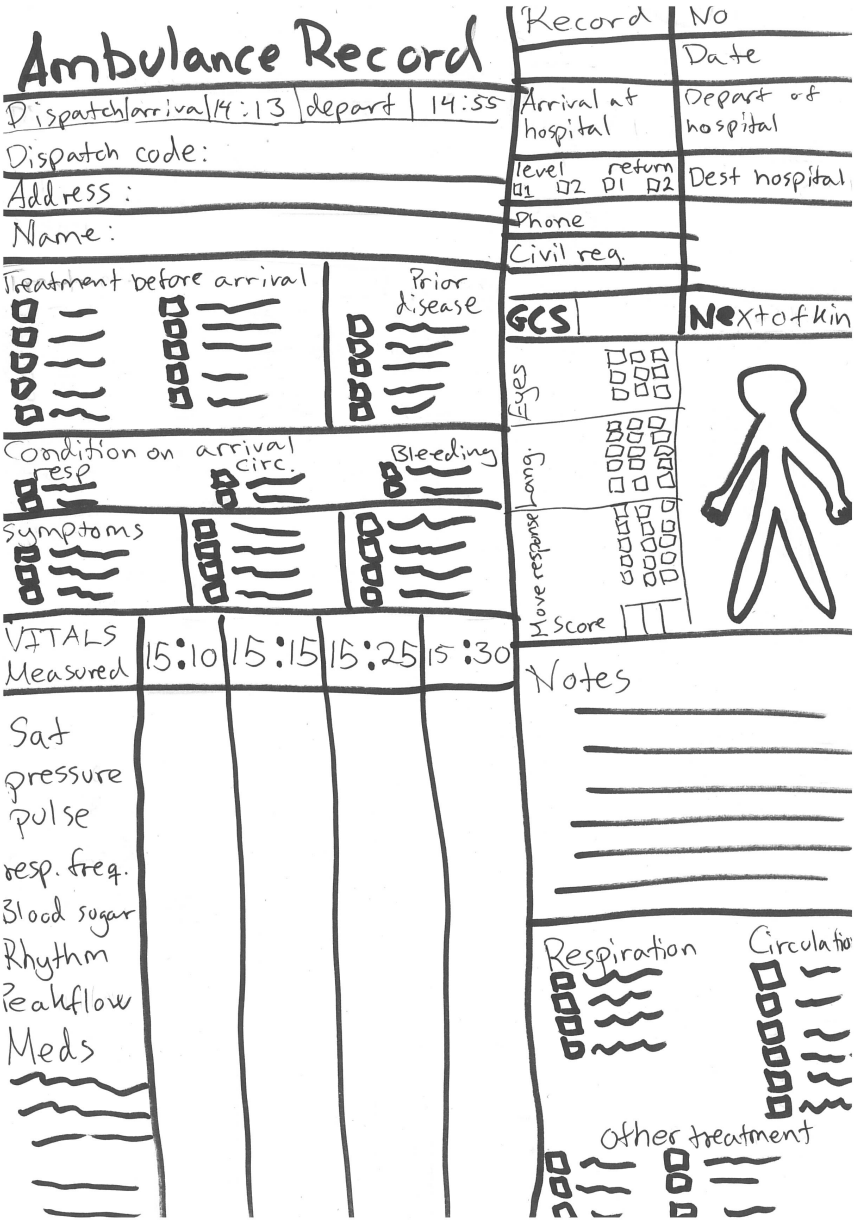

Figure 10: A replica of a paper-based ambulance record. The process of inputting data is to start from top left and ending in top right, describing a U-shape.

6.2 ACTORS IN THE COLLABORATIVE ORGANISATIONAL CONTEXT

In the region of Zealand two major EMS operators are responsible for taking care of emergency dispatches: operator "A" and operator "B". Payments to the contractors are service-based and revolve around the EMS crews' response times of emergencies. The response time of an emergency is measured from dispatch to arrival at the emergency address and rated on a scale from 1-5 (1 being the most acute and 5 being the least acute). The decision of what type of EMS vehicle

and what type of crew to send to an emergency is decided when an emergency call is received and this is a unified decision made by both technical and healthcare personnel that monitor all incoming calls at the dispatch centre. The technical personnel overview the geograph-

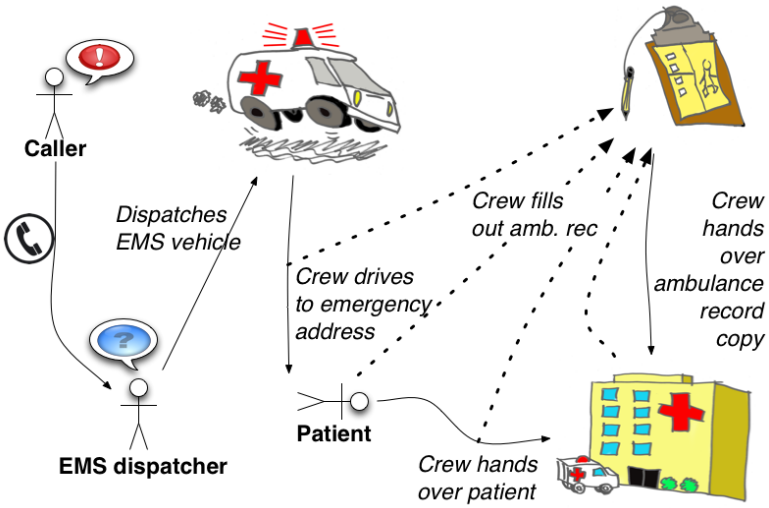

Figure 11: Figure of the emergency process in the Danish EMS sector. An emergency caller calls the EMS dispatch center who then dispatches an ambulance. Arrows indicate the flow of information and movement, while dotted lines in the arrows represent the process of documenting. When receiving the dispatch the EMS crewmembers begin the documentation with the basic patient data and keep inputting documentation in accordance to the level of acuteness of the specific dispatch.

ical locations of EMS vehicles and the type of crew available through a geographical IS and dispatch the vehicles needed. The healthcare personnel are responsible for interacting with the emergency callers (Danish citizens) as well as to get more contextual information about the emergency and provide instructions for first aid until the EMS crews arrive. The technical personnel work for both operator "A" and operator "B" while the healthcare personnel are paramedics or nurses hired by the prehospital center that work part-time for either ambulance operator.

6.3 PROJECT ORGANISATION OF THE PILOT IMPLEMENTATION

Top management at the prehospital center of Region Zealand was tasked with finding a working EAR tool to perform the EAR implementation as they saw fit but the deadline for implementation of the EAR was set to March 2011, the same deadline for removing the physician-manned EMS vehicles. Thus the prehospital management would have only 3 months to procure, configure and implement an EAR tool that was more or less ready for operations. Prehospital top management

agreed to this and initiated a search for a functional commercial off-the-shelf EAR tool that:

- was owned by an organisation willing to configure and develop on the EAR before, during and after the pilot implementation.
- could be tailored to the Danish context and language quickly.
- was so economically feasible that the prehospital management could avoid enrolling the pilot implementation project into a European Union procurement since this would be too expensive and slow down the process.
- was known to actually work in other EMS contexts.

Prehospital management met with a Norwegian vendor that had experiences with repackaging EAR software developed by a Swedish software vendor. This EAR technology was already in use in some parts of Norway and other countries in Europe. A contract was made that promised that the Norwegian vendor would be responsible for managing training of the users in how to use the EAR as well as leasing the software and hardware for a two year period. Development of integration with the existing ambulance equipment was specified to be a running process during the pilot implementation.

A healthcare professional with a nursing background from the prehospital center was responsible for the initial local configuration of the EAR in order to make sure that it abided by the Danish health standards.

The organisational actors, referred to as stakeholders from now on, thus included:

- The prehospital management group consisted of four people: Prehospital centre manager (responsible for the prehospital centre as a whole), technical operations manager (responsible for the day-to-day technical operations), medical director (responsible for EMS education, training and medication standards) and healthcare personnel manager (responsible for education and coordination of healthcare personnel at the dispatch centre). Prehospital management were considered to be the project initiators and owners who would overall be responsible for communicating with the involved stakeholders as well as setting up the hardware related to the EAR.
- The product vendor from Norway who was responsible for customization, configuration, implementation of the IS and education of users, as well as coordination and communication with the software vendor in Sweden.
- Two ambulance managers from the ambulance operators who were responsible for finding a place in the ambulance for the EAR units and selecting a small group of paramedics from each operator who could act as superusers.
- A superuser group consisting of around 10 paramedics selected based on their knowledge and interest of IT and availability.

- Regular users consisted of all other paramedics that worked for both ambulance operators. Superusers were meant to locally train the regular users through peer-to-peer training with the EAR in use.
- Two researchers, both Ph.D.-students (one being the present author) would observe the project and took the job of evaluating the project by facilitating minor events as the process went along.

A steering committee was formed to be in charge of coordinating, communicating and taking actions to progress the project. The steering committee of the project consisted of four central representatives: the technical EMS leader from prehospital top management, the healthcare professional in charge of EMS project coordination and EAR configuration, and an ambulance manager from both ambulance operators. Figure 12, p. 76 represents the formal organisation of the implicated stakeholders of the project.

The EAR project was pioneered as a "pilot" to the involved stakeholders, supposed to run for two months at a time up with continuously updated functionality until the "real" national EAR IS would be implemented two years later. Prehospital management blankly admitted that they had no prior knowledge with implementing this type of tool, neither functionally nor procedurally, and so, as an experimental pilot the main purpose was to learn about needed functionality and actions required in order to develop and implement an EAR to run properly:

> *"[...] when we perform a pilot project we do have some significant risks involved and we do not have to end up fulfilling a set goal [where] a development project is still within certain confines and you really do not have that in a pilot project the same way. With so many risks in a pilot project you have the possibility to just shut it down and say:* "that was it.""
> - Technical operations manager

6.4 THE TECHNOLOGY CHOSEN AND OVERALL SETUP

Other EAR vendors had also been contacted at prior to the agreement, though none could live up to the demands mentioned in the previous section. The first IS that was inquired into was an existing (and highly successful) Danish EAR that belonged to an existing EMS operator. However, it did not live up to the above mentioned demands described by prehospital management as it was too expensive to lease, not configurable enough, and lacked possibilities for development during the testing period.

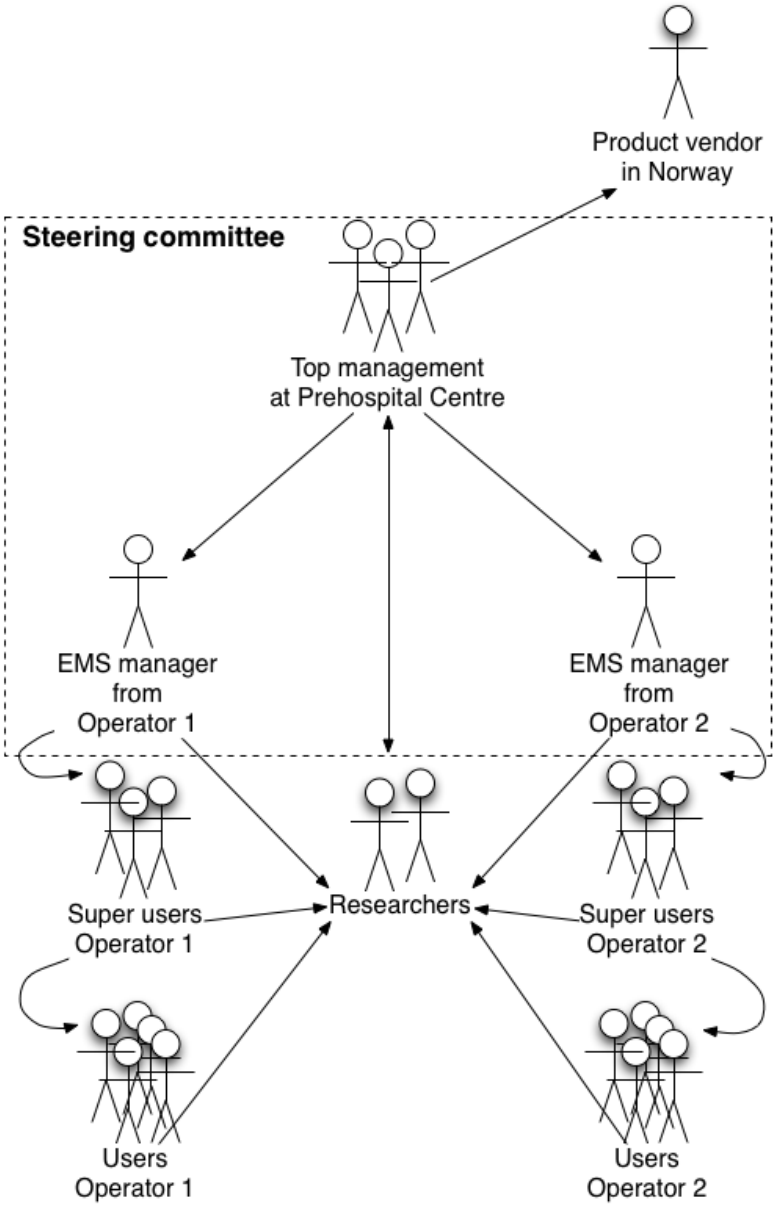

Figure 12: Showing the formal project organisation. Arrows indicate the formal communication directions.

The hardware setup of the Norwegian product was rather comprehensive because it required a lot of physical change. Other than obtaining an EAR unit consisting of hardware and software, the unit was also required to plug into the existing physical work environment by bridging interfaces between other tools. The new setup for the physical environment ranged from drilling holes in the ambulances for the mountings of the internal docks for the EAR units (which was no easy task considering the amount of existing equipment in the ambulances) to finding locations of the printers at the EDs. The printers were viewed as a temporary solution to bridge the transition from old paper-based records to new paper-based records because the technological scope of the pilot implementation did not include integration with the electronic patient records at the hospital.

The EAR units themselves were touch-based tablet computers that could endure physical punishment in the harsh contexts the EMS personnel often would engage in. A unit was around 2″ (5 cm) thick with a handle on top for better handling, and a stylus in a chain for precise input as an alternative to touch input, which it also supported (see figure 13, p. 77).

Figure 13: An EAR unit in use in the ambulance.

The units were able to receive over-the-air updates using the wireless phone network, so any technical changes made to the software during the testing period would automatically be updated in the units when they were rebooted. The setup included 17 EAR units to be distributed according to the amount of paramedic EMS vehicles at the disposal of each EMS operator. Being the operator covering the largest geographical area, operator "B" would thus recieve 10 units for their paramedic EMS vehicles and operator "A" would receive three. The remaining four units were placed in EMS Sub Urban Vehicles (SUVs), located in the outskirts of the region where there was only very little need for coverage. An EMS SUV could carry only one crewmember, a paramedic, equipment and no patients. The vehicles were thus only used for emergencies that required paramedic competencies for arriving early at the emergency address to stabilise the patient and await arrival of a secondary ambulance with EMTs as crewmembers. Three

EMS SUVs belonged to operator "B" and the fourth unit was placed in an EMS SUV that belonged to the prehospital center.

Five of the biggest EDs in the region were equipped with a docking station connected to a printer for immediate availability for the paramedics at the entrance of the ambulance area. The process was supposed to replicate the process of the old paper-based records since this process was familiar to the users. The key difference was that upon completion of the ambulance record the paramedics were supposed to go to the docking station and print out the EAR and hand this over along with the patient rather than tearing off a copy of carbon paper. One logistical difference, however, was the EMS SUVs seeing as they did not carry patients. The paramedics in the SUVs would then only rarely end up at the EDs but rather work as a task force to assess and treat patients quickly at the emergency address. This treatment also required documentation and would often be handed over to the ambulance crew showing up later. In order to prepare EARs for this deviance in the process, the SUVs were also equipped with printers so the paramedics could print out a copy of the documentation performed on site or upon handing over the patient.

6.5 THE OVERALL PILOT IMPLEMENTATION PROCESS

The pilot implementation consisted of three iterations where the EAR units would be put into the work context of the EMS crews and be used to fulfill the tasks of documenting the patient treatment electronically rather than on paper. I define an iteration as consisting of a) implementing the technology; b) letting users use the technology; c) receiving feedback; d) taking technology out of operations. Only the first iteration was exempt from this as it was only EMS crewmembers from operator "B" that tested out the EAR and they only did this retrospectively at the stations and not in the ambulances. The iterations strongly resembled development iterations since each one was initiated by a planned encounter, either as a meeting or an action taken between stakeholders followed by an episode of change. However, several unplanned encounters would also occur during the planned episodes and these would further initiate subepisodes that would occur in parallel with the overall iteration. As the pilot implementation went on and the management group would learn more about the project, the iterations would also become more structured and focused on acting on feedback from the users by configuring and developing the EAR. The first two iterations thus were very "ad hoc" influenced and by far the most comprehensive in terms of involving users. The third iteration was shorter and more time was spent on details, more focus was on evaluating the EAR in actual use, and the project management had generally learned to work around or solve the biggest challenges that occurred in the first two iterations.

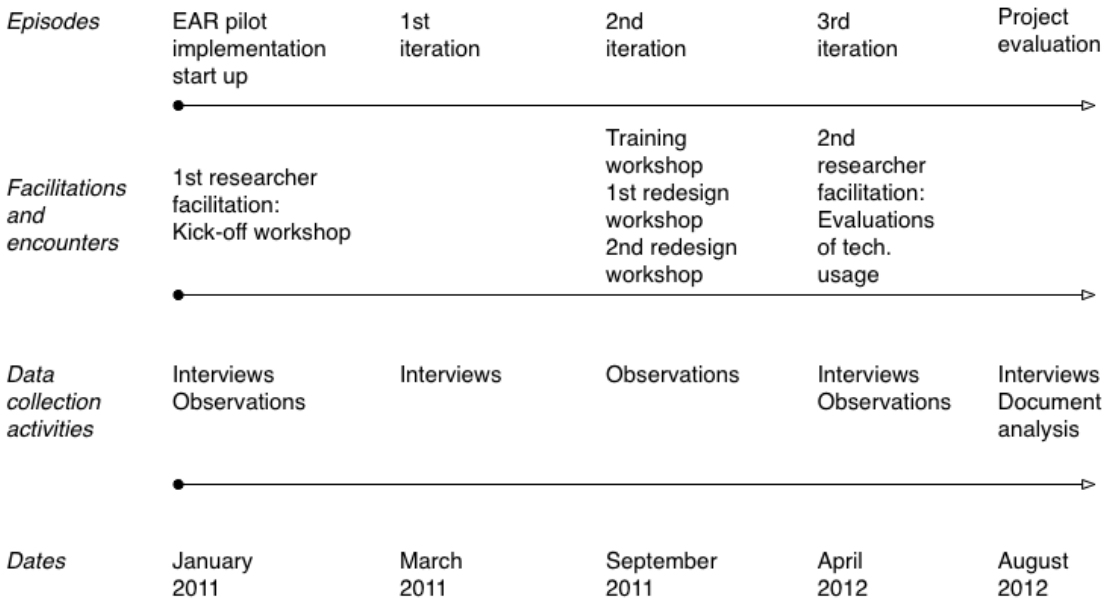

Figure 14: Timeline of the EAR pilot implementation

Two events were performed by the researchers. The first event was a workshop meant for all stakeholders to encounter each other in order to share their anticipations and perceptions about the project, while the second event was an episode of evaluation in the beginning of the third iteration based on an analysis of a need for communication and understanding between users and management. Figure 14, p. 79 shows the overall timeline of the pilot implementation process organised around episodes, facilitations and encounters, and data collection activities.

In the next sections I will go into depth with each of the iterations. I have chosen to draw on certain types of directions of events similar to the study by Orlikowski et al. (1995). I do this because the case of Orlikowski et al. (1995) and the case of this dissertation both involved a technology-in-use project sanctioned by a stakeholder group in the organisation, mediating either configuration of technology or new, organisational guidelines. Just like Newman and Robey (1992) used episodes and encounters to denote the type of event, Orlikowski et al. (1995) used four types of episodes (called *activities* in their paper, though I refer to them as episodes for a more consistent use of concepts) to denote the directions of these events. Essentially, Orlikowski et al. (1995) (p. 421) presented four episodes that were taken by the management group directed at:

1. Establishment: denotes establishing the organisational structure and guidelines for using the IS.
2. Reinforcement: training and follow-up on feedback of the use of the IS.
3. Adjustment: based on the feedback, configuring the guidelines for use or adjusting the technical setup within the realm of what is possible.
4. Episodic change: major changes to the IS as a whole, ranging from redevelopment of functionality to new guidelines.

I have also taken the liberty to add an additional action that Orlikowski et al. (1995) only implicitly mention in their paper but I nevertheless feel the need to explicate for analytic purposes:

5. Technology in use: the action of actually implementing and keeping the technology operational in the organisation.

I have added this action out of need because there were times when the EAR technology was not in use in the case study and where episodes of "equivocation" roamed instead[3] (Newman and Robey,

3 One of the reasons this action must have been overseen or at least assumed to be implicit in the case of Orlikowski et al. (1995) is most likely due to the nature of the technology of the IS that was studied. The technology was a news group information sharing IS shaped like a bulletin board/intranet and as such always online and not of business critical nature. This meant that the IS was always in use and as such it made no sense to distinguish between operational and not operational. In the present case of this dissertation, however, it did.

1992, p. 254). In this case study it was necessary to denote this type of action since a pilot implementation is an iterative process that require frequent updates and time to consolidate feedback. If any critical issues are found, it is important to be able to pull the IS from operations and reinstate it again.

I will use these five types of episodes to show which encounters would initiate which episodes in the pilot implementation. I should also note here how I distinguish between events, encounters, episodes, facilitations, and actions. I have already described that I denote an event to consist of an encounter and an episode. Encounters are short and often herald in or end a longer episode for example in shape of meetings, workshops etc. between stakeholders. Facilitations are planned events that have the possibility to turn into encounters, depending on how important for the path of dependency they are deemed by stakeholders. For example, the second researcher facilitation was not an encounter but rather just a longer episode of feedback since it did not hold any special significance in terms of impact on the project (other than provide information to project management for how to take further actions). The first researcher facilitation, though, could be denoted as an encounter since the participants here were actually surprised and changed their perceptions of the project significantly during and after it took place. Actions can be seen as taken on individual or collective level by a group of stakeholders, for example by announcing that the EAR project will begin, or upgrade the printers in the setup. Actions denote the perceived meaning behind something that can be interpreted and evaluated, resulting in not all events being included in denoting a significance for the project. An action can for example be ascribed to all events of training during the process and does not necessarily denote the actual events but the interpreted intentions behind them. While related to an encounter in terms of significance, actions are not necessarily visible until either shown and enacted verbally, whereas encounters are.

6.6 FIRST ITERATION

In short the planning and design of the pilot implementation consisted of analysing and uncovering technological gaps in procedures that needed to be bridged with for example printing out the EAR because integration with the EMRs at the hospitals were out of the scope of the pilot implementation.

Up to the early point of initiation of the pilot implementation, many of the users and stakeholders at the EDs were uncertain about what was going to happen as well as what the new EAR technology was even capable of. Instead, their questions were directed at the researchers since the users assumed that the researchers knew more about the details of the project. The two researchers would realise

that the stakeholders were in need of meeting each other in order to understand their different expectations of the project. This led to the first event where a workshop was facilated with users, EMS managers and representatives from the Norwegian product vendor who would present their product and the scope of the pilot implementation.

After the workshop an introductory training course for the superusers was held by the product vendor and the Graphical User Interface (GUI) was improved by the healthcare personnel manager from prehospital management. For technical and organisational reasons, the EAR project did not adhere to the political deadline. Technical reasons included issues with procuring and producing hardware mounts that could live up to standards in the vehicles. Organisationally, the product vendor refused to communicate with the prehospital management because they were currently in a separate regional bid regarding control room software. Apparently, collaborating with an existing Region for an IS procurement that was very similar would have disqualified the product vendor immediately. This was completely unanticipated from prehospital management at the time. Rather than postponing the whole pilot implementation, prehospital management decided to allocate an EAR unit to each ambulance station and make all paramedics at the station fill out the an EAR after each dispatch. However, as supply was limited, only operator "B" was chosen for this task. This way three birds could be hit with one stone. Users would try out the EAR in a passive and friendly environment first and prehospital management could build the foundation of a digital database where data could be extracted so the political decision to remove physicians from the ambulances could be evaluated, which was the main purpose of the pilot implementation anyway. It was also a way of providing user feedback on the structure and content of the records as well to get an idea of what the users thought about using the EAR. The users, though, were not particularly impressed. Although the EAR was a highly anticipated product and some of the users found it interesting to work with ambulance records digitally, the units were found to be slow and the structure of the GUI unintuitive. In August 2011 the steering committee would meet with the product vendor and, based on the users' feedback, reconfigure the EAR user interface as best as possible. It was also decided that another day of training should be provided to those users who felt rusty in using the EAR, seeing as a solid six months had gone by and that several changes had been made to the interface.

One thing to note here is that the researchers were not involved until the second iteration officially began[4]. As such the empirical findings only revolve around the kick-off of the project and the sec-

4 Essentially this was due to practical reasons. It was not until May that the researchers were informed of the decision to make the EMS crewmembers do this.

ond and third iteration, while the events of the first iteration were only vaguely touched upon in retrospective interviews.

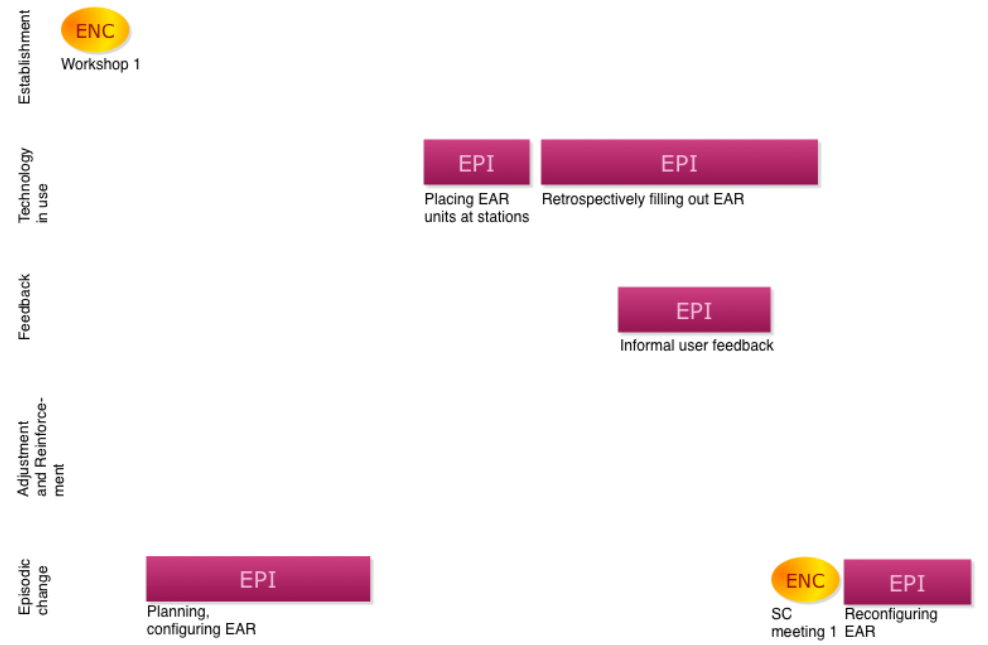

Figure 15: Process model of the 1st iteration showing two types of events proposed by Newman and Robey (1992): events as encounters (ellipses), and events as episodes (rectangles). Each event is furthermore located depending on the types according to (Orlikowski et al., 1995).

6.7 SECOND ITERATION

At the end of August, prehospital management felt certain that the overall product and setup was ready, and September 21st, after several delays, the EAR units were finally implemented into the ambulances of both EMS operators. The respective EMS managers instructed the users that they now had to use the EARs and not the paper-based records. Both EMS operators instructed the users through the official chain of command emanating from the prehospital centre that use of the EAR was now mandatory. However, if situations should arise where use of EAR was impossible, the users could choose to revert to using the old paper-based records instead. The users were also instructed to report issues and constructive feedback on the use of the EAR to the EMS managers who would gather and share feedback at the following steering committee meetings. This could be considered to be the encounter that would shape the second iteration of technology use of the pilot implementation.

