Inbox for User Feedback as a Method for Evaluating User Experience

A Method Evaluation in Scrum based Software Development

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Abstract

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This study aims to evaluate the method Inbox for User Feedback, as a tool for including the user perspective on Scrum projects. Inbox for User Feedback is developed together with Uppsala County Council to better handle user feedback on their system presenting Electronical Healthcare Records, implemented by the "SUSTAINS project". Data collected through IUF is categorised in Atlas.ti, and a qualitative analysis of the categories is presented. The results show that fifteen distinct categories can be used to represent the users feedback on the system for Electronical Healthcare Records. Three of these, Control/Participation, Memory Aid and Dialogue with Healthcare Personnel, show strong connection with known patient empowerment indicators.

Through the work of developing and evaluating IUF, both advantages and disadvantages of the method were discovered. The positive features of the method are that it includes the user, gives rapid feedback, provides a cheap and flexible solution. The negative aspects are that it lacks statistical accuracy, provides a shallow study leaving out many potential users and the method generates big amounts of unstructured data.

The results of this study are not statistically accurate due to methodological problems in the way user feedback was collected. However, the qualitative analysis can still give important information about the users' perception of the system.
Sammanfattning


Resultaten visar på femton separat kategorier under vilka användarnas feedback kunde sorterats. Tre av dessa har direkt koppling till kända patient-
maktsbegrepp som kunskap, kontroll och delaktighet.


Rapporten presenterar ett antal områden där resultaten ändå är användbara i en kvalitativ analys och påvisar intressanta resonemang och frågeställningar hos användarna. Förbättringsförslag gällande urvalsprocessen lyfts också fram för att, om så önskas, kunna extrahera mer representativ statistik vid framtida användning av metoden.
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Contents

1 Introduction ........................................ 11
   1.1 Motivation ..................................... 11
   1.2 Research Questions ............................. 12
   1.3 Delimitations .................................. 12

2 Methodology ........................................ 15
   2.1 Related Work ................................... 15
      2.1.1 Literature Study ............................ 15
      2.1.2 Conferences and Seminars .................. 18
      2.2 Iterative Categorisation of emails ............ 19
         2.2.1 Emails with User Feedback ............... 19
         2.2.2 Qualitative Data Analysis ................. 19
         2.2.3 Evaluation with regard to Patient Empowerment.. 20
         2.2.4 Input from Stakeholders ................. 21

3 Theoretical Framework & Background ................ 23
   3.1 Scrum ......................................... 23
      3.1.1 The Agile Method ............................ 23
      3.1.2 Attempts to Include User Experience in Scrum .. 25
   3.2 SUSTAINS ....................................... 26
   3.3 Patient Empowerment ............................ 27
      3.3.1 Examples when Patient Empowerment makes a Difference.. 28
      3.3.2 Patient Empowerment According to SUSTAINS .... 28
   3.4 Online Feedback Mechanisms ..................... 28

4 Inbox for User Feedback ............................. 31
   4.1 Presenting the Inbox to the User ............... 31
   4.2 The Receiver .................................... 31
   4.3 The Categoriser ................................ 31
   4.4 The Evaluator .................................. 32
   4.5 Assigning Roles ................................ 32
   4.6 Two Implementation Examples ................... 32
   4.7 Use Cases ...................................... 33

5 Results ............................................. 35
   5.1 Character of Feedback provided through TUF .... 35
      5.1.1 Categories .................................. 35
      5.1.2 Providers of Feedback ....................... 36
   5.2 User Feedback Through the Patient Empowerment Perspective ... 37
5.3 Advantages and Disadvantages of IUF in Software Engineering 39
  5.3.1 Advantages ........................................ 39
  5.3.2 Disadvantages ...................................... 40

6 Discussion 41
  6.1 Methodological Discussion ................................ 41
  6.2 Future work .......................................... 42

7 Conclusion 43

References 45

Appendices 48

A Table of Categories 49

B Glossary 52

C Screenshots from EHR 53
1 Introduction

November 8th 2012 a new civic service in Uppsala County was launched through the existing online portal "Mina vårdkontakter" ("My Healthcare Contacts"). People were given the possibility to view their own healthcare records online, something that previously only had been available on paper and had required a long-winded handling process. Responsible for this innovation was the SUSTAINS project, an EU project with goal to support users to access information and services [1].

At the same time as the system presenting Electronical Healthcare Records (EHR) was launched, an email inbox was opened with the purpose to collect user feedback to evaluate the service. When the users logged in to view their EHR they got a message from The SUSTAINS project group in Uppsala County Council (UCC) requesting usecases.

"More and more citizens use the possibility to view their own medical record through 'Mina vårdkontakter' (like you just have). We request 'usecases' describing how this information is being used. It would be much appreciated if you could share your experiences! Both positive and negative experiences are welcome. Please email us at sustain@ulu.se and tell us how you have experienced and used the online information in your medical record." [2] translated from Swedish.

As a result of this request around 600 emails were received from October 2012 to March 2014. In the work of this thesis project, these emails were categorised, both through pre-defined categories based on patient empowerment (e.g., knowledge, control and participation) as well as themes that emerged through the process of analysing the emails (thematic analysis [3] p 274). The pre-defined categories were discussed during an initial meeting with the stakeholder and these were designed to suit the goal of the study. The results of the email categorisation were concluded in the technical report Resultat och reflektioner kring mailkategorisering av användares mail till Uppsala läns landsting kring åtkomst av journaler via nätet [4].

The categorising of the emails was a major part of the development of a method for handling user feedback in a new and flexible way. The method was named Inbox for User Feedback and will be referred to as IUF or "the method" in this report.

1.1 Motivation

The system providing EHR in UCC is developed using the Scrum software development methodology. Scrum projects often lack ways to systematically collect and evaluate user feedback [5]. IUF provides a new way to handle
user feedback which could work well with the agile nature of the Scrum methodology [6]. When users express their thoughts in emails, and if handled correctly, bugs and other problems can be discovered quickly. Thanks to Scrum projects’ ability to react on emerging requirements, change course and deliver new versions fast, this way to collect feedback could be efficient.

The EHR was developed through SUSTAINS pilot project in Uppsala and is now implemented to different extent in Region Skåne, Västmanlands County Council and Jönköping’s County. It is now decided that all county councils in Sweden will implement this service and the solution developed through the pilot project will be used as a standard [7]. This means that all county councils in Sweden will meet a great amount of user opinions, whether they ask for it or not, and the need to take care of that feedback sufficiently is urgent. IUF is a method developed together with Uppsala County Council to meet the pilot project’s needs. Benny Eklund at UCC had the role as Receiver and the author of this report did the work of the Categoriser and the Evaluator (see Section 4 for a description of these roles.) Since the UCC model will be the standard for implementing the service, all county councils in Sweden will benefit from the findings in this report.

1.2 Research Questions

Within the scope of this master thesis, the following three questions will be studied and answered.

