

HELSINKI UNIVERSITY OF TECHNOLOGY  
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## **Introducing personas in a software project**

Master's thesis

November 10<sup>th</sup> 2003

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Instructor: Minna Hesso, M.Sc. (Econ. & Bus. Adm.)

# HELSINKI UNIVERSITY OF TECHNOLOGY

## ABSTRACT OF MASTER'S THESIS

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<p>This thesis investigates the process of creating personas and introducing their use into an ongoing software project, with the objective of providing the development team with information on user goals and characteristics as well as tools to use this information effectively. Personas are fictive users of a product that are based on research and can be used to concretize user characteristics and goals in user-centered design.</p> <p>The theoretical framework of this thesis consists of an introduction to user-centered design processes followed by an overview of current research and reported uses of personas. Motivations for the effectiveness of personas as a method are presented as well as different approaches to the creation of personas. In addition, recommendations for the communication of personas to a product development team are reviewed and success factors for a persona effort are identified.</p> <p>The thesis work was carried out in the development of Sonera Cid Manager, a web-based telephony management application developed for telecom operator TeliaSonera by software solution provider Novo. There is a wide variety of user roles in the application, which provides for an interesting setting for persona development and use.</p> <p>Personas were created based on qualitative research on current and potential users of the system. These personas were then communicated to the development team using different means. After an initial period of use, the perceived usefulness of the persona method and effectiveness different means of communication was evaluated.</p> <p>Personas were judged to be a useful tool when used in conjunction with appropriate methods such as scenarios and successfully integrated into existing work practices.</p>			
<b>Keywords:</b> User-centered design, user research, user profile, persona.			

## TEKNILLINEN KORKEAKOULU DIPLOMITYÖN TIIVISTELMÄ

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<p>Tämä diplomityö kuvaa persoonien luontia ja käyttöönottoa jo käynnissä olevassa ohjelmistoprojektissa. Persoonat ovat tutkimukseen perustuvia tuotteen kuvitteellisia käyttäjiä, joiden tarkoitus on konkretisoida käyttäjien ominaisuuksia ja tavoitteita käyttäjäkeskeisessä tuotekehityksessä. Työn tavoitteena oli välittää projektiryhmälle tätä käyttäjätietoa sekä luoda välineitä tiedon hyväksikäyttöön.</p> <p>Diplomityön teoreettinen osuus koostu johdatuksesta käyttäjäkeskeisen tuotekehityksen prosesseihin ja katsauksesta persoonista tehtyyn tutkimukseen sekä raportteihin niiden käytöstä. Perusteluita menetelmän tehokkuudelle sekä eri lähestymistapoja persoonien luontiin esitellään. Lisäksi tarkastellaan suosituksia siihen, millä tavalla persoonia kannattaa kommunikoida kehittäjäryhmälle ja pyritään tunnistamaan menestyksekkään persoonahankkeen mahdollistavat tekijät.</p> <p>Työn käytännön osuus suoritettiin Sonera Cid Manager:in kehitystyössä. Sonera Cid Manager on selainpohjainen puhelinliikenteen hallintajärjestelmä, jota tietotekniikan palvelutalo Novo kehittää tietoliikenneoperaattori TeliaSoneralle. Järjestelmässä on suuri määrä erityyppisiä käyttäjärooleja, mikä luo mielenkiintoisen ympäristön persoonien käyttöön.</p> <p>Järjestelmän nykyisiä ja potentiaalisia käyttäjiä tutkittiin laadullisin menetelmin ja näiden perusteella luotiin persoonat järjestelmälle. Nämä persoonat kommunikointiin kehittäjäryhmälle eri tavoin. Sisäänajojakson jälkeen persoonamenetelmän käytännöllisyys ja eri kommunikointitapojen tehokkuus arviotiin kehittäjien näkökulmasta.</p> <p>Persoonamenetelmä todettiin tehokkaaksi työvälineeksi, jos sitä käytetään sopivien menetelmien, kuten käyttötarinoiden, kanssa yhdessä. Lisäksi nämä menetelmät on integroitava onnistuneesti jo olemassa oleviin työtapoihin.</p>			
<b>Avainsanat:</b> Käyttäjäkeskeinen suunnittelu, käyttäjätutkimus, käyttäjäprofiili, persoona.			

## TEKNISKA HÖGSKOLAN SAMMANDRAG AV DIPLOMARBETE

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<p>Detta diplomarbete beskriver en process var personas skapas och införs i ett fortlöpande programvaruprojekt. Personas är fiktiva användare av en produkt, vilka baserar sig på forskning och kan användas för att konkretisera användares egenskaper och målsättningar. Syftet med arbetet var att tillfoga projektet information om dessa frågor samt att skapa verktyg för att effektivt utnyttja denna information.</p> <p>Arbetets teoridel består av en introduktion till användarcentrerade produktutvecklingsprocesser följt av en översikt av aktuell forskning i personas samt rapporterad användning av metoden. Motiveringar för personas effektivitet som metod samt olika tillvägagångssätt för att skapa personas presenteras. Dessutom granskas rekommendationer för hur personas bör kommuniceras till produktutvecklingsteam. Även faktorer som möjliggör ett framgångsrikt personaprojekt identifieras.</p> <p>Den empiriska delen av arbetet utfördes i samband med utvecklingsarbetet för Sonera Cid Manager, ett webbaserat system för styrning av telefontrafik inom företag. Systemet är utvecklat av programvaruleverantören Novo för telekomoperatören TeliaSonera. Systemet innehåller en bred skala av användarroller, vilket erbjuder en intressant omgivning för arbete med personas.</p> <p>Personas skapades på basen av kvalitativ undersökning gjord med systemets nuvarande och potentiella användare. Dessa personas kommunicerades sedan till produktutvecklingsteamet på olika sätt. Efter en inledande ibruktagningsperiod utvärderades metodens nyttovärde och de olika kommuniceringsättens effektivitet ur produktutvecklarnas synpunkt.</p> <p>Personas bedömdes vara ett effektivt verktyg om det används i samråd med lämpliga metoder som scenarier och om dess användning integreras lyckat med nuvarande arbetsmetoder.</p>	
<b>Sökord:</b> Användarcentrerad produktutveckling, användarundersökning, användarprofil, persona.	

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# 1 INTRODUCTION

“Know the user” is commonly cited as a central principle for user-centered design (Nielsen, 1993; Faulkner, 2000). To be able to design and implement a system that is usable there must clearly exist an understanding of the user of the system, his characteristics, needs and goals. Several approaches to including users in the design process of computer systems have been proposed.