During the second iteration the users experienced various technical and procedural issues that forced them into working out new ways of solving how to document the patients. They would report severe issues (for example breakdowns of printers) directly to their EMS manager who would make sure that the right authority would be informed to take care of the issues promptly. A central issue first discovered in the second iteration was the difference of the written records and the print-outs. Sometimes the issues could be resolved by EMS management themselves and at other times the prehospital management would have to come up with a fix. Suggestions for improvement were gathered by the EMS managers and these issues were attended to at the steering committee meetings.

The implementation was vastly more comprehensive than first anticipated. As a result several encounters would occur during the second iteration that would foster new episodes of change within the organisation in parallel with other episodes. The first planned event was the first steering committee meeting that was held one week into the second iteration. Here the group members would share feedback on the most critical issues that the users had with the EAR, e.g. that the units were still too slow and that inputting civil registration numbers would sometimes be prone to errors. Furthermore, the first instances of using the EARs would for example strongly increase time consumption of documentation. In some instances the users would spend up to 90 minutes entering information into the EAR after hand over of the patients, which was a rather severe increase from the usual maximum of 10 minutes that the paper-based records would take. While the old paper-based records would be only one A4 page the new EAR would sometimes take up to 14 pages, often rendering the flow of documentation useless as the ED personnel could not easily gain an overview

of the patient after hand over. This was clearly not acceptable and these issues were escalated to the product vendor who promised to come up with a fix.

A significant encounter occurred shortly after the first steering committee meeting when a single paramedic would react to the new EAR by redesigning the user interface in protest. This was done in his free time by taking screen shots of the GUI of the EAR and manipulate it using MS Paint. The steering group reacted positively upon seeing this and in response gathered a work group of other superusers with the task of redesigning the GUI spearheaded by this particular paramedic.

In the third week of the pilot a third encounter occurred at the training workshop that was performed by the product vendor. The training workshop was meant to refresh and review the procedures of using the EAR, as well as teaching EMS managers how to use the data extraction module of the EAR. EMS management and representatives from prehospital management also participated in this meeting and the next redesigned version of the GUI was also shown to the participants. The workshop was significant because EMS management and representatives from prehospital management would realise that the users' inquiries to the product vendor revealed diverse and individual ways of using the EAR. Some were unpredicted and organisationally undesirable according to standard operating procedures. These issues were then promptly followed up on at the second steering committee meeting held on the same day where the product vendor representative was also present.

Steadily the use of the EAR would decline and users would revert to using paper-based records as they experienced limitations using the EAR for their everyday work. Despite having reconfigured much of the pilot setup and that the units had become more functional and usable after the initial startup problems were weeded out, the users still felt it was cumbersome to use and felt frustrated that not all their dispathes could be filled out using the EAR. Many of the users would still experience that the EAR units would slow down or simply not boot and as a result would be reported faulty. The faulty units would continuously be shipped to the product vendor in Norway for repairs but it would create large gaps of time for up to two weeks where the users could not use the EARs for documentation since they were not available.

Up to this point only the technical operations manager had been participating in the steering committee and supervising the project because the medical director was about to be replaced. The second iteration would thus end after six weeks due to an encounter at a workshop with the newly hired medical director of the prehospital management. He participated at the workshop to get an overview of the product and the work done by the superusers in the redesign group. Having seen some of the issues that were fixed by the work

group but still not implemented, he was concerned that the quality of documentation of the existing GUI was inadequate for data extraction and documentation purposes. Two days later the medical director would publicly announce that the EAR pilot had been put on stand by until the quality issues were investigated and fixed. Prehospital management also announced that the EAR would not be implemented again until integration with the defibrillator had been properly developed and tested. This was one of the most desired requests by the users since and an obvious piece of functionality to have for a new ambulance record. However, developing the integration had been delayed due to organisational and political issues and the EMS managers had attempted to comfort the users with the fact that the integration was planned and in the pipeline. After the announcement of stopping the second iteration, though, it was decided that this functionality was needed to create satisfaction and goodwill from the users again.

The first two iterations were evaluated at an ensuing prehospital status meeting with the political representatives from the Region. Technical issues were blamed for the delays and lack of quality of the software. The EAR implementation, however, was not cancelled and was still expected to be reimplemented once the necessary technical adjustments had been made.

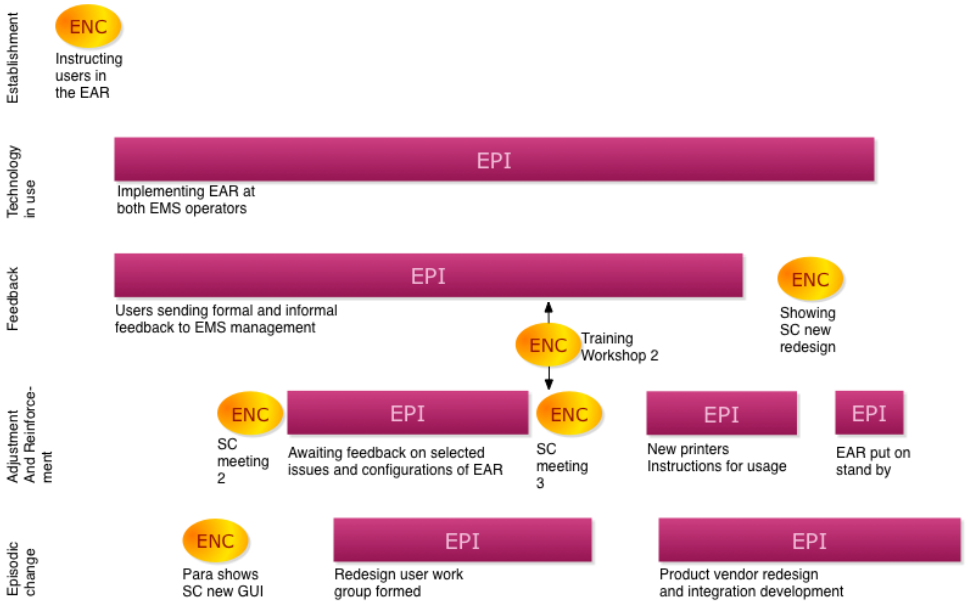

Figure 16: Process model of the 2nd iteration showing two types of events adopted by Newman and Robey (1992): events as encounters (ellipses), and events as episodes (rectangles). Each event is furthermore located depending on the types according to (Orlikowski et al., 1995). Notice that the second training workshop was a central encounter where users would both provide feedback but would also learn more about each others' usage of the EAR, hence arrows pointing in both directions.

6.8 THIRD ITERATION

Following a long hiatus of non-action, the EAR pilot implementation was revitalised in February 2012 when a new project manager had been hired at the prehospital centre. At this point the prehospital management had reduced their commitment and participation in the project. The primary political motivation in the pilot implementation had originally been to survey paramedics through extracting quantitative data from the beginning of March but because of the many delays during the project, the committee dedicated to evaluating this had found other means of getting hold of that data. As a result, much of the political pressure had also decreased. The new project manager was thus given full decision-making authority and re-initiated the project by gathering two of the most dedicated superusers from each of the EMS operators, and yet again a task force would weed out design issues by walking through the newly redesigned GUI. After combing through issues with the EAR user interface, the project manager announced that he simply could not find any more issues until it was tested in actual work practice.

At the end of March 2012 the product vendor had finished developing an integration solution with the defibrillator as well as tweaking the printout of the ambulance records so that they now would only take up 3 pages of information rather than the usual 10-14. The results of the researchers' observations and qualitative analysis following the first two iterations were that more clarification of specific technical issues of use was needed. As a result, the second researcher-facilitated event also followed in collaboration with the new project manager who formed an evaluation plan where the researchers would shadow superusers using the EAR and focus on documenting critical aspects of using the EAR in practice. This time the scope of the iteration would be scaled radically back so that only two ambulances with dedicated superusers would participate. They were meant to use the redeveloped EAR units for at least 50 dispatches to get a representational idea of the technical issues that needed fixing. The issues were documented and sent to the software vendor who would fix them as quickly as possible. At the end of each dispatch these issues would be summarised and solutions to problems would be discussed with the superusers. Furthermore summaries with the most pressing problems were sent to the project manager and EMS managers during the test in order to create a steady flow of feedback and information on the current status.

One of the superusers ended up withdrawing from the pilot implementation after two days of using the EAR due to dissatisfaction of the process and product. The technical standards simply did not live up to his expectations. The specific reason was that despite having reported an issue that made the keyboard malfunction, this issue was

still not taken care of after two weeks and several attempts of fixing it by the hardware vendor. This forced him to fill out the EAR only using the stylus which took up more time than he was prepared to spend. Furthermore he had expected to have a printer installed permanently in the ambulance so that he was able to use the EAR with all patients and not only the ones that had to be transported to those EDs with docking stations. However, this sudden demand of printers was not well met as it required a renegotiation of the operator contract on the pilot implementation and ultimately ended up with the operator denying this as it would be too cumbersome to drill more holes and run wires through the ambulance.

Meanwhile the pilot implementation with the second superuser was more successful and lasted one and a half month. The pilot implementation could not run for the full 50 dispatches since the test was dependent on the superuser's schedule, sudden shift changes, off days due to vacation, and the actual ambulance being taken out of operations for 14 days due to hitting a deer. The superuser also experienced that half of the dispatches would require no documentation since they were either regular patient transports, the patients would have to arrive at certain EDs that did not have any printers installed, or the patient would only be treated at the address of emergency, meaning that the patients would not be brought to the hospital.

In August 2012 a status meeting was held with the project manager and the two EMS managers in order to decide the future of the EAR pilot implementation. The project manager collected the most important issues from the feedback reports and one of the superusers would be present for clarifying and contextualizing the issues. Upon seeing the amount and severity of issues, the EMS managers agreed among themselves that they would prefer to spend their resources pursuing projects that were more critical for their business, such as prioritising an upcoming regional accreditation process that could have a severe impact on the future of their contracts with the Region. Ultimately it was decided that the EAR pilot was put on indefinite stand by until the accreditation had been completed in late 2012.

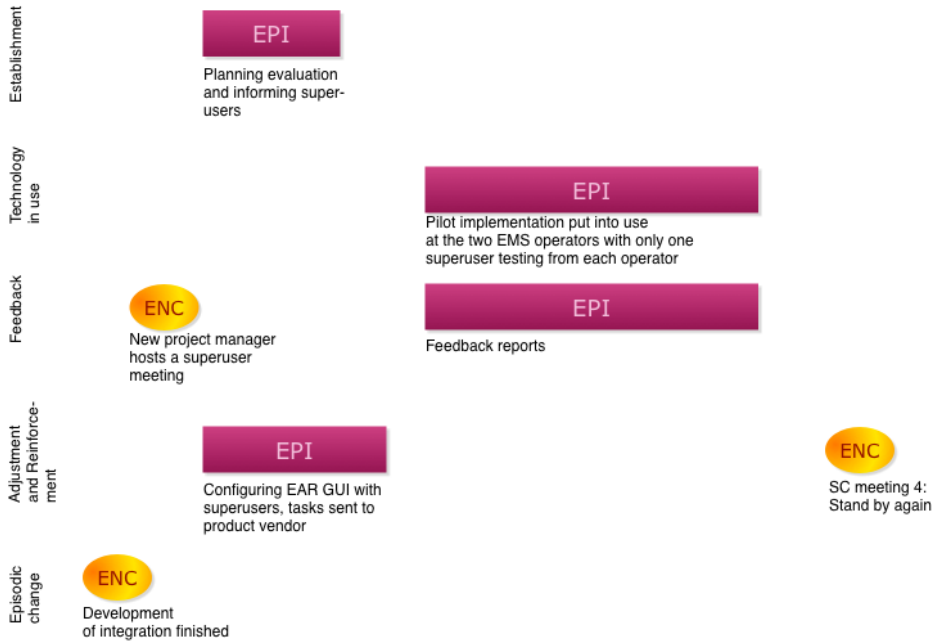

Figure 17: Process model of the 3rd iteration showing two types of events adopted by Newman and Robey (1992): events as encounters (ellipses), and events as episodes (rectangles). Each event is furthermore located depending on the types according to (Orlikowski et al., 1995).

6.9 SUMMARISING THE PILOT IMPLEMENTATION

Once one goes into the specifics of such a process, all kinds of contextual events take place. For example the fact that the top management group in prehospital management changed during the project, the EMS management's engagement and motivation kept changing, and that the amount of involved users changed drastically. These are all events that are fairly typical for ISD projects, though are rarely mentioned when attempting to abstract such cases to field-invariant conclusions.

During the process, it becomes clear that mostly informal feedback occurred in the first iterations, while more formal feedback occurred in the later iterations. It also becomes clear that putting the technology in use really warranted changes, both organisationally (in the shape of adjustments and reinforcements, training events and the like) as well as technical must-have reconfigurations of the setup in order to make it work.

It was also clear that the technology in use and the specific contents of the encounters in the pilot implementation clearly was derived from the specific practice of EMS work. Furthermore, as the organisational structure of the pilot implementation was formal and hierarchical, much of the informal feedback and stories of use stayed on the level of the users and their closest EMS manager, resulting in only formal feedback that was considered to be crucial to the future of the pilot implementation was given to the steering committee, for better or worse.

The political goal further enmeshed the motivation and engagement of management. This is an important aspect because the political goals actually made the pilot implementation possible in the first place, although it became clear that once the political focus diminished, the EMS management motivation for keeping up the project decreased similarly drastically.

The motivation from the users, though, was very high from the beginning of the project and long into the technology in use phases. This goes to show that those events that revolved some kind of critical change were all defined as encounters and afterwards followed by an episodic change. The encounters further involved both the steering committee as well as the users.

From the process of the pilot implementation, three major actions that seemed to influence user expectations show up. First of all the action of "announcing" the EAR project, project updates and formal answers to feedback inquiried from the users. Second of all the action of "giving feedback" which consisted of not only formal feedback from the users but also a continuous stream of inquiries directed to the EMS managers and the prehospital management but also among the users themselves. Third the action of "experiencing" which consisted both

of experiencing the EAR in hypothetical and actual use but also experiencing events such as training workshops, design workshops and certain management meetings where some of the superusers were present.

I will use these actions as "enabling actions" in the next chapter of the findings (chapter 7) as they seemed highly relevant in enabling changes in the user expectating process.

6.10 AN INVESTIGATION INTO WHAT CONSTITUTES EMS WORK

The case context somewhat gives an idea of the overall tendencies of the users for the motivation of the EAR and how the pilot implementation progressed over the three iterations. The progress of the pilot implementation was clearly an influence on the users' expectations since several actions were taken that all played a role in what the users believed to come next. In this section I take a step down in an attempt to answer the part of sub-research question 2 that revolves around the actual work context of EMS (*"How does the specific work context influence the user expectations that exist prior to an ISD project?"*) on a practical and work-related level in order to lay the ground for exploring where the specific directions of expectations were aimed in the next chapter of the findings. In order to do this, I argue that we need a thorough understanding of how users worked first and as a result an answer to the specificities of how EMS work *works*.

The purpose of this section is to show that fulfilling the *core mission* (Jensen, 2007) of EMS work makes the EMS crewmembers feel like they have gained value and satisfaction. Fulfilling the core mission is first of all defined when EMS crewmembers have taken actions on and with the patient that has resulted in overall ensuring that the patients have been given the possibility to gain the best treatment further on in their trajectory in the health care network. Second of all EMS crewmembers feel that their core mission is fulfilled when they have managed to balance the many types of work with and on the patient well enough to also feel they have made a difference.

As already explained in section 11, p. 73 and shown in figure 11, p. 73 EMS work *seems* rather straightforward. An emergency is called in, an ambulance is dispatched to the emergency address, and the ambulance brings back the patient to the hospital. However, as with most work, the *ostensive* aspects are fairly understandable because they are abstracted to a level of comprehension. It is the *performative* aspects of work that truly can create insights into works as it is actually done (Novak et al., 2012). Much like clinical work taking place at the hospital, EMS work relies on a combination of situated practices, how the EMS crewmembers handle situations depending on their competence, prior experience as well as their specific expertise level. Furthermore the EMS crewmembers also rely on a broad range of input and output

by communicating with the dispatch center and also physicians and other clinical staff at the receiving hospital ward (usually the ED), not to mention communicating with the patient.

6.10.1 *EMS caretaker relations with the patient*

As a result of being the sole caretaker of the patient in the ambulance, the EMS crewmembers develop a very intimate relationship with the patient in the short time that they are together. This relationship is exemplified in the following excerpt taken from a dispatch where a lady fell inside a supermarket, badly hurting her knee. It took the primary EMS caretaker several attempts at relieving her pain during the dispatch, beginning with laughter gas and eventually having to use a strong morphine-based pain reliever:

> *"When the handover is done and responsibility thus formally moved to the new primary caretaker, the ED nurse in particular, the EMS crewmember would turn his attention to the patient once again and carefully say goodbye using the patient's name. The patient then looks at the EMS crewmember while stretching out her hand. When the crewmember grabs her hand, the patient utters with a tear in her eye:* "thank you so much"*. I am quite astonished by the level of care and intimacy that has emerged between the primary EMS caretaker and the patient in this very short and intense duration of time during the dispatch.*
> *The EMS crewmember tells me afterwards that it is very important to him to show extra care for the patients by finishing the dispatch with a proper goodbye. This is why the EMS crewmembers follow the patients all the way to their designated wards and make them ready for handover there."*
> - Excerpt from ethnographical notes

The relationship is unique compared to health care work performed for example at a hospital. At hospital wards it is usually only intensive care units where there is the same one-to-one relation between caretakers and patients. At any other ward at a hospital, one clinician (nurse or doctor) will often be designated as responsible for the well-being of the patient, denoted as the *primary caretaker* making sure that the patient is taken care of by other health care personnel depending on the symptoms. However, this particular clinician will also often have many other patients simultaneously that he or she will have to keep an eye out for. In contrast the relation between patient and EMS crewmembers is a one-to-one relationship. Despite the fact that two EMS crewmembers usually make up the crew on an ambulance, only one of the crewmembers is designated as the primary caretaker who will sit in the back of the ambulance while the other makes sure they arrive safely at their destination. For the average patient, being trans-

ported in the ambulance is perhaps the only time during the patient trajectory where one single individual is solely responsible for the patient without also having to take care of other patients.

6.10.2 *Core mission of EMS work*

The point of being solely focused on one patient is important because this structure and the ensuing actions also shape the EMS crewmembers' enactment of what the core mission of EMS work really is. I will draw on the concept of clinical work as having a "core mission" as described by Jensen (2007). In her disseration, Jensen (2007) defines the core mission of clinical personnel as values relating to how they define their work. These values are often based around the belief that the clinical work practice should serve the patients' best interests and that any changes to work practice should improve the treatment of patients (Jensen, 2007, p. 106).

The core mission of EMS work is essentially a logical extension of the same belief with the contextual surroundings of the purpose of what the EMS crewmembers do: transporting patients from A to B. During this transportation though, the EMS crewmembers are given a set of tools and equipment as well as education to do whatever is in their power to heighten the quality of treating the patients. Like in regular health care work, the education, competencies, tools and equipment all enhance the "arc" of work actions that the EMS crewmembers can take in order to finish their part of the patient trajectory (a patient trajectory denotes the process of engaging the patient and finish the patient by leaving him/her in others' hands). The arc of work-related actions to choose from contains four types of work: machine work, comfort work, sentimental work and articulation work (Strauss et al., 1997). Machine work denotes actions taken using medical equipment and other machines. Comfort work relieves patients of discomfort, often brough upon by other types of work. Sentimental work revolves around the mental well-being of the patient, and articulation work involves coordinating the present or future patient trajectory with other clinical actors. A fifth type of work has further been proposed to revolve around the four types of work and is specifically applicable for EMS crewmembers: providing the right balance to the other work types in order to give the best treatment of the patient (Pedersen et al., 2011). The balance work here is meant as an extra amount of cognitive energy that the responsible EMS crewmember in charge of the patient continuously must take into consideration because he/she is the sole caretaker of the patient and has to perform the correct type of at the right time to obtain the core mission.

Berg (1999) further denotes clinical work to revolve around the patient in a network of other actors that all depend on work products

and articulation. The EMS work being done with the patient can be viewed often as a small part of this network, often where the patient trajectory begins in the first place. However, EMS work is special in the sense that patients rarely return to the EMS crewmembers again for further assistance with clinical services as is often the case at hospital where patients can be moved from ward to ward in order to unravel symptoms and coordinate a longer, planned trajectory. This means that within the trajectory of EMS work, the limited actions that can be taken are also compressed into a short duration of time. In this time interval, the primary EMS caretaker needs to unravel as much information as possible from the patient (articulation work), provide a hypothetical work diagnosis based on the symptoms (using his experience and competencies), make sure that the patient is calm enough for treatment in the ambulance and at the ED (sentimental work), treat the symptoms with whatever tools are available (machine work, comfort work), and finally document everything that goes on in the ambulance and hand all this information over verbally and in writing (articulation work). As such the personal performance indicators of EMS crewmembers are often personal values and feelings that emerge within the EMS caretaker/patient relationship since the life of the patient is literally in the hands of the EMS crewmembers. The following excerpt is taken two weeks into the pilot implementation. The ambulance was dispatched to a young man who had fallen on his scooter and had broken his lower right arm. After the dispatch the caretaker paramedic explained why he enjoyed the dispatch despite the fact that he was using the EAR unit as a documentation tool:

> *"When we arrive back at the station the paramedic "Randall" mentions that it was a really good dispatch. I ask why and he answers that he was satisfied overall because he felt that he made a difference for the patient, since "Randall" managed to treat the patient by relieving his pain. Furthermore he mentions that he made really good use of most of his tools, both scissors for cutting up the wrecked scooter clothes, medicine, IV and the defibrillator to measure the vital parameters. "Randall" also managed to document with the EAR unit while taking care of the patient."*
> - Excerpt from ethnographical notes

In the excerpt the distance to the hospital and the non-acuteness of the dispatch made it possible for paramedic "Randall" to get started on the documentation ahead of time. With these surrounding factors, he grounded his satisfaction in the fact that he managed to draw on the whole arc of work actions available while at the same time balancing them all with the patient trajectory. This made him feel he made a difference for that particular patient.

6.10.3 *Logistical process of ambulance work*

An additional aspect that EMS crewmembers must be aware of in their work is navigating within the logistical process of transporting and handling patients. This type of navigation requires a large degree of *logistical awareness*. The idea of having distributed awareness is closely related to what the CSCW literature denotes as *awareness* of the work situation and the surroundings (Artman and Garbis, 1998; Blandford and Wong, 2004; Hayashi et al., 1999; Kuziemsky and Varpio, 2011; Randell et al., 2010; Schmidt, 2002). Giving a proper definition and review of this literature is out of scope for this dissertation but suffice it to say that the concept of awareness denotes actors taking actions in a work environment with others in order to gain an overview of the present situation, making it possible to take actions that seem to solve the apparent problems at hand. In the instance of EMS, the logistical awareness makes the EMS crewmembers able to anticipate the possibilities of hospital destinations a patient can or should be transported to before receiving a formal destination from technical personnel at the dispatch center, thus saving them precious time if they can anticipate the destination as early as possible. The awareness also aids crewmembers in knowing the general coverage in their designated area which creates the notion of whether or not they need to hurry the patient handover in order to move to the next urgent dispatch.

The disturbance of the EAR in terms of the time it took for the single paramedics to fill out the documentation using the EAR units was for instance such an impacting factor that the users themselves knew that they became a bottleneck for the entire day-to-day operations:

> *"[...] you are approximately aware what vehicles you have in the area and you just knew that you would be busy for 45 minutes after finishing the dispatch. You can of course just drop it but then you just had to reconstruct everything afterwards and you seriously want to finish the rotten EAR before you are dispatched again because otherwise you just have to finish it even later."*
> - Paramedic "Karlyle"

The importance of logistical awareness should not be taken lightly. In the instance of the EAR pilot implementation many of the users had very negative experiences with being locked into using the EAR since they could no longer gain a proper overview of how busy they were and they felt impeded by the fact that they could not simply prioritise new level 1 dispatches and postpone less important patient documentation to after the next urgent dispatch was finished:

> *"We are paid for either 10 or 14 minutes and then the trap is sprung and we have to perform the handover of the patient, repack our vehicle and reestablish so we are operational again. And of course with the*

> *EAR unit then I will be sitting in my chair. Goodnight and I shut off for at least half an hour and [my colleague] then needs to run around mopping the floor, change the sheets and do all of that stuff that we usually do both of us. So of course if we are on a dispatch with a trauma patient with a spineboard and there's a lot to do, [...] blood and washing and then this powerlessness because then the dispatch centre calls us because we have a limited amount of ambulances available:* "When are you free, we have another dispatch waiting, it's a serious level one" *for example. [...] Of course they want some kind of status update on if they can count on us within relatively short time or if they have to dispatch an ambulance twenty kilometres away."*
> - Paramedic "Thomas"

In the above mentioned quote, "Thomas" describes how the interdependence on the technical personnel at the dispatch centre automatically increased his awareness of how busy he was himself. Furthermore the prior quotes are examples of clashes between ostensive and performative routines. While the ostensive routine for EMS crewmembers is to deliver written documentation for all patients that are handed over, sometimes they deliberately choose to wait with the documentation in order to prioritise more important dispatches. This means that the understanding of their core mission values (helping more patients) becomes a performative practice that takes priority and in certain cases simply overrides the ostensive routines.

On a lower level, logistical awareness is linked to the practicality of actions that need to be taken with the medical equipment that the EMS crewmembers relied on. Since the EMS crewmembers are dependent on a large variety of machine work in order to safely treat the patients and the patient assessment always begins on the emergency address before any attempt is made to move the patient (except for highly acute emergencies), the equipment needs to be transported and handled in a very sequential manner according to each specific patient emergency.

> *"When I started here we just brought the patient to the hospital. Now we run up [to the second floor], bring the patient down, then up again for our stuff and then we can depart for the hospital."*
> - Paramedic "Jones"

The list of medical equipment consists of the following:

- Defibrillator
- Medicine bag
- Stretcher
- Ambulance record/EAR
- Autopulse (revival and assistance equipment for Cardiopulmonary Resuscitation (CPR))

- Spineboard (for strapping down patients with back injuries or other physical traumas)
- Oxygen container

The equipment is combined and brought in accordance with what the dispatch report says upon dispatch and in accordance to what the EMS crewmembers assess the patient situation to be upon arrival at the emergency address. For example, spineboards are usually only used for patients with traumas or back injuries, while the autopulse is usually used by paramedics in the emergency SUVs since they need as much help providing CPR as possible. Nevertheless, the sequence of carrying medical equipment consists of running back and forth, with a minimum of equipment for the initial assessment (consisting of defibrillator, medicine bag and a stretcher) and then more equipment is brought if deemed necessary. Obviously, when the EAR units were implemented, the usual process of bringing equipment was disturbed quite a bit, and the EMS crewmembers needed to adapt to carrying the additional piece of equipment:

> *"And then you have the issue that [the EAR unit] was a millstone around our necks:* "Now where do we put it? Ok, we'll just put it on your stomach if that is ok?" *When I think of that darn electronic ambulance record I just don't know how we can solve the issue that no matter what, we'll be given a piece of equipment we have to lug around. That is constantly a limitation for us in the EMS area. That there are limits to how much we can carry!"*
> - Paramedic "Karlyle"

6.10.4 *Process and product of documentation*

In this section I will show how the documentation fulfills several roles in the ostensive routines and performative practices of EMS work, both as a process and as a product. As a product, the documentation shows an ostensive picture of what kinds of work the EMS crewmembers have performed on the patients, and can be seen both as a product that makes the EMS crewmembers very vulnerable but also as a product that embodies their professionalism. As a process, the documentation is a type of articulation work that needs to be balanced during a dispatch. If the EMS crewmembers are able to document important information regarding the patient during the dispatch; so much the better (i.e. the example of fulfilling their core mission in section 6.10.2, p. 95).