1. What type of feedback will users provide through IUF?

2. To what extent can this feedback be useful in improving patient empowerment?

3. What are the advantages and disadvantages of using IUF as a software engineering method in Scrum?

1.3 Delimitations

During the timeperiod of this thesis project, the mailbox is still in use and receiving emails with user feedback. The analysis made within this study is focused on emails received between October 2012 and March 2014. The scope of this master thesis does not include the possibility of testing the method in real Scrum projects. Instead, the method will be evaluated through interviews.

IUF will not be evaluated through an accessibility perspective for those who have special needs. The EHR supports sharing the healthcare record
with a relative or representative for those who need help handling their healthcare contacts. Those users and their representatives have been welcome to contribute their feedback like any other user and the emails received to the IUF show that some of them have. However, the limitations of the service and the way the feedback was collected in IUF have left a significant number of citizens excluded.
2 Methodology

The methodology used when developing Inbox for User Feedback consisted of several iterative cycles. The initial work phase, including formulating the categories and using them to sort the feedback contributed through the emails was done with close contact with the stakeholder, Uppsala County Council. That part, the using of IUF, is visualised on the left side of Figure 1.

The right side of Figure 1 represents the major part of this thesis project. The key steps include compiling the results from using IUF in the initial work phase and evaluating the IUF method itself through the perspective of patient empowerment. The results were compiled in two steps, focusing on answering the first research question. Firstly in a qualitative way, focusing on what themes could be found in the way users provide different types of feedback. Secondly the categories were analysed statistically, looking for co-occurrences and correlations. The evaluation of the IUF method was focused around answering the second research question. If the feedback provided through IUF shows proof of patient empowerment indicators such as knowledge, control and participation, the IUF method can be said to empower patients.

In parallel to the initial and main work, a continuous learning phase including literature study, participation at seminars and conferences as well as writing and publishing results of the categorising in the technological report “Resultat och reflektioner kring mailkategorisering av användares mail till Uppsala läns landsting kring åtkomst av journaler via nätet” [4] took place.

2.1 Related Work

There are two projects central for this master thesis, the SUSTAINS project which is an EU-project with the purpose to deploy a service providing EHR, and the DOME project which is a research project focused on documenting and evaluating the deployment process. The DOME project was financed by VINNOVA [3]. This thesis was done within the DOME project, after a request from SUSTAINS, which had the role as stakeholder.

2.1.1 Literature Study

In order to get a thorough understanding of the SUSTAINS project, public documents of work package 1, “Project Co-ordination, Management and
Figure 1: Overview of the methodology used when developing Inbox for User Feedback.

Quality Assurance”, work package 3, “Evaluation and Deployment Planning” and work package 6, “Real life pilot in Uppsala” were read. These included:

- Uppsala patient questionnaire [9]
- Intermediate trial evaluation - Uppsala [10]
- Final trial evaluation - Uppsala [11]
- Questionnaire for Patient Empowerment Assessment [12]
- Public final report [13]

To be able to answer the research questions (Section 1.2) the concepts of Patent Empowerment, Scrum software development methodology, Feedback theory and Usability needed to be studied. In regard to this, papers published at the conferences Human-Centered Software Engineering (HCSE), International Conference on Human-Computer Interaction (INTERACT) and International Conference on Software Engineering (ICSE) were read. As well as articles in the journals Patient Education and Counselling (PEC) and Social Science & Medicine (SSM). A brief summary of relevant papers follow below.
Existing but Not Explicit - The User Perspective in Scrum Projects in Practice, INTERACT 2013 [5] is an interview study with the purpose to understand challenges of integrating user perspective in Scrum projects. The study focused on how IT professionals working in Scrum projects takes responsibility for the user perspective and to what extent usability activities with users are applied, something that is known to be lacking in the Scrum methodology. Their results show that feedback within Scrum projects often are gathered in an informal, ad hoc way. Based on that, the authors recommend this process to be systematised and integrated in the existing Scrum process.

The Usage of Usability Techniques in Scrum Projects, HCSE 2012 [6] explores how usability techniques are integrated in Scrum projects. The method used in the study was a questionnaire-based survey handed out to IT professionals using usability techniques in their Scrum projects. The results of the paper show that informal usability techniques like workshops and interviews are most commonly used. These have the benefit of being possible to carry out without much preparation. Since a Scrum sprint often lasts two to four weeks, the simplicity of a usability technique is critical for its possibility of being used.

New directions on agile methods: a comparative analysis, ICES 2003 [14] defines the main characteristics of a Scrum project. The authors present the Scrum methodology as an agile software development method based on flexibility, adaptability and productivity. It is concluded that “While most methods appear to cover project management, true support is missing” [14, p 251], making Scrum the outstanding method “explicitly intended for the purpose of managing agile software development projects” [14, p 248].

Patient empowerment in theory and practice: Polysenry or cacophony? PEC 2007 [15] is a review article analysing fifty-five articles examining how empowerment has been used in the care of chronically ill patients. The article presents patient empowerment as a process rather than a state and describes the philosophy of empowerment as people “having the right and ability to choose by and for themselves”. The authors also suggest patient empowerment as having two dimensions, either seen as happening in the interaction between patient and HCP, or seen solely from the patient’s point of view.
Patient Empowerment: Myths and Misconceptions, PEC 2010 \cite{16} clarifies the concept of empowerment by observation and logical reasoning. The authors claim that empowerment is not something that is done to the patient, which collides with the traditional approach within medical care where the complying patient is the desirable. In conclusion, the authors state that patient empowerment occurs not only when the patient thinks critically and make autonomous decisions, but when the health care professionals’ goal is to support the patient in doing so.

2.1.2 Conferences and Seminars

This master thesis is done within the DOME project and it has been very beneficial to get access to the rich knowledge and experience of this research group. The inspiration for this study came from meeting the researchers within the eHealth area as well as influential project managers at Uppsala County Council. The following three occasions have been particularly important.

November 14th 2013 Reference group meeting took place on World Usability Day at Karolinska institutet in Stockholm. The meeting was structured as a workshop focused on EHR and other patient related eHealth services. The purpose of the workshop was to create an interactive discussion between the reference groups and researchers within DOME. Apart from the interactive discussion the workshop also included three presentations, a status report from SUSTAINS, a student presentation of a project within future eHealth services and DOME presenting results from their patient empowerment study. This reference group meeting gave a good insight to the research done within DOME and the purpose of the SUSTAINS project. It also gave an opportunity to meet influential people, researchers and decision makers within the eHealth area, laying the ground for a genuine interest, later resulting in this thesis project.