This thesis investigates one method to help focus the design of computer software on the end users of the product. The personas method, generally attributed to Alan Cooper (1999), is one way of bringing user considerations to the center of attention in design. This is not done by having actual users participate in the design process but by creating fictive users, called personas, who concretize the target user population. Design efforts are then focused on these personas. Although the identities of the personas are invented, the characterizations are based on data collected from actual or potential users using different methods (Pruitt and Grudin, 2003).

First, a review of user-centered methods in software design is presented as a background for the persona approach. This is followed by an overview of the persona method, with reported uses and variations on the method. Then, a persona creation effort made by the author is described and evaluated with respect to its usefulness as perceived by software developers.

## 1.1 Background

The research for this thesis was carried out from March to September 2003, with the user study phase conducted in May. The context, in which persona creation is studied, is Sonera Cid Manager, a web-based system for company-wide handling of telephone call routing. The software is developed by software solution provider Novo Group Plc. (Novo) for telecom operator TeliaSonera Plc (Sonera). Cid

Manager is a part of the Sonera Cid service concept, which provides telephony solutions for business customers. Cid Manager is available as an additional service to customers subscribing to Sonera Cid.

Cid Manager has been in production use since late 2001. Prior to Cid Manager, Sonera's customers would use customer support at Sonera to manage their incoming call routings in Sonera's intelligent network (IN). Some of the objectives of Cid Manager from Sonera's point of view were to provide a more flexible service to their customers and reduce the number of customer support calls by letting the customers manage their routings by themselves. An increased use of the Cid services was also anticipated as a result of the easier access to the services.

The specification and design of Cid Manager has been a joint effort by teams from Sonera and Novo, while Novo has handled the implementation of the software. The author of this thesis, working for Novo, managed the persona creation effort. However, team members from both companies were involved in the persona effort. When referring to "the development team" in this thesis, staff from both companies working on the project is intended, unless otherwise noted.

The Cid Manager system includes over 10 different user roles, with different tasks and privileges and, to some extent, differing user interfaces (UIs). The users' roles are divided into two major groups: 1) Internal users, who are working in Sonera's organization with the Cid service and 2) External users, who work for Sonera's customer organizations that make use of the Cid Service. In this thesis, work is concentrated on the latter, as less is known about these in the development team. Specifically, the two most central external user groups are studied. Using the terminology of Cid Manager, these are called external master users and end users.

- **External master users** are users responsible for managing incoming call routings within their organizations. These users have access and editing privileges to nearly all Cid Manager information concerning their organization. Their tasks include taking new telephone numbers in use in the organization, adding new end users to the system and changing routings for existing numbers.

- **End users** are people making use of the Cid services within an organization subscribing to the Cid service. These are normally people with an increased need for telephony services and reachability. An end user can only change the routing and services of his own telephone number.

Adoption of the system has not been as fast as had been hoped. Currently, only few users in the end user role are actually using the system. In most organizations, master users handle all tasks related to incoming call routing and Cid Manager, indicating rather passive use of the services. In some organizations, even master users are reluctant to use Cid Manager and will rather contact customer support at Sonera to do necessary changes in call handling. Feedback from training and support indicate that the system is somewhat difficult to learn and that there are usability problems. A need for an increased focus on usability issues has thus been identified in the development organization. As the system is still evolving, tools to help produce software with increased usability would be needed.

The usability work carried out in the context of this thesis is based on the assumption that a more usable system would yield more use, as well as decrease the need for training and customer support. However, the objective of this thesis is not to identify usability issues, but rather to provide tools to enable a more user-centered approach to developing the software in the development team.

Personas were chosen as a central theme for this usability work for a number of reasons: It is a fairly recent methodology, for which promising results have been reported (Grudin and Pruitt, 2002; Calde et al., 2002; Cooper and Reimann, 2003). It could well be characterized as a current design trend (Holzblatt, 2002). Although it hadn't been used in the organization before, it quickly achieved the support of management, which can be seen as a critical factor for its success (Pruitt and Grudin, 2003). Being a seemingly unorthodox method introduced in a discipline characterized by strict logic such as software development naturally adds interest to this study. How will a team that could be expected to consist of "logical thinkers" respond to the introduction of a design methodology that draws on empathic thinking?

In contrast to most previous reported uses of personas, this thesis reports a case where personas are introduced late in the development cycle, with the system under research already in production use. Personas are usually seen as a powerful tool in the early phases of product development, in conceptualization and early design. In the project described here, personas are used to get a better understanding of current and potential users among developers as well as a way of introducing user-centered thinking in the development project.

## 1.2 Objectives

The constructive goal of the thesis is to 1) Investigate two central user groups of the target application in order to discover their characteristics, goals and tasks and 2) Create tools to aid the development team to use this information effectively. This thesis is based on the assumption that personas can be used to achieve the latter goal.

The personas are created based on a qualitative study of current and potential users of the system. These personas are then introduced to the Cid Manager development team and the use of personas is integrated into existing processes, where appropriate. To evaluate the success of this persona effort, an investigation of the effects of the effort on the development team and its perceived usefulness is made. The emphasis here is on communication of the personas in the development project, as this can be seen as one critical factor for the success of a persona effort (Pruitt and Grudin, 2003). Although important, the process of improving work practices by using personas has been left to less attention in this thesis.

The research questions that this thesis aims to answer are thus:

1. *Is the introduction of personas seen as useful from the point of view of the developers?*
2. *Does the work done with personas increase the awareness of user concerns in the development team?*

*3. What information concerning the personas was memorable to the developers, and which characteristics were seen as important?*

*4. Which means of communication were perceived as effective when introducing personas?*

### **1.3 Structure of Thesis**

This introductory chapter aims to describe the backgrounds, motivations and objectives of this thesis. In the next two chapters, literature relevant for the thesis is reviewed. Chapter 2 gives an introduction to user-centered design and some common principles and processes in this area. In chapter 3, previous work on personas is presented, including different approaches to the creation and communication of personas and some motivations on why the method is considered effective.

In subsequent chapters, the persona effort and evaluation made in the context of this thesis is presented. Chapter 4 provides some information on Cid Manager, the software that the personas were developed for. In chapter 5, the methodology used to create and communicate the personas and to evaluate the effort is presented. In chapter 6, the results of the persona effort and the evaluation are presented. Based on these results, the fulfillment of the research objectives stated in this chapter is evaluated in Chapter 7. The thesis is summed up by the discussion in chapter 8.

## 2 USER-CENTERED DESIGN

Before examining the persona method (chapter 3) and the case study carried out for this thesis, the basics of user-centered design are presented, in order to give the reader an overview of the methodological domain in which personas are utilized. First, the principles of user-centered design are described, followed by an overview of user-centered design processes. The chapter is concluded by a presentation of two examples of concrete approaches to user-centered design, the other being a framework where personas are of critical importance.