The importance of the documentation as a process, though, should also be seen in the light of what it represents to the EMS crewmembers as a product. In order to understand the documentation as a product, it is important to note that the primary attributes are those of being asynchronously as well as synchronously used as an information

sharing product, during and after handover of the patient. The more thorough the documentation product is, the more the crewmembers feel confident that future questions that may arise will be looked up in the ambulance documentation by the clinical personnel at the EDs. Upon patient handover, both EMS crewmembers and ED personnel will skim the vital parameters and mutually agree on what happened during the dispatch in a synchronous information sharing activity. This further influences the confidence of the EMS crewmembers that the patient is in good hands. As such the synchronous action of handing over the patient with the documentation as well, further enables asynchronous information sharing between the ED personnel because of the common knowledge established between the caretakers:

> *"I believe that the ambulance record is important for the ED personnel, especially when their shifts end. You might hand over the patient to a nurse but if she is on her way home and her thoughts are everywhere else, which I greatly sympathise with by the way, and she is out the door and does not hand over the documentation, I am gone and on my way and they cannot reach me, the situation of the patient might worsen and then they only have the ambulance record as a source. [...] The primary purpose is to keep a somewhat sensible overview on the ambulance record so it can be used further up the system."*
> - Paramedic "Jack"

The actions of information sharing using the documentation thus strongly relate to the core mission of EMS: to make sure that actions are taken to enhance the patient trajectory in a positive manner.

The documentation is also considered as a proof of the work that has been done and as a proof of work quality. It is very common for the EMS crewmembers to have their documentation reviewed by a superior, either a manager or a supervisor, who then gives feedback on what needs to be done better. This is possible because a common conception of the documentation is that what is not written in the documentation has not happened, even though in reality the EMS crewmembers did take those actions in the ambulance. This reverberates back to the idea that the more thoroughly an ambulance record can be written, the better the chances are for the next caretakers to take proper actions regarding the patient trajectory. However, due to time and space constraints it is ultimately impossible for the EMS crewmembers to perform a "perfect" ambulance record where nigh everything is documented.

Many EMS crewmembers assist each other at the time of dispatch with the crewmember not driving starting up the ambulance record. On arrival at the emergency address, the assisting crewmember will then document the treatment that the primary EMS caretaker is performing in addition to save time. However, for a paramedic who is dispatched in the emergency SUV this type of assistive coordination

is not possible because the paramedic will arrive at the patient alone. As a result, when the paramedic arrives at the patient, he/she has to assess the patient basically with their hands full until the secondary ambulance arrives. When the secondary ambulance arrives and the paramedic chooses to handover the patient, they then need to write the documentation of the treatment so far as quickly as possible in order to give the secondary EMS crew a proper written handover with treatment given and vital parameters measured so far. Essentially the completeness of the documentation always revolves around the compromise of the time that is available. EMS crewmembers only have 14 minutes to hand over the patients at the ED before they are free for accepting new dispatches[5]. They also have to take into consideration the amount of time they spend on writing documentation and handing their patients over to the new ambulance crew, since it is also viewed as a breach on their core mission to simply keep the patient waiting for the administrative work to be done. On the other hand, the documentation needs to be good enough to fulfill the other aspect of the core mission: making sure that other caretakers can get an immediate answer when they have questions regarding earlier treatment. When the EAR was implemented, the paramedics experienced that this problem became even worse:

> *"We got the printers into the vehicles but if we finished the documentation and thought that the secondary ambulance could transport the patient themselves without my help in the ambulance then in principle I had to write the whole ambulance record and print it out and sometimes the consequence of this was that the ambulance crew had to wait longer before they could get the ambulance record from us."*
> - Paramedic "Karl"

One paramedic uttered that he would love to have the possibility of writing a "good looking" ambulance record when the new EAR came because he expected the EAR unit to take care of much of the manual labour of copying vital parameters and basic info. As a result, he would be able to provide more thorough information about the context of the patient. Another paramedic always attempted to document some of the contextual and ungeneralisable details of the patients:

> *"I always try to write that [the patient] has been found on the floor and he probably did not receive any help for maybe two days. [...] That kind of undefinable information that might not have any significance but maybe it does. Especially that kind of information that [the ED personnel] do not have any chance of receiving because they are not*

5 The timelimit is based on the contractual relationship where the Region only pays for up to 14 minutes of the dispatch upon arrival at the ED. From there on the EMS operators need to make sure they have the crews ready again in order to provide the coverage promised in the contract.

> *on the front lines so to speak. They merely receive a patient at the ward and then they take it from there."*
> - Paramedic "Karlyle"

It seems to be no wonder why especially paramedics in EMS SUVs were motivated and looked forward to a new tool that hopefully could save them from having to compromise their documentation practices as it would actually hurt their core mission.

The documentation also served as an assistive memory tool in case complaints were filed against the EMS crewmembers. From time to time, patients or their family will file complaints about the treatment and as a precaution for this the EMS crewmembers are legally bound to hold a private copy of the ambulance records for up to five years. The problem with complaints are that they always originate from completely unpredictable dispatches and are difficult to anticipate:

> *"It's often some very weird stuff and never someone you have argued with, even those times where you do an extra effort in documenting this very dispatch because it seems likely, no. Those who receive complaints never imagine that it was that specific dispatch."*
> - Paramedic "Karlyle"

The amount of dispatches performed on a regular day shift (around 8-12) quickly adds up and it can become very difficult for the EMS crewmembers to respond to complaints straight away. As such it is also important to them to write some contextual information about the dispatch to assist their memory. Reading the date, time, vital parameters and basic patient info is simply not enough. Despite the fact that the EMS crewmembers explicitly claim that they primarily document for the sake of the patient, it is equally done to protect themselves for unjust complaints. When the EAR came, the EMS crewmembers became uncertain on whether or not they were able to retrieve their electronic records since they were saved to the cloud. As a result, many of the EMS crewmembers would work around to gain some security back by carrying a pen and paper in addition to the EAR so they could jot down important information on the spot. Some would even fill out the paper-based record first and then copy all the information into the EAR at the end of the dispatch (with the obvious result that this greatly increased the overall time to finish the documentation):

> *"Many of my colleagues would fill out paper-based ambulance records in the beginning because it was a safe method, and then they would fill out the electronic one afterwards. That's what some chose to do but if you think about it and you would end up being formally accused and you have two ambulance records on one patient, that's not really a good thing now is it? So safety and comfort through procedures are essential to us because we want to do stuff the correct way."*
> - Paramedic "Thomas"

Despite wanting to "do stuff the right way", when the EAR was implemented there was no right way in many of the cases and this ultimately became a prioritisation that the crewmember had to make between security and the prospect of potential complaints.

6.10.5 *Summary of EMS work*

In this section I have addressed the sub-research question of what constitutes EMS work in order to further shed light on the sub-research question of how the specific work context influenced the expectations in an ISD project in the next chapter. Drawing on the division of work types in medical work from Strauss et al. (1997), I have found that EMS work distinguishes itself from other kinds of healthcare areas in that the patient trajectories are shorter and more intense and that three important factors constitute EMS work: making a difference, balancing work types, and being able to anticipate future events, e.g. through logistical awareness. All constituents support the core mission of EMS work as the core mission focuses on whether or not actions have been taken to aid the patients in their trajectory through the healthcare sector. The core mission also relates to balancing work types between machine work, sentimental work, comfort work and articulation work performed on and with the patient. Furthermore the logistical awareness of the location of the patient and the locations of other EMS crews played an important part in EMS work in particular. These three factors all related to the satisfaction that the EMS crewmembers felt with their overall work performance. As a result, expectations regarding new electronic equipment were also directed at the outcomes of EMS work and to fulfilling their core mission, balance the work types and provide logistical awareness to the EMS crewmembers.

Discovery is not just perceiving something new, but perceiving what it means.

— Robert S. Root-Bernstein (Root-Bernstein, 1989, p. 66)

7 FINDINGS

The following chapter is divided into several sections. In the first section I will explore sub-research question 2 ("How does the specific work context influence the user expectations that exist prior to an ISD project?"*) by showing how users in the pilot implementation drew on the narratives containing technological awareness. In the following sections I will explore sub-research questions 3 (*"How do actions taken influence user expectations in an ISD project?"*) and 4 (*"How do user expectations influence the actions taken in an ISD project?"*) by categorising the overall* enabling actions *containing "announcing", "experiencing" and "giving feedback" that would enable users to recharacterise their expectations into "will", "want", "should", "must" and "hope".*

7.1 ORIGINS AND EMERGENCE OF DESIRES

Let me first start out with explaining the origins of the expectations and from where they emerged[1]. As I explained in chapter 4, p. 21 the directions relating to technology of expectations in IS projects are often influenced by narratives of technological awareness which I will draw on for this part of the findings. I will present two types of technological awareness narratives that the EMS crewmembers drew on: The first type of narrative stemmed from reflections of their own experienced work practice that resulted in an awareness of where technology had the potential to plug problematic holes in the routines. The second type of narrative stemmed from stories of other, similar EAR ISs that were well-known to the users. Both of these types of narratives of technological awareness were used as stories of what the users would expect of the future EAR pilot implementation.

7.1.1 *Experience of issues in ostensive routines*

Knowing the possibilities of computers and electronic equipment made it possible for the EMS crewmembers to begin a reflection process

1 Take note here that I am aware that the word "origins" is a bit controversial, so let me strictly say that it is used only as a logical point of departure in time to denote expectations that the users would explain they had before the pilot implementation began, and not as the actual source or actual point in time where expectations began.

about their own work procedures, understood as the abstract, ostensive routines that they had to follow and compared to actual, performative practice through firsthand experience. These reflections were characterized by a high level of individual and social reflections on practice through first-hand experience with the problems or issues that needed improving. This type of knowledge would mainly be used as directions of expectations leading to a more abstract outcome; for example that certain automated actions would create speedier handovers to the ED. In this section I will show examples from practice that explicate the users' specific desires toward change, and in turn, created a high motivation for the EAR product.

The fact that the idea of having electronic ambulance records in the ambulance was more than 10 years old had already shaped much of the users' collective perceptions of how electronic equipment could improve their work practice. This created wishful thinking that "if only this part of my work was electronic or I had the aid of a computer" where the users would reflect on how their performative practices differed from their designated ostensive routines. This was exemplified in the following excerpt from my ethnographic notes after a morning dispatch in early January 2011 shortly after the EAR pilot implementation had been announced:

> *"As we arrive at the station after a MORS patient[2] the paramedic leaves me in the common area to retrieve an additional set of papers similar to those he had just filled out. The paramedic hands me the set and explains that all EMS crewmembers are legally required to fill out an extra copy after they have treated any patient suffering from a heart attack.*
> *One of the paper copies is for the Danish Heart Attack Index (DHAI). He is required to copy the existing basic patient data from the ambulance record into new forms, as well as writing the whole history of vital parameters an additional time. He also needs to print out extra copies of the vitals from the defibrillator because it holds all the cardiological relevant information from arrival at the emergency address until the patient is handed over to the ED. He explains that these papers are a real hassle and take up a lot of time because the EMS crewmembers are to copy a lot of redundant information. In the case of our last dispatch the patient had been declared dead and as a result the documentation procedure was even more comprehensive because the responsible paramedic would need to procure signatures and names from the physicians that had received the patient at the ED. This was a requirement from the EMS crews' standard operating procedures in order to correctly ascertain that the correct procedures had been followed. However, it could take as much as 15 minutes after*

2 A MORS patient is a patient found with signs of being dead and later declared dead by a physician.

> *arrival at the ED! It becomes clear to me that the paramedics rather saw all of these extra copies of redundant information completely gone and instead integrated directly into the ambulance record so they can save time on gathering names, signatures and extra copies for their own record keeping afterwards."*
> - Excerpt from ethnographical notes taken after first dispatch 9.00 AM, January 4th, 2011.

These comprehensive documentation procedures obviously caused paramedics to dread the aftermath of their work when encountering heart patients, not only because of the stakes concerning the patient's life, but also because the paramedics would be caught afterwards at the ED for up to 15 minutes to catch up on documentation work that they needed to fill out. Recalling my earlier points of the core mission in EMS work (see section 6.10, p. 93) this would be problematic essentially because additional time spent at the ED would refrain the paramedics from being available to the public for additional help. EMS managers were obviously not too happy about this as well because they had contractual obligations to not spent more than 15 minutes at the ED upon arrival with the patient, and in these MORS instances 15 minutes could easily be spent on filling out documentation and tracking down clinicians alone!

In the above mentioned excerpt we see how the reflection and awareness of the existing tools and work procedures in the ambulance are characterised as "want" expectations when the ambulance records would eventually be digitalised. The desire was to make their shortcomings of work procedures more efficient. The very action of reflecting on work practice and explaining about the desires of users to me (essentially an action of feedback in itself) kindled hope in the paramedic that the work procedure issues could be taken care of. Believing these issues to be likely candidates for changing their work practice for the better, the EAR was a welcome change:

> *"I actually believe that everybody by default kind of welcomes initiatives like [the EAR]."*
> - Paramedic "Karlyle"

7.1.2 *Abstract rumours and stories from elsewhere*

Even more powerful than the stories of firsthand experience were the rumours and collective stories of similar technology in the EMS sector in Denmark. This type of technological awareness narrative was mainly characterized by a high degree of abstract knowledge about the IS based on other crewmembers' stories and what the users had only read about. This resulted in less specific suggestions for improving current work procedures. Instead these stories would represent

a more general solution to problems and focus on the personal and professional outcomes of using the ISs. The stories were used to exemplify and underline the fact that such technological strivings were actually realistic desires to pursue.

One such story of EAR awareness came from the experience of an earlier attempt of digitalising the paper-based ambulance records that had been performed in Denmark 5-8 years earlier[3]. The attempt had not ended well and the users participating in it had turned out negative towards the project. However, it had the effect that the users became aware that it would only be a matter of time until a second attempt was made.

The second attempt came in 2005 and was considered highly successful. The primary EMS operator in Region Northern Jutland had in collaboration with an independent software developer and the emergency departments developed an EAR IS called "amPHI"[4]. The amPHI was considered to be a technology rich on features such as full integration with the EMS dispatch software, EMS dataradios, the defibrillator and even with monitors at all the EDs in the Region of Northern Jutland. As such the scope of the amPHI was so broad that it also included end-users in the shape of ED clinical personnel and healthcare personnel at the EMS dispatch centre. The amPHI IS had also initially been planned and executed as a pilot implementation where additional features continuously had been added to the technology in a continuous process as the end-users slowly became more proficient using the technology.

Seeing as the EMS sector is quite small in Denmark, the amPHI system had had several years to surround itself with rumours and stories of its usefulness. The story of the success was overwhelming and supposedly hailed in "the future" of the modern Danish EMS sector:

> *"Northern Jutland has been using an EAR for 10 years now, so ever since they began it was rumoured that this was the future."*
> - Paramedic "Jones"

The rumours of the capabilities and success of the system originated from a wide range of sources: some EMS crewmembers had tried using it during their education in the Region of Northern Jutland, and a select few had experiences with it from earlier in their careers. Several users from Region Zealand also stated that they had mostly read about amPHI through articles published in the specific EMS news

3 Actual date unknown.

4 The name is short for *am*bulance *P*re*H*ospital *I*ntervention. The project was sponsored by "Det Digitale Nordjylland" and developed in collaboration between Region Northern Jutland, Falck A/S and Judex A/S (Judex, 2013).

magazines as well as online resources available to all EMS crewmembers in Denmark[5]:

> *"[...] what we had heard from Northern Jutland, what we had read in our periodicals about how they had run the process and how happy they had become with the amPHI up there."*
> - Paramedic "Thomas"

The notion of rumours and second and abstract knowledge of the amPHI was especially dominant:

> *"The amPHI from what I have heard, I don't have any practical experiences with it, but it works impeccably. They also had some problems in the start-up phase until they kind of had accustomed themselves to it, and in the present situation, from what I have heard, if a unit is not operational in Northern Jutland, it's almost the same as if the ambulance is not operational. They are depending so much on [the amPHI] that the ambulance almost can't run without it [...]"*
> - Paramedic "Thomas"

In the above quotes, the user "Thomas" describes the story of the amPHI not only as a product with a high success rate, but also as a project process of importance. What becomes important is not that they were dependent on the amPHI, but that the crewmembers would ascribe such an amount of significance to a single piece of electronic equipment. It is especially interesting because the ambulance record is not an essential part of the medical treatment of the patient and will always be under-prioritised for the benefit of the patient. In the case of the amPHI though, the EMS crews simply ascribe so much dependence to the electronic records that they do not want to work at all without it, making them depend entirely on its succesful operation for completing the EMS work as a whole!

The above-mentioned narrative fragmens were clearly stories of desires and how technological awareness majorly influenced characterising the amPHI or a similar EAR IS with "want" characteristics. In the case of user "Thomas" , the directions of these "want" expectations were desires for the same dependence on the coming EAR as with the regular EMS equipment. Such an outcome would be indicative of a very good IS and make for a strong satisfaction with the EMS work performed. The story also played an important role in showing what was technologically possible and thus talking about the amPHI as a proof-of-concept technology that the pilot implementation EAR as a product and a process would be compared to.

In figure 18, p. 110 I have illustrated how the narratives of technological awareness between the EMS crewmembers, to the researchers

5 A paramedic would state in one interview that he would learn of most of the rumours regarding deadlines and political decisions of the EAR at "www.beredskabsinfo.dk", a news portal focused on the EMS sector in all of Denmark.

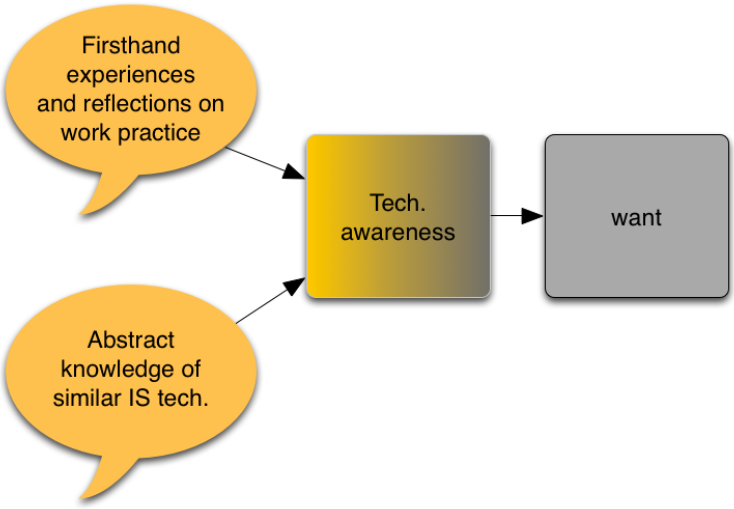

Figure 18: Figure of the stories that influenced the technological awareness and the "want" characteristics understood as the desires of the users. Arrows indicate directions of influences while speech bubbles denoted stories of technological awareness.

and to the EMS managers would reinforce the direction of their expectations and these characterisations as "want" towards the future EAR IS. The colours move from vivid orange to grey in order to convey that the characterisations of "want" expectations become more solidified by enacting the narratives through storites of technological awareness.

7.2 ENABLING ACTIONS

Throughout the project process, the users would provide examples of actions taken that they would connect with how they changed their characterisations of their expectations[6]. Since the actions taken were narrated in way so they were considered to cause characteristics of expectations to change I have labelled them "enabling actions". I will thus draw on the three enabling actions that I uncovered from the case description in chapter 6.9, p. 92 of "announcing", "experiencing" and "giving feedback".

Due to the hierarchical structure of the project organisation, most changes and updates provided through announcements from the steering committee were then interpreted by the users. The consequences experienced by the users and feedback were then fed back to the closest actor (often the EMS managers or superusers). One example of this could be the formal announcement of the sceduled dates of the pilot implementation. Prehospital management would announce a date

6 These actions would be perceived as causes for why their expectations changed characterisations and would be narrated as such. Causality here is thus only a logical denominator as it was entirely up to the users to make individual sense of it.

via email to the EMS crews that then would influence users' expectations directed at what would happen and when it would happen. When the date came and nothing happened, the users would then react to this lack of complying with the schedule between themselves, even providing a snide remark to their closest EMS manager. When a new date was formally announced that would also not be abided by, this would warrant further snide remarks as feedback among the users, all fueling and changing the characteristics of the users' expectations. As a result, the enabling actions taken in the pilot implementation process could be viewed in an iterative sequence that the users would react to throughout the project. Reactions were primarily given through feedback, either to the EMS management or between the users while discussing the issues and experiences among themselves.

Some actions were taken by the crewmembers, others by the EMS and prehospital management, other actions were only mentioned implicitly but could be interpreted as who did what between the lines. Actions with implicit actors often occurred when the users experienced changes to the EAR units or events in the pilot implementation process. An example of the changes to the setup of the EAR could be when the faster printers were implemented during the second iteration, yet after having experienced this change the users would shortly afterwards provide feedback that they would prefer wireless printing or even better; integration with the ED that had yet to be developed and was out of scope of the pilot implementation. Another example came from when the integration between the EAR and the defibrillator had (finally) been implemented, yet the users were not satisfied with the speed of transfering information and thus directed their expectations toward new aspects of this integration instead. An example of the process events could be from when the prehospital management let the superusers know that they were supposed to teach other users how to use the EAR, yet both superusers and users afterwards much preferred an organisation-wide training mandatory course for all users.

The central focal point was not the changes themselves but instead how the users would normatively assess how well actions had been performed and how to improve on the actions and on the EAR itself.

One example that actually included all three types of enabling actions is the following explanation of how the second iteration went:

> *"When we said:* "it can't do this and this"*, they just said:* "it will come, it will come. Just use it and it will come soon and it will work." *[...] Our frustrations were kind of culled by knowing that it would get better very soon so we shouldn't worry about that. [...] But it then turned out that it wasn't that simple to make [the integration] work etc."*
> - Paramedic "Karlyle"

In the quote all enabling actions are in a sense included and described in a sequence. The sequence begins with the users providing feedback by inquiring their EMS managers for what the users "want" of functionality to make the EAR work better. The desired functionality had at this point been reinforced by the users having tried the EAR in real practice, thus enacting a technological awareness narratives based on firsthand experiences and reflections. Based on the feedback given to the EMS management, the EMS managers would then announce to the users that the desired functionality would come eventually as long as the users kept using the EAR, further holding down their frustrations. Then the users would further inquire (probably from desperation at this point) about the desired functionality and the planned schedule for updates again, this time receiving the announcement that it was more difficult to carry out than first anticipated. In this sequence we see several iterations of enabling actions that would potentially change how the users characterised their expectations. I have denoted each enabling action with a letter to show the sequential order: feedback (F) based on the technology in use, announcing (A) to the users to wait and keep using the system, making the users await the functionality through continuous use and experiencing (E) the technology in use, the users further inquiring (F) about the status of the updates, and eventually the EMS management announcing (A) that the planned functionality now would be delayed further. Figure 19, p. 112 and 20, p. 113 respectively show examples of how the iterative sequence of the enabling actions described above could occur in the pilot implementation.

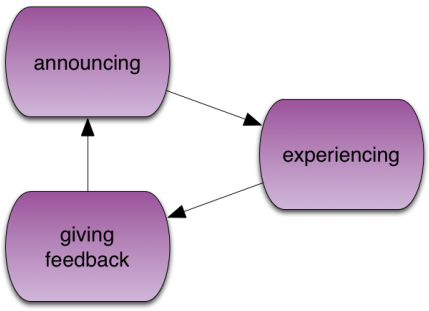

Figure 19: Figure of the sequential and iterative nature of the overall enabling actions.

The following sections are structured according to the above-mentioned three enabling actions: announcing, experiencing, and giving feedback. I will present each action as an isolated section and focus on the changing characterisations of expectations based on this particular action. In reality though, many actions of announcing, experiencing and giving feedback took place within each iteration of the EAR pilot implementation. However, I have chosen to present these actions thematically rather than chronologically because: a) chronolog-

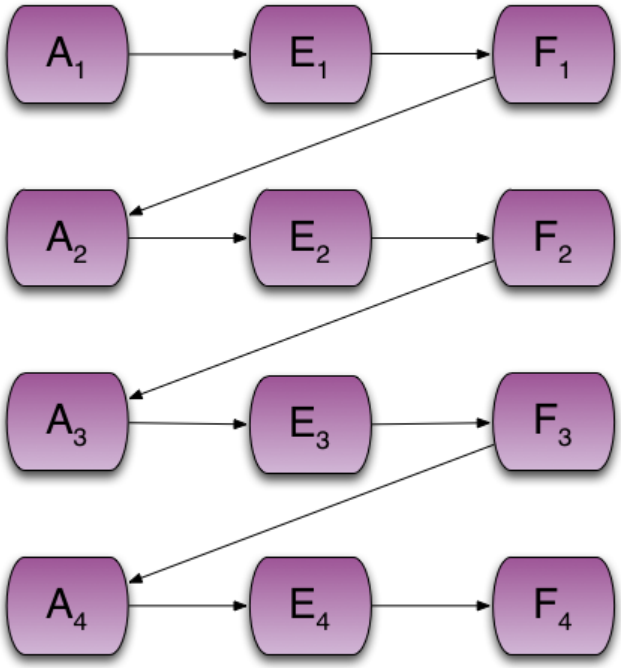

Figure 20: Figure of how enabling actions would be chronologically sequenced within the iterations of the pilot implementation.

ical tales of such complex events tend to be either boring (especially when not much is happening or the theoretical focus is very strict) or very confusing (when a lot happens simultaneously or the theoretical focus is very broad); and b) the direction of the expectations could not easily be traced. For example, new patterns of directions of expectations would emerge from experiencing the product and process in both the second and third iteration, while other directions of expectations presented early in the project would not be mentioned again later on[7].

As far as it is possible I will present each section of enabling actions with narrative fragments that take place in a chronological order from the first iteration, second iteration and third iteration, and I will take special heed to explicitly denoting when and where in the process the narrative fragments take place.

7.3 ANNOUNCING PROJECT UPDATES

Information to the users was highly reliant on a designated chain of command due to the formal structure and hierarchy[8]. Seeing that the

7 Instead of trying to cover all these directions (which I clearly cannot due to empirical and methodological limitations) I will leave this up for further research, since many interesting research questions emerge from this.

8 I deliberately use the preposition "to" here since users were not very involved in the beginning of the project. As mentioned in the case study chapter 6, p. 69, this was

Region owned the project, they were also responsible for any information that needed to be given to the participants of the project, usually mediated to EMS managers who would communicate the information to the users. Obviously this made it difficult to engage in discussions as well as clearing up misunderstandings quickly as the information took an additional day to get back to prehospital management before the EMS managers could address issues on the next formal morning meeting with the EMS crews.

This did not mean, however, that informal communication did not take place, since users needed some alternate source of information of what was going on. This source came from the prehospital centre where many of the EMS crewmembers worked part time. As a result, rumours spread fast this way since the EMS crewmembers working at the prehospital centre would keep tabs on what went on, though rarely the information was 100% reliable.

The EMS operators and their crews relied on two sources of information: Informal communication that EMS crewmembers who worked at the prehospital center would mediate early on and during the project as continuous updates. This mediation was considered to be an uncertain and unreliable source but would nevertheless often precede actual formal announcements made from the prehospital center. The second type of information was formal announcements that were sent from prehospital management through emails and, considered important enough, the information was then addressed by the EMS managers on their daily morning meetings with the EMS crewmembers. Formal announcements could be information about official dates for launching and pausing the EAR, while the less important announcements such as new regulations and changes of work procedures were simply forwarded to the EMS crews' respective email addresses in the hopes that enough users would read it and informal communication between the users would take care of the rest. Announcements of less formal importance could be presentations given of the system, or simply clarifications of the scope of the EAR.

In this section I will show how announcements would be the enabling actions for how users recharacterised their expectations between "want", "will" and "hope". I will show that the users would compare the content of the announcements with their existing "want" expectations and if they matched, the users would in certain cases change their characterisations from "want" and "hope" to "want" and "will", showing that they felt more confident about the EAR and its features.

