

# A closer look at the para- and perimedics during the implementation of an Electronic Health Record

Evidence from a case study

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Trefw acceptance, resistance, Electronic Health Record

## **PREFACE**

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## SUMMARY

Recent research indicates that stakeholder issues can possibly form important barriers to information systems implementation activities, since different stakeholders groups may have different interests and attitudes. This study expands previous research where the user group para- and perimedics scored significantly lower on support and acceptance than other user groups (i.e. doctors, nursing staff and management). This study uses an adoption framework, which explains acceptance and supporting behaviors of system users. In order to understand what influences the acceptance and resistance behaviors during an information system implementation process, a case study was undertaken. Data was gathered in a large teaching hospital in the Netherlands using in-depth interviews. This research is a contribution to the literature, since previous research has not yet focused on the para- and perimedics user group. Therefore, this research provides a closer look at their behavior during the implementation of an Electronic Health Record (EHR). The findings show that, despite there is no relationship between involvement and adoption, the para/peri user group is supportive and shows acceptance towards the EHR system. This is in contrast to previous research and hence, in contrast to the literature.



## 1 INTRODUCTION

In this research the focus is on para- and perimedics, a specific user group in information system (IS) implementations in hospitals. In previous research (Cordes, 2013) studying this user group led to remarkable results compared to other user groups, which will be explained later in this section. Moreover, IS research in healthcare is useful since there is an escalating pressure on health care services, possibly due to the aging population (Boonstra & Van Offenbeek, 2010). Additionally, in the last couple of years, there has been an increasing demand for exploiting the possibilities of information technology (IT) in healthcare (Jensen & Aanestad, 2007). As Jensen and Aanestad (2007) mentioned, IT can be seen as a tool for achieving better information flows as well as for achieving high quality in patient care and treatment. With the mounting demand for health care and a limited budget, IT is a logical step to develop efficient ways to expand their current services (Jensen & Aanestad, 2007).

Without having effective work processes, organizations potentially expose themselves to a number of problems. For instance, poor quality of care, and poor resource and financial management (Payton, Paré, LeRouge, Reddy, 2011). Information technology systems can be part of the solution to achieve the same or even better services at lower costs (Boonstra & Van Offenbeek, 2010 and Grimson, 2001). IT systems can be very beneficial, for example, when turning paper files into electronically read formats and in solving inefficiencies between different groups of medical staff in health care agencies who operate independently and cannot exchange patient information (Boonstra, et al., 2008).

A Grimson (2001) advocate that healthcare is information intensive, which entails that there is a high interest in digitalizing information. He also states that patients would benefit if doctors and other treating physicians have access to a comprehensive electronic record of their medical history. This record is called an Electronic Patient Record (EPR) (Boonstra et al., 2008). There seems to be some ambiguity in the literature about the term EPR (Jensen & Aanestad, 2007). Consequently, different terms are used, some of which are: Computerized Patient Record (CPR), Electronic

Patient Record (EPR), Electronic Health Record (EHR), or Electronic Medical Record (EMR) (Jensen & Aanestad, 2007). This paper sticks to the term Electronic Health Record (EHR). Greenhalgh et al. (2008) and Greenhalgh et al. (2009) mentioned that an EHR is a complex innovation that must be accepted by individual patients and staff and should be embedded in organizational and system level routines.

Therefore, introducing an EHR is a complex and often unpredictable endeavor as it involves a large organizational change. The possibility exists that healthcare professionals are not satisfied with the new system because the system does not meet their needs and necessitates workarounds in order to complete the work procedures (Jensen & Aanestad, 2007). For instance, Lorenzi and Rily (1995) set out as a criterion that in order to be considered successful, an IT implementation should meet the perceived needs of more than 90% of the end users (Lorenzi and Rily, 1995). It requires not only technical changes but also organizational changes. Those changes can affect different stakeholders, since they may have different opinions about implementing the EHR, which can vary in power, interests and attitudes (Boonstra et al., 2008). Therefore, not meeting all the different interests of stakeholders may lead to a delayed or failed implementation process. It is important for those promoting an information system, for example an EHR system, to identify the different stakeholders and their attitudes towards a system. Additionally, it is important to seek to reconcile stakeholder interests.

Recent studies indicate that stakeholder issues form important barriers to healthcare information systems implementation activities (Boonstra et al., 2008 and Payton et al., 2011). It has been investigated before, that different stakeholders groups have different interests and attitudes towards the EHR system implementation (Boonstra et al., 2008; Cordes, 2013). Cordes (2013), for example, conducted and analyzed data from different stakeholder groups; nursing staff, doctors, paramedics and perimedics (para/peri), and management in a large teaching hospital in the Netherlands. The objective of his study was to investigate

how intended behaviors of different user groups differ from those expected by implementers, in case of the EHR implementation. A remarkable observation was that the user group para/peri scored significantly lower on acceptance as well as on support as compared to the other user groups (nursing staff, doctors and management) (Cordes, 2013).

This remarkable result of the research of Cordes (2013) is the starting point for this study to examine why the para/peri group scored significantly lower on the crucial adoption variables acceptance and support in comparison with the other user groups. The usage of qualitative data should provide insights in the existing quantitative data. Many researchers have investigated the impact of information technology implementation on the user groups in hospitals, however, in most cases this research was conducted among nurses and doctors and not among the para/peri user group (Van Offenbeek et al., 2013; Boonstra et al., 2008; Boonstra et al., 2010; Jensen and Aanestad, 2007). Not focussing on all available user groups can be a limitation in research. This paper will close this gap by focussing on the heterogeneous group: para/peri. This group is heterogeneous since some variation can be found within the composition of the group. Para- and perimedics consist of, for example, practitioners, assistants and healthcare professionals, which can handle various medical emergencies (Auvinena & Palukkab, 2012). Moreover, nurses and doctors often belong to a department and para- and perimedics are often spread across different departments within a hospital. This, in conjunction with the heterogeneity of the group, makes it interesting to investigate this user group.

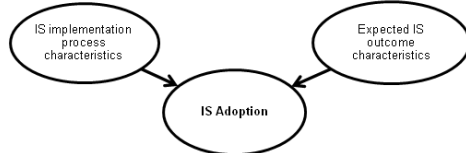
Besides the theoretical interest, this research will also contribute at a more practical level. Stakeholders' acceptance is crucial, but it is also important for managers to understand why and how stakeholders react to technology adaptation (Jensen & Aanestad, 2007). Moreover, as Payton et al. (2011) mentioned, without the support of the people in the organization, any change process can be very hard. Therefore, if there is an understanding of stakeholder attitudes, it may be easier for promoters to consciously decide their strategy for managing those (Boonstra et al. 2008).

The aim of this study is to discover what the attitudes are within the para/peri user group towards an EHR implementation project and how these attitudes lead to acceptance and support of an EHR system. So, this paper will answer the following research question: What are the effects of intended behaviors of the heterogeneous para/peri user group on acceptance and support, in the case of an EHR implementation? Before answering this main question, a few sub questions need to be answered. The sub questions are: How can the para/peri user group be classified into subgroups? And what is their relation with the EHR? The second sub question means whether the group will use the EHR system and if they will, how. These sub questions can be answered by reviewing subgroups and classification literature and by interviewing experts. Thereafter, in-depth interviews need to be conducted in order to answer the main question. To answer the research questions, a qualitative case study will be conducted. According to Yin (2014) the essence of a case study, the central tendency among all types of case studies, is that it tries to illuminate a decision or set of decisions by answering questions such as: Why was the decision taken? How was it implemented? What was the result?

This paper is designed as follows: In the theory chapter, theory about users reactions, job satisfaction, involvement, and subgroup classifications will be reviewed. In the method section, the data gathering and analyses processes will be described. The results part describes the findings of these analyses. The discussion and conclusion part addresses the most important findings, the theoretical and practical contributions of this study, limitations and recommendations regarding future research.

## 2 THEORY

As mentioned in the introduction, different stakeholders have different interests and adoption attitudes towards the implementation of an information system (IS) (Boonstra et al., 2008). Most information technology system adoption theories focus on either acceptance or resistance. Van Offenbeek, Boonstra and Seo (2013) used the term ‘adoption’, which includes acceptance and resistance behaviors, while in previous studies the term ‘implementation’ is often used. However, adoption goes beyond implementation, since it also includes the use of an information system, subsequent to its implementation (Lapointe & Rivard, 2005, 2007). Adoption of an IS can be influenced by characteristics of the IS implementation process and the expected IS outcomes characteristics (Hong, Thong, Chasalow & Dhillon, 2011; Baronas and Louis, 1988). This is shown in figure 1 and will be explained below. This theory section starts with a review of adoption theory, and will subsequently provide an in depth review of the IS implementation process and the expected IS outcome characteristics and how this influences the adoption of an information system.



**Figure 1** Initial conceptual model: Adoption of a system will be influenced by characteristics of the IS implementation process and expected IS outcome characteristics.

### 2.1 IS ADOPTION

As mentioned before, most information system theories tend to focus on either acceptance or resistance. In this study, the term ‘adoption’ is used to cover both acceptance and resistance behaviors. This leads to two important dimensions in IS adoption: a support/resistance dimension and an acceptance/non-acceptance dimension (Van Offenbeek et al., 2013). The acceptance dimension depicts

high use to non-use and the resistance dimension covers enthusiastic support to aggressive resistance. This section will elaborate on these two dimensions and the connection between those two in a two-dimensional framework (Van Offenbeek et al., 2013).

#### ACCEPTANCE

According to Burton-Jones and Straub (2006), acceptance is defined as “a user’s employment of a system to perform a task”. Acceptance is conceptualized at the individual level since it explains the intentions of individual users towards using the system and by implicitly restricting acceptance behaviors to system usage. Therefore, the behavioral component of acceptance is equivalent to use (Lapointe & Rivard, 2007; Van Offenbeek et al., 2013). Many authors have developed IS acceptance models; the most prominent acceptance models will be discussed below.

Davis (1989) introduced the Technology Acceptance Model (TAM), which has its origins in cognitive psychology. It became one of the most prominent information system acceptance models. The TAM mentions two determinants of the outcomes of IS: perceived usefulness and perceived ease-of-use, which have become the core variables in technology acceptance research. However, later research has extended the range of variables and refined their measurements in order to better explain use behaviors (Van Offenbeek et al., 2013). The second prominent acceptance model is developed by Venkatesh et al. (2003). They developed the Unified Theory of Acceptance and Use of Technology (UTAUT), which is an integrated model of user acceptance. In this model, performance expectancy, effort expectancy, and social influence are the determining factors of the outcomes of the system, which entails the intention to use a system. Besides this, in the UTAUT model facilitating conditions are the direct determinant of use behavior (Venkatesh et al., 2003).