### 2.1 Principles of User-Centered Design

*User-centered design*<sup>1</sup> (UCD) refers to a design approach where users are involved in order to produce a more usable system or product (ISO, 1999). Input from future users of the product is incorporated at different stages of the development using different methods, so that the end product could be made to match the needs and requirements of the user as closely as possible, thus rendering economic and social benefits (ISO, 1999). The *usability*<sup>2</sup> of a finished product or system can therefore be seen as the metric of success for user-centered design (Faulkner, 2000).

There are differing views on the precise definition of user-centered design (Karat, 1996; Kujala, 2002). The discussion on this issue is, however, not particularly relevant for this thesis and the author will instead attempt to describe the approach by presenting some commonly accepted principles for it. These are the principles suggested by Gould and Lewis (1985) and the ones documented in ISO 13407 (1999), the first being a generally accepted reference and the latter being an international standard on the subject.

In their article, Gould and Lewis (1985) recommend the following principles when designing for usability:

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<sup>1</sup> In ISO 13407 user-centered design is referred to as human-centered design.

<sup>2</sup> For a definition of usability, see ISO 9241-11 (ISO 1998) or Nielsen (1993).

- Early focus on users and tasks
- Empirical measurement
- Iterative design

In this context, empirical measurement refers to the practice of testing and validating design decisions early in the process with intended users using prototypes of the system. Iterative design refers to a cycle of design, test, measure and redesign as many times as is necessary (Gould and Lewis, 1985).

Although the fields of user-centered design and usability have matured significantly since the publication of the article by Gould and Lewis, the principles remain valid today. They are also reflected in the principles that characterize the incorporation of a user-centered approach in interactive system design according to ISO 13407 (ISO 1999):

- Active involvement of users and a clear understanding of user and task requirements
- Appropriate allocation of function between users and technology
- Iteration of design solutions
- Multi-disciplinary design

The first principle is very similar in the two lists. Like Lewis and Gould (1985) ISO 13407 also stresses that the involvement of users should be made at early stages of design, although this is not explicit in the wording of the principle. Furthermore, an iterative aspect is present in both recommendations. Of the other two ISO principles, “appropriate allocation of function” refers to the decision of which tasks should be carried out by the system and which should be left to the user. Multi-disciplinary design, on the other hand, means that people with different skills and viewpoints should participate in the design.

## 2.2 User-Centered Design Activities

In this section, two well-known user-centered design process models are described. The process models are high-level descriptions of what phases or activities constitute a user-centered design process.

### 2.2.1 ISO 13407 Process Model

In addition to general principles concerning user-centered design, ISO 13407 provides a process model for activities in a user-centered design process. The model is presented at a general level and is not tied to any specific methods. Only the output of each activity is specified, the choice of methods is left to the designer. These activities and their interdependence are presented in Figure 1.

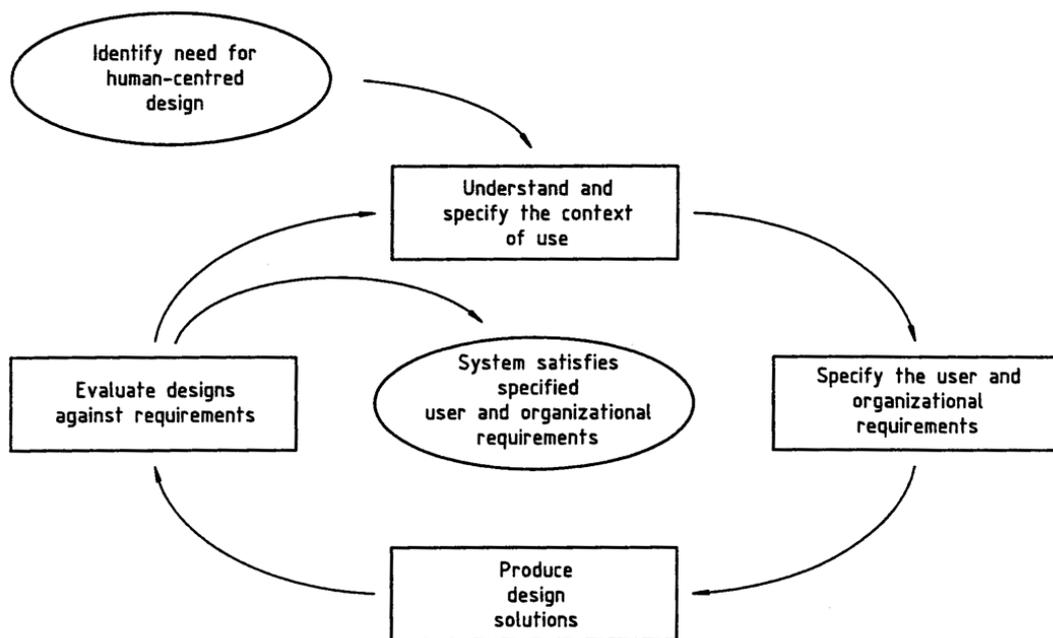


Figure 1: Interdependence of user-centered design activities in ISO 13407 (ISO, 1999)

In Figure 1, *Understand and specify context of use* refers to the activity of collecting data on users, their tasks and work environment. *Specify the user and organizational requirements* refers to creating requirements to be used as goals for the user-centered development work. It should also be possible to use these requirements to

measure whether the outcome of the design process is satisfactory from a usability point of view. (ISO, 1999)

*Produce design solutions* is the activity where existing knowledge is used to develop design proposals. The proposals should be made concrete using different kinds of prototypes and these prototypes should be tested with users (ISO, 1999). The results from these tests serve as feedback for new rounds of iteration of the design. *Evaluate design against requirements* highlights the importance of evaluation in different stages of user-centered design and also suggests feedback to be collected for different timeframes: In the short term, this means feedback in order to improve design. In the medium term, attempts to assess whether user and organizational objectives have been achieved should be made. On a longer timeframe the goal is to monitor the long-term use of the product or system.

## **2.2.2 Usability Engineering Lifecycle**

Another well-known process model is the usability engineering lifecycle described by Nielsen (1993). The model consists of eleven steps (Nielsen, 1993):

1. Know the user
2. Competitive analysis
3. Setting usability goals
4. Parallel design
5. Participatory design
6. Coordinated design of the total interface
7. Apply guidelines and heuristic analysis
8. Prototyping
9. Empirical testing
10. Iterative design
11. Collect feedback from field use.

The activities are identified in more detail than in the ISO model, but the basic flow is very similar in the two models. Both models go from user research to requirements or goal setting through prototyping and testing to design, stressing the

iterative nature of design. Both models also emphasize that feedback from users should be collected early, as changes in design are considerably less expensive when done in the early stages of development.