May 19th-20th 2014 DOME intergroup conference was focused on discussions regarding current studies as well as future work within DOME and took place at Uppsala University. Participators at the conference was researchers, PhD students and master students within DOME, representatives from SUSTAINS and Svensk Förening för Medicins Informatik (e.g., the Swedish Association for Medical Informatics). The conference provided a deeper understanding for both the DOME project and the SUSTAINS project as well as for the work of a researcher in general.
October 17th 2014 Symposium "Journal via nätet" was a symposium regarding EHR's which took place at Uppsala University. The day was focused on presentations and interactive discussions related to the EHR service ("Journal via nätet") and other eHealth services for patients. Presentations were made by researchers within DOME, project manager of SUSTAINS, a medical doctor, researcher and pioneer within eHealth and students at Uppsala University. It was also possible to follow the symposium through a live stream, for those who were unable to attend in person.

2.2 Iterative Categorisation of emails

The 563 emails were categorised using the program ALTAS.ti Qualitative Data Analysis [17], in order to extract and analyse user feedback. The emails were received during the period October 2012 to March 2014.

2.2.1 Emails with User Feedback

Feedback from users were compiled through an iterative categorising process. The purpose of an iterative method was to read each email several times and thereby ensure unambiguous categories. The nature of IUF require categorisation to begin before all data is received. This means that the first email will be categorised before all categories are definite and therefore an iterative process is crucial.

During the categorising process both the users’ emails and the UCC’s replies were available for reading. Even though the latter were not included in the categorisation, they contained information that made it easier to understand the basis each user’s feedback. What appears to a user as a “problem” may actually be a conscious design decision. One example is the parent reporting an “error” in the system when she only could see her twelve-year-old’s healthcare record and not her fifteen-year-old’s. When her email was read together with the reply she got from UCC it becomes clear that it is not an “error” at all, but a decision made to protect teenagers integrity, and a suitable category could be selected to represent cases like these.

2.2.2 Qualitative Data Analysis

For managing and categorising the emails the tool ALTAS.ti Qualitative Data Analysis was selected. ALTAS.ti supports coding documents of different types. In this study data was represented by emails presented in pdf format but ATLAS.ti allows different types of text documents, images, audio
recordings, video clips and geo data to be coded and analysed together [18, p 7].

ATLAS.ti treats data and codes (i.e., categories) as one unit called the Hermeneutic Unit. The files holding the data to be coded are called Primary Documents. In this project data was collected continuously over a period of one and a half year, resulting in six primary documents, each representing emails received during a three month period.

ATLAS.ti provides good support for thematic analysis [3, p 274], where new categories can be created when they appear in a document. A section of a document can be coded in one or several categories by entering the name of the category (either an existing or a new one), selecting categories from a list or code in vivo (i.e., using the quoted section as a category itself) [18, p 24-26]. Each categorised section is saved as a quotation and through the Quotation Manager different operations can be performed on the these quotes. This allows sections coded in the same category to be extracted for comparison to ensure unambiguous categories. This also makes it possible to compare categories’ occurrence in different primary documents. In this study, that means emails received during different periods of time can be compared to see if users’ feedback varies, e.g., before and after an update to a new version of the system.

2.2.3 Evaluation with regard to Patient Empowerment

The goal of the SUSTAINS project is to improve patient empowerment. Therefore, it was in the stakeholder’s interest that the user feedback got evaluated from a patient empowerment perspective. This evaluation was done after the categorisation was finished, to avoid biased assigning of categories.

The evaluation was possible through comparing the categories [4, p 2-4] with the definition of goals within patient empowerment [19]. Three categories with strong connection to patient empowerment were Control/Participation, Dialogue with HCP and Memory Aid.

By using the Quotation Manager in ATLAS.ti, all quotes from a category were written to a text file for further analyse. During this analysis it became clear that users thought reading their EHR made a significant difference. Several quotations contained factors known to be important for empowering patients. Within Control/Participation, Dialogue with HCP and Memory Aid, every quotation contained such factors. Therefore these were considered as the categories with strongest patient empowerment connection. Concrete examples of these quotations are found in Section [5.2].
2.2.4 Input from Stakeholders

Stakeholders in this project were coordinators for SUSTANIS at UCC. During the project work continuous meetings with the stakeholders took place. An initial meeting was held before the work of categorising the emails began. The inbox had then been open for about one year so they had received a lot of feedback that they did not know how to process in a beneficial way. During that meeting the stakeholder presented the background of the EHR service as well as the inbox they had set up. That meeting was also spent discussing their objective for having a categorisation done and deciding a few categories they wanted to include. While the work of categorising the emails was carried out, continuous contact were kept through email, sharing questions, thoughts and updates on the progress.

During one other meeting the results from the email categorisation were discussed and it became clear that a statistical representation of the results were important to the stakeholders. As a result of that, another iteration of the emails was done and statistics were extracted. See Figures 1 (a, b, c) and 2 (a, b) in [4] p 6-7.

During the last two meetings the stakeholders emphasised their interest in the report being published in a scientific journal. That would spread the knowledge of the findings of this study to decision-makers within healthcare, which would accelerate the deployment of EHR in county councils all around Sweden.
3 Theoretical Framework & Background

In order to understand and discuss the results of this study, a few key concepts need to be defined. Since this thesis project is a study of Inbox for User Feedback’s applicability in Scrum based software development, this popular agile method will be described in the first section below. The second section presents SUSTAINS, the project deploying Electronic Health Records in Uppsala County Council. Since evaluation of IUF was done with regard to patient empowerment, that is defined in the third section. Finally, IUF is a method for collecting user feedback in order to evaluate user experience, therefore a brief reasoning about feedback theory and which users reply to requests for feedback is included.

3.1 Scrum

Scrum is an agile software development methodology based on flexibility, adaptability and productivity[14]. The method was originally referred to as "the rugby approach" and the name Scrum originates from rugby where a scrum is a tightly packed formation of players with their heads down who attempt to gain possession of the ball[20]. Within software development, this translates to the project team working as one unit, collaborating on difficult tasks, quickly reaching a shippable product.

3.1.1 The Agile Method

That Scrum is an agile method means that development is focused on providing the functions immediately needed by a customer, instead of delivering a complete, finished and through tested whole system at once [14]. One of its main agile features is its possibility to react rapidly to requirements churns[21] (e.g., customers changing their minds) as well as changes in business and technology.

When working in a Scrum project, the system or product is developed in an iterative, incremental way, focusing on immediately needed functions first. Each iteration is called sprint and usually lasts for two to four weeks. In difference to other software development models, the sprints are never extended but end at a set date whether the goal for that part of the project has been reached or not. During a sprint no new tasks may be added and all suggested changes are kept for the next sprint. At the end of each sprint a working product should be delivered to the stakeholders, the sprint is reviewed with the team and the stakeholders and feedback from that is incorporated in the next iteration. User feedback from IUF can be included in this phase of the
sprint and play important role in the review. A simple overview of this can be seen in Figure 2, and a more detailed overview including key roles, artefacts and events is visualised in Figure 1 of the report “The Scrum Primer”[22].