#### RESISTANCE

According to Van Offenbeek et al. (2013) resistance is not just “an antecedent of acceptance”, but is defined as “be-

havioral reactions expressing reservation in the face of pressure exerted by change supporters seeking to alter the status quo". There are a couple of prominent theories about resistance. Nevertheless, research focusing on resistance is much scarcer than research focusing on acceptance (Van Offenbeek et al., 2013). In this section the main literature about resistance will be reviewed.

Markus (1983) made an important contribution to resistance research when she distinguished three resistance theories: system-determined, people-determined and interaction theory. In order to overcome resistance, the system-determined view requires modification of the technical features of the system. Besides this, the people-determined view recommends HR-oriented interventions, for instance training people. Next to that, the interaction theory, which explained resistance in organizational settings, mentions that people or groups resist systems because of the interaction between characteristics related to systems and to people. This interaction theory exists of two variants: the socio-technical variant and the political variant. The socio-technical variant focuses on the division of responsibility for organizational tasks across various roles. Consequently, it focuses on the work-related communication and coordination around this division of labor. The political variant clarifies resistance as a product of the interaction of system design features with the intra-organizational distribution of power (Joshi, 1991). The political variant also raises the interesting view that wider contextual issues may affect IS adoption (Van Offenbeek et al., 2013).

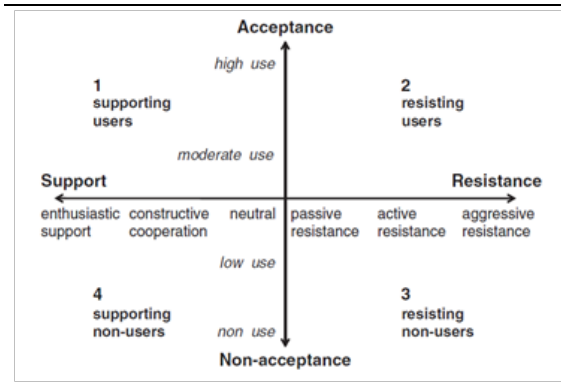
According to the Multilevel Model of Resistance to information systems of Lapointe and Rivard (2005), resistance behavior may vary from apathy to aggressive behavior and these behaviors can vary over time. They maintained that resistance behaviors occur due to perceived threats resulting from the impact of an information system. Their system model sees resistance more as a social system. In their Multilevel Model of Resistance to information systems they identified five interacting resistance components. These five components of resistance according to Lapointe and Rivard (2005) are: (1) the initial conditions, which entails the context prior to implementation; (2) the subject of resistance, this can be both the user or the actor; (3) the ob-

ject of resistance, hence the information system; (4) the perceived threats, which are the possible negative consequences of the information system for the actor or user; and (5) the resistance behaviors (Van Offenbeek et al., 2013).

Concluding, besides including contextual issues, resistance research also explains the resistance behaviors of all the actors involved, not just the users. Consequently, resistance research tends to pay attention to the interaction between the parties' reactions over time. These characteristics of resistance research show how resistance theory has a broader scope than acceptance theories. Next to that, according to Van Offenbeek et al. (2013), the resistance-support continuum showed aggressive resistance behaviors on one end of the continuum. On the other end of the continuum, supportive behaviors are depicted. Support is important to achieve maximum benefits from change (Judson, 1991). Nevertheless, research on supportive behaviors is very limited. However, Coetsee (1999) does clearly address the opposite end of the resistance continuum as support. After reviewing the prominent theories of acceptance and resistance, it can be concluded that acceptance and resistance are two separate dimensions. Van Offenbeek et al. (2013) created a framework to enable the connection and combination of the two research streams, which will be discussed in the following section.

#### CONNECTING ACCEPTANCE AND RESISTANCE

As mentioned before, most information systems theories tend to focus on either acceptance or resistance of an information system and also, the relationship between both received little attention. Consequently, Van Offenbeek et al. (2013) developed a two-dimensional framework on acceptance and resistance. In this section the framework showed in figure 2 will be explained. The framework distinguishes two dimensions: resistance (from enthusiastic support to aggressive resistance) and acceptance (from high use to non-use).



**Figure 2** A two-factor view on user reactions: degrees of acceptance and support/resistance.

The dimension acceptance is from intentional use behavior in which the user will use the system on a regular basis (acceptance) to not using the system (non-acceptance). The dimension resistance is from enthusiastic support to aggressive resistance. For example, support can include active participation in an implementation team or the act of promoting system use to colleagues. Examples of resistance are complaining, voicing opposing views or apathy (Van Offenbeek et al., 2013). Specific antecedents for acceptance and resistance behaviors were selected by Van Offenbeek et al. (2013) from key papers in the acceptance and resistance literature. For the resistance/support dimension these antecedents include quality of work and life, emotions and facilitating conditions. For the acceptance/non-acceptance dimension these are: perceived usefulness of the system, perceived ease-of-use, self-efficacy and intrinsic motivation. These different factors will contribute to a behavioral response towards the system. For the resistance part of the dimension, the concepts can lead to activities aimed to block or hinder the system implementation and thus, the use of the system. Regarding the support part of this dimension, the implementation and the use of the system will be supported. For the acceptance dimension this can lead to use behavior, in which the user will use the system on a regular basis. For the non-acceptance dimension this can lead to not using the system (Van Offenbeek et al., 2013).

Van Offenbeek et al.'s (2013) as well as Seo et al.'s (2012) research shows that acceptance and support/resistance behaviors can co-exist and that the variance in these behaviors may differ by user group and over time. This can raise questions about the voluntariness in the intra-person interaction between acceptance and support/resistance reactions. Voluntary and mandatory use is on the same continuum (Karahanna et al., 1999; Brown et al., 2002). In a fully mandatory environment, workers will end up being either supporting or resisting users.

## 2.2 EXPECTED IS OUTCOMES

The expected outcomes of implementing an information system are important for the adoption of the system, which will be explained in this section. If employees expect that the advantages to them obviously outweigh the disadvantages they have a high personal relevance regarding the change and support for the change is highly likely. They can see that the change is necessary to improve the current situation (Cawsey et al., 2012). In addition, people can become intrinsically motivated by performing their job which can lead to job satisfaction and supportive behavior. Therefore, the expected job satisfaction after the implementation of a new information system plays an important role. (Umstot et al., 1977; Venkatesh and Speier, 1999).

### JOB SATISFACTION

The implementation of an information system leads to broad impacts on employees; changes in the nature of tasks and it can have a big impact on the job themselves. Job satisfaction is defined as "the extent of positive emotional response to the job resulting from an employee's appraisal of the job as fulfilling or congruent with the individual's values" (Morris and Venkatesh, 2010). In this study, job satisfaction is defined by the satisfaction related to the systems used and by the job characteristics of the job characteristic model (JCM) of Hackman and Oldham (1980), which will be explained in the next paragraphs.

In the JCM model, five constructs of job characteristics lead to job complexity which induces job satisfaction (Hackman and Oldham, 1980). The first job characteristic, task significance, entails the extent to which a job has an impact on

the lives and well-being of people. This can be in an organizational setting as well as in life in general (Morris and Venkatesh, 2010). The second characteristic, task identity, is about performing and completing a whole identifiable outcome (Morris and Venkatesh, 2010). Next to that, it encompasses creating a sense of wholeness of the job (Umstot et al., 1977). The third construct is skill variety, the extent to which a job requires the different skills and tasks. Fourth, autonomy is about the autonomy in a job, the responsibility to take own decisions. Moreover, the employee can choose how the work is done (Morris and Venkatesh, 2010). The employee is no longer fully dependent on the supervisor (Umstot et al., 1977). At last, feedback, is about getting clear information about employees' performance (Morris and Venkatesh, 2010). According to different authors, all of the job characteristics have a positive influence on job satisfaction (Hackman and Oldham, 1980; Morris and Venkatesh, 2010; Umstot et al., 1977).

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According to Morris and Venkatesh (2010), changes in job context, systems or other organizational change mechanisms, have the potential to alter job satisfaction. As mentioned above, job satisfaction is about the intrinsic motivation of an employee. Intrinsic motivation refers to the pleasure and inherent satisfaction derived from a specific activity and consequently to supportive behavior (Umstot et al., 1977). Moreover, if employees expect that the new system implementation has advantages, they may be expected to be more satisfied which leads to more supportive behavior towards the change (Cawsey et al., 2012; Umstot et al., 1977). Therefore, it is interesting to research the changes that can arise in job satisfaction when organizational members need to switch towards working with a new information system; taking into account that the expected job satisfaction will be influenced by the expected satisfaction related to the information system used and the job characteristics of the JCM model.

### 2.3 IS IMPLEMENTATION PROCESS

Next to the expected outcome of implementing an information system, the implementation process itself is also important for the adoption of the system, since the process of implementing a new information system can represent a

situation in which workers experience a threat to their sense of control over work. By involving users in decisions relating to implementation, their sense of control will be increased and workers may become more satisfied with the system (Baronas and Louis, 1988).

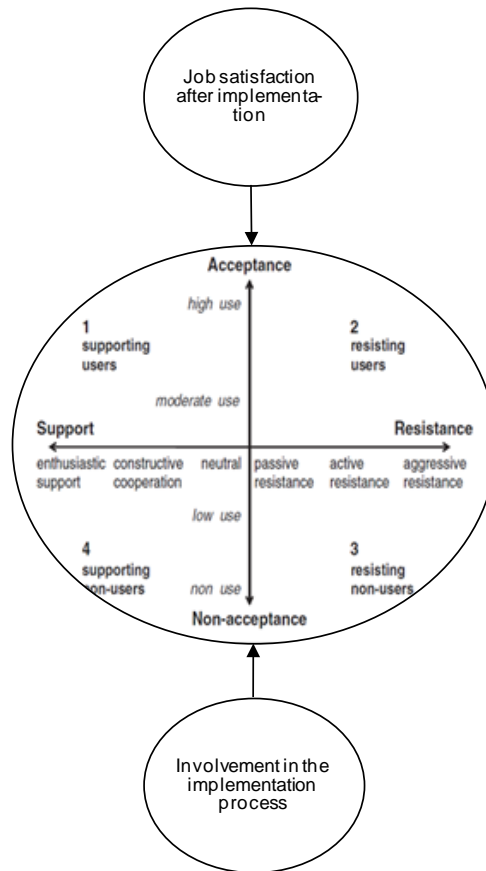
#### INVOLVEMENT

According to Oreg et al. (2011) and Bartunek et al. (2006), participation during the change process can be linked with the experience of positive emotions. Participation during the change process can also be linked with a greater involvement in implementing behavioral change. Involvement is "the degree to which a person is identified psychologically with his work or the importance of work in his total self-image" (Lodahl and Kejner, 1965). It is the internalizations of values about the integrity of work or the importance of work in the worth of the person. For a person who is involved in his or her job, work is a very important part of life and that person is affected very much personally by his whole job situation (Lodahl and Kejner, 1965). Moreover, involvement in the early stages of the change process can decrease change related stress and withdrawal behaviors of change recipients. Therefore, involvement is also connected to adoption, and especially acceptance, since change recipients whom experience greater stress, which can be caused by lower levels of involvement, tend to be less open towards accepting changes (Oreg et al., 2011). Moreover, user involvement is predicted to increase user acceptance by committing users to the system and therefore decreasing user resistance to change (Barnas and Louis, 1988).