Given that the informal communication with prehospital management and rumours started at the prehospital center and spread in the

mainly due to the strict deadline claiming the project to begin after a preparation period of only three months.

project organisation, the EMS crewmembers were already aware that an EAR project was under way as early as Autum 2010. These more informal rumours would be stirred up and the users would begin to draw on their existing narratives of technological awareness, both on their existing reflections on their work practice and on the story of the amPHI. Essentially, one could characterise the expectations to grow in belief of certainty because users and managers now openly discussed the rumours. By discussing the project as something that was "about to happen", the users would characterise their expectations of the EAR pilot implementation as "will" because it became an expected reality.

This effectively meant that when the steering committee officially announced the date for the EAR project to be March 1st, 2011, beginning with an introductory workshop for all stakeholders to participate in, the EAR project was now considered to be real. This formal announcement was crucial for how the users characterised their expectations as they would be recharacterised from "want" to more certain "will" expectations:

> *"[The EAR] is something we have been waiting for for many years. And then we were told that a new system would be implemented that had been established in Norway. And which worked. [...] my expectations from the beginning were that this will work, and that it is at the very least not worse than what we already know, the amPHI. So I had a clear expectation that we would get to use something like the amPHI! With all what I have seen from other places I thought[...]:* "Just wow, now it's really gonna be fun to go to work [...] especially because I know what is possible.""
> - Paramedic "Jones"

In this quote user "Jones" explains the connection between his desires and what he heard announced from the prehospital management. His belief of certainty stemmed from what he believed to be already widely known at the time, the amPHI. He describes his reactions upon the announcement of the pilot implementation EAR with the probable future belief using "will work" and the future indicative measure of "not worse" compared to technology that already existed. The fragment is taken from after the second iteratio, after the particular user had already had experience with the EAR in use and judged it not to work optimally. Nevertheless he expresses that the action of announcing the EAR would create a link between his desires and a claim that the EAR would work, resembling a promise given from the prehospital management. His claim that the EMS crew had wanted an EAR for 10 years indicates expectations previously characterised as "want" that was then recharacterised with "will" also since he knew that the new units already worked in Norway. The proof of concept EAR would thus be used as further arguments for why he linked "want" and "will" expectations. The change in char-

acterisations was very typical for the users at this point in time and the pattern of reacting to the initial announcements by recharacterising their expectations into "will" with the directions towards an EAR that overall worked well. For example, user "Thomas" used a similar narrative to explain his expectations, as they were also described as being huge:

> *"I actually had huge expectations [before the EAR implementation] [...], so that's when I thought that when one implements such a system, it's probably going to be something that can really match what we have read about. This is, this is really a heavy-weight, iPad go home right?"*
> - Paramedic "Thomas"

While "Thomas" does not explicitly mention the announcement of the EAR, he does mention the prehospital management's choice of implementing such a system as being the cue that connected his own expectations with narrative rumours of the existing technological awareness. The quote shows that one of the inherent assumptions of the user "Thomas" was that it was highly probable that the implicated stakeholders would naturally know of the users' existing "wants" and the technological awareness of both similar touch-based technology such as the (at the time of writing) widely popular iPads and amPHI. Implicitly the narrative fragment is based on the notion that user "Thomas" felt that for the pilot implementation to make any sense, the goal was to end up with something that would match existing technology. What is worth noticing here is that this indicative evaluation of the EAR mostly was based around the functionality of the system, in terms of visible and explicit features. The cue of features and technological functionality is important because the users would later on use this for evaluative measurement and reasoning for why the system was unsatisfactory.

In the following quote, user "Karl" also uses his experiences with the announcement based on his existing technological awareness as a cue that bridges "want" with "will" expectations. What makes this narrative differ from the previous users though is that he through the narrative still characterises his directions of expectations as something that is a certainty in future development of the pilot implementation IS:

> *"The expectations were pretty high, you see, because [the EAR] is a tool that could have been really good to use, and you have lots of experience from Northern Jutland [...] that works super well so we have huge expectations."*
> - Paramedic "Karl"

In this quote user "Karl" draws on his existing desires and wishes by comparing them to his previous experiences with EAR. He subtly indicates that the EAR "could" have been a good tool to use (but ultimately implies that he was not really satisfied with the actual experience as

well). The quote is taken from an interview after the second iteration of the EAR where both formal and informal announcements had been made to the users explicating that the next iteration of the EAR would be right around the corner. Thus the quote was a reaction to an announcement action that underscored the fact that the EAR implementation was a continuous process of change and that the process was not over yet. This is particularly noticeable in his use of *"we* have *huge expectations"* indicating that user "Karl" still had these expectations at the time of the interview. Even though he experienced the EAR and found it lacking, the awareness of the amPHI as a successful system was still presented as something he believed the steering committee was striving towards. User "Karl" in this sense draws on a similar evaluation of a system that works well because the "want" expectations are grounded in a desire for something similar or better than the amPHI. This may indicate that as long as the current EAR technology was not working as well as the users had heard the amPHI rumoured, there was still room for improvement. Common for the above mentioned quotes are the cues that connect the users' existing technological awareness with their own narratives of having high expectations. Simply knowing about the amPHI was enough for them to retrospectively reflect on their previous expectations as being high. As a result the expectations of development and change turned not only out to be "huge" but also a constant. It should be noted here that whether the expectations were "actually" huge or not did not really matter as much as the fact that the characterisations of expectations were strongly influenced by "want" expectations with the direction of the end result of "working super well". Common for the previous quotes is that we also get a strong normative sensation of what the users though "should" have happened based on what they knew that modern technology was capable of.

Another example was from a user who, rather than focusing on the certainty aspect of his expectations took a more experimental approach that combined "want" with "hope":

> *"I thought it was really exciting to try something new and see what we would end up with: what [the EAR] could contribute to, if it could ease our work day."*
> - Paramedic "Randall"

User "Randall" here describes that he did not necessarily hold any belief of what was certain for the project. On the contrary, he describes the future dimension of his expectations as excitement directed at the very uncertainty of how his future experience will be by using the EAR units. While the characterisations of his expectations differed from the straight "will" expectations mentioned earlier, the origins of his expectations are nearly identical. The curiosity and experimentation on whether or not the EAR would make his work any easier can still be interpreted to be grounded in desires of an

end result from a "want" perspective. The excitement for the future end result is instead uncertain in the sense that he "hopes" that the EAR will ease up their work day. "Hope" in this way differs from "will" since there is no certainty of belief yet there is still room for disappointment. The characterisation is similar in the sense that it is somewhat certain that *something* will happen, though what will happen is left up to the future experience.

A central aspect of the impact of announcements as enabling actions was that users would adhere belief of certainty to those announcements that would correspond to their existing "want" expectations. This meant that a part of the expectations characterised as "will" originated from announcements that supported the users' "want" expectations directed for example at desired functionality or even the fact that the EAR was going to become a reality because it had finally been announced with an actual date! This meant that the users would strongly believe the announcements of dates and deadlines in the beginning of the pilot implementation process:

> *"[The atmosphere] was good, it was characterised as positive and exciting for using [the EAR]. [...] No one was skeptical because we all reckoned that it would be implemented in the ambulance March 1st."*
> - Paramedic "Richard"

Here user "Richard" explains how the users would trust the initial announcements of the prehospital management and that they would in fact look forward to trying the EAR. Because they were highly motivated for change and desired the end results they had heard about from the amPHI, the users also chose to believe the announcements of deadlines and dates. The quote is taken prior to the third iteration began. As noted in the case description chapter 6, p. 69, the dates for implementation of the EAR were postponed a number of times throughout the pilot implementation. When "Richard" uttered the abovementioned quote he did so with a smile and with a strong insinuation that the EMS crew after a while stopped believing these announcements. The announcements would after some time lose their trustworthiness as they were repeatedly directed at the same expectations with the same content. Thus in the beginning of the project the announcements of dates were trusted, resulting in certainty of belief among the users, but after a while, they would tire of these announcements, not taking them seriously anymore. Announcing deadlines and dates were not the only examples of this. Even more important was announcements of coming features and fixes that the users would inquire about:

> *"We [have] constantly had boosts of positive expectations or positive energy through hopes that we have been promised that in a month, then we we would get it just like we wanted it, in a month."*
> - Paramedic "Jones"

User "Jones" explains here how the promises of management were directed towards the users' "wants" that influenced their beliefs of what they would get and this gave them a positive attitude towards the project, if only temporarily. Though when these announcements were experienced as not coming to life, he was disappointed.

From this we get the notion that the announcements only in the beginning would influence the belief of the users and thus their initial characterisations of expectations, at least until the users themselves had experienced the EAR in use. It is further important to note here that the announcements were not provided out of manipulative or malicious intent but rather based around the beliefs of the steering committee themselves:

> *"I actually think that [the management group] expected that we could [document the EAR] just like we were able to with the [paper-based record]. No one had been considering that we are in a moving vehicle that jumps up and down. I do not really know how much they had thought about this?"*
> - Paramedic "Karlyle"

Two things become evident in the above quote. First, it shows that a great deal of the initial "will" expectations were influenced by what the steering committee believed in terms of "will" expectations. In a sense the only information available regarding the EAR pilot came from the prehospital management who communicated with the product vendor. After all, it was assumed that prehospital management had chosen a functional EAR solution to the best of their abilities and as a result the users would share these expectations. Second, it also shows how the expectations characterised as "will" (with the direction pointing towards seamless use of the EAR units) would instead be recharacterised as "should" when the users experienced the technology in use. Upon realising the difficulties of using a touch screen and stylus in a moving ambulance, the assumption of user "Karlyle" was that no one had given any thoughts to test the EAR before implementation.

Unfortunately, the EMS managers were powerless to actually react to the experiences and feedback and they could only inquire the prehospital management for further updates on technical fixes or other events. The solution for handling the constant inquiries was instead to reassure the users that changes were being worked on and that the management group would handle the reconfiguration in large chunks rather than drowning in constant rollouts of fixes. One of the EMS managers would react to the users inquiries by calming them down and give them a future prospect of gradual change:

> *"Some things just cannot be changed:* "I am aware [of the issues] and I have communicated them, but right now you just have to live with it."*[...] And the [users] have been really good at accepting*

> *that. [...] Some times when you say it like that, people will bridle at you, because:* "why does he say that? I can't accept that that's how it is, because of course anything can be changed!" *And anything can, but they accepted that it was not possible to change from day to day. You have to let it run and then collect and announce that we change a large chunk at once, and they have experienced that, those changes, [...] and that's why I think it has been easier for them to accept by saying:* "Well, we don't have to reconfigure every day but we can collect issues every two weeks or every month for example.""
> - EMS manager "Winther"

In the quote the EMS manager explains the effort that he had to put into reacting to the dissatisfied users and that it was difficult in the beginning to convince them that changes would not come immediately. The central part of the quote revolves around how he chose to "manage" these expectations. He chose to negotiate it as a process and explain that things take time and that eventually the management group would solve the issues. He then took the users' silence as if the users agreed to keep using the EAR, to keep their voices down and wait in return for trusting the certainty that eventually the changes would come around. In this sense it would seem that both characterisations of expectations as well as part of the direction of the expectations. For example, instead of revolving around whether or not the changes would come immediately, they would revolve around that they would come later, changing the timeframe of the expectations, though they were still characterised by "will" and "want". Note here that EMS manager "Winther" describes how he was able to change the characterisations of the users who objected from "should" to "will" also, since because of the announcement the users now were given reason to believe that changes were a certainty instead[9].

The reassurance from the EMS managers was hardly a one time occurrence and would repeat itself at the end of the second iteration as the steering committee and the superuser representatives had discussed the redesign of the EAR GUI. At the end of the second integration the medical director had announced that the EAR would not be re-implemented until the quality control issues had been corrected and until data integration between the defibrillator and the EAR was finished. User "Richard" characterised his expectations based on the announcements and actions taken at these meetings. The characterisations were rather mixed and in an attempt to not expecting too

9 The actions of EMS management here are immensely interesting as it forces the discussion of what happens when management attempts to manage expectations. It would certainly seem as if the users immediately accepted both to change directions and characterisations of their expectations, though I as I will show later in the findings only the characterisations were temporarily mitigated and not permanently changed.

much, he chose to switch between belief of certainty and simply being hopeful of the future process:

> Interviewer : *"So if you had to talk about your expectations for next time [next iteration]?"*
> User "Richard" : *"Excited [...] and hopeful that it will work fairly reasonable, that's what they are promising us right?"*

The reason for expressing both "hope" and "will" expectations based on the announcements can be found in the earlier quote by "Richard" p. 118 regarding how he deliberately attempted to not trust the announcements made by the steering committee anymore. Yet, somehow the announcements still mattered to him since he characterised them as "promises" in order to hold the steering committee the slightliest accountable.

This effectively increased the users' belief in the capabilities of the EAR for the third iteration as the announcement directly spoke to one of their most sought-after desires of functionality, believing that the functionality would solve most of their problems. So while user "Richard" would attempt to characterise his expectations without any certainty, his hopes and desires were still high due to these announcements. On the thought experiment that he would only be able to work with an updated GUI and not the integration with the system, he still characterised his expectations towards performance as not being able to use the EAR as he had envisioned from the beginning of the project. The desire for the integration was also reinforced through the following concern:

> *"I am bit worried considering that we were informed that [the EAR] integration with the defibrillator is not quite there yet, and they don't quite communicate. [...] Those are expectations that, when it's announced that [the EAR] must be capable of that and then it isn't [...]. It might be easier to work with but if it isn't integrated fully, we can't use it fully."*
> - Paramedic "Richard"

Essentially he expressed concern that a lack of the initially desired integration functionality would surely result in disappointment due to the promises made by prehospital management and in turn result in a less productive usage of the EAR.

7.4 SUMMING UP ANNOUNCING

Unsurprisingly, announcements played a major role in influencing the characterisations of expectations throughout the project. Many of the formal announcements from the steering committee influenced the way users characterised their expectations. As a result, when prehospital management announced that the EAR now had to be used,

users reacted to this with strong "will" characteristics of expectations, inclined toward believing that the EAR was now ready for use and that it would live up to their prior "want" expectations. Put shortly, users moved from characterising their expectations primarily as "want" to primarily "will" (though "want" characteristics were definitely still present).

Announcements would also make the users characterise their expectations as "hope", a characteristic similar to "will". Though rather than having certainty about specific directions of expectations, "hope" characterisations represented uncertainty but with the same effect if not met: leading to "should" and dissatisfaction. In terms of effects, the "hope" characterisation thus leaned closely to "will" though it occurred more often in the later parts in the project, most likely due to the lack of faith from the users. As more announcements would be made, users would remain hopeful that future changes to the EAR technology would fulfill their "want" expectations rather than trusting and believing the announcements.

The asymmetric relationship between users, EMS managers, and prehospital management made it very difficult to create synchronous communication that could clear up misunderstandings. As a result, EMS managers attempted to announce only what they could get away with based on what they knew. This seemingly served the purpose of temporarily influencing the users' expectations in terms of both directions and characterisations, though after having experienced the announcements and lack of further actions on these, many users would recharacterise their previous expectations in a negative light.

In figure 21, p. 123 I have illustrated the active characterisations of user expectations that the enabling action of announcing seemed to trigger. The direction of the arrows indicates which characteristic would primarily be enabled through interpretation of the action, in this case the "will" characteristic. The direction from "want" and "should" shows that by judging by what the users thought "should" happen and what they "wanted" to happen, the action of announcing gave rise to a strong belief of what would actually happen, especially directed towards the functional attributes of the EAR. Note also here the disclaimer that not all users drew on the "should" characteristic, mainly because many of them had no prior experience with this type of projects. Common for the users' recharacterisations when making sense of "announcing" actions was thus that the users would use their narratives of existing technological awareness of the amPHI and other technology to emphasise their expectations as "will" supported by "want" and "should".

This may indicate that announcing functionality or attributes that are directed towards previous desires of the users is also more believable, and thus the users will be more inclined to recharacterise their expectations as "will" expectations than if announcements did not relate to their desires.

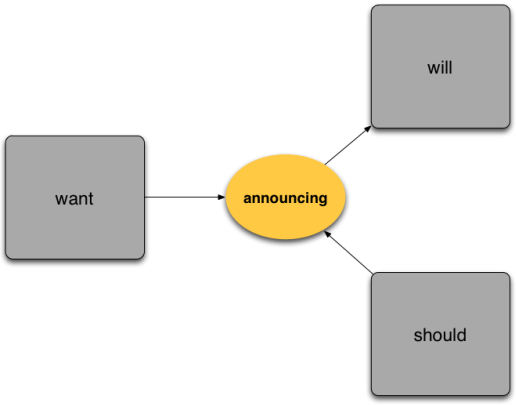

Figure 21: Figure of the movement of recharacterisations based on reactions to the enabling action of announcing.

7.5 EXPERIENCING THE TECHNOLOGY IN USE

The way the users characterised their expectations after an announcement was made was only very temporary as they would quickly afterwards experience the announcements coming to life (or not) or encountering the EAR in the real use context that would make them recharacterise their expectations.

As the EAR made the users take new actions and thus reshape their performative practices, they would also experience if their previously believed "will" expectations would actually hold water and in a sense force the users to recharacterise their expectations from that point on. In the following section I will show how the users' reactions to the experiences of their own actions firsthand led to these recharacterisations. Where I earlier showed how "will" was the dominant belief backed by "want" and "should", experiencing the EAR in action would reverse this characteristic so that the "should" characteristic became the dominant one. In this sense the second iteration was especially significant because a); only a minor amount of users were involved in the first iteration, and b); the users would only in the second iteration experience the EAR in the ambulance with actual patients, significantly impacting the ways they characterised their expectations, and c); time passed by and many actions were taken by the steering committee until the EAR was reimplemented again from the first to the second iteration. Nevertheless, the hands-on experiences the users had during the first iteration shaped their characterisations of their expectations of how they "hoped" the EAR would change in the future. Though because the first iteration was not "actual" usage of the EAR in the real working contexts, I will choose to cover this in the next section that denotes hypothetical use.

In the second and third iteration of the pilot implementation the users had to experiment with what actions from their previous paper-based documentation practices could be replicated into the new tech-

nology and which actions they would have to introduce to live up to the same level of patient treatment and documentation quality as before. This would impact the way they recharacterised their expectations into primarily "should" and "hope" expectations, though long-term it would also solidify a belief that change was necessary to even use the EAR further, thus characterising their expectations more strongly as "must".

I will also show that the experiences with the system narrowed down the directions of expectations over time so that which was a very broad scope of desired and envisioned functionality of the EAR eventually slimmed down more and more only a few central beliefs of necessary changes that should be made to the EAR.

7.5.1 *Clash between expectations and usage patterns*

Certain experiences with using the EAR would directly conflict with the "will" expectations of the users. These expectations were directed at different areas of use, ranging from feelings of doing the EMS work to the ease of use of the new documentation practice.

Essentially the users had tried using the EAR to the best of their abilities but they would cue the reason for the limitations as a combination of software and hardware limitations that in turn resulted in them feeling forced to revert to safer and less risky ways of using the EAR. Obviously the most prevalent and less risky way to use the EAR was to stick to the paper-based record until the patients were handed over and then re-entering all information into the EAR units. The narratives here took two different kinds of arguments for why the users would choose to reorder the priorities of using the EAR. One was the cumbersomeness of the functionality and usability of the actual setup, bracketed as the EAR would impact the physical reality of the EMS work practice. The other kind of argument would be the impact of how the limitations of the physical setup of the EAR would impact the users' feelings of fulfilling their core mission according to their previous expectations.

One particular expectation characterised as a "will" expectation was directed towards the feeling of professionalism while doing EMS work. In one instance, user "Jones" explained that by using the EAR he expected to feel more professional and in charge and that the users would be able to stand out more as paramedics because they could show that they had the newest technology available to them. However, while working with the EAR this particular expectation was recharacterised because the paramedics were forced to figure out new ways of working with the EAR while they were using it:

> *"From the beginning we may have imagined that we would get an extra tool that made everything easier, and then we realised that there were work processes where [the EAR] was actually an obstacle, or*

> *where it was an extra resource or another object for documentation to remember, and we needed to remember bringing [the EAR] out of the [patients'] apartments [...]. And of course it may be walking on air to dream that we would get a work tool that does half of our work, but there's always a catch. And going out on dispatches using [the EAR] opened our eyes: "Now where was it located? How to? Where to?" And it becomes an even bigger obstacle as mentioned earlier with our expectations of automatic data integration that were not possible. And we constantly had to remember at what times we should perform the new tasks, so the whole work process was completely changed, and that is difficult. Because for the past 16-17 years we have had a strict routine all the time and now you had to put something in between."*
> - Paramedic "Jones"

In this quote, user "Jones" explains that the initial expectations characterised as "will" and "want" definitely was a dream. With up to 17 years of routine in using the paper-based ambulance records, he realised that an electronic touch-based computer actually had unanticipated limitations that went beyond merely software usability problems. The hardware and setup itself would impact the work practice, and as a result, it made the users feel less professional:

> *"We had an expectation that [the EAR] would project an image of professionalism, that this just worked. [...] But it didn't. So it quickly became something we were a little embarrassed about. So that made it easier to just plug it out of the mounting and throw it into the bottom of the ambulance."*
> - Paramedic "Jones"

Figuring out how the EAR worked as he went along equaled to not working properly and, in turn, made user "Jones" feel less professional than he used to. His own evalutation measure certainly did not live up to those expectations that he previously was certain would be present. As a result, the feeling of unprofessionalism as well as the feeling that his expectations were let down resulted in using the EAR as little as possible and only when he needed to.

Another example of how expectations not being fulfilled would influence the actual actions taken in the ambulances came from user "Thomas" after having experienced how his performance would actually decrease from using the EAR units:

> *"It's been like the filter on our faucet at home that has completely been covered in limescale. It's not really reaching that level of performance that we know it can muster. [...] We have been forced to reduce the speed in our practice significantly!"*
> - Paramedic "Thomas"

Other limitations from using the technology in the ambulance included the paramedics becoming motion sick, further contributing to

not attempting to use the EAR like they would use the paper-based records:

> *"So I concluded that it really doesn't work when I am the primary caretaker because I don't want to get motion sick. Otherwise I don't have any resources to be out there, or I will spend too much time deleting because [the unit] responds slowly. That way I thought I could spend my resources better by being an extra pair of eyes for my partner at the dangerous intersections [...]. So in my opinion I have tested it out and realised what doesn't work and found a method for making it work."*
> - Paramedic "Thomas"

7.5.2 *Comparing to existing technological awareness*

Obviously, using the EAR with difficulties and necessary redesigns of work practice would also influence how users recharacterised their expectations and in which directions. A way of making sense of their experiences was to compare them to the narratives of technological awareness, especially the amPHI:

> *"The only thing we have heard about electronic ambulance records is that they have them in Northern Jutland and they are actually happy with this system. I don't even think they have been encouraged to say that. [...] But how they are able to make it work and be happy about. [...] It must really do something other than the one we have! I really can't see myself becoming happy with [the EAR]"*
> - Paramedic "Karlyle"

The quote is an example of underlining the significance of the amPHI in influencing the users' "want" expectations. Basically user "Karlyle" was throroughly disappointed with the EAR and this led to very negative feelings towards it. In order to try and make sense of this negative feeling, he would compare his experiences with what he had heard about the amPHI which was the complete opposite. In the end he ended up concluding that the product attributes between the two technologies had to be different from one another (indicating that some of the users actually assumed that the pilot implementation EAR and the amPHI were similar). This further reinforced his desires for changing the functionality of the system. A similar disappointment was also noted by user "Karl" :

> *"So I did get a little disappointed when I saw how much of a bother it really was, and there were just a lot of annoyances somehow, when we knew we had a tool already [the amPHI] [...], so we were not impressed."*
> - Paramedic "Karl"

In this quote we get the slightest hint of how the expectating process began to change in accordance to the actual experiences of the users. The awareness of the fact that there already was another tool available was reinvoked whenever an annoyance was encountered with the EAR because the amPHI was regarded as a technology bringing constant positive support that the users felt they could rely on.

User "Thomas" also expressed his frustrations through his technological awareness while having worked with the EAR for a long time:

> *"And it's also been a source of irritation that [the EAR] is not capable of communicating with our defibrillator. I mean, come on man! We are in 2011-2012, you can get apps for everything that can communicate worldwide and for some mysterious reason they don't know how to do this. It's simply technologically too bad for words."*
> - Paramedic "Thomas"

In both quotes above we see how the awareness and "want" expectations while experiencing the EAR in use added to the frustration of the users. However, the frustration seemed to be only partly directed at the lack of functionality. The other part was an implicit critique of those stakeholders that chose to implement the EAR and not the amPHI, or at least that they chose to implement the EAR without the much wanted functionality that was already known at the time. Having experienced the use of the EAR and realising that it did not live up to those basic expectations influenced by the narratives of technological awareness, the action of choosing to implement the EAR made little sense to the users. The quotes above reflect how the users, after having experienced the EAR and compared it to existing technology, would actually recharacterise their expectations as going from "will" and "want" to "should". It also shows that previous expectations were quite implicit as the users first directed their expectations toward the technology but after experiencing the technology now would direct the expectations toward those in charge: Since the technology was available, the action of developing the desired functionality should have been taken by the steering committee already.

The frustration was made even worse because the users were aware that the EAR had development opportunities and so would and could change as time went by. The awareness that the EAR product was going to have future changes would only support their initial desires by comparing the EAR with their existing tools in their work practice:

> *"I definitely found [the EAR] to have some shortcomings. If it needs to work really well all of that stuff we spent unnecessary time on inputting: pulse, blood pressure and all those addresses and dispatch times need to be integrated with our terminals automatically so they are simply sucked into the system. There's no reason to spend unnecessary time on that. It should be possible in our day and age to integrate this stuff."*
> - Paramedic "Randall"

In this quote the user "Randall" explains that the EAR could potentially work really well (indicating that this was far from his personal experience) but that it would require changes to functionality. It becomes clear that the "want" expectations directed at automatic data integration between equipment really took up a large part of what was believed to make work practice easier for the users. Furthermore this is compared to the existing equipment that was currently being used; the paper-based ambulance records. In the quote "Randall" uses the paper-based records as the evaluation measure of how easy the EAR "should" be to use. The specific solution was reinforced by him experiencing the shortcomings of the EAR and the "will" expectation arose that automatic integration would solve his biggest gripe about the manual input procedures. The quote also tells the story that he was aware that the EAR was not yet fully developed but would get there eventually, fully supporting the prospect of future change. As the frustrations would build up in the users, however, some of them would also be more outspoken regarding this normative characteristics, turning the "should" expectations into "must", showing an expectation of a direction that was perceived as the only correct path for the pilot implementation to follow.

The quote also shows that the characterisations of expectations were not a binary relationship, since we saw multiple characteristics of expectations in play: First of all the "want" characterisation directed at a desire for automatic input of data originating from users' reflections on their firsthand experience with work practice (the previous manual input and paper-based ambulance records). Second of all the projection of "hope" that there was an ongoing development on the EAR, i.e. a future prospect of change. Third of all the recharacterisations of expectations from prior certain "will" to "should" expectations, e.g. that the manual inputting of data should not, in fact, be manual when technology clearly could support this. The change was thus enabled through experiencing the EAR in action and reinforced by the "want" expectations of automatic integration and the awareness that it was technologically possible to do so. In fact, the normative part of the "should" characterisations would at times be recharacterised into "must".

7.5.3 *Changing directions of expectations*

The experiences of the capabilities and limitations of the EAR would gradually make the users redirect and recharacterise their expectations into a more narrow scope, actually ending up differing from the directions of their expectations before the pilot implementation was announced. As shown previously the experiences with the inconvenience of manual input would reinforce the users' desires for automatic data integration and thus these desires would convince

the users into believing that integration would solve their problems through characterisations of expectations as "will". While it might seem logical and reasonable enough that integration with the equipment, or even choosing a technology one knows works better, might have solved the experienced problems, one must also take into account that these were expectations directed at someone else implying that they "should" take actions to address this pursuing the users' "wanted" outcomes.