## 2.3 Approaches to User-Centered Design

The work described in this thesis focuses on the early activities of user-centered design. In the terminology of the models presented in the previous section, this would be “Understand and specify context of use” in the ISO model and “Know the user” in Nielsen’s usability engineering lifecycle.

To further elaborate on user-centered design, which is the framing of this thesis, this section will present two design processes that emphasize the early phases and aim to translate user needs to design: Contextual Design (Beyer and Holzblatt, 1998) and Goal-Directed Design (Cooper, 1999; Cooper and Reimann, 2003). In contrast to the process models presented in the previous section, these approaches are concrete methodologies, where a set of methods have been chosen for the different steps in the process. Both methods are proprietary in the sense that their authors make use of them in their respective design consultancies<sup>3</sup>, but both are also publicly documented in books and articles by their authors.

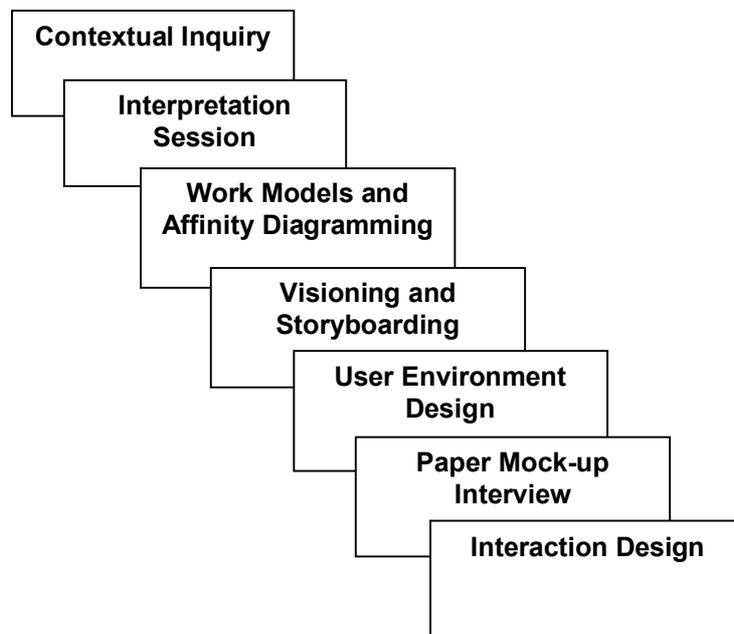
Contextual Design is a method that has been developed over a longer period and could be characterized as well known in the user-centered design community. In this presentation, it can therefore serve as a ground for comparison for Goal-Directed Design. Goal-Directed Design is the approach in which personas were first presented (Cooper, 1999) and is therefore of special interest to this work, although Goal-Directed Design was not used in its entirety in the case presented in this thesis.

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<sup>3</sup> Contextual Design is marketed by InContext Enterprises ([www.incent.com](http://www.incent.com)), Goal-Directed Design is marketed by Cooper Interaction Design ([www.cooper.com](http://www.cooper.com)).

### 2.3.1 Contextual Design

Beyer and Holzblatt (1998) characterize Contextual Design as “an approach to defining software and hardware systems that collects multiple customer-centered<sup>4</sup> techniques to an integrated design process”. Data gathered from users and other stakeholders of the system are used as base criteria for building the system. In the process of defining the system, current work processes are examined and redesigned if necessary. Design activities are focused on the customers and their work, in order to avoid internal disputes over “what customers would like” (Beyer and Holzblatt, 1998). A summary of the design activities in Contextual Design is shown in Figure 2 and explained below.



**Figure 2: Main activities in Contextual Design (InContext 2003)**

The Contextual Design process starts by gathering customer data. *Contextual Inquiry* is a field technique for data gathering, where a few carefully selected individuals are studied in depth using *contextual interviews* and observation to gain

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<sup>4</sup> Beyer and Holzblatt prefer to use “customer-centered” over “user-centered”, as they claim “customer” is more inclusive – referring to anyone who uses or depends on a system.

an understanding of current work practices and processes. Contextual inquiry is carried out in the work context in a spirit of partnership, where the designer and the user strive to gain a common view of the current work.

Following the data-gathering phase, the cross-functional design team creates a common perspective of current work in *interpretation sessions*. This common view is documented in *work models*. Contextual design defines five different types of work models that represent different aspects of work. For different customers that have participated in the research, different work models will emerge. These models are then synthesized across customers and articulated in *consolidated work models* (Beyer and Holzblatt, 1998).

Having established current work models, the design team should try to redesign work. This step is given much emphasis in Contextual Design, as this is where the data gained in the thorough research and analysis phases comes to use. *Visioning and storyboarding* are methods that draw on data and enable the design team to invent new ways of doing work. When the team has a clear vision of the new system, the structure of the system is modeled in the *User Environment Design* phase (Beyer and Holzblatt, 1998). Once the base user environment design is ready, development proceeds through rapid iterations working together with users on paper prototypes. When the iterations have lead to designs that are deemed sufficiently effective, implementation can start.

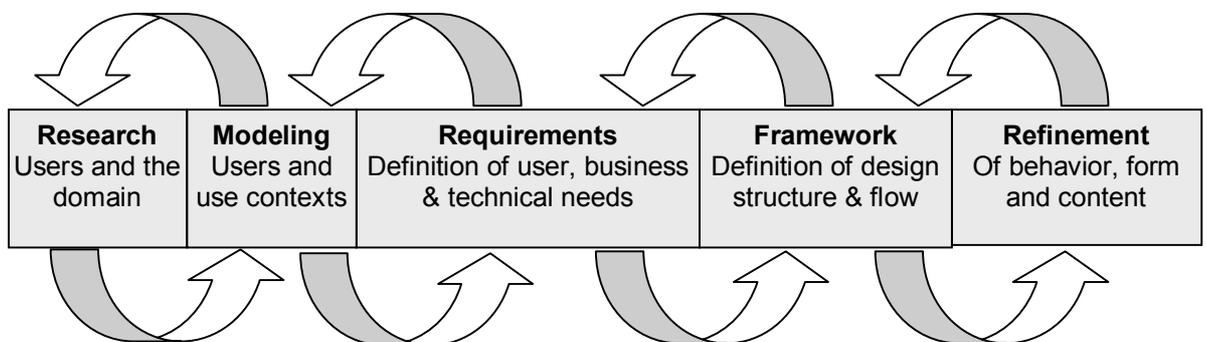
In different contexts, the authors suggest applying Contextual Design to differing extents. The full process is needed for new products or when entering new markets. For quick analyses, a design team could research a fewer number of customers and skip preparing the different work models. (Beyer and Holzblatt, 1999)

### **2.3.2 Goal-Directed Design**

Goal-Directed Design shares many of the ideas found in Contextual Design. However, the process is lighter in the sense that it doesn't prescribe the creation of

the multitude of models that Contextual Design recommends. Goal-Directed Design does also not suggest the same amount of user involvement as does Contextual Design: Actual users are mostly involved in the first phase of the process and to a small extent, if all, after that. In addition, whereas Contextual Design is heavily geared towards business systems, Goal-Directed Design is created with both corporate and consumer settings in mind. The emphasis in the design process is on the step from research to design, which Cooper and Reimann (2003) describe as often being a “black box” in design processes.