![Figure 2: Overview of a Scrum sprint](image)

In the planning of each sprint, as well as the whole Scrum project, two types of backlogs are used. The first is the *project backlog* which is a prioritised list of new customer features[22]. This is created by the *product owner*, a key person within a Scrum project. The product owner is responsible for maximising return on investment and this role is similar to an ordinary product manager but working much closer to the development team. The second backlog is the *sprint backlog* which is created by the development team themselves. At the start of each sprint, the team selects the next items in the product backlog (e.g., the items the product owner has given the highest priority of those remaining) that fit into the timeframe of that sprint. Each item is decomposed (if necessary) into several smaller tasks, and added to the list of work to be done during the sprint. This list makes up the *sprint backlog*.

During each sprint, daily Scrum meetings are held with the purpose of update and coordination of tasks between team member. This meeting should be very short and each team member is required to attend and report three things,

1. What has been accomplished since the last meeting?
2. What will be done before the next meeting?
3. What obstacles are in the way?

This report is meant as an status update for the team and is not intended for the product owner, who may of course attend the meeting anyway. The tasks of the sprint backlog should be so small that they only takes a couple of hours to implement. The team plans the sprint together, calculating the capacity and deciding how many tasks they will be able to finish, but it is up to each team member to pick the tasks he or she wishes to work on. If a team member runs into a problem or gets stuck with a task, this is brought to the other team members attention at the next Scrum meeting (at the latest, the next day) who then quickly can help solving it.

Apart from the product owner and the development team, the third key role of a Scrum project is the ScrumMaster. The ScrumMaster’s role is to help both the development team and the product owner in whatever way possible. That person is not a member of the team, neither is he or she one of the stakeholders. The ScrumMaster serves the team, making sure they can work as efficiently as possible. “He or she educates, coaches and guides the Product Owner, Team and the rest of the organization in the skilful use of Scrum” [22, p 5].

The Scrum methodology offers a framework that, with some practice and good support from the ScrumMaster, can make software development efficient and profitable. It is however very important to go “all in” using the Scrum framework as it is specified, and not try to change its flow of events [22]. It is the job of the experienced ScrumMaster to prevent teams mutating Scrum. Scrum processes should be iterative and incremental, meaning that with each sprint the development team progresses and learn to estimate time and managing tasks realistically.

Skriv mer här eller merga med föregående section.

3.1.2 Attempts to Include User Experience in Scrum

Scrum is a popular methodology in Sweden and it is used in many software development projects. Even though many developers agree that usability aspects are important [3], Scrum does not include this in its framework. User feedback are handled informally in Swedish Scrum projects today [3]. With its short sprints and rapid development, no existing methods for collecting user feedback are efficient enough to be used in a Scrum project [23]. However, user feedback is important input when developing new IT systems [24] and therefore new methods for handling user feedback in a way suitable for the short timeframes of Scrum needs to be developed [3].

There are variants of Scrum including usability work such as U-Scrum [25], UX Scrum Team [26] and Framework for Integrating Agile Develop-
ment and User-Centred Design \cite{27} to mention a few. Common for these are however that the usability work happens in parallel to the agile software development. UX Scrum Team for example suggests that a separate user experience (UX) team should be organised and work one or two sprints ahead of the development team. Both Singh and Budwig et. al. agree to introduce a second product owner, a person focused on usability and working as a peer to the traditional product owner \cite{25,26}. Also, Integrated Agile Development suggests a solution with usability work in parallel to traditional software development. Chamberlain et.al presents a field study of three projects, of which two uses Scrum and user centered design. Both projects made a distinct difference between usability work and software development, assigning separate design teams responsible for UX \cite{27}.

By separating usability work from software development and distinguish between UX and agile methods to the extent that an extra UX team with a new product owner is required, is to say that UX ‘is not equal to’ agile, and a traditional Scrum project cannot include usability work without radically change its structure. This thesis will attempt to prove the opposit.

Assigning a separate team to handle usability work, potentially with its own product owner, will add an extra cost both in time and money to any Scrum project attempting to implement it. This may limit the number of projects to which such a solution will be useful or even possible to carry out. IUF presents a framework which is there on the user’s and the developer’s terms, ready to adapt and use in the context of each Scrum project.

3.2 SUSTAINS

The SUSTAINS project, short for Support USers To Access INformation and Services, is an EU project and collaboration between several organisations in eleven countries coordinated by Uppsala County C. The aim of the project is to provide citizens with online access to their EHRs as and offer other related eHealth services with the purpose of simplifying healthcare processes and change the role of the patient. SUSTAINS contribute to the new paradigm stating that when citizens are given access to their EHR, they are made active actors in managing their own healthcare and that results in fundamentally changing the patient’s role in the treatment of a his or her disease.

The project contributes in the areas of patient empowerment, medical results and efficiency within healthcare\cite{1}. The SUSTAINS project aims to measure the impact of EHR and complementary eHealth services in those three areas, of which the technical report Resultat och reflektioner kring mail-kategorisering av användares mail till Uppsala läns landsting kring åtkomst av journaler via nätet\cite{2} is one part.
3.3 Patient Empowerment

Patient empowerment has become part of the taxonomy of medical care and it is often used as the motivation for pushing through new reforms in healthcare. Also SUSTAINS’ deployment of EHRs was motivated as an eHealth service empowering patients, which several assessments later showed was true.[28]

The concept of patient empowerment is more complex than it first appears. In order to empower patients, everyone involved must first understand and agree on the definition of the concept. A common understanding of patient empowerment is that it includes increased knowledge, control and participation gained by the patient. However, the view on how this is reached, and whether it is a static state or a process differs among researchers.

According to Aujoulat et al.[15] patient empowerment has two dimensions, either seen solely from the patient’s perspective or as an interaction between health care provider and patient. These two dimensions create two different definitions of patient empowerment as a process, either created within the patient (personal transformation) or as a given by the HCP to the patient through sharing of knowledge and power. However empowerment is gained, the authors conclude that as a result of their empowerment process, the patient is expected to better manage his or her health. This demand is often present, even when HCP’s misinterpret the concept of patient empowerment and practice it in a way that makes the demand impossible to reach.

Truly embracing the approach of patient empowerment in practice of medical care requires a significant paradigm shift, colliding with the traditional view of the HCPs role as superior. HCPs may try to change the philosophy of patient empowerment to fit their current beliefs, rather than making a genuine attempt to shift paradigm. This results in HCPs using the “empowerment approach” to try to get their patients to make the decisions that the HCP thinks are best.[16]

A well-trained HCP plays a key role in the empowerment work. Critically thinking patients who make autonomous decisions are not enough. To establish truly empowered patients, health care professionals have to make it their goal to encourage patients in their strive for empowerment.[16] The traditional style of consulting patients must be transformed to enable true patient involvement and HCPs need training in how to practice shared decision making.[23, 26]. Not until both patients and HCPs understand the philosophy of the empowered patient, and the misconceptions about the model are cleared, can a genuine paradigm shift take place.
3.3.1 Examples when Patient Empowerment makes a Difference

Many studies on how patient empowerment reflects patients’ motivation to follow their treatment have been conducted on patients with chronic diseases [16,31,32]. Chronic diseases are special in the way the success of the treatment is strongly dependent on the patient’s internal motivation. The patient empowerment approach supports patients making autonomous decisions and facilitate self-directed behaviour change, often required to cope with chronic disease.