Reviewing the adoption theory and studying the characteristics of the process and expected outcomes of the implementation of an information system, leads to the following conceptual model, which is shown in figure 3. Job satisfaction, as expected IS outcome, is defined by the systems used and by job characteristics. Job satisfaction leads to intrinsic motivation and pleasure which leads to supportive behavior (Umstot et al., 1977). Next to that, according to Baronas and Louis (1988) involvement in the information system implementation process will lead to acceptance of the new IS.



**Expected IS outcome characteristics**



**Figure 3** Completed conceptual model: Adoption (acceptance and resistance) will be influenced by expected IS outcome characteristics (job satisfaction influenced by the satisfaction of the new system and the job characteristics (grey)) and by IS implementation process characteristics (involvement).

The previous theory section was used to fulfill the need for information and to have the theoretical concepts clearly defined. In order to answer the research question: What are the effects of intended behaviors of the heterogeneous para/peri user group on acceptance and support, in the

case of an EHR implementation? the para/peri user group needs to be classified into subgroups in order to decide by whom qualitative research will be conducted. Therefore, the next paragraph is a bridge to the method section to determine who should be interviewed.

## USER CLASSIFICATION

Since it is possible that the adoption attitudes and practices are different among various user subgroups, it is important to first investigate which subgroups are present. Additionally, some subgroups can be positive towards EHR implementations, while others voiced complaints and concerns, and therefore hinder the implementation (Payton, Paré, Lerouge, and Reddy, 2011). Therefore, after classifying user groups into subgroups their acceptance and resistance behaviors can be investigated.

As Cohen (2013) stated, jobs are fundamental organizational building blocks. Jobs are bundles of tasks performed by different employees under administrative job titles. Jobs shape important outcomes for organizations and their members. Within an organization there is a job design, which refers to how jobs, tasks and roles are structured, determined, and modified. It also refers to the impact of these structures, determinations, and modifications on individual, group and organizational outcomes (De Cooman, Stynen, van den Broek, Sels, and de Witte, 2013). Subgroups or workgroups can be classified by the job employees employ.

According to Carton and Cummings (2012) a work group is: “a group whose membership and task are formally recognized by the organization”. Within these groups subgroups can be found. There is no commonly accepted definition of subgroups in the literature (Carton and Cummings, 2012). This paper adheres to the definition of Carton and Cummings (2013). They mentioned that subgroups are: “subsets of team members that are each characterized by a unique form or degree of interdependence”. There are different subgroup types. These different types can relate to how the pattern of behavior within and between subgroups varies according to general classes of member characteristics. Carton and Cummings (2013) discussed two kinds of subgroups, one type of subgroup according to social identity, called identity-based subgroups and the other type of subgroup according to knowledge and task-related processes, the knowledge-based subgroups. This paper focusses on the latter, the knowledge-based subgroups, because these subgroups are formed according to the principles of information processing. Mem-

bers from different knowledge-based subgroups are divided based on technical language and approaches to problem solving that have unique ways of filtering and processing information and knowledge. There can be different forms of knowledge-based subgroups. Examples of knowledge-based subgroups are: cohorts, international subgroups, clusters, and task-related subgroups.

Task-related subgroups emerge because the nature of a team’s task causes subgroups to form according to specialized knowledge, training, and experience. However, the adoption attitude towards an information system implementation can differ among various subgroups. For instance, some subgroups can be positive towards EHR implementations while others voice complaints and concerns, and therefore hinder the implementation (Payton, Paré, Lerouge, and Reddy, 2011). Therefore, reasons for supporting or resisting an implementation can vary among different subgroups.

However, according to the adoption literature, users’ willingness to continue using an information system is mainly driven by a consideration of the benefits, that is, whether the system provides useful and satisfactory functions (Van Offenbeek et al., 2013). Consequently, the expected satisfaction regarding the job can differ among various subgroups. The next section elaborates on how this has been examined in this study while focusing on the case of an EHR implementation program. Information will be provided on how the data used in this study has been collected and analyzed.

### 3 METHOD

In order to understand acceptance and resistance behaviors during an EHR implementation process, a case study provides data. As mentioned in the introduction, the essence of a case study is to illuminate a decision (Yin, 2014). According to Eisenhardt (1989) case studies can be used to generate theory; besides this, it is a research strategy which focuses on understanding the dynamics presented within single settings. As mentioned before, the quantitative data of Cordes (2013) forms the starting point of this research. Furthermore, qualitative data should provide additional insights in the quantitative data. In this study, a triangulation method is used. Triangulation is made possible by using multiple data collection methods and provides a stronger substantiation of constructs and hypotheses (Eisenhardt, 1989). The next section presents background information about the case. Subsequently, the qualitative and quantitative research methods will be explained.

#### CASE BACKGROUND

In this section background information about the case will be given. This case study reflects on the previously collected quantitative data, where in total 587 participants responded to the survey. In order to investigate the remarkable observation in the research of Cordes (2013), regarding that the user group para/peri scored significantly lower on the variables acceptance and support compared to all the other user groups, the qualitative data will be used. Moreover, qualitative data can provide rich information in addition to Cordes' (2013) findings. This research used a positivist approach; knowledge was gained from observable experience. This approach is in part contextually bounded, because it essentially depends on the researchers' appreciation of the situation (Van Offenbeek et al., 2013).

The case study has been carried out in a large teaching hospital in the Netherlands, which is preparing for the implementation of an Electronic Health Record, on organizational wide level. This EHR program will take multiple years before the information system will be actually implemented. The implementation ensures that all users of the multiple

legacy healthcare systems will work together in one patient record. In previous research of Cordes (2013), future users which should actively use the system were grouped into the following user groups: doctors; nursing staff; paramedics/perimedics (para/peri); and management. In this study the focus will be on the para/peri user group, since they showed outstanding results in previous research as mentioned before.

The qualitative and quantitative research methods used in this research, are divided into three rounds. Round 1 is a preliminary investigation based on interviews with experts. This round will decide with whom the analyses in the other two rounds will be conducted. Round 2 consists of quantitative analysis of the existing dataset of previous research (Cordes, 2013) and will investigate the antecedents relating to acceptance and support; the middle part of the conceptual model. Round 3 is a qualitative in-depth investigation. These different rounds will be explained in the next section.

#### 3.1 ROUND 1

First, to answer the sub questions: How can the para/peri user group be classified into subgroups? And what is their relation with the EHR? a preliminary investigation was conducted to receive knowledge and information about the para/peri user group, which is also useful for the other rounds. To answer the sub questions, data was gathered through conducting five interviews with different staff members of the EHR program. The main question of these interviews was how to divide para/peri in a good way into subgroups. Next to that, the large teaching hospital in the Netherlands provided an overview with all the 150 para/peri job positions, which were not divided into subgroups. Besides, a standard division of the para/peri user group was used to analyze in order to make a new division. Consequently, after conducting information about the division of the para/peri group, experts were interviewed to get more knowledge about the different job positions with-

in the para/peri group and about how they are related to the use of the EHR.

### 3.2 ROUND 2

In the second round, the quantitative data set of the study of Cordes (2013) has been used. It can be concluded from the first round that not all respondents in the data set of Cordes (2013) are going to actually use the system and are also not supposed to do so. Based on these findings, these respondents were removed. In order to see if the para/peri group still scored significantly lower on acceptance and support, it was necessary to re-analyze the collected data by Cordes (2013). In this section, the quantitative data collection and analyses will be explained.

#### QUANTITATIVE DATA COLLECTION

During his research, Cordes (2013) conducted a survey among the four user groups: nursing staff, doctors, paramedics and perimedics (para/peri), and management. He conducted this survey to measure the intended behaviors of user groups. The survey included 25 statements, which were derived from eight concepts relevant in IS adoption; acceptance, support, power, impact, emotion, ease-of use, usefulness, and facilitating conditions. Respondents were asked to what degree they agreed with each statement, on a 5 point Likert scale from: (1) total disagreement to (5) total agreement. Additionally, a not applicable box was added. In his research, Cordes (2013) tested the survey in two sequential pilots to check the validity of the statements' construct. Furthermore, it has been controlled whether the statements were properly scaled and ordered. In this research the same data set as in the research of Cordes has been used (2013).

#### QUANTITATIVE DATA ANALYSIS

In order to enable an adequate comparison with the results of Cordes' (2013) data analysis the same data analysis methods will be used. Additionally, the data set used in this research is the same data set as used in the research of Cordes (2013) however, some para/peri participants were removed. First, an exploratory factor analysis (PCA) with Varimax rotation to see if there are statements which load

on the same factor. Moreover, when items did not load well on a factor, they were excluded from the next analysis, since the reliability of the factor increased when the item got removed. For the resulting factors, multi-items constructs were created by summing up the items encompassing each factor and dividing them by their number. Additionally, for the negatively loaded items, the inverted factors were used. Linear regressions were used to discover significant relations between the remaining constructs resulting from the factor analysis with acceptance and support. Finally, one way ANOVA was used to test for significant differences in mean scores on acceptance and support between user groups.

### 3.3 ROUND 3

After executing the preliminary research to get an insight in the para/peri group in the first round, the quantitative data was re-analyzed in the second round. In the final round, using qualitative data should provide insights in these quantitative results. In this section the qualitative data collection and analysis will be enlightened.

#### QUALITATIVE DATA COLLECTION

In order to answer the main question: What are the effects of intended behaviors of the heterogeneous para/peri user group on acceptance and support, in the case of an EHR implementation? five in-depth interviews focused on five large job positions within the para/peri user group were conducted. The different job positions were: (1) diagnostic radiographer, (2) physiotherapist, (3) occupational therapist, (4) dietician and (5) surgery assistant. During these interviews, open-ended questions were used and the following topics were addressed: job description in combination with the job characteristics and systems used; involvement in implementation process; and acceptance and resistance. These themes emerged by reviewing the literature. All of the five interviews were recorded with the permission of the respondents. The interviews took around 45 minutes and data were transcribed immediately after conducting the interviews.

## QUALITATIVE DATA ANALYSIS

A coding scheme was developed in order to structurally analyze the transcriptions made of all interviews. This is called deductive coding; theory-driven codes, since the codes have emerged by reviewing the literature (Fereday and Muir-Cochrane, 2006). Quotes from the five interviews were coded based on a start-list of variables. Acceptance, support, involvement, job satisfaction and (current and expected) job characteristics (task significance, task identity, skill variety, autonomy and feedback) formed the main categories, see Appendix II-V. As mentioned in the theory, antecedents of acceptance and support are defined.