*Scenarios* are a concept that is of central importance in Goal-Directed design and therefore might need some explanation. Scenarios are essentially stories about people and their activities and are used to describe the functioning of a system or concept from the point of view of a user. The level of detail of a scenario can vary widely, but there are some elements that are characteristic to a scenario: The scenario mentions or presupposes a *setting* or environment, it includes an *actor*, who has certain *goals* and the story moves forward through *actions* – things that actors do or things that happen to them (Carroll, 2000).



**Figure 3: Goal-Directed Design (Cooper and Reimann, 2003)**

An overview of the phases in Goal-Directed Design is shown in Figure 3. The process is started with a research phase. In this phase ethnographic field study techniques, such as observation and contextual interviews are deployed to collect qualitative data from potential or actual users of the product (Cooper and Reimann,

2003). This phase is very similar to the contextual inquiry phase of Contextual Design.

A principal outcome of the research phase is *usage patterns*, which are identifiable behaviors in the user population that suggest goals and motivations. These patterns and goals drive the creation of *personas* in the *Modeling* phase (Cooper and Reimann, 2003). Cooper and Reimann characterize personas as “detailed composite user archetypes that represent distinct groupings of behavior patterns, goals and motivations observed and identified during the Research phase”. The creation and use of personas is presented in more detail in chapter 3. From the set of personas that will emerge, the most suitable are identified as design targets.

The *Requirements Definition* phase employs scenario-based design methods (see e.g. Carroll, 1995). An important point here is that the scenarios are focused on the goals of personas and not simply on user tasks in the product to be developed. Personas become the main characters in the scenarios and the designers use the personas to explore what the product should be like. This is done by imagining a day in the life of the persona using the product and detailing this *context scenario* iteratively. Business goals and technical considerations are also taken into account to form a requirements definition for the product.

In the *Framework Definition* phase another two central methodological tools are employed (Cooper and Reimann, 2003): *Interaction design principles* provide guidance as to how the system should behave in different contexts and represent bottom-up guidelines. *Interaction design patterns* are general solutions to classes of known problems, much in the same way as design patterns in software design (Gamma et al, 1995) or architecture (Alexander et al., 1977). These represent top-down guidelines. The output of this phase is an *interaction framework definition*, which is a stable basic structure for the interaction in the system.

The work started in the Framework Definition phase continues in the *Refinement phase*, where the interface is specified in detail. The design is validated through *validation scenarios* where the personas are imagined in high detail working through central paths in the interface. The output of this process is a *form and*

*behavior specification*, which can be delivered in paper or interactive media, and on which the implementation will be based. (Cooper and Reimann, 2003)

## 2.4 Conclusion

This chapter covered basic principles and processes of user-centered design, followed by examples of two specific methodologies. Although definitions and terminology vary depending on the author, central principles in user-centered design could be summarized as:

- Early and continuous involvement of users in design
- Use of multi-disciplinary teams
- Iterative design before implementation
- Empirical testing of designs.

In the case presented in this thesis, only part of a user-centered design process is carried out and evaluated. In the view of the ISO 13407 process model, this case corresponds mainly to the activity “*understand and specify context of use*”. In the Goal-Directed Design process, the work could be seen to span from the Research phase to the start of the Requirements Definition phase. However, in order to appreciate the position and importance of this particular phase in the greater picture, a broader look at user-centered design was presented.

## **3 PERSONAS**

This chapter covers the basics of the personas approach. The motivations for the efficiency of the approach are presented, followed by some variations on how to create the personas. Finally, some reported uses of personas in other projects are presented. The persona effort carried out for this thesis is described in the chapters following this one.

### **3.1 Background**

Personas are an increasingly popular design technique, used to describe user characteristics and goals in product design and marketing (Sinha, 2003). Personas are descriptions of fictive users, who are given names and faces and are presented in detail with emphasis on characteristics, goals and tasks. It is important to note that only the identities of the personas are invented, their characteristics and goals are based on user research. Both quantitative and qualitative data can be used as background information for the personas (Grudin and Pruitt, 2002). Personas as a tool for user modeling was popularized by Alan Cooper (1999), who reported on successful use of the method as part of Goal-Directed Design, which was presented in the previous chapter. However, similar techniques have been used earlier in user-centered design, an example of this are the user profiles that Hackos and Redish (1998) suggest to be created following user research. In marketing, Moore (1991) has presented the concept of target customer characterizations, which resembles personas to some extent.

### **3.2 Motivations**

Familiarity with the users of a product is central in designing for usability, as was stated in previous chapters. Personas aim to introduce many of the benefits of having users involved in different phases of the design process, while avoiding some of the difficulties related to user involvement, such as availability of suitable users, cost and scheduling. Personas could be seen as a form of discount user involvement,

although personas cannot replace real users in all development activities. An example of an activity where real users are necessary is usability testing. On the other hand, decreasing the need for access to real users is only one aspect of use for personas. Cooper and Reimann (2003) list the following aspects in which personas help designers:

- **Determine** what a product should do and how it should behave
- **Communicate** with stakeholders, developers and other designers. Personas provide a common language for discussing design decisions.
- **Build consensus and commitment** to the design. A common language helps build a common understanding.
- **Measure** the effectiveness of the design. Design choices can be tested using personas to provide a powerful reality check with rapid feedback, although this does not eliminate the need for usability testing with real users.
- **Contribute** to other product-related efforts, such as marketing and sales plans. The knowledge of a product's users in the form of personas can be of great interest also to business units outside product development.

### 3.2.1 Benefits in Product Development

The primary benefit of a well-developed persona in product development is to serve as an explicit design target. If the development team has a clear view of whom they are designing the product for, a number of problems can be resolved, such as the “elastic user” and “self-referential design” (Cooper and Reimann, 2003).

*Elastic users* refer to a situation, where the characteristics and goals of the user are discussed without precise knowledge of who the user is (Cooper and Reimann, 2003). This leads to an implicit user description that might change depending on the situation and the speaker. By making assumptions about the user explicit through a persona, these kinds of problems can be avoided (Grudin and Pruitt, 2002). The persona defines the user, for whom the product is being developed for, which eliminates debates over who the user might be.