One aspect that turns out to be of importance for patients with chronic illness is the possibility to view their own EHR, and trough that fulfill their need for information. “And sometimes, when you have been to your doctor, you are thinking ‘what exactly did he say?’. Then it would be convenient to have a look.”[32, p 4]. It was such indicators that were the trigger for the SUSTAINS project.

3.3.2 Patient Empowerment According to SUSTAINS

In the “Questionnaire for Patient Empowerment Assessment”[12] a literature review on patient empowerment is presented. It discusses empowerment in general and concludes that “empowerment must come from within an individual or group, since it must be gained by those who seek it [...] empowerment cannot occur unless it is sought”[12, p 9]. With this view, empowerment cannot be “given” to those who do not want it. Hence, the SUSTAINS project can only take responsibility for developing eHealth services to support empowering patients but it is up to each person to take the role as director for their own healthcare.

The SUSTAINS patient empowerment framework is built of the concepts patient knowledge, patient control and patient participation. It is defined as follows: “patients having the ability to understand health information and make effective use of it, as well as to gain control over and participate in a meaningful way in the disease management process in an equal partnership with healthcare professionals”[12, p 15]. It is with this definition as ground user feedback collected through IUF have been evaluated.

3.4 Online Feedback Mechanisms

When asking for feedback through an online survey or similar, it has proved to be a positive bias of opinion[33,34]. Users are simply keener on taking the time sharing their experience when they are pleased with a service rather than when they are dissatisfied. This is described in something called the
spiral of silence theory, created by a fear of indirect online bullying. People tend to voice their opinions more freely when it aligns with the perceived majority opinion. This creates the illusion of a very strong majority, making it even harder to express a diverging opinion, contributing further to the spiral of silence.

Using online mechanisms for collecting user feedback has many benefits, but such a method also presents some methodological problems, one of which is self-selection. By selecting people at random from a target population and collecting their feedback on a system, service or product, that result becomes applicable on the whole population target for the study. However, this is usually not the approach used when collecting feedback online. When a survey questionnaire (or any request for feedback) is put on the web, visible for everyone who happens to visit the site, the process of selecting respondents is not random. A non-random sampling process makes it impossible to apply probability theory on collected data and the results from the survey will not be representative on the whole target population.

Participation in a self-selection online survey depend on several factors that are out of the researcher’s control. Respondents need to have access to the internet, have accidently visited the website providing the questionnaire and decide to submit their response, three factors whose probability cannot be estimated. However, in some cases something called propensity weighing may somewhat compensate for biased results. Propensity weighing includes the result of a parallel study, estimating the probability for someone to participate in the survey, into the result of the survey questionnaire. Bethlehem explains with an example: “The variable Internet indicates how active a person is on the internet. There are two categories. Very active users and more passive users. The population consists for 1% of active users and for 99% of passive users. Active users have a response propensity of 0.99 and passive users have a response propensity of 0.01.” By calculating the propensity for several variables describing a user (such as age, gender, social background, education and activity in the internet etc.) and drawing the relationship between them (see Figure 8.1 in How accurate are self-selection web surveys? p 17), the possibility of removing the bias can be determined.
4 Inbox for User Feedback

Inbox for User Feedback is the methodology created together with Uppsala County Council to handle user feedback in the system for electronic health records. The central component of IUF is an email inbox to which users are encouraged to contribute their feedback. The feedback is written informally, following no specific structure and are not obliged to answer any specific questions, but should reflect the users' thoughts and experiences as they have tried the EHR service. The emails are then processed in two ways, one person handles the contact with the user, reads and replies to the emails and another person categorises the emails and evaluates the feedback.

4.1 Presenting the Inbox to the User

The email address of the inbox is presented to the user after he or she has logged in to the system. Together with the email address there is a short description of the SUSTAINS project and who the receiver of the feedback is. If the receiver is described in a clear way to the user, the risk of emails with irrelevant questions are reduced.

4.2 The Receiver

The person receiving the emails with user feedback in this study was an experienced person within UCC. The person had great knowledge of the system's functions and design but did not handle the technical development directly. The person was not a medical doctor but had a wide network of people with different competences that made it possible to provide users with answers to complicated and specific questions.

The receiver of the emails should be chosen carefully based on what service the user of IUF wishes to give to the users. A person like the one described above with great knowledge, competence and a wide network of contacts, results in greater cost compared with a less experienced receiver. An experienced receiver can however be profitable in cases where user contact is important for future development of the system. The receiver is also the person removing personal data from the emails, if it is desired to have user anonymous emails in the categorisation phase.

4.3 The Categoriser

In this study, the categoriser was a person different from the receiver. The categoriser was a person without medical competence and with only brief
knowledge of the EHR system. Instead the categoriser had technical competence and experience of studies within human-computer interaction. The categoriser was a person outside the SUSTAINS project, minimising the risk of a biased categorisation. The tool used for categorisation was ATLAS.ti which is described in Section 2.2.2.

4.4 The Evaluator

In the current study the categoriser also worked as the evaluator. This had the benefit of using the one person having the overall picture obtained by reading all emails and replies as the evaluator. The evaluation is then based on a broader dataset and the analysis is of qualitative type.

If the evaluator is chosen to be a different person than the categoriser, and this person only has access to the data extracted through the categorisation, the analysis will be of qualitative type. In these cases the evaluator will not get to know the user in the way the categoriser has. Instead the evaluator is directed to do a statistic analysis, studying how many representatives each category has and how they correlate to each other.

4.5 Assigning Roles

If replying to the users is included as a part of collecting the feedback, the receiver should have good knowledge of the EHR system. The receiver then also works as the replier, hence the receiver should be separated from the categoriser and the evaluator.

If it is of less importance to reply to users’ questions, the categoriser can be the same person as the receiver. This minimises the number of persons handling the emails, increasing cost-effectiveness. It is however important that this person has some distance to the project itself, to be able to perform an unbiased categorisation. The categoriser will also not be working with anonymous emails if this implementation is chosen.

4.6 Two Implementation Examples

As mentioned above, IUF can be adapted to suit the individual needs of a Scrum project. The framework of IUF contains three key roles, Receiver, Categoriser and Evaluator, described in sections 4.2, 4.3 and 4.4. By assigning these roles in different ways, corresponding to each Scrum project’s needs, resources can be distributed in an efficient way.