Antecedents of acceptance are: perceived usefulness of the system; perceived ease of use; intrinsic motivation; facilitating conditions; self-efficacy; behavioral responses (intention and mandatory). Antecedents of support are: consequences for quality of work, impact and behavioral responses.

Consequently, job satisfaction and the job characteristics are defined in the coding scheme. Finally, participation is defined as a concept which leads to involvement. Appendix II-V shows the start-list of codes used for the transcription of the interviews. In order to increase the inter-rater reliability an expert (i.e. a Change Management student) reviewed the identified coding of the quotes. Besides this deductive method, attention was given to other issues raised by participants during the interviews, in order to avoid imposing derived codes on data on which they do not apply and to allow contextual issues to come forward.



## 4 RESULTS

In this section the findings of the three rounds will be presented. First, the findings of the preliminary research will be showed. Second, the findings of the quantitative re-analysis will be presented and finally, the findings of the qualitative in-depth investigation will be mentioned.

### 4.1 ROUND 1

In this section the results of the first round will be discussed. In the first round, data was gathered through five interviews with different staff members of the EHR program. The objective of these interviews was to answer the sub questions How can the para/peri user group be classified into subgroups? And what is their relation with the EHR? Interviews with experts provided knowledge and information about the para/peri user group and were useful for making a clear division of the para/peri group. Consequently, it was important to know if all the para/peri job positions are going to use the Electronic Health Record, this covers the second sub question. The results will be explained in the upcoming paragraphs.

#### 1 Task-related subgroups

After interviewing different staff members of the EHR program, it became clear that the para/peri user group is very complex. This group comprises around 150 different job positions and the large teaching hospital provided an overview with all the different job positions. There was a standard division available, created by the large teaching hospital's staff which has been discussed with experts. During these interviews, information was gained about the differences in tasks within the para/peri group. After the interviews, it was concluded that the standard division of the para/peri was not useful and was not clearly divided. Consequently, a new division was made based while using the overview of all the 150 job positions. First, a task description was given to all the 150 job positions. Second, all the job positions were categorized and selected on contact with patients and no contact with patients and after that, the group was divided in task-related subgroups. For the

new division of the para/peri, which will be used by the large teaching hospital, see the appendix I.

#### ACTUAL USE

After dividing the para/peri group into task-related subgroups, experts were asked if the subgroups will actually be going to use the Electronic Health Record when it is implemented. This question is important since all the para/peri job positions were included in the research of Cordes (2013). Interviewing the experts provided insights in which job positions are going to use the EHR and which are not going to use the new system. After the interviews it was clear that not all the para/peri job positions are going to use the system; some of them will stick to the current system they are using. This means that in the research of Cordes (2013) para/peri job positions have been included which need to be excluded in future research, which has led to a re-analysis in round 2. Experts were also questioned regarding which para/peri job positions are large, and therefore cover a big part of the para/peri group. The different job positions were: diagnostic radiographer (which covers 21% of the subgroup imaging technique) physiotherapist, occupational therapist, dietician (which covers together 31% of the subgroup clinical treatment) and surgery assistant (which covers 30% of the subgroup clinical support); these job positions were selected to be interviewed in-depth in round 3.

After performing the first round, it can be concluded that the para/peri user group was not clearly divided into subgroups. The new division is based on task-related subgroups. Furthermore, it can be concluded that not all the para/peri job positions are going to use the EHR; some of the job positions will stick to the current systems they are using. Therefore, a re-analysis of the data of Cordes (2013) needs to be done; which will be explained in the next round.

## 4.2 ROUND 2

In this section the quantitative findings will be presented. The quantitative data analysis is performed with the same data set as Cordes (2013). In the research of Cordes (2013) data is conducted from different stakeholder groups, namely nursing staff, doctors, para/peri and management. His objective was to investigate how intended behaviors of different user groups differ from those expected by implementers. It could be concluded that the para/peri group scored significantly lower on acceptance as well as on support in relation to the other user groups. The conclusion of round 1 was that not all the para/peri respondents are going to use the EHR; therefore those respondents were deleted from the dataset.

### DESCRIPTIVE STATISTICS

After removing some participants who will not use the Electronic Health Record, the new data set consisted of 521 participants, which means that the data of 66 participants was removed. The factor analysis in the research of Cordes (2013) showed that the PCA resulted in five factors: usefulness, impact, support, facilitating conditions, and acceptance. It was remarkable that if all the same variables of the research of Cordes (2013) were used in this data re-analysis, there were only four factors. This can be the cause of some removed participants. In order to get the same five factors (usefulness, impact, support, facilitating conditions, and acceptance) one variable (power\_2) is added in this re-analysis, so the PCA in this research resulted in the same five factors. Inverted variables were used for statement 4 and statement 10, similar to the analysis of Cordes (2013), because they loaded negatively on their respective factors. These statements (i.e. their interpretation) were inverted also. The scree plot, which is showed in Appendix VII, showed the best result when five factors were used. The rotated component matrix of the final Principal Component Analysis can be found in Appendix 2. Each final factor was reliable, since all factors had a Cronbach alpha higher than 0.70 and lower than 0.90, see Appendix VI (Nunnally, 1970). Furthermore, histograms of the factors showed near normal distributions for all factors (Appendix VII).

Subsequently, in table 1 below the descriptive statistics and correlations between the research variables are shown. The table shows that 68.5% are female and the mean age is 44.15 years. The mean scores on the variables usefulness, acceptance, impact, facilitating conditions and support, range from (1) strongly disagreed to (5) strongly agreed. As the table shows, usefulness is related to acceptance. However, facilitating conditions is also associated with usefulness and impact is also related to acceptance. This is somewhat surprising, because according to the literature impact expected to be related to support. Moreover, support is also related to usefulness and acceptance. This indicates that in this case, users who intend to use the EHR also support the implementation process and the other way around.

### INTENDED BEHAVIORS OF USER GROUPS

Appendix X shows the linear regression of the independent variables and the dependent variables. The dependent variables are acceptance and support. According to acceptance, 25.9 % of the variation in acceptance is explained by usefulness, facilitating conditions and impact. They have a positive relationship with acceptance. Moreover, facilitating conditions and usefulness showed to have a significant positive relationship with support and impact does not. According to support, 22.3 % of the variation in support is explained by the independent variables.

Finally, it is interesting to see if the scores on acceptance and support significantly differ per user group and besides, if those scores differ from the ANOVA results in the research of Cordes (2013). The ANOVA results of the research of Cordes (2013) are shown in table 2 and 3 below. The tables present the mean scores and differences between means per user group on acceptance and support and showed that the para/peri user group scored significantly lower on acceptance as well as on support as compared to the other user groups.



Means (m), standard deviations (SD), and correlations between the research variables (n=521)

Variable	m	SD	1	2	3	4	5	6
1 Gender	F=68.5%		-					
2 Age	44.15	11.37	.020	-				
3 Usefulness	3.35	.79	-.048	.108*	-			
4 Acceptance	4.02	.82	-.065	.072	.501**	-		
5 Impact	3.52	.70	.023	-.095*	.057	.129**	-	
6 Fac. cond.	3.36	.69	.049	-.127*	.451**	.340**	.050	-
7 Support	2.93	.94	-.026	-.143**	.319**	.231**	.118*	.462**

\* Significant at the 0.05 level (2-tailed) \*\* Significant at the 0.01 level (2-tailed)

**Table 1** Descriptive statistics and correlations between the research variables.

Mean scores (m), standard deviations (SD), and differences in mean between user groups

User group	Acceptance						
	n	m	SD	1	2	3	4
1 Nursing staff	156	3.99	.80	x			
2 Doctors	159	4.11	.78	.11	x		
3 Para/Peri	92	3.46	.97	-.53*	-.64*	x	
4 Management	30	4.18	.94	.19	.08	.72*	x

\* Significant differences in mean at the 0.05 level

Scale Acceptance: 1 = intend to not actively use the system, 5 = intend to actively use the system

**Table 2** ANOVA results for acceptance per user group.

Mean scores (m), standard deviations (SD), and differences in mean between user groups

User group	Support						
	n	m	SD	1	2	3	4
1 Nursing staff	95	2.96	1.05	x			
2 Doctors	102	2.90	1.02	-.06	x		
3 Para/Peri	76	2.44	1.07	-.53*	-.46*	x	
4 Management	25	3.77	.92	.81*	.87*	1.33*	x

\* Significant differences in mean at the 0.05 level

Scale Support: 1 = not support implementation of system, 5 = active support implementation of system

**Table 3** ANOVA results for support per user group.

Thus, according to the research of Cordes (2013), the user group para/peri scored significantly lower on acceptance as well as on support as compared to the other user groups. After re-analyzing the data set, compared to the ANOVA results for acceptance per user group in the research of Cordes (2013), there is a small difference. Table 4 shows the mean scores, the standard deviations and the differences in mean between user groups on acceptance. As the mean scores showed, after removing para/peri participants, their mean score on acceptance increased: para/peri scored

an average of 3.56 compared to the average of 3.46 in the research of Cordes (2013). However, the para/peri user group still scored significantly lower than the other user groups. Table 5 shows the mean scores, the standard deviations and the differences in mean between user groups on support. The para/peri user group still scored significant lower than all the user groups. However, comparing the mean scores of para/peri on support, it is increased in this research. The user group para/peri has a mean score of 2.62 instead of the mean score of 2.44 in the research before.

Mean scores (m), standard deviations (SD), and differences in mean between user groups

User group	Acceptance						
	n	m	SD	1	2	3	4
1 Nursing staff	156	3.99	.80	-			
2 Doctors	157	4.11	.79	-.12	-		
3 Para/Peri	44	3.56	.98	.44*	-.55*	-	
4 Management	30	4.18	.94	-.19	.07	.63*	-

\* Significant differences in mean at the 0.05 level

Scale Acceptance: 1 = intend to not actively use the system, 5 = intend to actively use the system

**Table 4** ANOVA results for acceptance per user group.

Mean scores (m), standard deviations (SD), and differences in mean between user groups

User group	Support						
	n	m	SD	1	2	3	4
1 Nursing staff	150	2.95	.89	-			
2 Doctors	148	2.84	.93	-.10	-		
3 Para/Peri	45	2.62	.98	-.33*	-.22	-	
4 Management	32	3.65	.86	.70*	.80*	1.02*	-

\* Significant differences in mean at the 0.05 level

Scale Support: 1 = not support implementation of system, 5 = active support implementation of system

**Table 5** ANOVA results for support per user group.

Concluding, after removing the participants who are not going to use the Electronic Health Record and re-analyzing the quantitative dataset, the mean scores of para/peri on acceptance and support increased. However, the para/peri user group still scored significant lower on acceptance as well as on support compared to the other user groups: nursing staff, doctors and management. Qualitative data should provide insights in these results, which is conducted in round 3.