The third iteration of the pilot implementation was a good example of this, when integration with the defibrillator had finally been developed (and tested over a month), and the EAR would also sport a new and revised GUI, redesigned by the users themselves. After the initial four weeks of test runs, one of the superusers involved would react the following way:

> *"[The integration with the defibrillator] is a great tool, but again, it's not fully developed at all. [...] We found an issue where it's not transferring the pulse, which is a pretty vital parameter, and then the fact that I can't use the defibrillator as my primary work tool for transferring to the [EAR] even though there's a lot of event fields that could be used, so you had timestamps for when we had started [the treatment]."*
> - Paramedic "Mitch"

During the last couple of dispatches user "Mitch" realised that, while the integration worked well and transmitted the vital parameters in less than a few seconds, there were still a few bugs to work out in the print out and in the transfer of some of the vital parameters. What was even more interesting was the second direction of expectations; that upon experiencing that the integration with the defibrillator was actually possible this also spawned several new ideas for redesigning the integration functionality, in this case "wanting" the defibrillator to be the primary work tool since it was always within an arm's reach. This would actually show how one instance of a design proposal experienced in use would suddenly reprioritise directions of expectations, characterised by new "wants" and "should".

The second superuser of the third iteration would find even more issues, eventually resulting in him leaving the project. Essentially the two superusers found that the redesigned EAR did not live up to their expectations yet again because they experienced new issues with the newly developed functionality. While previous examples in this section were characterised by the "should" expectations as well as "wants" after experience, this new example from the third iteration would instead bring in new directions of expectations characterised by "want" and "should" because of the possibilities of technological change.

7.6 SUMMING UP EXPERIENCING THE TECHNOLOGY IN USE

The experiences of using the EAR in actual work practice were very significant to the users. The experiences shaped a notion of belief of what the EAR was going to be and what was going to be possible doing with it, while its shortcomings would hail in new ideas and suggestions for how to fix it. Whether users experienced the EAR in the first, second or third iteration, the general consequence was disappointment and normative suggestions for improvement for what the users found the prehospital management "should" do about the present situation. The characterisation changed from "will" being the dominant characterisation, to the more normative "should" characterisation while at the same time based on a more clear idea of what the users actually "wanted" from the EAR.

This also meant that certain directions of expectations initially characterised as "want" were no longer mentioned because other features and issues were considered more important for the apparent situation (examples of features no longer mentioned ranged from data integration with the big overview screens at the ED to digital forms for assessing haemorrhages and/or thrombosis treatments). However, it was very clear that while these directions of expectations were no longer mentioned, they were still desired. The technology in use would then serve as a prioritisation process where users would instead attach value to what they believed could solve the worst issues that they encountered using the EAR. Primarily believing what "should" be done was thus the dominant characterisation of expectations as the new EAR would impose a certain structure on the users' documentation practices. The "should" characterisations, though, were also examples of a synthesis of what the users believed was reasonable to ask for given the technological possibilities available. These technological possibilities were influenced by the users' existing technological awareness as well as their experiences with the actual EAR technology itself. Seeing that integration was possible and that certain feedback given to prehospital management were actually being heeded and acted on would enhance the characterisation of what the users thought "should" be done about the present state of affairs. One of the users summarized the process from the first two iterations very well in the following quote:

> *"It's been like moving through a trough where we were firstly surprised over the simplicity of this wonder on the table, then we got it in our hands and felt that it was a little heavy and awkward, then it went downwards a little. Then we turned it on and saw that it worked, and then it went upwards again, and then we realised that it didn't work, and then it went downwards again."*
> - Paramedic "Jones"

Assessing expectations was a constant quest with many parallel and sequential experiences using the EAR, meaning that the users would be in an alternating change of reprioritising the directions of the expectations and recharacterising them moving from "will" and "want" to "should".

In figure 22, p. 131 I have illustrated the recharacterisations of the expectations as the users would get more experience with the EAR. This type of recharacterisation occurred in all iterations. The directions of the arrows denote the movement from what was earlier (the starting point) and into the users conclusions of their expectations at the time of inquiry (the end point). After several cycles of experiencing many users would end up characterising their expectations as "must" expectations.

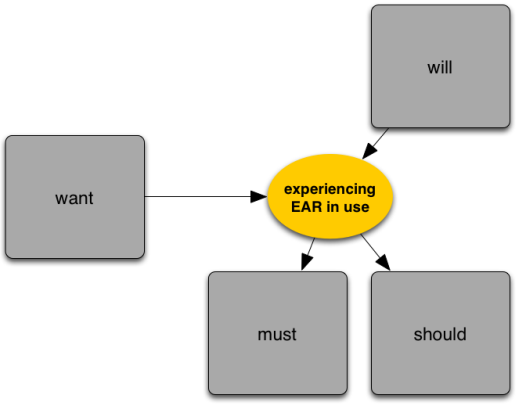

Figure 22: Figure of how the characterisations of expectations changed during and after experiencing the EAR in use.

7.7 EXPERIENCING THE EAR AS EVENTS IN A PROJECT PROCESS

In the previous section, the technical functionality of the EAR was in focus to show how the experiences of the EAR technology would impact the way the users would characterise their expectations. However, the EAR project was equally focused on processes like development and implementation events that also impacted these characterisations. These events included planning events throughout the process, either as training courses, workshops or management meetings. As previously mentioned I defined many of these events also as enabling actions, since they in retrospect were characterised as enabling change by the users (although not all enabling actions could be viewed as events). Experiencing these events would result in the users being aware that development of the EAR pilot implementation was an ongoing process and they would expect the management group to take actions according to the announcements made.

In this section I will show that the awareness of the EAR as a development process would make users draw on the events as well as

the experience of using the EAR and thereby also change the way they characterised their expectations. Examples included training events where the users afterwards felt they had expected more because they still felt insecure when using the EAR in action. The characterisations of expectations were directed at the users realising that the events should have been done better or that corrective actions should have been taken sooner. Furthermore, the users felt the process as being hopeless after having experienced the events but also implied a normative "should" characterisation for an eventual next time such events took place. They would also imply an existing desire characterised by for example "wanting" more information or better training in the EAR. The change in characterisations that would emerge from experiencing these events and then the EAR in action shortly after was similarly based on "should" and "want" expectations being dominant. However, they would also instigate "hope" and make some of the users look forward to the potentially coming changes.

7.7.1 *Hypothetical technology in use*

A large part of the changes of characterisations through experiencing the process of the pilot implementation could be attributed to "hypothetical technology in use". This type of enabling action primarily rooted itself in the users imagining how the technology would be used based on the information about the EAR they were given. Information was provided to the users on for example training workshops where the GUI was presented using slideshows or where the EAR units used to input imaginary documentation. A large part of the 1st iteration was as such conducted using test patients for training purposes. Characterising expectations also happened when users participated in workshops where they would get a better idea of what the visions were for the EAR and how it could be used through announcements from either product vendor or prehospital management. Here the users reacted to the presentations of the EAR and the overall setup given by the product vendor and based on technological awareness of the users they quickly imagined how they would go about using the EAR. As such they would quickly characterise their expectations directed at how to use the EAR primarily in terms of "will" expectations. The following is an excerpt of the users' reactions to announcements of the capabilities of the EAR from the first intervention kick-off workshop where the product vendor explained that no plans had curently been made regarding data integration to neither defibrillator nor ED:

> *"[if the EAR system] will not log all measurements automatically - because you have to concentrate about your treatment, your patient, and your little computer terminal - it's not certain that you can document during the dispatch. [...] We have been trained in concentrating about the patient and not on the documentation. I often can only input mea-*

> *surements and medication into the records afterwards, and that is of course also those times when documentation is the most critical because of the acute condition of the patient. That's where we land when the system will not be designed as we expected."*
> - Paramedic "Neil"

Here user "Neil" vocalises how his expectations implicitly changed based on the presentation made by the product vendor. The outcome prior to the workshop was characterised by "will" and "want" and with the direction of being able to concentrate about the patient and not the documentation. The means to do this were directed at the functionality of automatic integration in the new EAR, also characterised as "will" and "want" prior. During the workshop this no longer seemed possible because of the clarification of the product attributes and so the users instead moved to a new focus of his own performance of the EAR in the ambulance, claiming with certainty that their work practice would now not change at all (also implying a change in outcomes). It became clear that the automatic integration was a strong desire of theirs and that they were certain that their work practice would not be made any easier as long as this functionality was not developed. This way we get a hint of recharacterisations into "should" as the user unfolds his image of hypothetical use with the EAR.

At the same workshop, one of the EMS managers also put himself in the users' place and shared his own frustrations with the other participants:

> *"But what we as paramedics wanted was a tool that could aid us in performing this task as well as possible. And that does require some substantial parameters supporting this and I hear that, those won't come now unfortunately. And that really sucks. Because we will now only be left with an electronic version of the paper-based documentation. [...] I want to transmit this to [the ED] but when I am told that it's in the future, unknown to me, I think that it's a real pity because I would have liked to have this from the beginning."*
> - EMS manager "Dale"

The vital part of the quote lies in the notion that another highly requested piece of functionality, the integration with the ED, was located in the future and would not be a part of the pilot implementation from the beginning. While the EMS manager thought this was a pity, he was still willing to use the EAR. As in the previous quote the expectations of experiencing work performance with the EAR would now be changed to be similar to using the paper-based ambulance records, though instead of characterising the coming of functionality as "will", he emphasised his "want" expectations of this and changed the direction of this expectation in the future rather than now. The direction of having the integration immediately was simply postponed due to the

prospect of change that was put up at the workshop. Data integration to equipment and ED might not come true from the beginning of the pilot implementation but the users still chose to hope that integration would eventually come. As such the "will" characteristics were not really removed or managed as much as they were simply reprioritised through recharacterisations of immediate expectations towards another focus.

The change of characterisations of the expectations further reinforced the users' "want" characteristics. Even though the product vendor attempted to influence user expectations through communication and information to be more in line with what the product vendor could deliver, the product vendor merely succeeded in postponing what the users saw as inevitable functionality. Expectations of the functionality of the EAR as such did not change as much as they were merely postponed and recharacterised to fit what could be immediately expected from the EAR.

7.7.2 *Participating in events instigating hope*

The redesign workshop that was held during the second iteration was an event that further attested the purpose of the pilot implementation as a process of development. One of the users described the impact of the workshop the following way:

> *"We were completely down when we participated in the [design] workshop and thought: "This is utterly hopeless!" But when I left we were punching the air, we who participated, and thought: "Well if it will be how we want and have described it [...], then [the EAR] is going to work, then there's hope. Light at the end of the tunnel." [...] It ended as a positive when we left [...], at least we had hope."*
> - Paramedic "Tobey"

Here "Tobey" desribes how the participating users, after the workshop, were hopeful and filled with positive energy again. This was completely contrary to the experiences they had had with the EAR in action (as described earlier in section 7.6, p. 130). The expectations with the redesign workshop were characterised as hopeful though uncertain about what they would get. The users still believed that the changes they decided on would create a positive improvement because they were now given the chance to change the functionality to their hearts' content. This was further supported by another user who was also of a positive belief:

> *"Now the design has hopefully changed and become easier to work with and even speedier, in the ambulances but also in the emergency SUV-vehicle, faster flow, printing it and handing [the record] over."*
> - Paramedic "John"

At the time of this quote, the changes to the GUI had already been made and implemented into the EAR units, and user "John" had seen that this was a fact. The expectations here are characterised as "hope" directed at the performance of the new work practice and not whether or not the changes would actually come true (seeing as he had now seen with his own eyes the redesigned changes coming to fruition through software updates). As such the direction of the expectations were highly "wanted" as well and this was excactly what he hoped for would happen by only hypothetically experiencing the new changes in use.

Involving representatives of users in the redesign events also influenced users who did not participate but only heard about these events. After hearing about the workshop, user "Karlyle" also characterised his expectations about the EAR with a flicker of hope:

> *"[The involvement of users] has changed my feeling that now someone is involved [in the EAR project] who at least knows something about it. [...] Before they thought that this was something that could be implemented by management and then figure it out as they went along and it would eventually work. And I guess it's pretty typical that somebody will decide something and it is going to work because "that's what we have decided". But they just forgot to ask those who were holding the product in their hands first."*
> - Paramedic "Karlyle"

In the quote user "Karlyle" recharacterises his expectations from "should" to "hope". While it was still no guarantee that the EAR would work better, having someone at the helm who "knew something about EMS work" at least provided him with hope. Likewise, other users were also hopeful for the future now that a lot of time had flown by. In short, the prospect of changes over time created "hope" for the desired outcomes of receiving a good EAR.

7.7.3 *Experiencing time going by*

While participating in events or experiencing announcements was one aspect of expectations, another was the wait that users would experience afterwards. The experience of waiting actually showed to be crucial to the characterisations of expectations. Users were quite vocal about experiencing large chunks of time that went by where no events or actions were seemingly taken. To the users this would reflect that nothing was actually going on in the project. Not showing that actions were being taken in these long episodes influenced the users' tolerance and ensuing recharacterisations of expectations.

One user would for example strongly hope that the changes they had proposed would be quickly implemented:

> "Rolf": *"I really don't hope too much time will pass by."*
> Interviewer: *"Yes, supposedly it's easy to reconfigure [the system]."*
> "Rolf": *"Yes, if it's simply moving fields around, I can imagine that it might take longer to change larger issues like what we have now."*

In this fragment, the user "Rolf" reflects on his own expectations by looking forward to the changes that the redesign workshop as an event had proposed. Several aspects of characterisations pop up from this quote. First, user "Rolf" shows two expectations of different directions. He characterises the expectations directed at the changes from the redesign workshop as "will", though he was less certain of the expectations directed at the timeframe of when these changes will come and instead these expectations were characterised as "hope". Explaining that he hopes that it will not take too much time also indicates that the changes are desirable while time passing by is not desireable since the more time goes by, the more negative an impact it will have on the users' attitude towards the pilot implementation. Second, he draws on his own technological awareness of software development being difficult as a reason for fearing that time may be a problem since he does not know if the GUI changes they decided on were technologically feasible.

Unfortunately, a long time did pass by in this specific episode and prehospital management only announced the projected date once, further influencing the users' expectations. In the following example user "Tobey" explains how the announcement would actually influence his belief of certainty:

> *"When they in the beginning announced one month, then I had an expectation that when it has been six months it's because they have really worked seriously on this and made it work. They might even have solved more than what we agreed on at the [redesign] workshop."*
> - Paramedic "Tobey"

In this quote, "Tobey" characterises his expectations of new changes as "will" and as "hope". First of all the lack of information available forced him to trust the little that he knew about the project which was the one month deadline that the prehospital management informed him about. The cue that he then noticed was the fact that six months had gone by. Knowing that the project had not been cancelled yet, he then interpreted this to mean that work was still being done on it, characterising his expectations as "will" of the direction that the EAR would be reimplemented with his desired changes. A second characterisation of expectations was "hope" based on the experience of time going by. Since the last announcement was six months ago he even described it with hope that more issues had been actually solved than what was initially agreed on.

Experiencing a multitude of episodes of time where nothing happened throughout the pilot implementation eventually did lead to

users caring less and less for the project and would eventually lead to non-use of the EAR. In the first iteration where the users were told to retrospectively fill out ambulance records from March 1st to May 1st, the users would enthusiastically begin filling out the records but collectively stop again after they realised that the EAR did not live up to their expectations performance-wise:

> *"I think I input one or two [records] or something like that, mostly because there were so many holes and inadequacies [...] and it ended up being too incomplete so I chose [not] to... Firstly it took a long time and after a couple I had a fairly reasonable idea of what needed to be done [...]. When I asked others what they had done and how many they had input [they answered] "I haven't at all" and then "I am not going to do it either" and that way it kind of spread like rings in the water."*
> - Paramedic "Karlyle"

In the second iteration, usage of the EAR would last for a longer time but eventually users would gradually report more of the units faulty or forget to bring the units with them in the ambulances. The usage of the EAR culminated after about 4 weeks where it became gradually more difficult to perform observations of them being used in practice. The following excerpt is taken from my ethnographical notes five weeks into the second iteration of the pilot implementation when I arrive at the station in the morning:

> *"At 7.50 AM I arrive at the station but I find it empty. Everyone must be out on dispatches. I wait for someone to arrive there so I know which clothes and uniform to wear on the dispatches. When a couple of crewmembers arrive, however, they have not heard that I came nor is the EMS station manager anywhere to be found. They are not very friendly when I say that I am there to observe dispatches done with the EAR, though they do ease up after telling them that I am just a researcher from the university. They tell me that the paramedic ambulance with the EAR is currently being repaired and the unit is in the ambulance but they will try and bring it from a second station.*
> *During the wait I sit down and listen to the crewmembers' stories about the EAR, of which there are many, and several new crewmembers arrive at the station to join the discussion. It is not very positive though and a lot of suggestions for fixing the EAR as well as the process is made.*
> *At 10 AM the ambulance that should have brought the EAR arrives but when I inquire into it, the crewmembers tell me while smirking that they must have forgotten the EAR at the auto repair shop. At this point it becomes very clear to me that the crewmembers have grown weary of the EAR and are using excuses and circumventions in order to not use it on dispatches. I thank them for the discussion and head home instead."*

- Excerpt from ethnographical notes, beginning of October, 2011

In the third iteration, one of the superusers dedicated to the project eventually got fed up with the small bugs and annoyances that occurred even after the unit had been sent back from the product vendor, ready for the third iteration. The following excerpt is taken from the first day of observations that I was able to participate in after a long, initial preparation of the technical setup:

> *"On our second dispatch, user "John" attempts to connect the EAR unit to the mounting in the ambulance. Upon connection he realises that the keyboard is still not working, contrary to the prehospital management claiming that it was fixed. As icing on the cake the EMS management had announced previously in the day that they would not install any printers in the test ambulance, despite "John" continuously requesting this. When we returned home after the dispatch, he tells me that he is backing out of the pilot implementation now. He says that it's like handing over your car to the mechanic and then get it back and it is still making noises on the axle."*
> - Excerpt from ethnographical notes after dispatch, April, 2012

After using the new EAR for a full day the user set forth an ultimatum for further reconfiguration of the overall setup so that the EAR could be used in what the users would call "all sharp situations", meaning that the EAR was used alongside treating real patients. When this was refused, he chose to quit the pilot implementation. It becomes clear that the waiting times and his "should" expectations directed at the equipment being fixed escalate into "must" eventually where his actions turn into non-use after having realised that the EAR was indeed not fixed.

The second user in the third iteration would be a little more forgiving. After having returned from vacation he experienced how his own hopes were not met and this led to disappointment:

> *"[...] when I was gone on vacation for four weeks I thought: "Ok, when I get back I will be able to see that they have started reconfiguring at least", that was my hope anyway. [...] I did not expect that everything was fixed and finished [...]. My hope was... it was not like I was surprised that they hadn't fixed it, but we have been in this process for a long time right. But my hope was that now they really wanted this, that they prepared the ground for this to work. And if it has to work, somebody needs to take some action and stuff needs to happen."*
> - Paramedic "Mitch"

Similar to the users leaving the redesign workshop, "Mitch" would leave the third iteration with a hope that changes would be be made. While he does characterise his expectations as being hopeful, it is also

clear that he did have a hint of confidence that the changes would actually come to fruition though (specifically from the sentence: "when I get back I will be able to..."). Instead, "Mitch" experienced a lack of actions when he came back to work and these non-actions led him to recharacterise his expectations into "should" due to disappointment. The reason for these characterisations changing into negative "should" expectations was essentially that the changes that were proposed during the third iteration were rooted in desires for fixes to the EAR so that the user could utilise the equipment even better. The cue to the normative "should" characterisation was also rooted in the user's belief that the prehospital management now seemed motivated to move the project forward themselves. In essence one of the important aspects of how user "Mitch" expectated of the past, present and future was the fact that the pilot implementation project had been framed (and proven) as a development project with a prospect of change.

7.7.4 *Combining experiences of events with experiences of the EAR*

Users would also direct their expectations toward events or actions that they felt "should" have been handled better. One example of these events was the training courses and the actions that had resulted in the process of implementation of the EAR.

After having experienced the EAR in action, the users still did not feel confident in how to perform the documentation properly and would have liked more routine at training sessions themselves:

> *"I expected that we would have received more training in using [the EAR] than we did before we began using it. [...] I did participate in a four-hour course a long time ago, what changes had been made and such, but I still think they should have prioritised more training and taught [us] how to work more with it before we had to use it. Because then we had to use it in situations where we didn't have that much routine in using it and we didn't know it that well."*
> - Paramedic "Karl"

In this quote, "Karl" is clearly disappointed of his experience of the training course and that they had to use the EAR in real practice immediately afterwards. While he implies that he had "will" expectations earlier, after having participated at and experienced a training session he instead recharacterises his expectations normatively, as something that "should" have been done better. Though he was only certain in this assessment after he had experienced the EAR in actual practice.

Likewise, another user had hoped that routine and testing the EAR had been done in another environment altogether:

> *"I actually had a hope that they would have implemented those EARs by telling us:* "Now you can use them for patient transportations and then you can try it out"*. That way we could find the*

> *errors along the way instead of trying them in sharp situations. [...] Situations where we have plenty of time and I can call someone and tell them that it doesn't work right. [...] That's what I expected."*
> - Paramedic "Jack"

In this quote, user "Jack" expresses the same disappointment of having experienced the implementation process going from non-use to using the EAR in all situations possible. He was well aware that the pilot implementation was a development process where he was required to provide feedback in order to find errors that could then be corrected. However, after having tried it out in those "sharp situations" he, like many of the other users, felt forced to down-prioritize the EAR until the very end of the EMS dispatch where he would then input the documentation. Here the experience of using the EAR in action combined with the actions that the prehospital management took in helping the users learn to use the EAR was characterised as "hope". The story he tells here was that prior to the implementation he had hoped that alternative actions of training the EAR were taken. However, upon experiencing the EAR in action this expectation was actually recharacterised into a "should" expectation.

The two above-mentioned examples have distinct similarities. Both emanate from an experience of participation in an event where the users were to learn about the EAR. Both examples end up in general dissatisfaction of the training process based on experiences with the actual product. In the examples both users seem to describe and compare to an expectation they carried prior to the implementation. The cues that both users draw on here are implied as an assessment based on their prior expectations, quality of the training process, and how that training process impacted their experience with the EAR that turned out to be lackluster. While the overall conclusion of this assessment was initial disappointment, it also included a characterisation of normative proportion in terms of those responsible for the training process "should" have done better. Implicitly this also meant that the "should" characterisations were carried over to the users' expectations for the future of the EAR.

Where the examples differed though was the description of the initial characterisations of expectations prior to experience. The user "Karl" described this as a more certain "will" expectation while user "Jack" described it as "hope". Interestingly enough the end result was the same, and both users seemed disappointed and held a more normative "should" characterisation about the process in the end.

7.7.5 *National procurement enhancing the prospect of change*

One of the actions that reinforced the notion of the prospect of change over time was the announcement of the national EAR that was under-

way simultaneously. Some of the users used this announcement to become disheartened. Afterall, why bother with a technology they found dysfunctional when another, more real EAR IS was right around the corner? Other users, especially those who had participated at training events and redesign workshops, knew that the pilot implementation EAR was meant for learning, and that without the pilot implementation they would probably not have been able to propose specific requirements for the national EAR also:

> *"If I hadn't been doing this we wouldn't have had any insight into what we needed. Some other EMS crewmembers participated from [other EMS operators] and they had* no *experience with anything. One of them had just been sent [to the workshop] and had scanned their [paper] records [...] at the station. [...] He was just a regular EMS crewmember who had no point of view on the matter at all so he was just... there... with nothing to say. So it matters a lot that we worked with [the EAR]. Otherwise we would not have had any input at all."*
> - Paramedic "John"

"John" explains here that several users had been involved concurrently in events for the national procurement during the last two iterations of the pilot implementation EAR. At the events the participating users could freely vent and explain what they wanted with very few limitations. When the participating superusers narrated their expectations following these events, they would draw on all of their prior experiences and expectations, including those from the pilot implementation EAR:

> *"It was a really good event to participate in when you have an idea of how the stuff can work. It was simply writing down, it's a kind of wishful scenario. Everything is automatic [...], why do I need to press "busy" if it has a GPS, then it must be able to know that we have arrived at the emergency address [...]. There's really a thousand different things but obviously when you have to reflect on these use case scenarios it will be based on what you remember from the EAR project."*
> - Paramedic "Tobey"

In this quote, user "Tobey" emphasises the importance of a vision workshop where the participating users created future use scenarios. These future scenarios and the functionality were explained as a wishful scenario where anything was possible. The quote shows strong similarities to the beginning of the EAR pilot implementation where the users would also begin with many wishes, desires and hopes for the functionality that at the time of announcement of the EAR had been recharacterised into "will" expectations. The characterisations of expectations of user "Tobey" also closely resemble the expectations changing after the redesign workshop in the second iteration. The

involvement of the users simply influenced and changed characterisations to "will" and "hope" characterisations because it seemed as if the desired "want" expectations now truly became possible.

The awareness of the national EAR also influenced the expectations differently in the direction of the pilot implementation EAR, though. The prospect of change made the users feel that the pilot implementation EAR contained a lot of lessons to be learned by prehospital management and that these lessons should also be transferred to the implementation of the national EAR:

> *"[Regarding] the national [EAR] they really have to have this system tested 100% before [...] it is implemented. It just has to be tested through and through, working from day 1. Of course there will have to be some adjustments like on the amPHI - and that took some years before it ran [well] - but now I just believe that when one has so much experience from [the amPHI] - and maybe also from this project - that when the [national EAR] comes, it just needs to work [...] - it's gotta be almost perfect from the first day with all of those experiences they draw on from the amPHI etc. And it's written in the procurement material that the new [national] EAR must not be worse than what is already on the market, [...] so it will not be worse than the amPHI and that is really really positive."*
> - Paramedic "Kenneth"

User "Kenneth" also strongly draws on his experiences with the limitations and issues of the pilot implementation EAR in order to expectate about the national EAR. Based on the experiences with the pilot implementation EAR project, "Kenneth" here strongly characterised his expectations as "must", mainly because his experiences and technological awareness increased. The expectations here are directed at the pilot implementation EAR as a learning project and characterised as something that "will" be used in the national EAR process so that the same mistakes are not made again.

7.8 SUMMING UP EXPERIENCING PROCESS EVENTS

Events that involved the users in redesigning the EAR GUI would change the characterisations into "hope" expectations, positive yet uncertain. When changes had been made, the users would express "hope" toward not taking too long to fix or develop the changes, since the opposite outcome would cause negativity towards the project. When long episodes of time did pass by without changes, though, users would characterise their expectations as normative and believe that someone "should" do something about it. Similarly, experiencing the content and structure of the training courses, users would recharacterise their expectations about the course content from "will" to "should", since they experienced a discrepancy between training and the actual EAR in practice.

Common for these two seemingly opposite directions was that they were both rooted in what the users desired. When the users participated in events that gave them free hands to change the EAR as they saw fit, this corresponded to enabling them to fulfill their desires themselves. However, receiving training in the EAR was not excactly desireable as such, since training also meant that the technology would be difficult to learn how to use. Nevertheless, upon realising the difficulty of the EAR, the users wanted more training in order to fill out the EAR correctly.

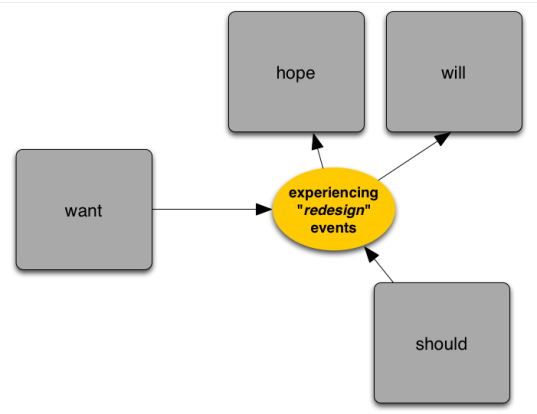

Figure 23: Figure of the flow of recharacterisations of expectations as narrated by the users having experienced redesign events.

In figure 23, p. 143, I have presented the flow of recharacterisations of the expectations as narrated by the users in terms of experiencing being involved at the redesign workshops. The directions of the arrows indicate how the different sub-events in the process would move to "hope" (and only few users characterising "will").