Table 1 visualises two implementations of IUF with different focus. The first implementation is called Communication-based IUF because its focus
<table>
<thead>
<tr>
<th></th>
<th>Communication-Based IUF</th>
<th>Simple IUF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receiver</td>
<td>An experienced person</td>
<td>Can be anyone</td>
</tr>
<tr>
<td>Replier</td>
<td>Receiver is also replier</td>
<td>No replier</td>
</tr>
<tr>
<td>Communication flow</td>
<td>Communication with users</td>
<td>One-way</td>
</tr>
<tr>
<td>Focus of project</td>
<td>User relations</td>
<td>Rapid improvements</td>
</tr>
</tbody>
</table>

Table 1: Describing important distinctions in focus and role-assigning in two implementation examples.

lies on building and maintaining user relations. Communication with users is a key aspect of the implementation and resources are focused on an experienced person reading and replying to every email.

The second variant is called simple IUF because it is more light-weight in its implementation. Here the communication is one-way, from user to developer, in order to be as cost-effective and product-oriented as possible.

4.7 Use-Cases

Here follow use cases of the two implementations. The first case represents a fictive County Council, but it can also be applied on larger companies with great purchasing power. The second case represents a smaller company with few employees, or a newly established company.

**X County Council** uses “communication-based IUF” because user relations is very important to them. Ann, who works for XCC, reads all emails and replies to all users. This is an important work but it takes time and since Ann is an experienced “senior” employee, it also costs XCC a lot of money.

XCC contacts Bertil who is not involved in the project and hire him to categorise all the emails. He is also asked to evaluate the categories and then report back to Ann.

**The Y project** uses “simple IUF” because they are a small company running on a tight budget and have their focus on rapid improvement of the system. They hire Alan, a low-priced student, to do the initial work of reading and categorising the emails. When he is done, Bea who works in the Y project, steps in. Her experience is focused on the final evaluation-phase. She works only with the categories that Alan found, not the “raw data” that the emails make up. Bea evaluates the categories and the Y system is improved according to Bea’s findings.
The Y project had initially not thought of including a user-study in their work and hence, had no room in their budget for it. Still, they manage to include the user perspective by using IUF.
5 Results

The usage and evaluation of Inbox for User Feedback have provided good answers to the research questions (Section 1.2). The user emails were categorised in fifteen distinct categories. Several of these corresponded directly or indirectly to indicators of patient empowerment. Since the feedback was freely phrased by the users, it also included reports of errors, technical problems and other aspects significant for improving the EHR system.

5.1 Character of Feedback provided through IUF

With the feedback collected through IUF, fifteen different categories were developed. The complete Table of Categories are found in Appendix A. Below is a summary of the most significant categories followed by a discription of who the user providing feedback might be.

5.1.1 Categories

The following five categories are found important for the future deployment of the service.

Control/Participation has shown to be one of the primary reasons for a reading one's EHR. The feedback in this category shows that patients have a strong desire to be treated as active participants in their contact with healthcare. Patients like to do their own research on their diagnosis in order to regain a feeling of control over their situation, but also to be able to ask relevant questions at their doctor's appointments.

Dialogue with HCP describes how the EHR supports users in their contact with healthcare. Users mention using “My Healthcare Contacts” for sending online messages directly to their HCP. Users also present cases where they have accessed information from one care unit through their EHR that have been helpful in their contact with a different care unit. They also discuss misstakes and misunderstandings that have been avoided due to the patient having the possibility to view the doctor's entries in the record.

Memory Aid is an important category. Many users describe the problem of remembering what was discusses at an appointment. By viewing their EHR when they get home, users are supported in remebering what the doctor said and what decisions were made. Users also talks about the advantage
of looking up words that were difficult to catch at the appointment such as diagnoses, medications etc.

**More Info** is a request that many users have. They want entries from psychiatric care, unsigned entries and x-rays but also for those who wishes to *submit* information through the EHR system like mobile phone number, “dissenting opinion” or change personal data etc.

**No HCP in UCC** is a category with 109 entries. This category represents feedback from users who does not have a health care provider in UCC. Because of this, they are unable to view their EHR, something that causes confusion and frustration among users from other county councils. Since users unable to use the system in the intended way lack the possibility to provide feedback describing their usage in a representative way, feedback from this category has been excluded from most part of the analysis. This does not mean that this category of users are not interesting to listen to. On the contrary, these users’ irritation may work as the drive for implementing the system in other county councils as well.

### 5.1.2 Providers of Feedback

The report *Intermediate Pilot Evaluation Uppsala* shows that young females and older males who has a current illness are the prime users of EHR[10, Figure 12-15, p 24-26]. The people providing feedback through IUF are found among them. The target population is therefore male and female users of the EHR system over 18 years of age. It can also be assumed that the distribution of users providing feedback follows the distribution of people using the system. In addition, the request for feedback demands that the user fulfil certain technical criteria. The user must:

- have a computer, smart phone, tablet etc.
- have an internet connection
- have an account at My health care contacts
- be a user of the EHR system
- have an email account
- know how to send emails
When asking for feedback through an online survey or similar, it has proved to be a positive bias of opinion \[23, 31\]. Therefore it is probable that positive users are over-represented among people providing feedback.

5.2 User Feedback Through the Patient Empowerment Perspective

*Please note that all quotations in this section are translated from Swedish. SUSTAINS’ request for user feedback can be found in Section 7.*

Among the fifteen categories there were several occurrences of patient empowerment indicators, for example “Control/Participation”, “Memory Aid” and “Dialogue with HCP”. These categories correspond to the central concepts of empowerment: knowledge, control and participation.

**Control/Participation** contains feedback from users describing a need for information. Users described a desire to know everything about their condition and experienced frustration when they felt that information was kept from them. Here follow some examples of thoughts users have shared that has been categorised under “Control/Participation”.

“I took a test last Wednesday and this Monday I could logg in and read the result. I still have not heard anything from my HCP, so if I had not had the possibility to read my EHR I would still not have known the result.”

“It provides me with answers to questions I have and I can keep track of the current situation, which makes me calm.”

“Everyone should get this possibility. This is for me associated with a feeling of security.”

“I experience it as very positive to find information from my doctor’s appointments, and in retrospect understand what the doctor really said. There is always a stressful situation when they explain what is going to happen and it is difficult to take it all in, but now I can read what was really said. It is also nice to be able to see when a referral has been sent or registered. All this gives me a feeling of control over my healthcare relations.”
“Even if it previously was possible to order paper copies of the medical record, does the EHR fill a huge need for interaction about medical information?”

**Memory Aid** is a popular use for EHR. Many users discussed difficulties with registering and remembering what the doctor says during an appointment. The EHR then worked as a complement to the personal meeting with the HCP. Here are a few examples of users’ thoughts categorised under “Memory Aid”:

“[I use EHR] Mostly because much is forgotten at a doctor’s appointment. To be able to read through all results at home is great for me.”