### 4.3 ROUND 3

The final round is conducted to provide insights in the results of round 2; that para/peri scored significantly lower on acceptance and support than the other user groups. After conducting interviews with the five different para/peri job positions: diagnostic radiographer, physiotherapist, occupational therapist, dietician and surgery assistant the five interviews were analyzed by using the coding scheme (Appendix II-V). In this section the findings on the different variables: acceptance, support, involvement and job satisfaction will be showed.

#### ACCEPTANCE

As already mentioned in the method, the perceived usefulness, the perceived ease of use and facilitating conditions relate to actual usage of the system and therefore to ac-

ceptance. The most of the interviewees were positive and they believed that the system is instrumental in achieving valued outcomes: "I think it will be one big system, where we only need to enter everything once". They also believed that the system would be free of (great) effort. One of the para/peri mentioned for example: "I do not think it will cost much effort for me to use the system". Moreover, they believed that an organizational and technical infrastructure exists to support the use of the system: "We have got two computer monitors; that is well arranged". So, related to the actual usage of the system, the most interviewees were positive. However, there are a few concerns as well; some of the para/peri job positions believed that the system is not instrumental in achieving valued outcomes: "I think the EHR is a bit sketchy with the possibilities". Furthermore, some of the interviewees believed that using the system

will take too much effort: "I think it is getting used to a new system..." Regarding to the organizational and technical infrastructure they are a bit skeptical about the new system: "At this moment we are not supported by the hospital to use the system; we have not enough computers". However, concerning intrinsic motivation, the system implementation and process is perceived as rewarding (i.e. interesting, pleasurable, fulfilling) in itself. The para/peri group did not mention that external rewards or sanctions are needed. For example, they described: "I think those developments are very interesting"; "I think this development is very good and I would really like to try the system". The para/peri group also got the feeling of being skilled to use the system: "I can easily learn a new system". Nevertheless, there are also concerns about not being capable to use the system: "We need to be trained before we can use the system". Furthermore, the group stated that they are required to use the system, so they do not have a choice: "We do not have a choice; we just have to use the system..." Overall, the findings related to acceptance are quite positive. Although, they got the feeling they will be required to use the system, so they do not have a choice. Besides this, there are a few concerns regarding their feelings about not being skilled enough to use the system.

#### SUPPORT

As addressed in the method, consequences for quality of work and behavioral response are recognized by Cordes (2013) as antecedents of support. Related to the consequences for quality of work, none of the interviewees think the implementation of the system will reduce the quality of (working) life: "I think it is good that everyone in the whole hospital will work in the same way"; "I think it will be easier for the patients as well; that all the information is accessible at one system". Moreover, they will support the system, as well as the implementation and the use of the system: "Yes, I think I would support it"; "I would cooperate and I think the rest of my colleagues also". So, findings related to the first two antecedents of support are positive. As addressed in the theory, impact might lead to resisting or supporting behaviors depending on the interaction of the characteristics of the system. The para/peri user group believed that the implementation of the new system has a low impact on the current work situation. They also think that they don't

have to make adjustments to the current work situation, or at most little adjustments: “I do not think we have to change that much to the current work situation”; “It does not suddenly have other effects”; “It will not have a big impact”. No one of the interviewees believed that the implementation of the new system will have a high impact on the current work situation. The expected low impact of the new system implementation is also positively associated to support.

In addition, as addressed in the theory, the expected job satisfaction after implementation might lead to supporting behaviors. While coding the interviews, it was observed that all the interviewees are very dissatisfied with the current work situation, especially with the current systems and applications they are using. Because of the dissatisfaction of the current system; they tend to support the new system, since they expect that the new system will be better than the one they are using at the moment, so they have high expectations. Therefore, the code job satisfaction changed to two new antecedents of support: ‘current job dissatisfaction’ and ‘shared meanings’. Examples of dissatisfaction of the current systems are: “Personally, I do not think the current system is the most useful system”; “The current system we are using is really complicated”. The para/peri group is extremely dissatisfied with the current systems they are using and this leads to shared meanings; which are optimistic expectations of the new system, what can be highlighted by the next quotes: “I think the new system can be very useful”; “Well, I actually do hope that it gets better”.

#### INVOLVEMENT

The responses on involvement of the para/peri group were equally distributed. Some of the para/peri group feel they are involved in the planning and implementing activities of the system: “I do feel involved, because I am participating in the workgroup EHR”. Others feel they were not involved in the planning and implementation of the system at all: “I do not feel involved and I notice that my colleagues do not feel involved as well”. Furthermore, while coding the interviews, it was observed that the user group reacted very negatively on the information provision by the large teaching hospital. They do not get information and are not aware of the new

system and implementation process. This arises from the next quotes: “First, I need to know more about the new system”; “I do not really know what the system will contain”. Next to that, the most of the interviewees isn’t sharing their knowledge about the new system within the user group; they do not talk about the new system with colleagues: “I have never heard anyone about it”; “We are not talking about it”. Subsequently, not only low participation, but also low information provision by the large teaching hospital and less knowledge sharing within the para/peri user group leads to not feeling involved in the process.

#### JOB CHARACTERISTICS

Finally, the five core job characteristics were investigated: task significance, task identity, skill variety, autonomy and feedback. The para/peri user group all think that the job has a big impact on the lives and well-beings of people, which is called task significance, for example: “I think we are very important in the diagnosis and treatment of the patients”. They also agreed that their jobs require different skills and tasks: “The work is very diverse; we have to do a lot of different things”. Furthermore, the para/peri user group gets feedback and information about their performance, for example: “We are discussing and there are moments to ask each other questions”. The other two job characteristics, task identity and autonomy, are both high and low coded. There is a distinction between the work activities of the para/peri itself and the work in a broader context. Task identity, for example, is about performing or completing a whole identifiable outcome. For the para/peri function itself, they are performing a whole identifiable outcome; they treat the patient in its entirety on their specific discipline: “The intention is that you guide and treat as many patients from the beginning to the end”. However, in the broader context, from the patient’s point of view, the para/peri job is just a part of the total process the patient has to complete: “From the patient’s point of view, our work is just a small part, because the patient can be treated by many different disciplines”. Related to autonomy, the para/peri user group is responsible to take own decisions, if it is associated to their specific job position: “We have a lot of autonomy”; “For my work specific tasks I am responsible”. But, in the broader context from the patient’s point of view, they don’t have the final responsibility: “The surgeon is always ulti-

mately responsible”; “If he or she [doctor] wants something to happen, I am the subordinate”. Overall; the para/peri user group scored high on the different job characteristics related to their own work. However, from the patient’s point of view, the para/peri group is only performing a small part of the patient’s treatment process in the hospital. Because the para/peri group expects that there will not be a big impact on the current job situation, they do not expect that the job characteristics will change.

The final round was important to provide insights in the results of the second round. Overall, the findings related to acceptance and support are quite positive. Even though, they do not feel involved in the implementation process. Related to job satisfaction, the para/peri group does not expect a change in the job characteristics. Next to that, they are dissatisfied with the current systems they are using which leads to optimistic expectations of the new systems, which is called shared meanings. The next section will elaborate more on these findings and gives a final conclusion.

## 5 DISCUSSION AND CONCLUSION

This study aims to discover how different attitudes lead to acceptance and support of an information system by using a case study of an Electronic Health Record (EHR) implementation program in a large teaching hospital in the Netherlands. To investigate this, the framework with a two-factor view on user reactions of Van Offenbeek et al. (2013) was used. To which extent was this framework useful for this study and what can be concluded? According to the literature, the expectations are that the expected job satisfaction after implementation and involvement in the implementation process have a positive influence on adoption. This will be discussed in this chapter. First, the following paragraph will discuss the rise of new sub-codes during the coding of the interviews. After that, the main findings of this study will be discussed. Furthermore, the theoretical and practical contributions will be addressed. At last, limitations and future research possibilities will be mentioned.

While coding the interviews several codes were added to the coding start-list, see Appendix II-V. As stated in the theory section, the expected job satisfaction after implementation was one of the codes on the start-list during the transcription process. However, while coding the interviews, it was observed that the interviewees showed dissatisfaction with the current work situation, especially with the current systems and applications they utilize. Their dissatisfaction with the current system tends to lead to the support of a new system, since they expect that it will be better than the one they are currently using. This leads to high expectations from the new system. Due to these observations, the start-code expected job satisfaction has changed to two new antecedents of support: 'current job (dis)satisfaction' and 'supportive shared meanings'. According to Bos, et al. (2013) job dissatisfaction is an affective reaction, which leads to negative feelings, that result from the appraisal of one's job experiences. Being dissatisfied before implementing an information system can be important for which behaviors will be exhibited, since it may result in the need for recovery. Thus, the existence of negative emotional response and the dissatisfaction with the

current job may lead to a need for recovery which can result in supporting a new system (Bos, et al., 2013; Venkatesh and Speier, 1999). Not only does the current dissatisfaction lead to support of the new system, having high expectations of the new system has the same effect. This is called supportive shared meanings. According to Maitlis and Sonensheim (2010) supportive shared meanings are optimistic expectations of the potential of the new system and its implementation. Moreover, expectations can be seen as being shared meanings that can connect with cues to create meaning in change situations (Weick, 1995). However, expectations can both be enabling and constraining. Expectations are sticky and this is where a risk comes in to play, as individuals hold onto familiar meanings (Maitlis & Sonensheim, 2010). To conclude: the low satisfaction of the current system of the user group leads to very high expectations of the new system. That makes both satisfaction of the current system and supportive shared meanings of the new system antecedents of support.

As mentioned in the theory, each of the job characteristics have a positive influence on job satisfaction (Hackman and Oldham, 1980; Morris and Venkatesh, 2010; Umstot et. al., 1977). The para/peri user group scored high on the different job characteristics related to their own work at this moment, however, they do not expect a change after implementing the new system. Therefore, the term 'job satisfaction' is replaced by the other two antecedents, which were explained in the previous paragraph: current job satisfaction and supportive shared meanings.

Besides the sub-codes supportive shared meanings and current job satisfaction, more sub-codes have been added while coding the interviews. While viewing the code involvement, it can be seen that participation is not only an antecedent; low information provision and less knowledge sharing leads to feelings of low involvement. Low information provision means that the user group does not receive information from the company; besides this they are not aware of the new system and implementation process (Zatzick and Iverson, 2011). If there is less knowledge shar-

ing, there are no interactions about the new system with colleagues. Therefore, two new antecedents of involvement have arisen. These are also connected to the supportive shared meanings, since the user group has high expectations of the new system while they do not feel involved. Maitlis and Sonenshein (2010) also argue that updating is essential to enable an adaptive role for shared meanings during change. Updating allows individuals to revise interpretations based on new information (Christianson, 2009; Rudolph et al., 2009). However, updating cannot have the proposed outcome, and thus go wrong, when revised interpretations are not shared. Therefore, information collection and knowledge transfer are important (Waller, 1999).