*Self-referential design* occurs, according to Cooper (2003), when designers consider themselves the future users of the product they are designing. This leads to products where the internal structure of the system is reflected in the user interface. The end user of the product, however, will usually at best only have a partial understanding of the internals of the system. Products like this will not be easy to learn and understand for the majority users (Norman, 1989).

An explicit design target also simplifies the design task. Instead of trying to please a large population of different users, the software designer can concentrate on designing for a single user, the persona. As the result of such a design effort should be a clear and consistent product, advocates of the persona method claim that this yields a better product even if the actual users would turn out not to closely match the persona. The actual users might be different from the intended users e.g. in the case where an entirely new product is being developed. (Cooper, 1999)

In addition to an explicit user definition, Grudin and Pruitt (2002) state the engagement of product development teams as one important benefit of using personas. The authors claim that scenarios, as discussed in section 2.3.2, are often used, but seldom sufficiently memorable or believable. One reason for this is said to be that scenarios are not always based on research, but rather on assumptions. Another reason would be that scenarios are not engaging. It is not easy for the reader to relate to the rather dull descriptions of usage situations that scenarios provide. One way to improve scenarios is introducing personas as actors in them. Personas can make scenarios more realistic and more engaging, thus making them more useful. (Grudin and Pruitt, 2002)

Furthermore, Cooper (1999) mentions skill levels in computer literacy as being one common problem when defining target users. According to Cooper, computer literacy is often judged on a one-dimensional scale. In reality, however, computer literacy is a very complex issue, which a simple scale cannot account for. Faulkner (2000) also points to similar findings. Using a persona, the skill level of a target user can be defined more accurately than the traditional “naïve – novice – expert”. This can be done e.g. by describing what kinds of tasks the user has previously performed

with computers, which programs he has used but also general attitudes towards computers (Cooper, 1999).

As a general benefit, a number of practitioners (Calde et al., 2002; Grudin and Pruitt, 2002) have stated that the use of personas in development projects has led to a greater focus on users and work contexts among the developers. These statements are, however, based on the subjective view of the practitioners; no formal comparative studies seem to have been presented on this issue. On the other hand, Blomquist and Arvola (2002) report on a study of a persona effort that was not successful. The personas were not conceived as reliable, and were not adapted by the design team. The design team was not involved in the creation of the personas and was thus not familiar with the research that the personas were based on. Pruitt and Grudin (2003) noticed similar problems in earlier persona-like efforts and thus stress the importance of believability and communication.

### **3.2.2 Why Not Use Real People?**

Based on these arguments, one might ask why one cannot simply use real user representatives instead of personas. Cooper (1999) claims that real persons tend to have special characteristics that do not apply to the general user population, but might influence design in a negative way. As an example, Cooper mentions a company president, who wanted all the company software to be used only by mouse. Designing for this user would shut out people who like to use the keyboard for manipulation. (Cooper, 1999)

Pruitt and Grudin (2003) comment that using real people would eliminate the possibility of introducing data from different sources, such as market research or usability testing, in the persona descriptions. In addition, it could also cause developers not to believe in the generality of the characteristics of the one representative user. (Pruitt and Grudin, 2003)

Another motivation not to directly use real users instead of personas is implied by the usability slogan “Users are not designers“ (Nielsen, 1993). If a real person

would be used in the same way as a persona, a natural consequence might be to ask the user to decide on design issues. A commonly stated insight in usability engineering is that although a user can identify the problems in his work tasks this doesn't enable him to provide the best solutions. The design should be done by designers, not by users. (Nielsen, 1993; Cooper, 2003)

### **3.2.3 Psychological Aspects**

Although people not familiar with the method might judge personas as a rather unscientific way of dealing with user characteristics and goals, personas are a powerful tool because they draw on some psychological characteristics of humans. *Theory of mind* is the ability in humans to draw inferences and form expectations about other people, especially people they know. This type of reasoning enables designers to think in terms of personas and imagine how the persona might act in a specific situation. These inferences are not always right, but people learn from experience (Pruitt and Grudin, 2003).

Another motivation to present data of the user population in the form of personas is memorability. Humans are in general not very good at considering statistics or probabilities (see e.g. Kahnemann et al., 1982). A statement such as "40% of the users will use the product one to two times a month" is not very helpful for a designer. However, if we state that Sirkku, the main persona in our design project, normally uses the service once every month, this data becomes easier for people to grasp.

## **3.3 Persona Creation Approaches**

A number of different approaches have been suggested for creating useful personas. In his original presentation, Cooper (1999) does not go into details on what kind of data should be used to create personas and does also not state clearly to what degree personas should be based on user research. Later reports on personas, however, seem to be united in the view that the relevant characteristics and goals of the personas should be tightly coupled to data from actual users (Goodwin, 2002;

Grudin and Pruitt, 2002; Sinha, 2003). In a later publication, Cooper (Cooper and Reimann, 2003) more specifically shares this view.

However, opinions differ slightly on the type of data to be used for background information and the details of moving from research to personas. Goodwin (2002), working for Cooper Interactive, suggests that personas should primarily be based on qualitative data, which is collected through interviews and observation. Goodwin downplays the role of quantitative data, suggesting it could be used to validate the findings from the qualitative research, “if you have the time and budget”. Cooper and Reimann (2003) share Goodwin’s view and provide some more detail to what research methods they recommend. They state their methods of data collection closely parallel contextual inquiry as presented by Beyer and Holzblatt (1998). However, compared to contextual inquiry, Cooper and Reimann’s (2003) method is more light-weight, concentrates on user goals instead of tasks and also takes consumer domains into account, whereas contextual inquiry assumes a business context (Cooper and Reimann, 2003).

The data collected from observations and interviews is mapped to behavioral variables. The mapping need not be on a precise scale, as long as the mappings of different interviewees are correct relative to each other. A set of interviewees that cluster on a group of behavioral variables form a behavioral pattern. A behavioral pattern, in turn, forms the basis of a persona. By adding details from the data the behavioral pattern is developed into a persona. Goodwin (2002) stresses that all aspects of the persona should be grounded in research, in order to make the persona credible and analytically sound. Exceptions are the persona’s name and picture. The name should be invented and the picture can be taken e.g. from a collection of stock photography. However, these should be chosen carefully to be realistic for the persona in terms of age and cultural background (Goodwin, 2002).

Grudin and Pruitt (2002), having used personas in the design of mass-market commercial software products, suggest using different kinds of quantitative and qualitative data. This can include material collected for other purposes, such as marketing and material from external sources in addition to data from research done specifically for the personas (Pruitt and Grudin, 2003). In fact, the author states that

initial personas are created before persona-specific user research is done. When these initial personas are ready, they are filled out with qualitative data collected from users that are representative for the segment in question.