“One great benefit is to be able to read in plain text what was said during the last doctor’s appointment. It is not so easy to remember in detail what the doctor/nurse said, and you do not take any notes of your own during an appointment.”

“It is nice to be able to read what medicines have been prescribed, since they have difficult names and as a patient I do not want to bother the doctor with questions all the time since the time allocated for each appointment is limited.”

**Dialogue with HCP** is mentioned by several users as something that is improved through access to EHR and “My healthcare contacts”. The possibility to read up on medical terms and prepare questions for the next appointment is highly appreciated. Below follow some feedback from users regarding “Dialogue with HCP”.

“[I use the EHR] Mostly because much is forgotten at the actual doctor’s appointment but also for the possibility to view test results before the next appointment.”

“I use My Healthcare Contacts to keep in touch with my HCP.”

“It is a great help in understanding of and dialogue with healthcare.”

“I skip between different care units and specialists and it is not always they have access to my medical record. It is great with a connection directly
to my primary care unit. I wrote a message to my doctor asking for a renewal of a prescription last night. Today I got a text message saying I have a reply from my doctor in “My healthcare contacts”. If there is something I do not understand I use the EHR to prepare relevant questions for my next doctor’s appointment.”

Apart from those three categories there were also empowerment indicators embedded in the categories “Childrens EHR”, “Error in Contents” and of course “More Info”.

5.3 Advantages and Disadvantages of IUF in Software Engineering

Through the work of developing and testing the IUF method in the Scrum project developing the EHR system, several indicators of both advantages and disadvantages were encountered.

5.3.1 Advantages

IUF is developed and tested on a specific Scrum project developing a system for EHR. There are however no known limitations to which Scrum projects may benefit from using it. IUF does not claim to present every possible scenario, nor does it include every possible user of a system, but it does include the user perspective in a direct way, where previously the user were overlooked. IUF can therefore be used on its own or in addition to other user studies.

IUF is a method that allows the product-oriented Scrum developer to include the user perspective, without the time-consuming work of actively searching for participants and collecting data. The method provides a framework for collecting and evaluating user feedback in a way appropriate for Scrum. When a new version of an IT system is launched, users can share their thoughts through a mailbox where their feedback can easily be picked up, evaluated and included in one of the following sprints. Developers benefit from rapid feedback from users and users will more likely approve of a system they feel is built to match their needs.

The advantages of IUF is summarised in the following four key characteristics:

- Includes the user
- Rapid feedback
• Cheap solution
• Flexible method

In the specific case of EHR in Uppsala, IUF has made it possible to detect and correct flaws and bugs in the initial system. The user feedback has led to several improvements of the system and today, the EHR is presented to the user in a more holistic way than it was when the inbox was opened in 2012. Examples of how the system has changed through these design improvements can be viewed on screenshots of the old and the new system in Appendix [C].

5.3.2 Disadvantages

The greatest issue with IUF is its lacking statistical accuracy [4]. This may cause developers to think twice before incorporating IUF as method for user studies in their Scrum project. This also makes IUF inadequate to use when a quantitative user study is desired.

A traditional user study is more thorough than IUF. Selection of participants is often carefully prepared and the data collection may be done through interviews, questionnaires or other methods, making sure to cover key areas with the questions the project wants users to reflect upon. Results of IUF does include all possible scenarios, and due to the way data is collected, many potential users of the system are left out of the study.

For IUF to work optimally, the inbox should be open continuously as long as the system is in use. This demands a dedicated receiver for the same period of time. The data collected through IUF is made up of users' freely phrased thoughts. This creates big amounts of unstructured data that needs taking care of. As a long-term solution IUF requires more maintenance compared to a simple questionnaire which is distributed, filled out, analysed and then finished.
6 Discussion

As seen in Section 5.1, females in the age of 23-72 and males in the age of 53-72 with a current illness make up the majority of users of the EHRs. That means that younger and older people and people with few entries in their medical records are less likely to be in the group providing feedback. Also people with disabilities that makes it difficult or impossible for them to access their EHRs are missing from the group providing feedback. That need to be accounted for when discussing target population for this study.

563 users provided feedback on EHR in this study. Of those were 109 users who had no HCP in UCC and therefore lacked meaningful contents in their EHR. Of the remaining 454 users, 213 were neutral and of the rest 97.9% (236 users) were positive and 2.1% (5 users) were negative to the EHR service. That means a vast majority of those who chose sides in the matter were positive to EHR. However, the effect of nonresponse (and spiral of silence) and self-selection [35] is important to take into account before claiming the results to be unbiased.

6.1 Methodological Discussion

The feedback was collected through a type of web survey where users of the EHR system were asked to provide their freely phrased thoughts in an ordinary email. This approach contains some methodological problems. Since the emails constituted the samples selected from the target population, probability sampling have not been applied and misconstructions due to self-selection have to be accounted for [35].

As mentioned in Section 3.4, quality of a web survey can be improved through propensity weighing. By collecting additional information (a set of variables like age, gender, internet activity etc.) about the user in the survey, and compare occurrence of these variables with their distribution over the target population, a flawed survey sample may be corrected.

The problem with SUSTAINS request for user feedback is just that it is a self-selection survey. The request was simply ‘put on the web’, and no propensity information about the user was collected. Therefore the above described correction cannot be used and no unbiased estimates can be computed.

Another methodological problem occurs when the target population is wider than the sampling frame [35]. In this particular study, only people with internet access participated. Since the target population were people using the EHR system (which implies having internet access), this created no problem. However, it is important to remember that the results found
cannot be applied on a wider population than what was used for the study. In online surveys and reviews the spiral of silence (see Section 3.4) is another frequently occurring problem[34]. In this particular study users had no access to each other’s feedback. The feedback was collected as ordinary emails, so data security and user integrity were not taken into consideration. However, while it was far from impossible intercept individual user’s emails, there was no simple way of getting an overview of people’s opinions about the EHR like it is in an ordinary online review site. Therefore, only peoples’ quasi-statistical sense[34] affected their tendency to submit their feedback and the risk for creating a spiral of silence was not so large.

The qualitative analysis that was performed through categorising and analysing the emails was done from the author’s point of view. Despite the strive for objectivity in the analysis, it is probable that the data was influenced in the process. Since the categories emerged during the iterations of the emails, through thematic analysis, they were based on the author’s interpretation of the emails. This interpretation was undoubtedly affected by values, judgments and previous experience of the author.

The iteration of the emails was done by reading through all emails several times and the data set was put together by a person at UCC. The fact that these steps were done manually may have resulted in mistakes due to human error. Even though precautionary measures have been taken, unambiguous categories may occur if feedback in an email in the first primary document (see Section 2.2.2) have been categorised differently from similar feedback in the last primary document. Some emails occur several times in the data set because they are part of email conversations that have been included as a whole. The aim has been to only categorise each email one time, regardless of how many times it occurs in a conversation, but this cannot be 100% guaranteed and therefore minor statistical errors may be present.