Concluding, after coding the interviews, four sub-codes have arisen and have been added to the coding scheme: two sub-codes related to support, namely current job satisfaction and shared meanings; and two sub-codes related to involvement, namely information provision and knowledge sharing. This means that the analysis started with the deductive coding method, where codes derived from the literature. During the coding, data-driven codes emerged, which is called inductive coding (Fereday and Muir-Cochrane, 2006). In the next paragraph, the results from the quantitative and qualitative analyses, with regard to the adoption framework, will be discussed.

## 5.1 CONCLUSION

This paper started with the following research question: What are the effects of intended behaviors of the heterogeneous para/peri user group on acceptance and support, in the case of an EHR implementation? Before answering this main question, a few sub questions had to be answered: How can the para/peri user group be classified into subgroups? And what is their relation with the EHR? To answer these research questions, a qualitative case study is conducted in a large teaching hospital in the Netherlands. The sub questions were answered by reviewing the subgroups and classification literature and creating a new classification. A remarkable finding was that not all the para/peri job positions are going to use the new system, several are excluded. Related to the main question, there

was a distinction made between characteristics of expected implementation outcome and implementation process; both are influencing adoption. However, one of the main results was the dissatisfaction with the current situation among the para/peri user group; which is also influencing adoption.

In the information system literature there is wide agreement that acceptance and resistance are essential factors in information system adoption. As mentioned before, in this study the framework of Van Offenbeek et al. (2013) is used to describe the acceptance and supporting behaviors. In this case, all employees are intended to use the system. However, it is important to mention that the use of the system is mandatory because all legacy systems will disappear. That means that future users do not perceive to have a choice in develop a system but to accept it. The framework of Van Offenbeek et al. (2013) also provides the resistance/support dimension. This is interesting because future users do have a choice in whether they support the new system or not. In the next paragraphs the framework will be discussed.

The results of the quantitative data analysis of Cordes (2013) showed that the para/peri user group scored below the mean score on support and around the mean score on acceptance. Besides this, the para/peri group scored significantly lower on acceptance and on support compared to the other user groups (doctors, nurses and management). The explanation for these differences according to Cordes (2013) is that this might be caused by the expected degree of future use of the system, because para/peri scored lowest and was also expected to use the system least. In this study the quantitative data of Cordes (2013) was re-analyzed with the para/peri job positions which are definitely going to make use of the new system. However, they still scored around the mean score on acceptance and below the mean on support and significantly lower than the other user groups. According to these quantitative findings, the para/peri group can be placed group 2 of the framework – resisting users, see the figure below. Since the para/peri group scored just below the mean score on support there will be no aggressive resistance but passive resistance.



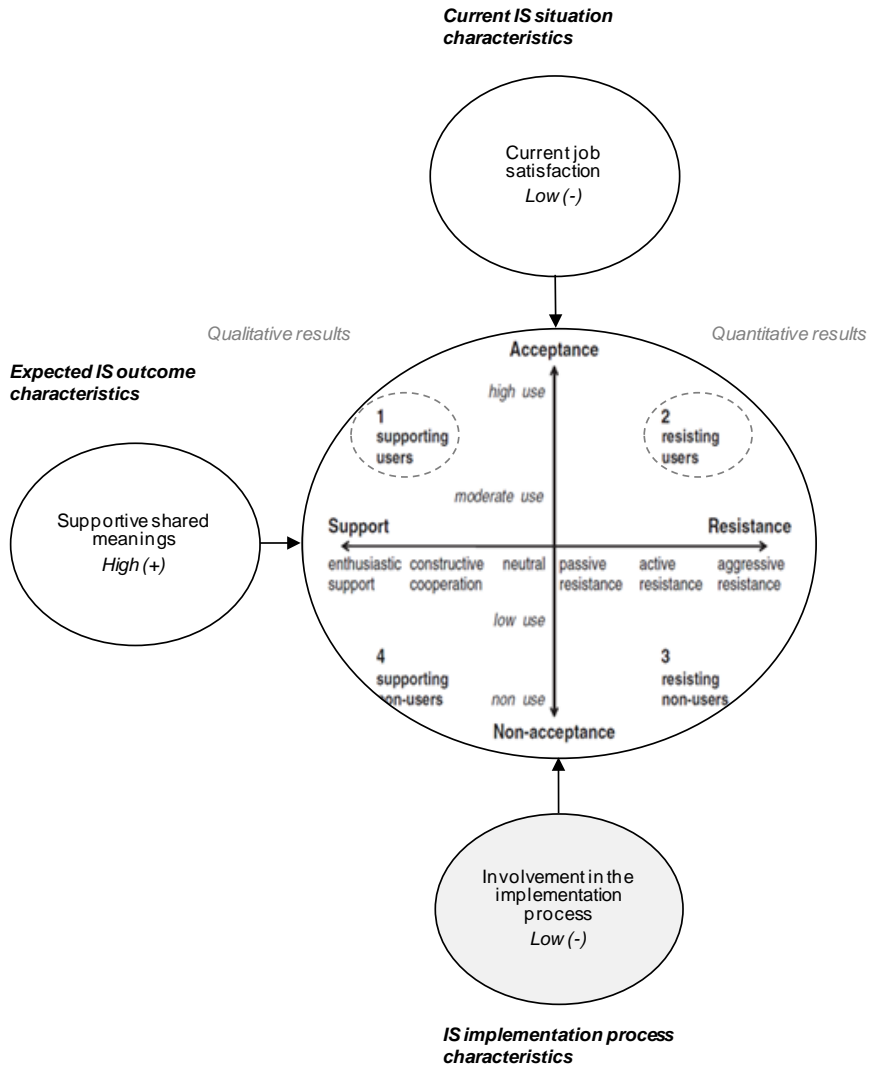
However, after conducting interviews with five para/peri job positions it was remarkable that those para/peri job positions seem to be very supportive, which differs from the quantitative results. They think the new system will not have an impact on the current work situation and they are also very dissatisfied about the current systems, which leads to high expectations of the new system. All these factors lead to supportive behavior regarding the system. Because of the dissatisfaction of the current system, users believe that implementing the new system will improve the quality of working life. The deviation in results of the quantitative analysis compared to the earlier conducted qualitative analysis might have been caused due to the usage of other antecedents of support then utilized in the quantitative analysis. For the quantitative analysis, Cordes (2013) used the degree of change in power and resources; compatibility in norms and values; emotions; consequences for quality of work; behavioral response; and impact. The former three variables of support were not used in this study. For the other dimension of the framework, (i.e. acceptance), the same antecedents were used, either in quantitative and qualitative research. Regarding the qualitative research, the findings related to acceptance were very much positively associated. However, they had the feeling not being skilled enough to use the system, while they were required to use it. However, there will be acceptance because they are obliged to use the system. Regarding these qualitative findings, the para/peri group can be classified in group 1 of the framework – the supporting users, see the figure below. Concluding, as showed in the figure below, according to the qualitative results the para/peri group members are supporting users and according to the quantitative results they are resisting users.

Besides the adoption framework, current dissatisfaction is a characteristic of the current situation and systems, which leads to negative feelings and a need for recovery. Therefore, the existence of dissatisfaction with the current job may lead to a need for recovery which results in supporting a new system (Bos, et al., 2013; Venkatesh and Speier, 1999). Finally, characteristics of expected outcomes are supportive shared meanings and high and optimistic expectations of the potential of the new system (Maitlis and Sonensheim, 2010), which will lead to supporting a new system, see figure 6. Therefore, it can be concluded that the

user group is supportive to the information system implementation, regardless whether they feel involved in the process. However, since they are dissatisfied with the current situation and systems, they have optimistic expectations of the new system. Moreover, they also show acceptance, because they feel they are required to use the system.

Next to that, characteristics of the implementation process are involvement characteristics. According to the literature, involvement is connected to adoption, especially acceptance, since the change recipients who experience greater stress, which can be caused by lower levels of involvement, were less open to accept changes (Oreg et al., 2011). However, in this case study related to the para/peri there is low participation, low information provision by the hospital and less knowledge sharing within the group itself. Therefore, the para/peri group does not feel involved in the process, which means that there is no relation between involvement and adoption as depicted in the figure below.

Therefore, it can be concluded that the relations found are different than expected. It was expected that there would be an influence of involvement on acceptance/support but according to the case study there is no relationship. Besides, it was expected that the expected outcome job satisfaction would have a positive influence on adoption, however, job satisfaction is replaced by current job satisfaction and supportive shared meanings. Low current job satisfaction and high supportive shared meanings have also a positive influence on adoption, see figure 4.



**Figure 4** Illustrative model: Adoption (acceptance and resistance) will be influenced by expected IS outcome characteristics (supportive shared meanings) and current IS situation characteristics (current job satisfaction).

#### THEORETICAL CONTRIBUTIONS

This study provides several theoretical contributions. The impact of an information system implementation on different user groups has been often investigated in previous research. However, in most cases this research was gathered among nurses and doctors, excluding the para/peri user group (Van Offenbeek et al., 2013; Boonstra et al., 2008; Boonstra et al., 2010; Jensen and Aanestad, 2007). Therefore, by taking the para- and perimedics into account this research adds new knowledge to the literature. Next to that, this research provides an extension to the research of Cordes (2013); in which the complete para/peri group was analysed. This also forms a contribution to the literature because in this research the focus was exclusively placed on the para/peri job positions that were actually going to use the system.

#### PRACTICAL CONTRIBUTIONS

Besides the theoretical contributions, this study contains numerous practical contributions to the field. As Boonstra et al. (2008) discussed, it is important to understand stakeholders attitudes, since this makes it easier for promoters to intentionally decide their strategy for managing these attitudes. At the moment, little attention has been paid to the para/peri user group compared to the other user groups. Therefore, this research contributed to the literature by investigating this specific user group. Moreover, support of the people in the organization is very important, because without support any change will be very hard to realize (Payton et al., 2011). Therefore, implementation activities are essential as they assist users in making sense of, and in coping with, changes and surprises. Additionally, they are expected to also contribute to system implementation success (Baronas and Louis, 1988). This was furthermore the reason to deliver an advisory report to the large teaching hospital. This advice is based on two main findings of this research. The first main finding is that there currently is some dissatisfaction among para/peri users regarding the information provision by the hospital. As a reaction to this, it is recommended that every department installs a representative. This representative needs to be aware of the situation regarding the EHR process and implementation and every para/peri needs to be aware whom to contact for ambiguities. It is expected that the para/peri group will feel

more involved when there is a representative who can provide them with information and share knowledge about the EHR implementation processes. Moreover, because the para/peri group doesn't feel involved yet, the contact between the representative and the para/peri group needs to be conducted personally. This way, the information provision will improve; the para/peri group will receive more information and knowledge about the EHR; resulting in that they will feel more involved in the implementation process. This is important because based on the literature, user involvement is predicted to increase user acceptance by committing users to the system and decreasing user resistance to change (Barnas and Louis, 1988).