Sinha (2003), on the other hand, proposes using quantitative methods to achieve a tighter coupling between user research and the created personas. Sinha criticizes previous persona creation techniques (Cooper, 1999; Grudin, 2002) as being too dependent on subjective judgment by the designer. The author claims that persona creation in this way is difficult for inexperienced designers. Even for experienced designers, personas created based on the same user research might differ considerably. To achieve more accurate personas, Sinha (2003) suggests using Principal Components Analysis on quantitative material to identify groups of correlated variables in the material. The personas are then created based on these groups.

Grudin and Pruitt (2002) also emphasize that persona use should be complemented with an ongoing effort to obtain as much information about the users as possible, “to improve the selection, enrichment and evolution of sets of personas”. Adlin et al. (2002) discuss the notion of “persona lifecycle”. According to the authors, a persona evolves over time, as new information about the users becomes available. The persona also goes through different life stages. The stages in this representation are (Adlin et al., 2002):

- **Family planning.** The research phase before the personas are created
- **Birth.** The personas are created based on the research data
- **Maturation.** Personas are introduced in the organization and continue to develop, providing that they are accepted by the organization.
- **Adulthood.** Personas have settled in their roles and are used naturally in the design work.
- **Lifetime achievement/Retirement.** The personas are no longer needed, and an evaluation and look into the future can be made.

In the case presented in this thesis, the stages from family planning to maturation are covered.

For personas to be successful in a development team, Grudin and Pruitt (2002) claim that there must be support from management and key team members. Grass-roots efforts, where a few team members have decided to try the effort were not seen as very successful (Grudin and Pruitt, 2002). With management support, people resources and a budget for creating and promoting the personas can be made available.

### **3.4 Persona Communication and Documentation**

After personas have been created, these need to be documented and communicated to team members and stakeholders. Pruitt and Grudin (2003) identify the communication of personas as a central factor to the successfulness of a persona project. Other practitioners (Adlin et al., 2002) share this view. In the partially failed persona effort reported by Blomquist and Arvola (2002), lack of communication was identified as a main reason for the failure. For this reason, the work in this thesis has a focus on the communication of the personas to the development team.

#### **3.4.1 Communicating Results of User Research**

Communicating the results of user research can be an issue of some complexity. The information collected in a qualitative study might be hard to quantify and present. It is equally hard to separate analysis and presentation and an appropriate presentation of data will normally include some degree of analysis. Written reports are seldom adequate for communicating data collected in qualitative user research (Härkönen, 2003).

Hackos and Redish (1998) suggest a variety of methods to present the results of user research, and suggest that methods for a particular case should be chosen based on the type of data that is available and the needs of the team that the data will be presented to. Some data presentation and analysis methods suggested by Hackos and Redish (1998) are profiles of users, task sequences, user/task matrices, affinity diagrams and video/audiotape highlights.

On the other hand, speaking from the point of view of user experience design, Mattelmäki and Batterbee (2000) warn researchers for “over-analyzing” the data that is presented to designers. Analyzing the data too thoroughly leaves no space for imagination and inspiration on behalf of the designers.

### **3.4.2 Persona Communication**

For the communication of personas, many of the same things must be considered as for communicating the results of user research. Personas can naturally be used simply as one way of presenting user research, but this would neglect much of the potential of personas. On the other hand, when presenting personas, it will often be necessary to also present the rationale behind personas, unless the audience already is familiar with the method.

Cooper and Reimann (2003) mention two basic deliverables for a persona, a list of brief bullet points with the central characteristics of the persona and a narrative written in third person about the persona. The authors stress the importance of the persona having a name and a picture, making the persona feel more real. The narrative is one to two pages in length and does not cover every observed detail, as the design team members ideally have participated in the research phase and people outside the design team don't need to know the details of the research (Cooper and Reimann, 2003).

Involving the design team in the research phase is surely a useful tool to make the personas believable. This is true for the results of most forms of user research (Hackos and Redish, 1998). However, this is not always possible. The underlying research might have been made by a single person or people outside the design team due to budget, timetable or political decisions. In large projects, on the other hand, it is not feasible to involve all team members in the research. In the study presented in this thesis, the design team could unfortunately not participate in the user research due to timetable constraints.

Pruitt and Grudin (2003) argue for multifaceted, multimodal and on-going communication that progressively discloses more information about the personas. The central information about a persona is stored in a “foundation document”, including data, key attributes, photos and reference materials. This foundation document, however, is not the primary means of communication. For this purpose the authors suggest methods such as posters, flyers and regular e-mails. Even more unorthodox materials, such as squeeze toys or mouse pads with persona pictures and information have been used. Once the persona documentation and materials are ready, a kick-off meeting is arranged for the development team, where the personas are introduced. (Pruitt and Grudin 2003)

### **3.5 Personas and User-Centered Design**

In order to fully exploit the possibilities of personas, these must be integrated in the design process that is used. There are differing views on how and where personas fit in with other user-centered design methods. In the presentation by Cooper and Reimann (2003), personas are a central part of the Goal-Directed Design process. Personas and their goals drive the entire process. However, Goal-Directed design is only one of the possible ways of employing personas.

Pruitt and Grudin (2003) state that personas can complement other approaches or can be used where other approaches are impractical. Perhaps the most obvious use of personas is in scenarios, where scenarios can be made more believable by using personas. Personas in scenarios were discussed in chapter 3.2.1. Other activities where personas can easily be used are review sessions and functional or integration testing.

Holzblatt (2002) discusses the role of personas in Contextual Design, stating that they are useful in “bringing to life the key types of users in the customer population being supported”, especially to people who didn’t participate in collecting the data. The contextual data, which is collected during the research phase of Contextual Design, is as such suitable material for constructing personas. There are a number of phases in the process, where personas can be useful, such as setting project focus,

communicating work models and providing a quick overview to complex data. In the scope of Contextual Design, however, personas are only one of the techniques that can be incorporated in the process. (Holzblatt, 2002).

### **3.6 Conclusions**

Personas is a design technique used in product or system design to describe user characteristics and goals. Personas are based on research and can be used in different phases of the design process – they are not tied to a specific process. They are also a powerful tool for communication as well within a product design team as between different stakeholders in a development organization, such as development, management and marketing.

Critical success factors for a persona effort could be summarized as follows:

- Evident links between personas and research
- Successful communication of personas
- Management support

The presence of these factors was set as an objective for the persona effort in this study.

## 4 SONERA CID MANAGER

The context in which the research for this thesis is carried out is the development of Sonera Cid Manager, a web-based system for telephone-oriented reachability management. In this chapter, some background information on the system under investigation, its development and its users is presented. This is done in order to give the reader an overview of the context for which the persona effort was made as well as some insight into the differences in user roles in the system.