In figure 24, p. 144 I have presented the flow of recharacterisations as narrated by the users based on what they experienced when too much time flowed by without anything happening, as well as how the users would react to the training workshops after having experienced the EAR in real practice. The figure resembles the previous figure 22, p. 131 since the characterisations of expectations primarily changed into "should" expectations. It should also be noted that a great deal of the events that would involve the users and made them influence the process themselves created hopefulness for the future, and as such I have also indicated an arrow moving to "will" expectations. I have chosen to dot the arrow from "will" to "experiences of events" as the users only described their expectations in this way after having experienced the events.

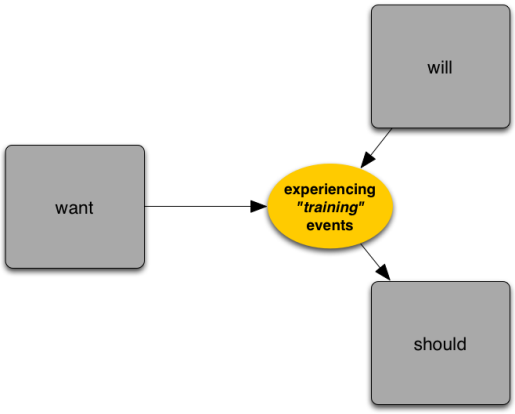

Figure 24: Figure of the characterisations of expectations as narrated by the users having experienced hypothetial use, time going by, and training events.

7.9 GIVING FEEDBACK

In this section I show "giving feedback" as the third enabling action that influenced the expectating process throughout the various stages and iterations of the EAR project. Feedback occurred during morning meetings between users and EMS managers, during the work shift between the users as well as whenever the users met with the prehospital management group at training and redesign workshops.

One of the main characteristics of the EAR implementation was that from the early hours of announcement, much speculation and expectating had been going on about the purpose of the project and the technical functionality of the EAR units. For this very reason it was also characterised by a great deal of feedback from users to the management group, but also between users themselves, often in the shape of common frustrations and problems that they experienced but also in the shape of solutions for how to overcome the problems without compromising patient treatment and documentation quality. The value of the feedback actions was not only to whom it was addressed, what the content was or whether it was acknowledged at all. Instead it was the fact that feedback had been given at all and thus enforced the belief that someone else would address the issues raised in the feedback, or at the very least acknowledge them. I will show here that the expectations would be narrated as "hope" or "will" expectations depending on how much the users "wanted" the issues of the feedback to be taken care of. This meant that when users inquired the management group about desired changes, the expectations would be characterised momentarily as "will" or "hope" until prehospital management had made an official announcement directed at the feedback or the users had experienced the changes of the setup or the product of the EAR.

One important aspect of the more formal feedback actions taken was rooted in the steering committee asking the users (through an announcement action) that they were to provide written and constructive feedback of their experiences with the EAR during the pilot implementation period in the second iteration.

The formal feedback given to the steering committee had very similar content. The characterisations of the expectations that the users voiced through this feedback varied a lot, however. Two different users would for example provide feedback on the civil registration card scanner on the EAR unit:

> 1. *"Would it be possible to transfer name and address when we scan the civil registration card of the patient in order to save time?"*
> - user X (unknown)
> 2. *"The scanner should be able to read my patient's name, address and civil registration number, preferably even more information."*
> - user Y (unknown)

The two feedback actions show widely different characterisations of expectations despite the fact that they are both directed at the excact same functionality. User X shows that he is not sure of the technical possibilities for providing more information from the civil registration card but would really like this functionality. Thus he describes the possibility as something he "wants", while the possibility at this point remains a "hope" for the future. User Y, though, realises the potential and proclaims that the scanner "should" be able to do more than it already does. The very experience of the scanner actually being available for the users to use in their work practice makes it clear to user Y that it is only logical for it to do more. Common for both suggestions is that both users were actually using the civil registration card scanner and as such saw the potential for further development. Whether or not it was technically possible or not seemed irrelevant as it was the actual experience that was the foundation for the different characterisations of expectations.

Another example comes from two other users who also saw a potential after having used both defibrillator and EAR at the same time:

> 1. *"It's very time consuming to input everything into the EAR (for example vital parameters), they should come automatically from the defibrillator."*
> - user C (unknown)
> 2. *"Looking forward to when [the EAR] kan cooperate with [data radio] and defibrillator!"*
> - user D (unknown)

In these quotes, user C reveals a common problem he has realised when using the EAR (inputting vital parameters) and as a solution makes clear that an integration with the defibrillator should be there. User D instead takes it for granted that the integration will eventually

come and, as a reminder, mentions this is in the feedback. In this case user C characterises his expectations as "should" while user D characterises them as "will". Both are based on the "want" expectation that their work will be easier with integration.

The very action of users providing feedback would actually have a significant impact on the way they recharacterised their expectations before and after:

> *"All I know is that we had to provide feedback on [the EAR] and [the EMS managers] would communicate that feedback to the Region and they would take it from there, and that kind of creates some expectations. [...]*
> *But I didn't expect [the issues] to be corrected within a short amount of time. We were meant to collect a list of issues and [the EMS managers] would communicate them to the Region, and then they could take the units back and everything would be fixed, that's what we expected."*
> - Paramedic "Karl"

In this quote user "Karl" explains how the EMS managers had asked the users to provide feedback that could be mediated to prehospital management, thus taking care of the feedback. The quote is important because it shows that he did not expect the issues to be fixed immediately (again a time reference) but instead expect that all issues would be taken care of when the units were sent back into use for the third iteration. The characterisation of expectations here is a clear "will" expectation because of the promise made through the initial announcement. Upholding his deal of the bargain meant that the changes to the units were that much closer to coming true. It also shows an implicit desire in the shape of that he wants the EAR to be fixed as well as an implicit "should" expectation based on the assumption that one should keep the promises made. Both the "want" and the "should" characterisations, however, were not the central focus of this characterisation but instead faded into the background and the belief of "will" took primacy.

Another user did not share the same strong "will" belief of changes because he did not view the feedback as a promise made by the prehospital management. Rather, after having experienced the EAR in use he was excited about the changes in the next iteration:

> *"I just think that all of those shortcomings that I have mentioned here, they should really be followed up and fixed [in the next iteration][...]. But I am excited to see how it will look and if there will be any changes or not."*
> - Paramedic "Randall"

The user here describes the shortcomings (which included integration with the defibrillator) as something he felt "should" be followed up on, though he also does not express any kind of certainty. This

can be explained with the fact that the first time the user actually provided feedback about the pilot implementation was during the interview that took place shortly after the second iteration. As a result he did not assume that any changes would necessarily happen, although he did characterise the changes as something that "should" happen for the following iteration.

Other users would draw on even stronger "should" characterisations of their expectations after the actions of providing feedback. The examples referenced from the workshop earlier in section 7.7.1, p. 132 were examples of all three enabling actions during the kick-off workshop, beginning with hypothetical technology in use through the presentation of the EAR and then inquiring the product vendor for their wanted functionality, essentially an action of providing feedback. The reaction to this was then the announcement of not having plans for the integration functionality initially, prompting the users for another round of hypothetical technology use by answering the question of how then their work performance would be impacted and changing their characterisations accordingly. Recalling the user reactions to the presentation at the kick-off workshop, the users were very disappointed that the EAR initially would be nothing but an electronic version of the paper-based records. While the users primarily reacted to experiencing the technology in use hypothetically, the reactions were not in vain though as it was accepted as feedback that enabled prehospital management to realise that this functionality was important. The product vendor and prehospital management's announcement that the functionality was planned in the future actually spawned the recharacterisation of expectations into "hope". During the second iteration then, when users had still not experienced any improvement in using the EAR nor any signs of integration with the defibrillator, they would start venting their frustrations to their respective EMS managers who would continuously reassure the users that work was indeed ongoing. The action of feedback and ensuing experience of the lack of actions taking by management changed their expectations to "must:

> *"And I wrote back to him that it needed to communicate with our dataradio, defibrillator, the ED, and I believe that the placement [in the ambulance] is completely immaterial. [...] As long as that stuff is not working, don't bother asking me where to bolt it. That's not where we should begin at all!"*
> - Paramedic "Karlyle"

The quote here is a reaction to their EMS manager who inquired into what kind of changes could be performed to increase the usefulness of the setup of the EAR. The experience of the EAR in action not only enhanced the user's earlier notion that the problems could be solved by providing the welcomed integration with the defibrillator and the ED. The feedback provided here represented the user's feelings of the disappointment he had felt through experiencing the shortcomings

of the EAR, and he finally had it when he felt overlooked because his "want" expectations, which he had given feedback on, were not pursued. The quote is significant because user "Karlyle" at this point in time had gone through several iterations of the enabling actions cycle, continously believing and hoping for the integration but experiencing that the expectations directed at "want" issues were not fixed, ultimately resulting in his conclusion that the provided feedback was actually not being acknowledged:

> *"I can never be certain that the issues go any further. If I go to my closest [EMS] manager and ask him if the stuff I told him has gone further [...]:* "That I have and please do not think that we are not achieving anything at the meetings, and we are telling them this and that!" *That's where I have to think:* "Then I simply don't understand why we are still having problems if they know what the problems are." *[...] Of course it occurs to me that the stuff I tell them are probably not going any further. Otherwise I must assume that somebody will realise that and:* "Of course, this is not working, let's draw a line in the sand." *So I do not know what goes further and what does not."*
> - Paramedic "Karlyle"

These frustrations of feedback were also voiced by other users because their desires directed at the functionality of the EAR had already been explained such a long time ago:

> *"I told my [EMS manager] that it needs to work so that when I enter the emergency SUV or the clinical ambulance for a dispatch and I haven't written my ambulance record, I can send it to the ED that receives the patient, or the ambulance with the [handed over] patient. We are not even there yet!"*
> - Paramedic "Jack"

In this quote, user "Jack" utters his annoyance that the "want" characterisations directed at technical functionality had still not been met, despite the fact that he had given this as feedback when the project began. The above quote also takes place where the user had gone through several cycles due to the feedback he had given from the beginning of the pilot implementation project. We see here that the user had hoped that the early feedback of his "want" expectations would also result in prospective change at some point in time, characterised by a "will" expectation (denoted by him telling the managers that he needed this functionality rather than simply suggesting it). When he then experienced that this did not happen during the second iteration he would change the characterisation as a strong "should" expectation and at the same time reinforce that his initial "want" expectation was right.

Even though the users had provided feedback of issues that should be improved on, it was still unclear to them what the status of the inte-

gration functionality was, and they did not seem to get any certainty from their EMS managers, despite inquiring about it:

> *"But we could never get a clear answer if we would end with an integration between the equipment or not, if it was possible, but it just would be really really useful, since it would save some time. [...] So we are still waiting for answers on it becoming reality or not, I sure hope so."*
> - Paramedic "Karl"

Here we see the expectations of integration with the defibrillator characterised much closer in similarity to the expectations described in the beginning of the EAR pilot implementation after announcement of the EAR. Contrary to how the expectations of the issues were mediated through feedback by "Karl" , we see that expectations directed at integration instead are characterised as "hope". This differed greatly from other users who, as shown above, had more normative expectations after having provided feedback. Instead user "Karl" describes his feedback as inquiries of possibilities of development rather than "must" or "should".

The diversity in attitudes can be attributed to several reasons. First of all, user "Karl" was not distinctly negative about the EAR (although not positively surprised either) and he proved to be more open towards the pilot implementation EAR technology than for example user "Karlyle" . The sheer attitude towards the project could have proven the user more tolerant for future development thus expressing hope towards the integration now that he had provided feedback in the shape of inquiries. The tolerance for the EAR could also be explained by his previous statement that he had not expected the issues to be taken care of immediately, mainly due to the EMS manager explaining that the issues would be fixed in chunks.

A second explanation could be due to the announcements made by prehospital management as a result of the different kinds of feedback provided by the users. User "Karl" interpreted the action of giving feedback to the EMS manager as a promise from the steering committee that made him confident that issues would be fixed eventually, while no such promises were made regarding the integration with the defibrillator.

Third, it could be due to the difference between issues that the users felt needed urgent fixing and their desired eventualities of development such as integration with the defibrillator. Since the issues with using the EAR were not anticipated at the beginning of the pilot implementation but only became clear in use situations, this may have made the user prioritise fixing those issues first and foremost before the EAR could be used properly again. In contrast, this was not an expectation that was shared by other users as previously explained. Rather, the user mentioned in section 7.9, p. 147 saw that having both integration with defibrillator and ED would solve annoyances

with the setup in one swing. While this user characterised his initial "want" expectations with a "will" belief that integration would come, user "Karl" in section 7.9, p. 146 only characterised expectations as "will" when they were directed at the issues that were fed back, while still characterising expectations directed at integration as "hope".

As mentioned earlier, feedback was also shared between users where they would discuss improvements and technological feasibility in groups around the coffee tables. The following excerpt is taken from my ethnographical notes in the last week of the second iteration where use of the EAR had strongly waned to the point where the users would give any excuse not to use the EAR as they literally dreaded it:

> *"During the discussion the two EMS crewmembers cover a huge area. One member mentions that he honestly had thought that the basic dispatch information would be sent directly to it when they were dispatched from the dispatch centre. Because of the time they spent on filling out the EAR they think that they should be three crewmembers on the ambulance in order to make it in time. They all agree that the training process was too short and too fast. They should have had more time to prepare for the EAR because they quickly felt insecure by using it. When this insecurity set in they would simply revert back to the old paper-based record because they knew how to handle that. One of the crewmembers mention that:* "My only ally is my ambulance record and psychologically I am thinking more on that s*** than on the dispatch." *The EMS crewmember then mentions that the technology is possible and points out the technology behind most Apple products available.*
>
> *It becomes very real to me that motivation and willingness are very low and the discussion borders between being completely negative or outright destructive. Negative because the users have so many suggestions for better ways to design and implementing such an EAR technology. Destructive because the users have found a loophole in their instructions by EMS managers that told them to go back to the paper-based ambulance records if they felt that it would impact the treatment of the patients to use the EAR. Some of the other crewmembers even came with a sigh of relief when he was told that the EAR had been forgotten at the mechanic when the ambulance was sent in for repairs."*
>
> - Excerpt from ethnographical notes, October 2011

The excerpt shows that much of the informal feedback that the users shared between each other contains very normative statements about how they felt that the EAR product and process "should" have been. It shows that at some point the users had characterised their expectations as "will" expectations, but now after experiencing the EAR in use, their informal feedback to each other simply reinforces normative characteristics of what someone else "should" have done.

7.10 SUMMING UP GIVING FEEDBACK

In this section I have shown what can only by described as very diverse patterns of characterisations of expectations as a result of feedback from users to EMS managers and between users themselves.

Much of the feedback between users and management group would be provided as a result of experiencing the EAR, either through actual use or through hypothetical use. Since the strategy from the prehospital management was to collect issues in large chunks and take actions on these issues accordingly, users quickly recharacterised their expectations directed at critical issues as "will" and "hope" immediately after giving formal feedback to the EMS managers. However, as shown earlier in the section about experience (see section 7.7.3, p. 135), depending on how much time went by, how many times the users would experience the same issues, how the users described the issues in terms of criticality, and how they interpreted announcements given to their EMS managers when they again inquired into the status of the project, the users would eventually recharacterise these expectations as "should".

The expectations involved in the feedback were directed at two areas of the EAR pilot implementation: a) usability issues that made it difficult for the users to complete their documentation; and b) further development of the integration with defibrillator and ED. Some users found that the EAR should be usable first and foremost without having integration and thus characterised expectations as "will" towards the usability issues and "hope" towards the direction of integration. Other users believed that the integration would also fix many of the usability issues and prioritised the integration first and foremost as something that "should" be fixed, even demanding this at the end of the pilot implementation. This could be explained though with the fact that these users also expressed that they as early as the beginning of the pilot implementation had given feedback to what they "wanted" of functionality in the EAR.

The second part of the feedback actions revolved more around informal feedback between the users themselves as a result of experiencing the EAR. These actions seemed to reinforce the expectations characterised as "want" and through social agreement the users would eventually recharacterise their expectations as something that really "should" be done by the steering committee.

This has led me to construct two different figures to encompass the results of the feedback actions. In figure 25, p. 152 I have illustrated the influence on the expectations coming from the formal feedback given to EMS management. Arrows represent recharacterisations from what the users "want" and what they thought "should" be done to more confident "will" expectations, or at the very least "hope" immediately after having provided formal feedback to EMS

management. In figure 26, p. 152 I have illustrated the immediate results of the social actions of discussing the experiences between the EMS crewmembers where the arrows primarily move to "should" from "will" and "want" after having experienced the technology in use, hypothetical or not.

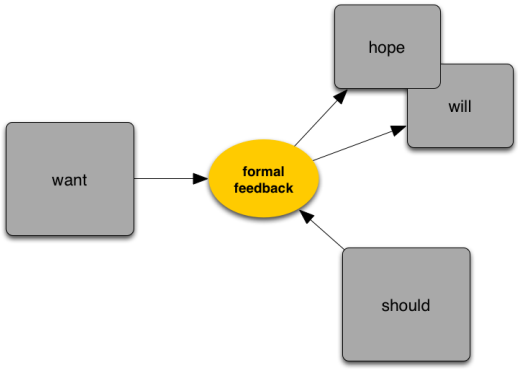

Figure 25: Figure of the characteristics of expectations after having provided formal feedback to the EMS managers.

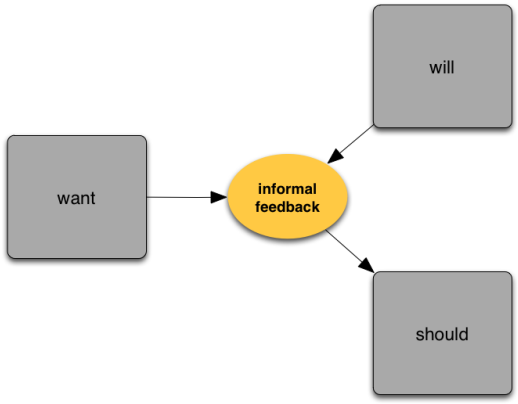

Figure 26: Figure of the characteristics of expectations after having provided informal feedback among the EMS crewmembers.

The general characterisations showed that feedback seemed to only impact "will" and "hope" expectations for a certain amount of time until the expectations would later be changed into "should" characterisations based on experiences (or lack of the same) of the issues.

7.11 SUMMING UP THE FINDINGS

In these comprehensive findings I have attempted to present the complex process of "expectating", denoted as continuously changing directions and characterisations of expectations.

7.11.1 *The expectating framework and characteristics of expectations*

The characteristics from the expectating framework were applied to the case study and resulted in the following:

- Desires and ideals (leading to "want" characterisations of expectations): this way of characterising the users' belief mainly revolved around what they "wanted" from an ideal point of view. Desires were influenced by a multitude of sources of which I have only touched upon those that directly were bracketed to technology, either from rumours of other ISs in use or from reflections on the existing work practice. These socially narrated stories of technological awareness would strongly influence the desires of the users and in turn how they characterised their expectations directed at technology.
- Certainty and uncertainty of what would come next (leading to either "will" or "hope" characterisations of expectations): this way of characterising expectations emerged from the classic understanding of expectations of IT: "will" expectations as a belief of certainty of a future state of product features. However, the users mainly mentioned the directions of expectations as either "will" and "hope" when they were also characterised as "want" at the same time. Other features of the EAR that were not directly "wanted" were not mentioned explicitly, even though they were also announced at workshops by the product vendor. In the cases where the users were not completely certain of a set of features they would characterise their expectations as "hope" instead of "will". "Hope" was equally rooted in desires that they had of the ideal EAR IS but with less certainty than when characterising expectations as "will". The distinction between the two characterisations of expectations here was thus that "will" expectations were rooted in certain belief that could be rooted both in desirable features and features held indifferently), while the "hope" expectations were rooted in uncertain hope of desirable features. Many users also deliberately chose to not use the word "expect" and would instead use "hope" in order to attempt not to be disappointed. However, their ensuing recharacterisation ended up as "should" or "must" either way, so the end results of these characterisations were found to be similar.
- Normative assessments of past and implied future (leading to "should" characterisations of expectations, eventually ending as "must"): this way of characterising was based around what the users thought was reasonable to expect but primarily based on assessing their past experiences and as such, the characterisations of expectations only changed to "should" and "must" when the users also compared previous experience or techno-

logical awareness with experience already gained with the EAR technology or IS. These normative assessments were based on a level of tolerance of the users and would, depending on how many times the users had experienced something (or the lack there of!), eventually change to demanding changes to the EARs, often resulting in non-use.

Users further characterised their expectations both as "will", "want" and even implied a "should" at the same time. They would sometimes even recharacterise their expectations as they kept reflecting on how the events and actions affected them. As a result, I chose to denote the concept "characterisations" as opposed to "types" or "categories", since they were far from mutually exclusive.

7.11.2 *Influence of enabling actions*

Interesting dynamics occurred when characterisations were narrated as changing during the pilot implementation. The users reacted to actions taken by themselves or others in the project, and I coined those actions "enabling actions" that led to recharacterisations of directions of the expectations. I have shown three overall enabling actions that each led to recharacterisations.

First, the enabling action of "announcing" primarily led to characterisations and belief in "will" expectations. This belief however, was strongly linked to the desires of the participants ahead of time, meaning that when announcements were made from the steering committee, users chose to trust these announcements and hold them as belief of that at a given time in the future the announcements would come true. A further interesting aspect of the recharacterisation was that many users prior to the pilot implementation drew both on "want" characterisations of certain features of the EAR but would also hold an inept "hope" that these features would come once the EAR was announced. In some cases the very announcement of the EAR would lead to a recharacterisation of expectations moving from "hope" to "will" while in other cases some users merely moved characterisations from "want" to "hope" because they were not completely certain of it.

Second, the enabling action of "experiencing" technology contained two different aspects in terms of experiencing a new work practice through using the technology, and experiencing the events in the pilot implementation unfurl. Experiencing the technology in actual work practice enabled the EMS crewmembers to realise what parts of the expectations would actually be realised by the EAR. This had two overall consequences. Those expectations that were characterised as "will" expectations that also corresponded with the functionality of the EAR were not mentioned to have any real effect but instead seemed to be taken for granted. When called to attention the users

would merely answer that that was how they had expected and how it should be so there was no reason to give any feedback on that. However, when the users experienced a discrepancy between the EAR and expectations characterised as either "will" or "hope", the users would often recharacterise their expectations into normative "should" expectations. It mattered not whether the expectations directed at features were characterised as "will" or "hope". Upon experiencing the EAR in practice the users were still disappointed and recharacterised their prior expectations as "should". This indicated that the announcement of planning or project updates would only influence the users' characterisations of expectations very little, slowly moving towards the inevitable normative characterisation of should.

Experiencing events unfurl in the pilot implementation process would have a more diverse impact on characterisations of expectations as it highly depended on the type of event experienced. Events where users were actively involved in making the EAR better, such as in redesign workshops, would result in the users being positively reinforced which in turn changed their characterisations of their expectations to be more hopeful for the future process. They were still not certain if or even how the actual changes would look when they came back. However, the users' involvement in the process by fixing issues themselves would correspond to their desires for change, thus making their expectations hopeful towards the project. Experiencing episodes of time going by, however, had very mixed impact on the characterisations. The longer reconfiguration and development took for changes to come in one instance would make one user recharacterise his expectations as "hope", in his mind certifying that development was still going on. Other users would simply give up due to the long duration of time where nothing seemed to happen. These users did not remove their expectations but would instead reprioritise the directions of their expectations with the characterisation that actions "should" have been taken sooner, either via announcements of project updates or simply by formally pulling the plug.

When users looked back at the experiences they had with training events they would bracket their prior expectations for the events with their following experiences with the EAR in order to assess whether or not they were satisfied. They were not. The users showed a clear movement of characterising their prior expectation either as "will" or "hope" to normative "should", also implying that any future training course should be improved on.

Third, the results of the enabling actions of "giving feedback" could be seen as similar to that of announcement. When the users gave the EMS managers formal feedback they would afterwards characterise their expectations either as "will" or as "hope" depending on the type of issues they gave feedback on. If the feedback revolved around usability issues or even critical problems that simply ruined the pos-

sibilities of completing the documentation, the users would assume confidently that these issues would be taken care of as quickly as possible. However, on feedback revolving around desired features such as data integration, the users characterised these as "hope".

Informally though, users would also give feedback to each other, either by helping one another or by telling stories of their problems. This kind of feedback would make the users collectively recharacterise their expectations into "should" and "must" characterisations.

7.11.3 *Influencing characterisations rather than directions*

While it seemed relatively easy for the steering committee to influence recharacterisations of expectations through announcements, users did not seem to remove their directions of expectations. Instead they were simply reprioritised into what the users believed was feasible at the time and once e.g. a piece of functionality was finished, the users would direct their expectations towards a new area of directions believed to have an impact on an overall outcome. Furthermore, it seemed there was a highly individual limit to how many times the steering committee could influence the recharacterisations of expectations through announcements or the amount of times that the users would give the same feedback before eventually turn negative and recharacterise their expectations into "should" and "must" no matter what was announced later on in the project.

7.11.4 *Examples of changing characterisations of expectations*

Figure 27, p. 157 shows an overview of the most anticipated direction of expectations: integration with medical equipment in the ambulances.

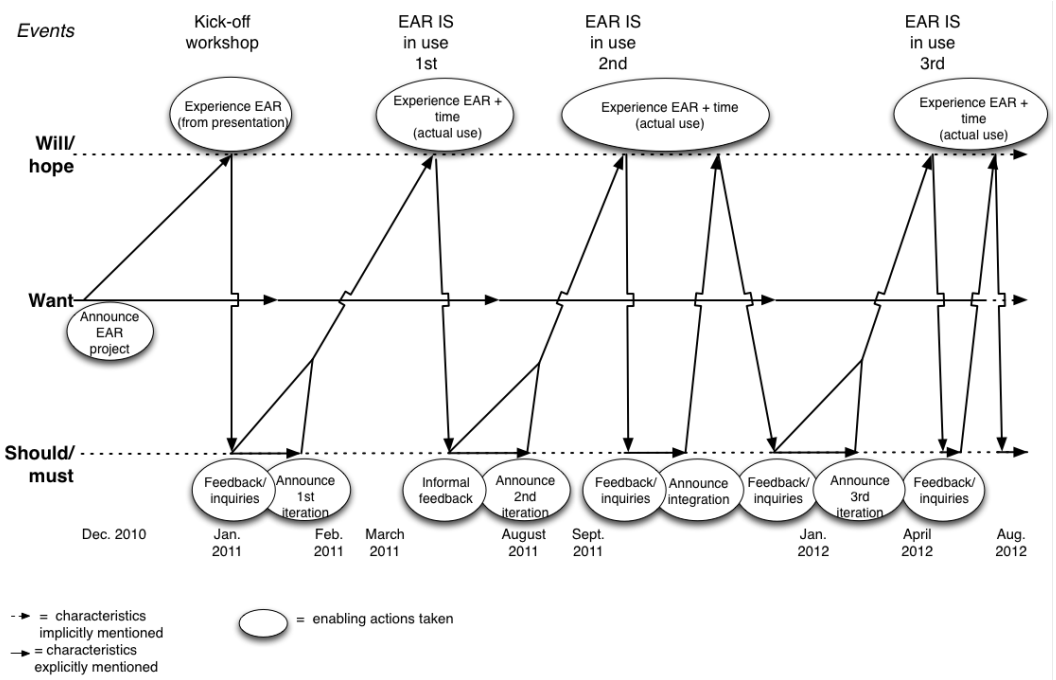

Figure 27: Figure of the most anticipated direction of expectations: the integration with medical equipment in the ambulances.