Thus, the first advice is related to increasing the involvement and decreasing the dissatisfaction about the information provision by the hospital. On the other hand, the second formulated advice is related to the dissatisfaction with the current work systems and applications used. It is important to understand why there is dissatisfaction with the current systems. Understanding the sources of this dissatisfaction can be helpful to further set out the EHR system and to find out which aspects to use and which aspects not to use in the new system. To get a better insight in the dissatisfaction among the para/peri group, it is recommended to hold workshops with the representatives of every department. Within those workshops, information will be given about the (dis)satisfaction with the current systems and the processes of EHR implementation. The insights into the dissatisfaction can be used in the development of the new system.

Concluding, two recommendations have been made to the large teaching hospital. First, every department needs to have representative to improve the information provision and involvement of the para/peri user group. And second, dissatisfactions about the current systems need to be understandable, to enable that this can be used in setting up the new system. These advices will be presented to the management team in February 2014.

#### LIMITATIONS

Benbaset et al. (1987) mentioned that case study research is especially suitable for the study of information systems

processes and implementations. However, several limitations should be addressed regarding this research. At first, the EHR system implementation project has not been completed as the design phase did not start yet. This can cause supporting behaviors even though the para/peri group did not feel involved. Second, a limitation pertains to this research's specific large teaching hospital context which can make it difficult to generalize the findings to other hospital contexts. Third, this study is limited in scope; there are only five different para/peri job positions interviewed in this case study. It is not sure whether the qualitative results can be generalized so that they can be applied to the para/peri group in total. However, generalizability is discussed extensively in different types of research. As Goeken and Börner (2012) addressed, it is interesting to know how to generalize the observations of a specific case in order to give guidance in terms of recommendations for comparable situations that might occur in the future. They also mentioned that single case studies are generalizable to theoretical propositions and not to populations. However, according to Yin (2014), collected data needs to be gathered from multiple sources of evidence, in order to have completeness and correctness of data. In this research a triangulation method is used, which is important for the reliability of the case study's outcomes (Yin, 2014).

Another limitation could be derived from the coding procedure. Double coding has occurred in order to establish a higher reliability in the coding process (Miles and Huberman, 1984). Coding of the interviews has been conducted by different researchers to minimize subjectivity. However, subjectivity can still prevail while coding the interviews (Yin, 2014). Besides this, three of the five interviews were conducted by one person; the other two interviews were conducted by two persons. This could be a limitation as well, because with two people, more can be requested from the interviewees.

#### FUTURE RESEARCH

This paragraph will address what types of future research might be interesting. Related to the qualitative findings, the para/peri user group still scored significantly lower on acceptance and support than the other user groups. They also scored below the mean on support. However, according to

the qualitative results they were very supportive towards the EHR implementation; although the interviews were conducted six months later than the quantitative survey. Therefore, it is interesting to conduct the survey, developed by Cordes (2013), again within half a year. It is suggested that only the para/peri job positions that will be using the new system will be included. Taking the timeframe in account; it would be interesting to use the data to find out whether the group is more supporting towards the system compared to half a year ago. Besides this, it would be interesting to investigate why the para/peri user group still scores significantly lower on acceptance and support than the other user groups (nursing staff, doctors, and management). It would also be interesting to find out how the para/peri user group reacts upon the recommended interventions. The advised interventions are related to the involvement of the para/peri group. Therefore, it would be interesting to find out if the user group will feel more involved after the interventions. Finally, it would be interesting to investigate whether the para/peri users feel more involved in the later stages of the implementation project opposed to earlier stages.

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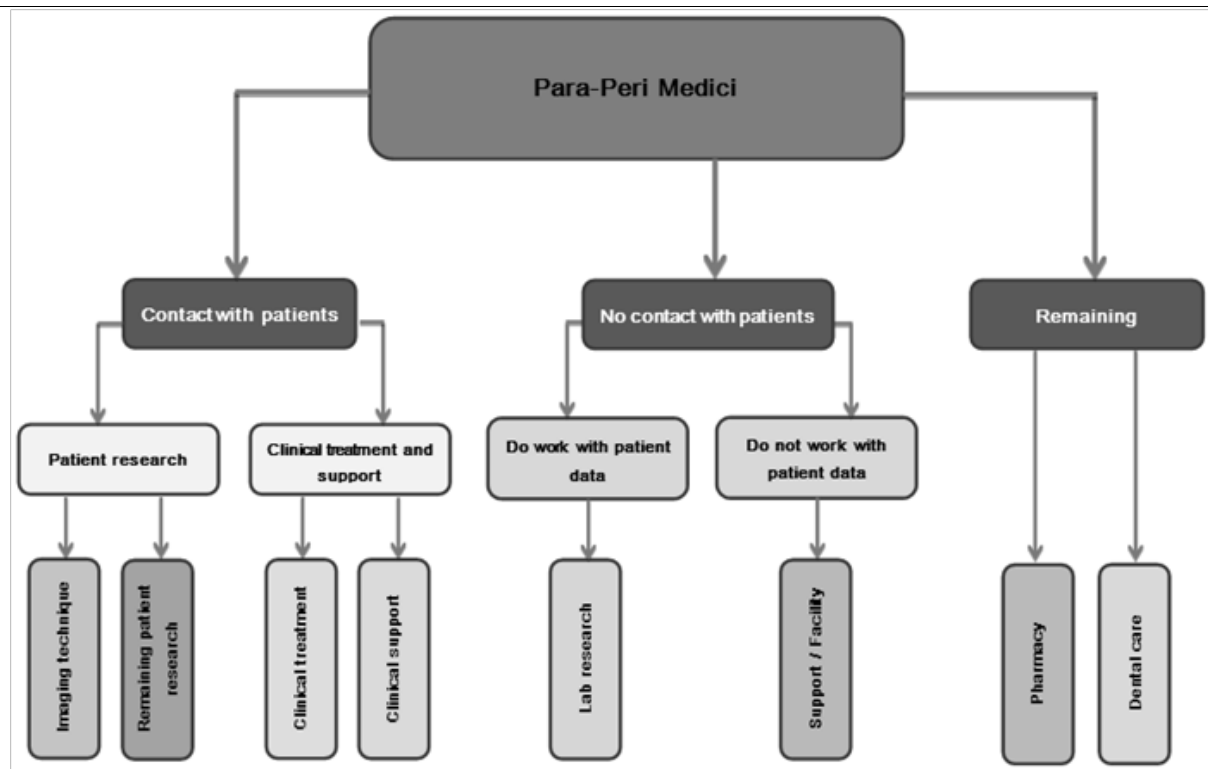


Figure 5 New division of the para/peri group in the large teaching hospital based on task-related subgroups.



APPENDIX II

CODING SCHEME ACCEPTANCE / NON-ACCEPTANCE				
Code name	Sub-codes	Acceptance (A)	Non-acceptance (NA)	References
<b>A.1 vs NA.1</b>	<i>Usage of the system: perceived usefulness of the system for valued outcomes</i>	When the user group believe that the system is instrumental in achieving valued outcomes	When the user group believe that the system is not instrumental in achieving valued outcomes	Burton-Jones and Straub (2006) Chin et al. (2008)
<b>A.2 vs NA.2</b>	<i>Usage of the system: perceived ease of use</i>	Using the system would be free of (great) effort	Using the system will take too much effort	Compeau & Higgins (1995) Davis (1989)
<b>A.3 vs NA.3</b>	<i>Intrinsic motivation</i>	The activity is perceived as rewarding (nice, interesting, pleasurable, fulfilling) in itself	External rewards or sanctions are needed. Or simply not using the system because is not experienced as rewarding	Davis et al. (1992) Umstot et al. (1997)
<b>A.4 vs NA.4</b>	<i>Facilitating conditions</i>	The user group is believed that an organizational and technical infrastructure exists to support the use of the system	The user group is believed that an organizational and technical infrastructure lack to support the use of the system	Venkatesh et al. (2003) Venkatesh and Speier (1999)
<b>A.5 vs NA.5</b>	<i>Self-efficacy</i>	One's feeling of being skilled of using the system	Not being capable to use the system	
<b>A.6 vs NA.6</b>	<i>Behavioral response: Intention</i>	The user group will use the system on a regular basis	The user group will not use the system on a regular basis	
<b>A.7 vs NA.7</b>	<i>Behavioral response: Mandatory</i>	The user group is required to use the system	The user group is free to not use the system	

Table 6 Coding scheme for acceptance/non-acceptance.

APPENDIX III

CODING SCHEME SUPPORT / RESISTANCE				
Code name	Sub-codes	Support (S)	Resistance (R)	References
<b>S.1 vs R.1</b>	<i>Consequences for quality of work</i>	Implementation of the system will promote the quality of (working) life	Implementation of the system will reduce the quality of (working) life	Bouckenooghe (2010) Lapointe & Rivard (2005)
<b>S.2 vs R.2</b>	<i>Behavioral response</i>	Activities intended to support the system, as well as the implementation and the use of the system	Activities intended to hinder the system, as well as the implementation and the use of the system	Knights & Murray (1992) Lapointe & Rivard (2005) Maitlis &
<b>S.3 vs R.3</b>	<i>Shared meaning</i>	Optimistic expectations: high expectations of the potential of the system and of its implementation	Negative expectations of the potential of the system and of its implementation	Sonesheim (2010) Morris and Venkatesh (2010)
<b>S.4 vs R.4</b>	<i>Current job satisfaction</i>	Dissatisfied (negative emotional response) with the current situation and applications used	Satisfied (positive emotional response) with the current situation and applications used	Van Offenbeek et al. (2013)
<b>S.5 vs R.5</b>	<i>Impact current work situation</i>	When the user group believes that the implementation of the new system has a low impact on the current work situation, no or only small adjustments to the current work situation need to be made	When the user group believes that the implementation of the new system has a high impact on the current work situation; which means that big adjustments to the current work situation need to be made	

**Table 7** Coding scheme for support/resistance (blue are emerged codes).

APPENDIX IV

CODING SCHEME INVOLVEMENT				
Code name	Sub-codes	High (IH)	Low (IL)	References
<b>IH.1 vs IL.1</b>	<i>Participation</i>	When the user group feel they are involved in all the planning and implementing activities of the system	When the user group feel they were not involved in planning and implementing of the system	Lawler (1994) Lodahl and Kejner (1965) Oreg et al. (2011) Zatzick and Iverson (2011)
<b>IH.2 vs IL.2</b>	<i>Information provision by the hospital</i>	When the user group gets information and has knowledge about the new system and implementation process (be aware)	When the user group doesn't get information and is not aware of the new system and implementation process	
<b>IH.3 vs IL.3</b>	<i>Knowledge sharing within user group</i>	When the user group is sharing their knowledge about the new system within the user group (talking about the new system with colleagues)	When the user group isn't sharing their knowledge about the new system within the user group (no talking about the new system with colleagues)	

**Table 8** Coding scheme for involvement (blue are emerged codes).

APPENDIX V

Code name	Sub-codes	CODING SCHEME JOB CHARACTERISTICS		References
		High (JH)	Low (JL)	
<b>JH.1 vs JL.1</b>	<i>Task significance</i>	The job has a big impact on the lives and well-beings of people	The job has not a big impact on the lives and well-beings of people	Hackman and Oldham (1980) Morris and Venkatesh, (2010) Umstot, et al. (1977)
<b>JH.2 vs JL.2</b>	<i>Task identity</i>	The job is about performing or completing a whole identifiable outcome	The job is about performing or completing a part of a whole	
<b>JH.3 vs JL.3</b>	<i>Skill variety</i>	The job requires different skills and tasks	The job doesn't require different skills and tasks	
<b>JH.4 vs JL.4</b>	<i>Autonomy</i>	He or she is responsible to take own decisions	He or she has no responsibility to take own decisions, and is dependent on supervisors	
<b>JH.5 vs JL.5</b>	<i>Feedback</i>	He or she will get feedback and information about the performance	He or she won't get or get less feedback and information about the performance	

Table 9 Coding scheme for job characteristics.