6.2 Future work

A greater goal that lies beyond the scope and timeframe of this master thesis would be to publish the results in a scientific journal. That would spread the knowledge of the findings of this study to decision-makers within healthcare and pave the way for IUF when EHR is being deployed in county councils all around Sweden.

The IUF method has so far only been used in the deployment of one system in one county council. In order to thoroughly evaluate its usability further testing is needed. The first step would be to continue using it when the EHR system is being deployed in other county councils in Sweden. Then further testing in different Scrum projects could be the final step.
7 Conclusion

The results of this study are not statistically accurate due to methodologi- cal problems in the way user feedback was collected. Participants of the study were chosen through self-selection and therefore the results cannot be considered unbiased. However, this does not mean that the findings in this study lack importance. Even though the statistics extracted through the data analysis cannot be applied on the target population, the qualitative analysis can still give important information about the users’ perception of the system. So, while it cannot be examined how many users think a certain thing it still can be determined what the users think.

Only 1.0% of the users of the system provided their feedback [4] and far from all of them report problems and suggest improvements of the system. EHR is a civic service meant to be available to as large part of the population as possible. There are about 56 000 users of the system in Uppsala County Council but most citizens have their medical record presented in the EHR system so the number of users will probably continue to increase. The less-than-one percent of users suggesting changes through Inbox for User Feedback have had quite some impact on the modifications made to the system. Even though it is positive that users’ thoughts are taken into consideration, there is also a risk associated with letting a small group of users affect the system development. Some changes to the system may be positive for a small group while making it less accessible for others. For example, suggesting to only implement the EHR system as a mobile application may be beneficial to the small number of users who only access their EHR on their smartphone. The software developers could then put all their effort into creating an efficient and stable application. However, this would exclude many current users as well as make it more difficult to attract more people to try the service.

The system presenting the EHRs are developed using Scrum. A characteristic of that software methodology is that every sprint (2-4 weeks) should result in a potentially shippable product (see Figure 2). This together with the political issues and discussions with doctors’ and nurses’ unions led to a shaky start-up process, but also thanks to the same feature of Scrum the system has improved rapidly. This gives other county councils the possibility to learn from Uppsala’s experience and benefit from a smoother start-up.
References


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[34] D. A. Askay, “Silence in the crowd: The spiral of silence contributing to the positive bias of opinions in an online review system,” *New Media & Society*, 2014. [Online]. Available: [http://nmsagepub.com/content/early/2014/05/16/146144814535190.abstract](http://nmsagepub.com/content/early/2014/05/16/146144814535190.abstract)


# APPENDIX

## A Table of Categories

<table>
<thead>
<tr>
<th>Category</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children’s EHR</td>
<td>Used for comments regarding children’s EHR. Parents asking why their children’s EHR cannot be read by them. Explanation: the child is between 13-18 years old and the EHR system is designed to protect the child’s integrity.</td>
</tr>
<tr>
<td>Control/Participation</td>
<td>One of the primary reasons for a reading one’s EHR. Used for comments from people wanting to keep themselves informed of the content of their EHR and their diagnosis. Representatives in this category have an ongoing contact with their HCP.</td>
</tr>
<tr>
<td>Dialogue with HCP</td>
<td>One of the primary reasons for a reading one’s EHR. Used for comments from people using the EHR in discussions at doctor’s appointments etc. Also used when EHR are mentioned as a tool for handling communication between different care units and when My Health Care Contacts (a related eHealth service) replaces the traditional phonecall.</td>
</tr>
<tr>
<td>Error in Contents</td>
<td>Used for comments regarding errors in the medical records. Also used for errors in personal data. The latter depends on data from the civil register and cannot be updated until the next healthcare appointment.</td>
</tr>
<tr>
<td>Medically Competent</td>
<td>Used when it is clear that the user has medical competence (i.e., the user writes “I work as a nurse” or mentions that he or she uses “Cosmic” etc.). Used in opposit to ‘Private Person’.</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Memory Aid</td>
<td>One of the primary reasons for reading one’s EHR. A large number of users providing feedback have stated that they use the EHR as “memo notes”. Several users point to the difficulty in recalling what the doctor said during an appointment, and the EHR then works as a complement to the face-to-face meeting.</td>
</tr>
<tr>
<td>More Info*</td>
<td>Used when the user requests more information, i.e., notes from psychiatric care, unsigned notes and x-rays but also for those who wishes to submit information through the EHR system like mobile phone number, “dissenting opinion” or change personal data etc.</td>
</tr>
<tr>
<td>Negative*</td>
<td>The user expresses mostly negative opinions about the EHR service. Used in opposit to “Positive”.</td>
</tr>
<tr>
<td>No HCP in UCC</td>
<td>Several users have expressed confusion and frustration when they were unable to view their EHR due to not having a health care provider in UCC. Some users expressed anger but some were still positive towards the service and hoped it would get implemented in their county council as well.</td>
</tr>
<tr>
<td>Positive*</td>
<td>The user expresses mostly positive opinions about the EHR service. Used in opposit to “Negative”.</td>
</tr>
<tr>
<td>Private Person</td>
<td>It can be assumed that most feedback came from private users. However, this category was used only when it is unambiguous that the user has no experience from working in healthcare. Used in opposite to “Medically Competent”.</td>
</tr>
<tr>
<td>Question*</td>
<td>Used when a user’s feedback mainly was phrased as a question requiring an answer.</td>
</tr>
<tr>
<td>Security Concerns*</td>
<td>Used for comments regarding the security aspect of the EHR system.</td>
</tr>
<tr>
<td>Technical Problem</td>
<td>Used when users experienced technical difficulties with the EHR system, i.e., problems with logging in, bugs and time-outs.</td>
</tr>
<tr>
<td>Technically Competent</td>
<td>Used when the user phrased the feedback in such terms so it becomes clear that he or she was a person with technical/computer competence.</td>
</tr>
</tbody>
</table>

Table A.1: Categories that were developed during analysis of feedback received through IUF. Categories marked with * were phrased prior to the categorisation while those that are unmarked emerged during the process.
B  Glossary

**DOME** Deployment of Online Medical records and E-health services

**EHR** Electronic Healthcare Record

**HCP** Health Care Professional

**IUF** Inbox for User Feedback

**My healthcare contacts** Mina vårdkontakter

**PCA** Principal Component Analysis

**Scrum** An agile software development methodology

**SUSTAINS** Support Users to Access Information and Services

**UCC** Uppsala County Council
C Screenshots from EHR

Figure C.1: Overview of a patient’s health care appointments in the old version of the system. Borrowed from Johan Svensson’s and Viktor Kerman’s Figure 1 - Screenshot of Health Record page of ‘My Health Record’ (Min journal i Uppsala län) [p.7]
Figure C.2: Startpage for “Journalen”. An overview of the different services that can be selected by the user.
Figure C.3: Overview of the timeline presenting the patient’s health care interactions.