The figure should be read from left to right as a process model. Note that the "want" characterisation of integration with medical equipment is a constant while the "will" and "should" characterisations keep changing as the users experience the different enabling actions. Each enabling action is denoted as a circle that initiates a new change in the characterisation, denoted as a new arrow. Events are denoted in the top of the figure. Punctuated arrows show when the characterisations were not made explicit. The "want" characterisation is as such explicitly present until the 3rd iteration where the expectation is fulfilled. Notice also that some enabling actions combine and reinforce characterisations of "will" shown by two arrows combining into one, e.g. after the kick-off workshop. The only real constant in the figure is the belief of "wanting" automatic integration with medical equipment, though in the third iteration this is not explicitly mentioned by the users and they instead directed their expectations towards more specific aspects of what they thought "should" come as the next step in the ISD project, actually changing or reprioritising directions of their expectations. Before announcement of the EAR technology there was no certainty of what the users would get (or if they would even receive such technology), all they knew was that they desired an EAR IS like what they had heard through their technological awareness narratives. As such the arrow is punctuated in the beginning before announcement of the EAR but solidified as soon as the EAR was announced since the users were now convinced that they would get integration from day 1. However, as it was revealed at the kick-off workshop or when other users got their hands on the EAR, they would realise that integration was not a part of it. As a result, they recharacterised their expectations directed at the integration as "should". During events of non-use the expectations were then characterised as "will" or "hope" while they actually changed into normative "should" expectations when experiencing the EAR units in practice. The recharacterisation into "should" was enabled both through the action of drawing on the technological awareness narratives but also through stories of use as informal feedback among the users themselves where they collectively agreed on what they believed the steering committee "should" do as their next moves. Up to technology use and based on the actions of providing formal feedback to their EMS managers, the users then again recharacterised their expectations as "hope" or "will" depending on what they had heard announced or rumoured. The "should" and "must" characteristics in the model is thus kept punctuated because the users' expectations were actually still implicitly based on norms while they e.g. got their hopes up for new changes later on. I have chosen to combine "will" and "hope" because of the similarity between them in terms of certainty and uncertainty. Similarly I have chosen to combine "should"

and "must" due to their more absolute and negative connotations that followed these narratives.

A solution is only a beginning.
Answers raise questions. That's what
you've got to look for. New questions
for existing answers. Finding [the] broadest
range of applications for one's novelty.
That in turn, requires broadest meandering
in fields of nature, and knowledge of as
many puzzles as possible..

— Robert S. Root-Bernstein
(Root-Bernstein, 1989, p. 191)

8 DISCUSSION

The structure of this chapter is divided into six sections. The first three sections will discuss the findings in relation to my overall sub-research questions in order to answer how the actual findings contribute to the existing body of knowledge on user expectations. In the first section I will also shortly include a discussion of how I have attempted to contribute to the 5 research gaps presented in the literature review (chapter 4) in order to show the "interestingness" of this dissertation. In the fourth section I will discuss the implications of the findings, in the fifth section I will discuss the limitations of this study, and in the sixth section I will point to areas of further research.

8.1 SUB-RESEARCH QUESTION 1: AREAS IN NEED OF FURTHER RESEARCH

In this section I will discuss the findings in relation to sub-research question 1 (*"Which areas of research on user expectations in IS are in need of further research?"*).

This dissertation adds to the understanding of user expectations not only in a new context of ISD but also in the context of actually exploring the area qualitatively, and by taking a more explorative approach to finding a feasible definition and separation of the many uses of expectations. Through a structured review of the IS literature on user expectations I identified 5 research gaps that I wanted to contribute to through: *"a direct* (gap 3, p. 39)*, interpretative, exploratory research focus* (gap 1, p. 32) *on how users change their expectations* (gap 5, p. 45) *in terms of directions and characteristics* (gap 2, p. 35) *in an organisational prototyping* (gap 4, p. 42) *ISD context* (gap 3, p. 39)*."*

8.1.1 *Contribution area 1: taking an exploratory research*

With the expectating framework I have attempted to shed light on the problem of the variety of definitions of expectations in IS that

has been problematised by e.g. Khalifa and Liu (2003). Expectations may indeed be a broader construct than first anticipated and I argue that we must be careful of uncritically assessing and predefining the concept of expectations prior to going out in the field since crucial information may be missed. I argue that predefining expectations as consisting of determinants like in the SERVQUAL model (Parasuraman et al., 1985) or as being purely directed at probable attributes and performance as denoted by various EDT studies certainly has been suitable for shedding light on satisfaction and intentions of usage in IS implementation and usage projects, though in ISD projects these narrow definitions may not be enough. They may even muddle measurements performed if one does not exert oneself into understanding the contextual factors of expectations.

8.1.2 *Contribution area 2: definitions of user expectations*

Expectations were found to be more dynamic than categorising them into a single type. Surely this makes it easier to measure expectations though it also runs the risk of encapsulating only the present expectations at a given point in time without knowing "why" they have changed to their present state and whether they have changed in the meantime. Instead I argue for treating expectations as dynamic processes that are constantly reevaluated and changed by the users, individually as well as collectively. One explanation I find in this dissertation as to why the various cognitive standards of "will", "want", "should" and "must" may be defined differently from study to study is that the findings of this dissertation pointed to users rarely confine their expectations to be expressed with only one characteristic. The characteristics simply do not seem to be mutually exclusive of one another, as previously indicated by a.o. Miller (1977); Boulding et al. (1993); Miller et al. (2008) and Teas (1993) who all treated expectations to belong to one type, class or category. I argue that separating expectations into types and assessing them as separate constructs as defined by many EDT and SERVQUAL studies (Suh et al., 1994; Pitt et al., 1997; van Dyke et al., 1997; ONeill et al., 2003; Khalifa and Liu, 2003, 2004; Nevo and Chan, 2007; Halilovic and Cicic, 2013a) may not be as separate as once believed. The findings indicated that users associate directions of expectations closely and that their expectations can span several mutually inclusive characteristics when articulated as a narrative process. I claim this not with 100% certainty since the limitations of the method made it difficult to be completely sure when and why users changed directions of expectations or simply drew on several characterisations at once. An example of this was their dissatisfaction of the lack of data integration where certain users characterised their expectations as "should" though whether it was a completely new direction aimed at the actual functionality or more like putting

blame on those responsible for developing the functionality was not completely clear.

Contrary to EDT, these expectations are directed towards means (denoted as *directions)* towards several abstract outcomes. Contrary to the marketing literature and the discussion on which cognitive standards to use as measurements for expectations, users apply more than one characteristic to their expectations at a time depending on the present experiences of ongoing events in the ISD project. Thus I have argued to define expectations as having specific directions (derived e.g. from the SERVQUAL model) towards abstract, future outcomes (derived from EDT and SCT), yet also consisting of a plurality of characterisations, drawn from Boulding et al. (1993); Pitt et al. (1997); Khalifa and Liu (2003) as the basic theoretical foundation. I will also argue that these were characterisations that cropped up from the specific case in a field-dependent manner. It is entirely likely that other characterisations (of which I actually found "hope" to be a contender) also exist in other areas and cases of ISD.

In the findings of this dissertation users drew on different characterisations depending on the actions they experienced and the time they participated in the specific process. This can account for some of the confusion that has emerged that "should" expectations may seem similar to ideals or "wants", when they were also sometimes characterised through a seemingly logical reasoning process in terms of what the users believed was feasible.

"Hope" was also identified as a characterisation that ranked alongside "will" in terms of the impact on how users changed their expectations. This is a really important finding seeing as most EDT studies so far have only probed for "will" (Szajna and Scamell, 1993; Mahmood et al., 2000; Spathis and Ananiadis, 2005; Hsieh and Wang, 2007; Nevo and Wade, 2007; Doong and Lai, 2008; Petter, 2008; Au et al., 2008; Venkatesh and Goyal, 2010; Brown et al., 2012) and/or "want" expectations as well (Suh et al., 1994; Chin and Lee, 2000; Nevo and Chan, 2007). Even Santos and Boote (2003) who included levels of tolerance into users' expectations did not include "hope" as a type of expectation. This could be because "hope" can be seen as a combination of "want" and "should" and contains a degree of uncertainty. However, this does not take into account those users who were completely certain that what they would get corresponded to their desires, while other users merely expressed that they might get what they desired. Nor did "hope" fall into the category of pure "want" since there was some degree of feasibility connected with "hope" while pure "want" expectations could basically be anything resembling the notion of the ideal system.

I also argued that "hope" can be connected to "will" since it definitely had the same impact on the dissatisfaction by the users though the two characteristics differ in terms of certainty. However, it is just as likely that it can actually be seen as a standalone characteristic of

expectations that should be dealt with accordingly in future research. Users attempted to use "hope" as a defensive characteristic for not wanting to expect anything, believing that they would not get disappointed this way. However, this strategy did not work because they would still recharacterise their expectations into "should" after having experienced too much time going by or the technology in use.

No matter if "hope" is a separate characteristic of expectations or could be defined to belong to either "want" or "should" it should still not be ignored as it seemed to play a strong role in the users' attitude towards management.

8.1.3 *Contribution area 3 - management strategies*

The majority of the IS literature on user expectations showed to prescribe management to be proactive or reactive to influencing users' expectations. For example, Szajna and Scamell (1993) proposed that one should not propose more than can be delivered. Brown et al. (2012) recommended to set the expectations low because it may be difficult to meet them once they are promised. Boulding et al. (1993) proposed that "will" expectations should be adjusted upwards and "should" downwards for maximum effect. However, they also claimed that no such attempts have been made in the expectations literature so far, prematurely concluding that it is impossible. Ryker et al. (1997) claimed that organisations are better capable of controlling internal sources of expectations as opposed to external sources because they can control the process better, for example in the shape of a prototyping process. These strategy proposals also assume that management has a strong control over what the users actually believe. Rather, the findings of this dissertation found that users were much more in control over what they believed themselves than what management told them, especially since the user constantly would verify and compare the pilot implementation IS with what had been announced previously. As a result users found their expectations to be rather feasible, fair and realistic in relation to the narratives of technological awareness they shared among themselves. This is quite interesting in regards to the general IS literature proposing that users expectations are often unrealistic compared to the capabilites of the technology or the point of view of managers Keil et al. (2002); Schmidt et al. (2001). Furthermore, the strategy of involving users and giving them hands-on experience with the technology product in use will indeed remove a lot of insecurity and make users reflect on specific solutions rather than abstract ones. This might just be the reason why prototyping and participation studies like Tudhope et al. (2000) believed that user expectations seemed to be better aligned in ISD projects using prototyping since users would keep wanting certain functionality of the technology but did not know when they would get them.

Participation in events would actually give the users more hope for the future, even convincing them to characterise their expectations as "will". This specific finding was similar to that of Nevo and Chan (2007) who claimed that "*the existence of desires can mitigate the impact of expectations on satisfaction as users look forward to the positive benefits of their desires' future realization.*" (Nevo and Chan, 2007, p. 298). However, the proposed benefits of aligning users' expectations realistically or aligning developers' mental models with users' as Shand (1994) proposes were not found in the present case study of this dissertation. Quite the contrary. Where Nevo and Chan (2007) found users' "want" expectations to mitigate the impact, this dissertation found the mitigation to only be a temporary solution. Instead the prototyping approach and the prospect of change mitigated the expectations of the users and made them recharacterise their expectations from "should" to "will", "want" and "hope", though only temporarily[1]. This gave rise to make it seem that users' expectations had been "managed" up until they then experienced the next version of the prototype. However, their expectations had in fact only been temporarily mitigated until the users realised that something else needed to be changed in order for the technology to work better. Seeing as the majority of the directions of expectations were not influenced by or originated from management, the control of the expectations was mostly in the hands of the users, only leaving management to influence the existing expectations through reacting to users' feedback through announcements. In organisational ISD prototyping it seems to be important to balance all three approaches and not rely on a single one due to the cyclical nature of actions that are taken in the project. With the findings of this case, I argue that iterative prototyping and pilot implementations as representatives of technology in use projects are not the holy grail of ISD, despite the fact that creating possibilities for participation and involvement of users have been called for as solving the gap in perceptions and expectations (Lin and Shao, 2000; Mahmood et al., 2000; Roberts et al., 2000; McKeen and Guimaraes, 1997). In the general literature there is a consensus that technology use will make user expectations more convergent with the technology itself as users gain more routine in using the technology (Bhattacherjee, 2001a; Nevo and Chan, 2007). Instead, the findings of this case found that routinisation was never really attained.

Involving users early and letting them gain experience with the technology in use in the pilot implementation was clearly a tradeoff. While prehospital management may have learned a lot of how to drive projects as well as what was needed for the users to be satisfied, the general user attitude and satisfaction greatly suffered from this

1 Although the actual duration of time before users "wear" out their patience is yet unknown but should be taken up for further research in a fashion similar to e.g. the study of Tyre and Orlikowski (1994).

to the point of creating very low levels of tolerance towards the next iterations. This showed that iterative development is not just a matter of learning about the organisational context for developing purposes, it is also about consistently (and quickly) responding to change as quickly as possible since users grow weary from using technology too long without them realising and feeling that their own feedback is turned into actions of desired change. Eventually the expectating process of users recharacterising the same directions of expectations ended up as "must" and "should" characterisations and ended with actions of non-use with the technology, even despite the fact that users had been involved in changing the EAR technology themselves.

It becomes a matter of making a choice of when one wants to discover that users are dissatisfied; early in the process before the technology is completely finished and cheaper to reconfigure or late in the process when the technology is finished and most of the final design decisions have been made (Pozzebon and Pinsonneault, 2005).

I will thus end this section with suggesting that taking an experimental, organisational iterative prototyping approach (e.g. pilot implementations) can be outright problematic for the organisations engaging in them but that it ultimately is a tradeoff between who will learn from them. They can create valuable learning and knowledge but can also come at the cost of distrust from users towards the stakeholders as well as fueling users' existing normative characterisations and tolerance for future ISD projects.

8.1.4 *Contribution area 4+5: Sub-research areas of IS and changing expectations*

Originally most expectation theories were derived from marketing, though over the recent years many IS scholars have claimed IS to be an area holding unique contextual factors that also require the theories to be altered accordingly (Khalifa and Liu, 2003):

> *"Most IS studies [...] overlooked the possibility that some unique IS contextual factors may potentially impair the validity of the theory, which is originally developed and tested in conditions that are very different from the IS environment"*
> - Khalifa and Liu 2003, p. 43

Khalifa and Liu (2003) unfortunately does not explain what these contextual factors were other than being more "dynamical" than other products or services. These dynamics also showed itself in the present case study: All participants saw the project as a development project where change would be ongoing as it went along, a so-called *prospect of change*. This specific factor was important because it separated this case study from prior expectation studies involving disconfirmation and its impact on satisfaction and usage with IS services or products

taking place in cases where the IS has been used for a long time or recently implemented. The prospect of change for the IS was important because in so far that users were highly motivated for the change that a new EAR would bring about and thus also very explicit about their "want" expectations. It is also entirely likely that working with IS with dedicated development and support teams simply creates a very basic premise, namely that of creating a prospect of change, whether it be version changes, bug changes or critical software issues that all stakeholders feel should be corrected sooner rather than later.

Some of the claims on how users change their expectations from the literature review section 4.1.6, p. 42 were that in IS processes, users will lower their expectations as they gain more experience with the IS or learn to cope (Khalifa and Liu, 2004; Zamani et al., 2013). The findings of this dissertation did not show that users reduced their expectations of the ISD project. This can be explained as the difference between the settings of the afore-mentioned studies compared to this study.

Nevo and Chan (2007) made the strong distinction that "will" expectations were future-oriented and mendable through information while "want" expectations were present-oriented and stable. I argue that this distinction is very difficult to make, since expectations characterised as "want" and "hope" were just as future-oriented in terms of the hope that users held for the future as management took new actions made new announcements. New directions characterised as "want" would also seemingly emerge when prior expectations were fulfilled, either by specifying further what the users wanted or by coming up with new wishes they hoped would be taken care of in the future. As such it might be more precise to argue that "want" expectations are stable in characterisations and directions as long as they are not fulfilled.

These findings also differed from those of Boulding et al. (1993) by showing that "will" and "should" characterisations did not as such influence each other. Rather it was the influence from enabling actions that linked the expectating process together and strongly influenced prior directions characterised as "want". Mapping these changing characteristics as a process model also showed how experiences with the technology actually influenced the characterisations and directions of expectations, a finding very different from that of previous EDT research as well as from Boulding et al. (1993) where "will" expectations primarily influence how users perceive their experiences and in turn evaluate their experiences.

8.2 SUB-RESEARCH QUESTION 2: WORK CONTEXT INFLUENCING USER EXPECTATIONS

In this section I will discuss the findings in relation to sub-research question 2 (*"How does the specific work context influence the user expectations that exist prior to an ISD project?"*) and sub-research question 3 (*"How do actions taken influence user expectations in an ISD project?"*).

The analysis of the values of the core mission in EMS work revealed that in addition to regular types of medical work proposed by Strauss et al. (1997), a work type of balancing these work types was an important part of the EMS work, since EMS crewmembers are solely responsible for the patient treatment up to patient hand over. Users wanted the EAR to support balancing their work and core mission and so their expectations were directed first at specific functionality relating to the technology and later to the expectations that the training events would make them reach these outcomes. These directions of expectations were found to be strongly influenced by stories of technological awareness prior to the announcement of the EAR pilot impementation. As such it became relevant to look at how users characterised their directions of expectations rather than primarily on product performance of the technology as prior EDT studies have done.

8.2.1 *On origins vs. influences*

The discussion of origins leads to whether or not expectations are "created". In the findings I deliberately used the word "origins" as a logical denominator, not as an empirical one, since it is extremely difficult to denote where beliefs originate from. The reason I bring this up relates both empirically to the case where two superusers in the third iteration deliberately attempted to not have expectations but it is also a discussion brought up by Au et al. (2002) who claimed that it can be problematic to specify expectations when users have none (Au et al., 2002, p. 455). In the case, even though users would claim that they had none or tried not to have any expectations, they still ended up being disappointed and recharacterised their expectations as the project moved on.

For this reason, I claim that not having expectations is close to impossible since users will have invoked some kind of expectations as soon as announcement actions are taken by a stakeholder. What users remember are often those beliefs they found important in the ISD project, not whether or not they corresponded to their prior narratives of expectations. For example, Brown et al. (2012) also drew on specific events such as workshops as a type of source. In the case of the present case study findings, these types of events were also evaluated in terms of how users believed the events could have been performed better and have given the users a better foundation for how to use

the EAR. Venkatesh et al. (2011) for example also find that social influence is a major factor in influencing users' expectations. This implies that events should not be seen as a source of origin but rather as a source of influence and enactment of past experiences and social stories, since it is the intersection between the two that determines whether or not they are remembered throughout an ISD project.

8.3 SUB-RESEARCH QUESTION 3 AND 4: ACTIONS AND EXPECTATIONS

In this section I will discuss the findings in relation to sub-research question 3 (*"How do actions taken influence user expectations in an ISD project?"*) and sub-research question 4 (*"How do user expectations influence the actions taken in an ISD project?"*).

One of the contributions by applying the framework of expectating to the case were to identify the enabling actions of: "announcing", "experiencing", and "giving feedback" that the users claimed were the reasons for their recharacterisations of expectations. By introducing actions into the framework of expectating, it can be viewed to expand on and complement the conceptual framework suggested by Bhattacherjee and Premkumar (2004) who divided expectations into pre-usage beliefs and post-usage beliefs using the construct of disconfirmation. While I agree with the claim of Bhattacherjee and Premkumar (2004) that a significant change in belief occurs as the users experience the IS, the findings show that there is also a need to further conceptualise and understand the changes of these post-usage beliefs. Users actually keep recharacterising their expectations as they experience actions that impact the product and process and not only the experiences of the technology itself. Showing this reason for recharacterisations of expectations is one aspect of the area of research on changing user expecations that has previously been called for by among others Boulding et al. (1993); Szajna and Scamell (1993); van Dyke et al. (1997) and Bhattacherjee and Premkumar (2004).

Actions taken in the project were experienced by the users in a cyclical manner. Users would actually go through this cycle of recharacterisations and redirections of expectations as they began each new shift from day to day, simply because they kept hoping that changes now would have come. However, due to the EMS context, users felt that they by no means could be asked to wait for changes to be made in the formal manner, and quick informal workarounds were quickly designed, either by prehospital management, EMS management or the users themselves. This is very similar to what happened in the study by Lim et al. (2005) who found that users react to management actions based on their preconceived beliefs of the purpose of the IS (Lim et al. (2005) researched an ERP implementation). An explanation for why the workarounds happened and the EMS crewmembers used

the EAR units less and less could thus be found in the fact that the users' directions of expectations hardly changed, though their recharacterisations of what they found the most important *did*. This was also a classic example of the discussion on expectations as vectors or as ideal-points that a.o. Pitt et al. (1997) brought up. As long as the particular type of change that the users directed their expectations towards did not happen, they would constantly get their hopes up every time they punched in in the morning and booted up the EAR units, completely disregarding other changes to the technology because the ideal, desired change did not happen yet. The directions of functionality however, differ from the findings of Gorla (2012) who finds that users have the widest zone of tolerance towards tangibles, the functionality of the service products. This ccould be because this dissertation takes a longitudinal approach and identifies that users are somewhat tolerant in the beginning of the ISD project towards the tangible dimension (such as data integration between electronic equipment) while later in the project they very quickly recharacterise their expectations as "should" and "must" showing a narrow zone of tolerance.

These findings also complement findings by Venkatesh and Goyal (2010) who found that negative experiences would influence the users' evaluation stronger than positive experiences. When directions of expectations were strongly desired this simply proved more important to users than when they were not. The users made no mention of other directions that were not desired yet still rooted in "will" characterisations. Only expectations also considered as issues that needed fixing in order to achieve the abstract outcomes were mentioned by the users after having experienced the EAR in use. This may be seen as a result of the level of importance of desires that then are reprioritised as the project moves along. Maybe the users realise that they did not need that particular feature anymore due to an equally effective workaround and the desires for the feature become less prevalent in their characterisations.

The existing strong "want" expectations from the users can also shed light on the findings by Brown et al. (2012) that even positive disconfirmation where users are given more than they thought they would get can actually be rated negatively. When experiencing technology that do not correspond to any directions of expectations characterised as "want" and the technology also fail to correspond to the overall outcome expectations, users simply do not care or will feel overwhelmed by functionality.

The findings here strongly supported that while desires and ideals may be more stable than other characterisations, they should still be taken into account and not merely dismissed as irrelevant (as for example done by Au et al. (2002)) since they play a strong role for influencing users' characterisations of expectations.

What can be derived from this, however is not to attempt to discover whether or not the users speak "the truth" about their expectations but rather to discover *how* the users frame their expectations when actions are taken and whether or not they merely change characterisations or actual directions.

Khalifa and Liu (2004) found that experience-based norms were difficult to use as a cognitive standard when users had little experience with existing or similar ISs. My findings similarly supported this with a few differences. Even the users who did not have any experiences to compare to either drew on other EMS crewmembers' existing technological awareness and stories of ideal ISs (for example in the case of the amPHI that was mostly just rumours), or they would quickly gain experience with the EAR or other events in the pilot implementation process to evaluate their satisfaction nonetheless. They quickly garnered experiences to make sense of and recharacterise their future expectations as "should" eventually. As such, experience-based norms played a very strong role in users' characterisations of expectations and contrary to the findings of Susarla et al. (2003) who found that experience-based norms did very little to impact satisfaction and that it was indeed the belief-based expectations, defined as "will", that had the biggest impact. This may indicate that "will" expectations may be important to measure but it is not until they have been recharacterised continuously into "should" expectations that the negative evalutations of the process and product emerges.

8.4 IMPLICATIONS

The knowledge on user expectations prior to this study was that users' expectations could be categorised either as "will", "want", "should", or "must" expectations and also measured as such. What is now known from the ISD case is that a fifth type is used by the user in their narrations ("hope") and that it seems more likely that they are actually characteristics rather than types or categories. This rather radical opinion is reasoned in how the users themselves narrated their expectations. As a result it can actually explain many of earlier studies' sometimes contradictive findings of user expectations since they have mostly limited themselves to only focus on one to two of the types. For example in Mahmood et al. (2000) who found that meeting expectations were important but not the determining factor in satisfaction with IS, Au et al. (2008) found that user expectations were not important at all, while Brown et al. (2012) found that positive confirmation of expectations had a high correlation to satisfaction with the IS. If user expectations indeed are narrated as characteristics it means that a much broader definition is required when assessing the users' expectations.

What one can instead hope for in ISD projects that involve a strong element of technology use is to make expectations more specific through experience and listen to how users are characterising their expectations; either as "want", "will", "hope", "must" or "should". Even more importantly the directions of these expectations should be assessed as users may direct their expectations towards many areas in ISD as the process continues.

Practical implications from this study is to stop trying to control user expectations in ISD projects since how the users decide to change their expectations is a result of their experiences, actions and other announcements taken in the project. Users' expectations will continuously change no matter which actions are taken and this could indicate that it is a basic condition for ISD projects that focus on iterative prototyping scenarios such as pilot implementations. Methodically, the expectating framework may be used to map the process of user expectating continuously as actions are taken to progress the project. Assessing expectations as both directions and characterisations may actually show what needs to be addressed in a prioritised sequence, since those expectations that are recharacterised in a loop of "will", "want" and "should" must also be those that need to be changed, or at the very least addressed, next. This could be done by taking a mixed method approach, so that the beginning of the process starts out qualitatively. This way the directions of expectations leading up to expected outcomes can be assessed. From here users can be surveyed in terms of how they primarily characterise the existing directions (e.g. using a Likert-scale), how they prioritise and whether or not new directions of expectations have cropped up since the last survey. The responses can be interpreted so that when new directions of expectations do crop up, it can be taken as a sign that the ISD project is actually moving in the right direction, while something needs to be done if users keep prioritising the same directions of expectations as "should". Figure 28, p. 173 shows an exeample of how to represent such an expectating process with expectations containing directions and leading to believed outcomes as enabling actions are made sense of throughout the project. The grayed out characteristics represent characteristics that users are not explicitly drawing on while black characteristics are those that users mention.

The case also showed how users would use the existing pilot implementation project as narratives in order to expectate for a second coming "real" project that they would immensely look forward to. The users would now look forward to the national EAR IS that was announced with the same level of motivation as when the pilot implementation began. In terms of performing pilot implementations, this type of influence on motivation and expectations could actually be taken advantage of as part of the overall development strategy (albeit quite expensive) when driving organisational change. A pilot

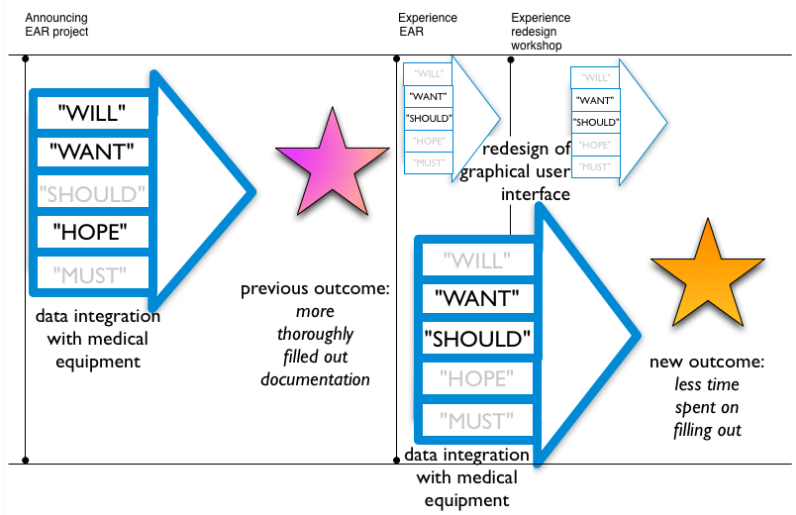

Figure 28: An example of how to map the expectating process with enabling actions in a process model. The figure is exemplary and should not be viewed as a complete process covering expectating processes of all users. The grayed out characterisations represent those characteristics that users are not explicitly drawing on while black characterisations are those that they do mention. The abstract outcomes denoted as stars change colour as users reprioritise both directions and the outcomes based on experience with the technology.

implementation in this regard can serve a dual purpose: Learning about the impact on practical use (like Hertzum et al. (2012) state) but also learning about the directions of expectations and the users' technological awareness, as well as strengthening the users' motivation for the "real" IS that will come later. Of course, a slew of cautions should also be taken when doing this. The scope of the pilot implementation can easily escalate, and in turn this will also influence the expectations of users who are not directly involved in the pilot implmentation. This occurs because experiencing technology in use very quickly enables users to characterise their expectations as "should" if users expect more changes to come and this can have an impact on the values of the individual users, on the project and on the organisation in its entirety. In the case many users did not feel they had many possibilities of voicing their opinions, and this had a negative impact on their expectations towards the future iterations and even on future projects that would be taken by the project organisation.