**APPENDIX VI**

<b>Rotated Component Matrix</b>					
Items	Component				
	1	2	3	4	5
USE_1	<b>.818</b>		.136	.117	.265
USE_2	<b>.795</b>		.115	.150	.218
USE_3	<b>.767</b>	.110		.291	
POW_2	<b>.746</b>		.151		.193
IMP_3	.115	<b>.842</b>		.107	
IMP_2		<b>.821</b>			.229
IMP_4	.282	<b>.717</b>		.241	-.220
IMP_1	.324	<b>-.571</b>	-.153	.185	-.133
SUP_1	.172		<b>.810</b>	.163	
SUP_3		-.133	<b>-.786</b>		
POW_1	.119		<b>.748</b>	.319	
FAC_1	.219		.190	<b>.757</b>	
FAC_3	.156		.302	<b>.731</b>	
FAC_2	.141			<b>.691</b>	.229
AC_2	.201	.135		.158	<b>.843</b>
AC_1	.343			.213	<b>.792</b>

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Rotation converged in 6 iterations.

**Table 10** Factor Analysis.

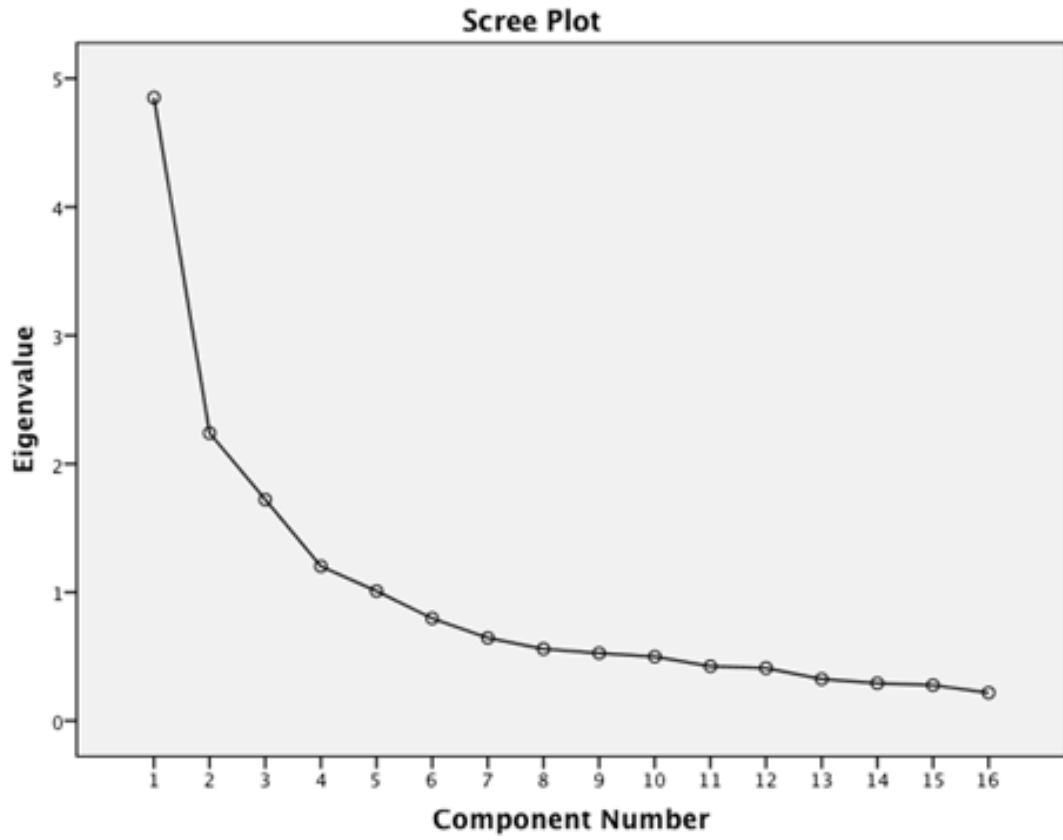


Figure 6 Scree Plot.

## APPENDIX VIII

Factor and Reliability analysis			
Variable	Factor	Items	Cronbach's alpha
Usefulness	1	USE_1,USE_2,USE_3,POW_2	.835
Impact	2	IMP_3,IMP_2,IMP_4,IMP_1	.717
Support	3	SUP_1,SUP_3,POW_1	.720
Facilitating conditions	4	FAC_1,FAC_2,FAC_3	.718
Acceptance	5	AC_1,AC_2	.818

**Table 11** Reliability Factors.

APPENDIX IX

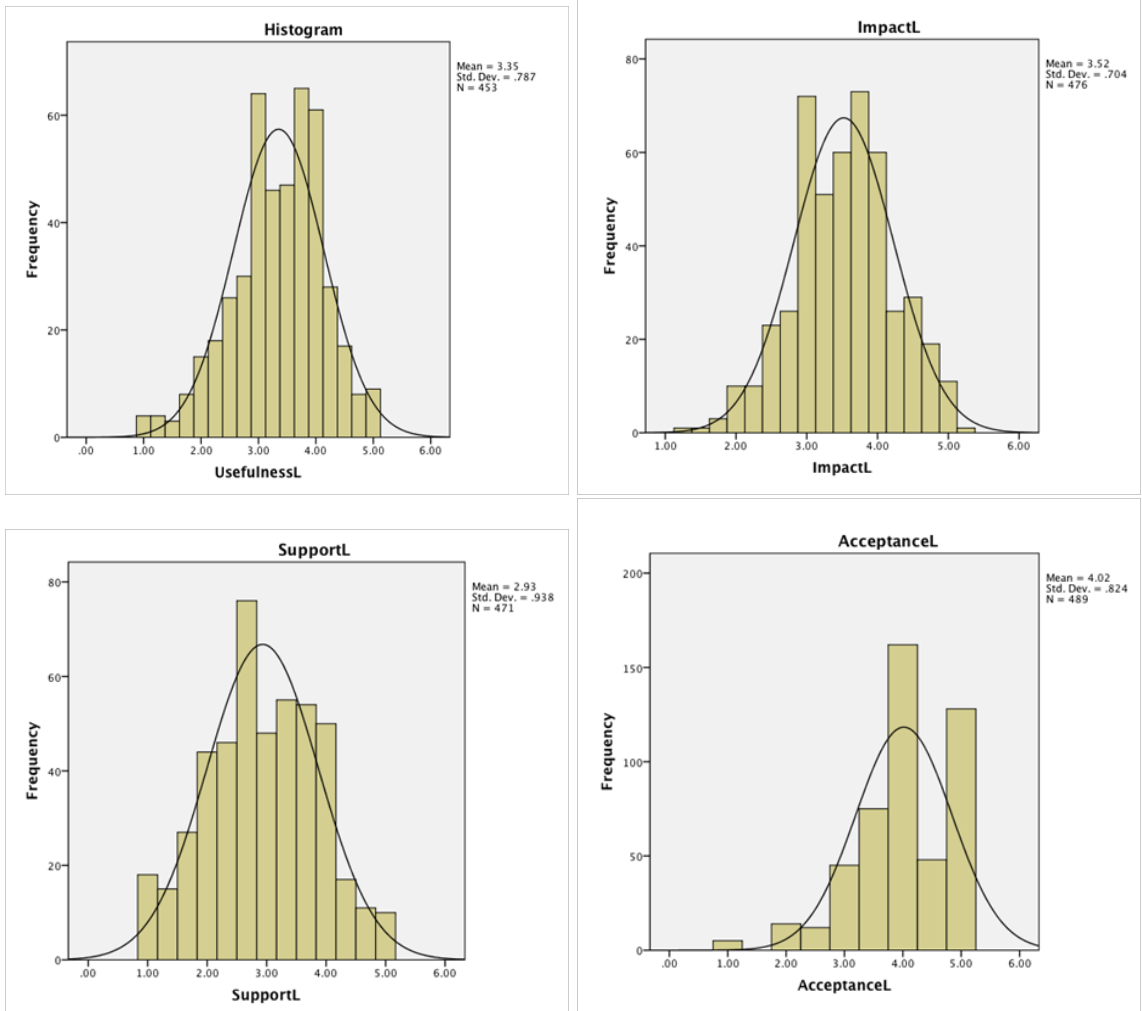


Figure 7 Histograms.



APPENDIX X

Linear Regressions				
Predictor variables	Acceptance		Support	
	Model 1	Model 2	Model 1	Model 2
<b>Control</b>				
Gender	<b>-0.092</b> (-.16, .09, .08)	<b>-0.070</b> (-.12, .08, .50)	<b>.006</b> (.01, .11, .91)	<b>-0.002</b> (-.00, .10, .97)
Age	<b>.035</b> (.00, .00, .51)	<b>.044</b> (.00, .00, .35)	<b>-.137*</b> (-.01, .01, .01)	<b>-.091</b> (-.01, .00, .06)
<b>Independent</b>				
Usefulness		<b>.373**</b> (.37, .05, .00)		<b>.154**</b> (-.18, .06, .01)
Facilitating conditions		<b>.197**</b> (.23, .06, .00)		<b>.369**</b> (.51, .08, .00)
Impact		<b>.090*</b> (.11, .05, .05)		<b>.080</b> (.11, .06, .09)
R <sup>2</sup>	<b>.009</b>	<b>.268</b>	<b>.019</b>	<b>.242*</b>
Δ R <sup>2</sup>		<b>.259**</b>		<b>.223**</b>

Note: \*p < .05, \*\*p < .01

Note: Standardized β coefficients are reported in bold, between parentheses unstandardized B coefficients, standard error, and p-value (significance)

Table 12 Linear Regressions.