8.5 LIMITATIONS

In this study I have explicitly used theory as a final product of research in order to explicitly show theoretical areas of potential contributions (Walsham, 1995b). However, as any researcher can testify, any research process has its limitations, and, being a qualitative study,

this is no exception. In this section I will discuss limitations of this study to include the following: definitions of IS, limitations of the qualitative single case study, the recall problem, methodical limitations, limitations due to the role, and ethical limitations.

The first limitation is that of the literature review. While it certainly is extensive I was also the sole conducter of it, making the interpretations of categories and concepts entirely my own. In order to rectify this, more fellow researchers will need to be included so that the classifications can be more thoroughly discussed and interpreted.

The second limitation to discuss is that of defining "Information Systems" as a concept and applying it to the actual action case study[2]. If the definitions of "information systems" are difficult and ambiguous (Alter, 2008), surely it is also difficult for me to draw on the IS literature and claiming it to be within the same definitions as I have used it. However, this is a general limitation of doing research within this realm and as such a basic condition. What is furthermore problematic is that the scope of IS during the pilot implementation seemed to change. As such you will find that only the second iteration as depicted in chapter 6, p. 69 was true to the definition of ISD since it was here development of both technology and work processes came into focus. The first and third iterations merely evaluated the EAR as an IS implementation. This also explained why I have been meticulously careful to denote exactly whether I used "users" or "participants" and whether they were directing their expectations at the technology or the overall existing work system or the IS that was supposed to be developed on using the EAR.

The power of stating my findings in this single case study may prove to be a strong limitation since the case in a number of ways has proven very specific. It is thus not unthinkable that the abstraction power of the findings may limit itself to field-dependent variables such as the ISD context, the specific technology, the hierarchical management structure etc. While I have made some efforts to abstract the findings (such as the very general enabling actions that can be compared to most actions taken in any ISD project), the manner and sequence of these actions stay specific to the case. Furthermore I have coded the empirical material alone, similar to the literature review. In order to enhance this aspect more coders and analysts would need to be included.

The methodical limitations include that it was not possible to interview the same users throughout the process which made it very difficult to trace directions of expectations and their priorities and the study had to instead rely primarily on retrospective accounts from

2 A limitation that has also proven to be present in most of the IS literature reviewed in chapter 4, p. 21.

many different users. The weaknesses were that relying on the memories of the users resulted in a certain confirmation bias (Ward, 2000) called the "problem of recall" (Nevo and Chan, 2007; Venkatesh and Goyal, 2010). The problem of recall indicates that the as time goes by from an event occurs before participants are inquiried, the participants' memories of what happened will turn out imprecise or inaccurate. Despite my attempts at diminishing this gap by bringing artefacts to the interviews or refer to specific dispatches during the interviews, the memory of when and what happened during the process was still vague and hazy from time to time. However, one can also see this as a strength since now the participants had time to let the experiences "sink in" and make sense of what went on during the project. A second methodical limitation was that I limited the scope of empirical material to only users. This has made it difficult to conclude anything management related though it did create a stronger focus on the users' narrative of how they changed their expectations. Including various management participants into the narratives would be interesting in comparison. Nevertheless, their rationalisations of how they felt at the time were very clear, even long after the pilot implementation. This actually supports some of the previous findings on the recall problem by Ward (2000) who concluded that the actual conclusions or actions that the users came to terms with was still the same (Ward, 2000, p. 90).

I also encountered another limitation in having two researchers collaborate on the same project with two different research focuses and at the same time performing an iterative grounded theory approach to the findings. Having two different focuses in the interview guides made it sometimes difficult to follow up on specific questions because both focuses needed to be weighted in the interviews.

This can also be viewed in comparison to another classical limitation of empirical studies concerning the concept of "saturation", the notion that no new knowledge can be gained from further empirical inquiries. This is a concept that I, as a qualitative researcher, feel strong ambivalence towards since the very foundation of interpretative, qualitative approaches is that you can always find new information. It is definitely correct that more interviews with users could have been performed with a stronger focus on their expectations, broadening and problematising the research results even further. However, this will most likely always be the case. Rather than defining the saturation threshold towards the empirical world, which is rooted in very rational research objectives, I instead argue that it is actually a subjective threshold belonging to the individual researcher that determines when he or she decides that enough material has been procured to bring about interesting results.

It was also apparent that the two researchers in fact influenced the participants, and our presence even injected "hope" into the users'

characterisations of their expectations. One of the best examples of this was when one user saw the participating researchers (the present author and the collaborating researcher described in chapter 5, section 5.4, p. 55) as an important change and influence on the overall project. The user deliberately mentioned that having the researchers participate was a welcome change to the usual way projects were run in the hopes that we were able to positively impact the outcome for the EMS crewmembers. This is what Walsham (1995b) refers to as "double hermeneutics" because the researchers become a part of the project that also requires incorporation into the hermerneutic circle of understanding. It is simply very important to be aware of this influence during the process for the researcher! For example, inquiring users into their expectations in the project might influence their expectations but then again, it might also simply make them reflect on their expectations and make them explicate them more strongly. The main point being that it is difficult to perform interpretative case research without also empirically bringing out the focus of the research.

I was further forced to compromise the presentation of the findings due to ethical reasons. While I mentioned that I deliberately structured the findings according to the enabling actions that I found, a second reason for doing so was that the case context was very volatile and that most user participants desired to participate anonymously. Similarly, when focusing on individual user expectations it also becomes difficult to show how individual mental maps evolve without also revealing the sources involved. As a result, the structure of the findings was actually a necessity as to not explicitly link the participants' actual identities to specific contextual statements.

8.6 FURTHER RESEARCH

A central area for further research revolves around that of the contributing to the existing theoretical assumptions of user expectations. Being a qualitative single case study, the findings would benefit greatly from being further explored by other case studies but also being used as quantitative measures by applying the framework to non-ISD and ISD settings alike, even testing out cases where the specific structure of the project organisation is not as hierarchical and where work and technology in use is not as critical. This should be done with a much sharper methodological focus on user expectations, continuously assessing users to figure out the impact on the technology in use and on the users' general attitude. Going into quantitative studies, the implications for further research could also be to further explore the significance of recharacterisations, reprioritisations of directions etc.; for example how often expectations are recharacterised, how many times expectations can be recharacterised until they are recharacterised negatively, how the many recharacterisations influence the further ac-

tions taken with the technology, what specific actions taken that also involve users reprioritising their directions, and how to capture when, what and how of these reprioritising of directions both qualitatively and quantitatively. Since the directions of user expectations seem to change when user expectations are partially or completely fulfilled, this can be an indicator for what should be changed or reconfigured next in order to maintain satisfaction with process and product. This naturally leads to also performing further research on the relation between user requirements, user needs, and user expectations. Differentiating between these concepts is difficult, for stakeholders as well as in the literature, where many scholars have ranked them alongside each other (Parasuraman et al., 1985; Henry and Stone, 1995; Lai, 2000; Gil-Garcia et al., 2007; Jessup et al., 2010). They do seem to relate to each other, though how and why may shed further light on what actions to take for management to better navigate in an ISD project.

Another area of user expectations is that of understanding the tolerance that users have towards their expectations and their experiences in the ISD project. Churchill and Surprenant (1982); Santos and Boote (2003) and lately Brown et al. (2012) mention this to have an impact on when users turned negative towards the project and so did the findings in the dissertation in terms of defining "should" characterisations after experience as a negative assessment. It would be interesting to find out more specifically when expectations are recharacterised into changing to "must" or "should" expectations and what the users would denote as their personal threshold, as the findings only gave a retrospective glimpse of this.

The findings also showed that on fulfilling expectations, new directions would emerge. However, whether they emerge out of thin air or are present from the beginning is up to debate (the latter seemed more likely as some of the directions mentioned had surely been mentioned before, such as wireless printing). What should be taken to be researched further is how comprised these directions of expectations are, since it was sometimes difficult to distinguish whether directions stayed the same when characterisations of "should" were mentioned due to experience, often as if someone "should" have done something about it earlier or in the future. As the users gained more experience with the EAR technology, they gradually became more able to discuss and present very specific changes to the setup of the EAR. The redirection of expectations could further be complemented by an actual hierarchy of expectations (like the paper by Santos and Boote (2003)), where expectations are directed at when, which prioritisation and to what outcome they were mapped towards.

It isn't answers that make a scientist,
it's questions...
Science is a way of asking more and more
meaningful questions.

— George Wald
(Wald, 1958)

9

CONCLUSION

In the very beginning of this dissertation I noted that the ISD discipline is a complex area because it draws on theories from many other theories in the IS domain and that there is a lack of ISD-specific theories on empirical phenomena. Specifically I found a potential contribution area in understanding:

"How do users change their expectations in an Information Systems Development (ISD) project?"

Known before the study:

- Users' expectations in IS vary and are typically placed in categories of measurable cognitive standards such as "will", "want", "should" and "must" and point to a future reference point such as perceived performance or service quality.
- Users' expectations are dynamic and will change during an IS process as they gain experience with using the technology.
- Users' expectations need to be kept realistic in order to create satisfaction.

Known after the study:

- Users' expectations in an ISD project can be considered as *characteristics* between "will", "want", "should", "must", and also "hope" and are directed at *several different reference points* including performance, training events, time between technological change and communication etc.
- Users' change their expectations dynamically in terms of the characteristics used and the prioritisation of the direction as users *react to new announcements*, *experience events* and *technology use* as well as *when providing feedback*.
- Users' expectations seem to be *generally high in ISD prototyping* due to an *inherent prospect of change* of both organisation and technology.

This question was divided into four smaller sub-research questions that I will cover in the following.

I answered the overall research question by theoretically deriving a framework from the literature of user expectations, both from marketing literature and IS literature. The framework was applied to a

longitudinal interpretative case study of an ISD project that was explored using a combination of ethnographic observations and semi-structured interviews throughout. The process of how users change their expectations was coined "expectating" as I have argued that it differs from the notion of "having expectations" and should rather be seen as reactions to actions taken in the ISD project.

In chapter 4 I answered the first sub-research question of *"Which areas of research on user expectations in IS are in need of further research?"* by consolidating the existing literature on user expectations. From this consolidation I identified five potential contribution areas on user expectations:

1. research on user expectations taking an interpretative, exploratory research
2. research on user expectations in terms of how users direct and characterise their expectations
3. research taking a direct approach in an ISD context
4. research taking an organisational prototyping approach
5. research on how users change their expectations

The conclusions from the previous literature found that expectations have been defined in many conflicting ways and that the impact of user expectations on IS user satisfaction and usage also conflicted with one another from study to study. While this largely could be rooted in the different contexts of the studies, I still identified a potential contribution area in the ISD sub-research area with a direct user expectations focus. Rather, the body of knowledge primarily focused on user expectations differing on long-term usage or implementation. The biggest finding, however, was that research addressing user expectations mostly found answers to "what" research questions, such as "what influences satisfaction or intentions of usage", hence very little mention of "why" and "how" user expectations seemed to change, despite a year-long tradition of calling on the latter type of research questions.

With the interpretive qualitative approach taking its departure in the theory of sensemaking, I answered the sub-research question by putting forward a framework with less rigid definitions of the concept of expectations in order to be able to empirically explore how users themselves chose to characterise expectations through characteristics of "will", "want", "must", "should" and "hope".

Chapter 6 addressed the second sub-research question of *"How does the specific work context influence the user expectations that exist prior to an ISD project?"* by providing a case description of the ISD process as organised and separated into events of episodic changes, adjustment and reinforcement, feedback, technology in use, and establishment. I addressed the specific work context of EMS by going into depth with what constituted the nature of EMS work. EMS work was

found to be constituted by a large degree of need for actions and reliance on equipment, analogue and electronic alike, with any issues obstructing the core mission of the EMS crewmembers taking immediate precedence and needed a workaround. Within this area of work, users were highly motivated for the opportunity to transition from paper-based ambulance records to Electronic Ambulance Records by developing and implementing an EAR using a pilot implementation approach. The context was largely characterised by a large number of users interacting and creating stories that would influence the attitude towards the coming IS, pre- and post-implementation. The stories were here used to reinforce the "want" expectations of being better at fulfilling their core mission.

In the findings chapter 7, I addressed the final two sub-research questions of *"How do actions taken influence user expectations in an ISD project?"* and *"How do user expectations influence the actions taken in an ISD project?"*. Using the framework of expectating, I uncovered three distinct actions that were taken by both management and users during the pilot implementation that influenced how the users would characterise their expectations to change. I denoted the classification of these actions as "enabling actions" since they enabled users to make sense of their experiences and beliefs and recharacterise their existing expectations. I have deliberately used the adjective "primary" characteristics because users would often narrate their stories as if all characteristics were present though only one or two were relevant at the moment of experiencing enabling actions.

The enabling action of "announcing" project updates would make the users recharacterise their expectations from primarily "want" to primarily "will" expectations (see also figure 21, p. 123).

The enabling action of "experiencing" the technology both in use and in hypothetical use would make the users recharacterise their expectations from primarily "will" and "want" to "should" (see also figure 22, p. 131). The enabling action of "experiencing" workshops and redesign events would make the involved users recharacterise "should" into primarily "want" expectations (see also figure 23, p. 143). The enabling action of "experiencing" time going by would make the users primarily characterise their expectations from "will" and "want" to "should" (see also figure 24, p. 144). Expectations that were characterised as primarily "should" were eventually reinforced as "must" expectations as the users experienced time going by, denoting a reluctancy to use the EAR units if changes did not come.

The enabling action of providing formal "feedback" about bugs and issues that were considered critical for their own work practice would make the users recharacterise "want" and "should" expectations into primarily "will" expectations (see also figure 25, p. 152). The enabling action of providing informal "feedback" among the other users and crewmembers about their own experiences and

Theoretical implications	Practical implications
It seems to be difficult to measure user expectations when taking a pilot implementation approach in an ISD project because users change their expectations by recharacterising said expectations and reprioritising their directions over time. This seems to complicate results when using theories like EDT, SERVQUAL and SCT to measure user expectations because they have a much narrower scope of defining expectations.	Users who provide feedback when testing out prototypes in use will also be directing their expectations at the area of feedback they provide. If users' expectations somehow can be assessed in terms of which characteristics and which directions they are dynamically moving in, recharacterisations and redirections might show whether the actions taken in the pilot implementation project are actually benefitting the project or not.

evaluations of the technology would primarily make the users recharacterise their expectations as "should" (see also figure 26, p. 152).

I further found an additional characteristic denoted as "hope" that would emerge after the users would no longer trust announcements or their experiences at events. This characteristic was then used instead of "will", denoting uncertainty, yet users would still recharacterise their expectations to "should" when the directions of expectations were not fulfilled.

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REFERENCES TO CONCEPTS

In the following I have included the most common concepts that I make use of in this dissertation. The concepts are ordered alphabetically and show where in the dissertation they are mentioned and defined. Concepts in *italics* are abbreviated concepts in the dissertation.

A–B

C

D

E

O

P

Q-R

S

T

U–V

W–Z

APPENDIX A

This appendix contains the full list of central and relevant papers accumulated from chapter 4, p. 21.

Table 15: Table of all 32 papers deemed central.

No.	Paper	Theory	Paradigm	Research Design	IS sub-area	Research focus	Types of expect.	Imp. to meet expect.	Focus on expect.	Changing expect.	Expect. management	Type of IT usage
1	Aggarwal and Rezaee (1996)	na	na	review	ISD	expectations	na	yes	indirect	no	proactive	mandatory
2	Alruwaie et al. (2012)	SCT	positivist	proposal	IT	continuance	will	yes	indirect	yes	na	voluntary
3	Bhattacherjee and Premkumar (2004)	EDT	positivist	factor	IS	continuance	will	yes	direct	yes	reactive	mandatory
4	Brown et al. (2012)	EDT	positivist	factor	IS	continuance	will	na	indirect	no	reactive	voluntary
5	Carr (2002)	SERVQUAL	positivist	proposal	IS	expectations	na	no	direct	no	na	na
6	Compeau and Higgins (1995b)	SCT	positivist	factor	IS	expectations	will	no	direct	no	reactive	mandatory

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No.	Paper	Theory	Paradigm	Research Design	IS subarea	Research focus	Types of expect.	Imp. to meet expect.	Focus on expect.	Changing expect.	Expect. management	Type of IT usage
7	van Dyke et al. (1997)	SERVQUAL	positivist	review	IS	service quality	na	yes	direct	no	proactive	na
8	Ginzberg (1981)	na	positivist	factor	ISD	expectations	na	yes	direct	no	proactive	mandatory
9	Gorla (2012)	SERVQUAL	positivist	factor	IS	service quality	will, want	yes	indirect	no	reactive	mandatory
10	Halilovic and Cicic (2013a)	EDT	positivist	factor	IS	continuance	will	yes	indirect	no	na	mandatory
11	Hsu et al. (2006)	EDT	positivist	factor	IT	continuance	will	yes	direct	yes	proactive	voluntary
12	Hung et al. (2011)	EDT	positivist	factor	IT	continuance	will	no	indirect	yes	na	voluntary
13	Jackson and Fearon (2013)	EDT	interpretivist	process	ISD	expectations	will	yes	direct	yes	reactive	mandatory

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No.	Paper	Theory	Paradigm	Research Design	IS sub-area	Research focus	Types of expect.	Imp. to meet expect.	Focus on expect.	Changing expect.	Expect. management	Type of IT usage
14	Khalifa and Liu (2003)	EDT	positivist	factor	IT	satisfaction	will, want	yes	direct	yes	na	voluntary
15	Khalifa and Liu (2004)	EDT	na	review	IS	satisfaction	will, want	yes	direct	yes	na	na
16	Liao et al. (2009)	EDT	positivist	factor	IS	continuance	will	na	indirect	yes	reactive	mandatory
17	Lim et al. (2005)	SCT	interpretivist	process	IS	user attitudes	will	yes	indirect	no	dialogue	mandatory
18	Mellarkod et al. (2005)	EDT	positivist	factor	IS	continuance	will	yes	indirect	no	na	mandatory
19	Nevo and Chan (2007)	EDT	interpretivist	factor	IS	expectations	will, want	no	direct	yes	reactive	mandatory
20	ONeill et al. (2003)	SERVQUAL	positivist	factor	IT	service quality	will	yes	direct	no	na	voluntary
21	Pitt et al. (1997)	SERVQUAL	na	proposal	IS	service quality	will, want, should	no	direct	no	na	mandatory

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No.	Paper	Theory	Paradigm	Research Design	IS subarea	Research focus	Types of expect.	Imp. to meet expect.	Focus on expect.	Changing expect.	Expect. management	Type of IT usage
22	Saeed (2012)	EDT	positivist	factor	ISD	expectations	will	no	direct	yes	na	mandatory
23	Shand (1994)	cognitive dissonance	positivist	review	ISD	project management	na	yes	direct	yes	proactive	na
24	Sokura et al. (2012)	EDT	positivist	factor	IS	expectations	will	yes	direct	yes	na	mandatory
25	Suh et al. (1994)	EDT	positivist	factor	IS	satisfaction	will, want	yes	direct	no	reactive	mandatory
26	Szajna and Scamell (1993)	EDT	positivist	factor	IT	expectations	will	yes	direct	yes	proactive	voluntary
27	Tanlamai and Ritbumroong (2010)	SCT	positivist	factor	IS	continuance	na	yes	indirect	yes	proactive	mandatory
28	Tesch et al. (2005)	EDT	positivist	factor	ISD	expectations	na	yes	direct	no	proactive	mandatory

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No.	Paper	Theory	Paradigm	Research Design	IS sub-area	Research focus	Types of expect.	Imp. to meet expect.	Focus on expect.	Changing expect.	Expect. management	Type of IT usage
29	Venkatesh et al. (2011)	EDT	positivist	factor	IT	continuance	will	no	direct	yes	na	voluntary
30	Venkatesh and Goyal (2010)	EDT	positivist	factor	IS	expectations	will	yes	direct	yes	reactive	voluntary
31	Zamani et al. (2013)	sensemaking	interpretivist	process	IT	continuance	will	yes	direct	yes	dialogue	voluntary
32	Zheng et al. (2010)	EDT	positivist	process	ISD	expectations	will	yes	direct	yes	na	mandatory

Table 16: Table of 125 relevant papers.

No.	Paper	Publ. source	Theory	IS sub-area
1	Al-Shafi and Weer-akkody (2009)	ECIS 2009	Unified Theory of Acceptance and Use of Technology	IT
2	Al-Shafi and Weer-akkody (2010)	EMCIS 2010	SCT	IT
3	Au et al. (2002)	Omega	na	IS
4	Au et al. (2008)	MIS Quarterly	EDT	IS
5	Baccarini et al. (2004)	Industrial Management & Data Systems	na	ISD
6	Barki and Huff (1985)	Information & Management	EDT	IS
7	Barnes and Böhringer (2011)	Journal of Computer Information Systems	EDT	IT
8	Bawden and Vi-lar (2006)	Aslib Proceedings	na	IT
9	Bekkering et al. (2009)	Information Resources Management Journal	Expectancy theory	IT
10	Benlian et al. (2010)	ICIS 2010	SERVQUAL	IS
11	Bhattacherjee (2001b)	MIS quarterly	EDT	IT
12	Bhattacherjee (2001a)	Decision support systems	EDT	IT
13	Brown et al. (2008)	Organizational Behavior and Human Decision Processes	EDT	IS
14	Bundschuh et al. (2011)	BMC medical informatics and decision making	HCI standard ISO 9241-10	IS
15	Cao et al. (2013)	Journal of Service Management	EDT	IT
16	Chang et al. (2011)	Computers in Human Behavior	SCT	IS

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No.	Paper	Publ. source	Theory	IS sub-area
17	Chen (2007)	Journal of Information Science	EDT	IS
18	Chen et al. (2005)	International Journal of Information Management	na	ISD
19	Cheung et al. (2013)	Journal of the American Society for Information Science and Technology	EDT	IT
20	Chin and Lee (2000)	ICIS 2000	EDT	IS
21	Chiu et al. (2005)	Computers & Education	EDT	IT
22	Chiu and Wang (2008)	Information & Management	SCT	IT
23	Chou (2010)	Online Information Review	SCT	IT
24	Chou and Chen (2009)	International Journal of Human-Computer Studies	EDT	IS
25	Compaeu et al. (1999)	MIS Quarterly	SCT	IS
26	Cooper et al. (1998)	Library Trends	SERVQUAL	IT
27	DeSanctis (1983)	Psychological reports	Expectancy theory	IT
28	Edwards and Browne (1995)	Library & Information Science Research	SERVQUAL	IT
29	Egan and Sandberg (2007)	Surgical Innovation	na	IS
30	Erevelles et al. (2003)	Information Technology and Management	EDT	IT
31	Fadel and Brown (2010)	Communications of the Association for Information Systems	Unified Theory of Acceptance and Use of Technology	IS
32	Fearon and Philip (2008)	behavior & information technology	EDT	IS
33	Gorla (2011)	ACM SIGMIS Database	SERVQUAL	IS

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No.	Paper	Publ. source	Theory	IS sub-area
34	Green (1989)	MIS Quarterly	attribution theory	ISD
35	Halilovic and Cicic (2013b)	Behaviour & Information Technology	EDT	IS
36	Henderson and Deane (1996)	computing nurse	EDT	IS
37	Henry and Stone (1994)	Information Resources Management Journal	SCT	IS
38	Hong et al. (2006)	Decision Support Systems	EDT	IT
39	Hong et al. (2008)	Journal of Computer Information Systems	EDT	IT
40	Hsieh et al. (2010)	Computers in Human Behavior	EDT	IT
41	Hufnagel (1990)	HICS 2000	Expectancy theory	IT
42	Hu and Kettinger (2008)	ICIS 2008	EDT	IT
43	Ilie et al. (2009)	AMCIS 2009	SCT	IS
44	Islam and Mäntymäki (2011)	PACIS 2011	EDT	IS
45	Islam and Mäntymäki (2012)	ICIS 2011	EDT	IT
46	Jiang et al. (2002)	MIS Quarterly	SERVQUAL	IS
47	Jiang et al. (2003)	Decision Sciences	EDT	ISD
48	Kang et al. (2009)	Computers in Human Behavior	EDT	IT
49	Karsenty (2001)	Applied Ergonomics	na	IT
50	Keil et al. (2002)	Information Systems Journal	na	ISD
51	Kettinger and Lee (1997)	MIS Quarterly	SERVQUAL	IS

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No.	Paper	Publ. source	Theory	IS sub-area
52	Kettinger and Lee (2005)	MIS Quarterly	SERVQUAL	IS
53	Klein and Jiang (2001)	Journal of Systems and Software	na	ISD
54	Kwahk and Oh (2009)	ECIS 2009	SCT	IS
55	Lam and Lee (2007)	Journal of Technology in Human Services	SCT	IT
56	Lankton and McKnight (2012)	Journal of the Association for Information Systems	EDT	IT
57	Lawrence and Low (1993)	MIS Quarterly	user involvement theory	ISD
58	Lee et al. (2010)	ECIS 2010	EDT	IS
59	Liao et al. (2007)	Computers in Human Behavior	EDT	IT
60	Limayem and Cheung (2008)	Information & Management	EDT	IT
61	Limayem et al. (2007)	MIS Quarterly	EDT	IT
62	Lin et al. (2005)	Information & Management	EDT	IT
63	Lundell and Lings (2004)	Journal of Systems and Software	na	IS
64	Lyytinen (1988)	Information & Management	na	ISD
65	Mahmood et al. (2000)	International Journal of Human-Computer Studies	na	ISD
66	Martins et al. (2014)	International Journal of Information Management	Unified Theory of Acceptance and Use of Technology	IT
67	McKinney et al. (2002)	Information Systems Research	EDT	IT
68	Miller et al. (2008)	American Journal of Business	SERVQUAL	IS

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No.	Paper	Publ. source	Theory	IS sub-area
69	Miller et al. (2013)	Information Systems Management	SERVQUAL	IS
70	Nevo and Wade (2007)	Communications of the ACM	EDT	IS
71	Palanisamy (2004)	Journal of Information & Knowledge Management	cognitive dissonance theory	IS
72	Penttinen et al. (2010)	Journal of Information Technology Theory and Application	na	IT
73	Petter (2008)	International Journal of Project Management	EDT	ISD
74	Rushinek and Rushinek (1986)	Communications of the ACM	na	IT
75	Ryker et al. (1997)	Information Processing & Management	SERVQUAL	IS
76	Schmidt et al. (2001)	Journal of management information systems	na	ISD
77	Shibl et al. (2013)	Decision Support Systems	Unified Theory of Acceptance and Use of Technology	IT
78	Shi et al. (2004)	The Journal of Academic Librarianship	EDT	IT
79	Somers and Nelson (2001)	HICS 2001	na	IS
80	Soereboe and Eikebrokk (2008)	Computers in Human Behavior	EDT	IS
81	Staples et al. (2002)	Information & Management	EDT	IS
82	Susarla et al. (2003)	MIS Quarterly	EDT	IS
83	Terzis et al. (2013)	Computers & Education	EDT	IT
84	Tesch et al. (2003)	Decision sciences	EDT	ISD

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No.	Paper	Publ. source	Theory	IS sub-area
85	Thong et al. (2006)	International Journal of Human-Computer Studies	EDT	IT
86	Tudhope et al. (2000)	Human-Computer Interaction	na	ISD
87	Venkatesh et al. (2003)	MIS Quarterly	SCT	IS
88	Waite (2006)	Internet Research	EDT	IT
89	Wang et al. (2013)	Information Systems and e-Business Management	EDT	IT
90	Wang and Sedera (2011)	ICIS 2011	EDT	IS
91	Wickramasinghe and Gunawardena (2010)	Journal of Enterprise Information Managemen	na	IS
92	Woodroof and Kasper (1998)	Information systems success measurement	expectancy theory	IS
93	Yang et al. (2006)	ICIS 2006	EDT	IT

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