### 4.1 Background

In this section, the concept of reachability and the Sonera Cid service are presented, followed by a brief description of the technical structure of the system.

#### 4.1.1 Reachability and Sonera Cid

Sonera Cid Manager is the management tool of Sonera Cid, a service concept offered by Sonera to its business telephone customers to provide controlled reachability (TeliaSonera, 2001). *Reachability* in this context refers to the ability for a caller to reach the desired callee, or someone else who can assist the caller, using a single telephone number. Examples of obstacles to reachability in a company setting include:

- The callee is not able to answer his phone due to a meeting, vacation or illness.
- The callee is not at the office, and can thus not answer his fixed line phone. He might, however, be reachable through his mobile phone.

*Controlled reachability*, on the other hand, refers to the callee being able to control how incoming calls are directed. Different handling of an incoming call might be desired in different situations. In some situations, the callee might prefer not to be disturbed, in which case incoming calls should be directed to another destination, such as a colleague or voice mail. On the other hand, the callee might also want a simple form of call filtering: In Finland today it is commonplace for employees to

have both a desk phone at the office and a mobile phone, which is used for both business and free time. Some people desire not to give out their mobile phone numbers, in order to protect their free time<sup>5</sup>. Without call redirection, however, not giving out the mobile phone number means not being in reach when not at the office.

Traditionally, call redirection has been taken care of in the telephone network of the receiving organization, either using switches or setting up call redirection using telephone devices. Sonera Cid is implemented in Sonera's telephone network and can thus offer a more advanced solution to the aforementioned issues. The basic concept of Sonera Cid is the Communications id (Cid) number, a telephone number with a 020-prefix that can serve as a façade for a number of telephony services.

These services include:

- **Reachability chains:** An incoming call is redirected to another device if there is no answer on the first answering device within a specified time. The call can further be directed to a third device, if there is no answer on the second.
- **Time-driven chains:** An incoming call can be handled according to the current time. For example, calls after 5 p.m. might be directed to voice mail.
- **Mobile services:** An SMS sent to the Cid number can be received in a mobile phone defined for this purpose.

In addition, as the redirection is handled in the telephone network, the traffic in the company's network is reduced compared to the situation where calls are redirected from a telephone switch or device in the company's premises. Furthermore, the number of the caller (the A-number) is signaled to the device receiving the call, which is not the case when the call is redirected through the company network. For some people, being able to see the number of the caller in redirected calls is perceived as a valuable feature of the Cid service<sup>5</sup>.

Cid numbers are distributed on a company-wide basis. This means that the phone numbers of a Sonera Cid customer will share a common prefix, independent of where the company's offices are located and whether the call is directly transferred to a desk phone or a mobile phone.

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<sup>5</sup> These assumptions were verified during the user research phase.

### **4.1.2 Technical Background**

As was mentioned, Sonera Cid Manager is the management tool of Sonera Cid. Before the introduction of Cid Manager, additions of Cid numbers and changes to the services of existing numbers were handled by personnel at Sonera. Cid Manager was developed to provide a more flexible service for Sonera's customers. Cid Manager was taken into production use in 2001.

Sonera Cid utilizes an intelligent network (IN) to handle the telephony services. Cid Manager provides a web interface to the Sonera Cid services, and communicates with the IN to apply changes requested by the users. In addition, Cid Manager handles supplementary tasks such as management of user and company data, billing reports etc.

## **4.2 User Groups and Tasks**

The delivery process of the Sonera Cid services is quite complex and involves a number of different actors, both on Sonera and in Sonera's customer organizations. Therefore, Cid Manager was originally specified to handle more than ten distinct user roles. Each user role has different access rights to the system, depending on the work tasks that users in each role are expected to carry out. The user roles were created based on work practices with Cid services prior to Cid Manager. The relevant organizational roles both in Sonera's and the customers' organizations were identified and mapped to user roles in Cid Manager. These user roles are thus divided into two basic groups: External and internal users. External users are users working in Sonera's customer organizations, whereas internal users work in Sonera's organization. The user roles are described in more detail in the following sections.

In earlier development work, the differences in needs of different user groups have been given little attention. The user interfaces for the different external user groups have been scaled-down versions of the user interface for the most advanced external user role, with less information visible and editable. The internal user roles are

implemented in a similar fashion: The user interface is largely consistent across user roles. Access rights are implemented by restricting insert, update and delete privileges to different types of information. The UI elements for these actions are not shown unless the user has rights to execute them. In more recent development work, differences in user tasks and needs for different user roles have been identified as an issue of importance. However, no radical changes to the original UI setup have yet been made.

#### 4.2.1 External User Roles

External users are people working for organizations that utilize Sonera Cid. There are four external user roles, which are summarized in Table 1. The external user roles are intended to match different organizational roles in the customer organizations.

	<i>Access rights</i>	<i>Primary Tasks</i>	<i>Current usage</i>
<b>Information Manager</b>	Browse all organizations data	Audit, reports	Low
<b>Master User</b>	Edit all organizations data*	Create, update and delete users and Cid numbers	High
<b>Office Administrator</b>	Edit data related to named office(s)	Create, update and delete users and Cid numbers	Medium
<b>End User</b>	Edit data related to own number(s)	Manage personal reachability	Low

\*) with some exceptions

**Table 1: External user roles. Current usage is reported relative to other user roles.**

At the moment, *master user* is the most common user role in terms of usage. In many organizations, this is the only role that is used. Master users can perform all the tasks of the other external user roles, as well as set up new user accounts for their organization in any of the four external roles. The most common tasks are thus creating and deleting Cid numbers and users and editing the services of existing numbers.

The tasks of an *office administrator* are fairly similar to that of a master user, although an office administrator only has access to the Cid numbers and users related to one or more named offices. Smaller companies with only a few offices might not need Office Administrators, as one master user can take care of all administrative tasks in Cid Manager if changes to the Cid services are made only occasionally. However, in large customer companies the use of Office Administrators is common.

The *information manager* has browsing rights to all information. This user group is only in marginal use at the moment. This role was intended for people in the customer organizations who should be allowed to audit the use of the services and extract reports, such as IT Managers. However, practice has shown that these types of users prefer to have master user privileges.

The *end user* has editing rights to the services of his own number, which means that he can edit reachability chains and other services. In addition to the web interface, the end user can also access Cid Manager using WAP or an SMS-based interface. This user group differs from all others in that Cid Manager is a tool that can assist the user in his everyday life – the user will have a personal interest in using the service, whereas other user groups will use the system as part of their work tasks. At the moment, however, usage among end users is only moderate compared to the amount of Cid numbers defined in the system. One reason for this might be that the role implies a change in behavior for members of this group. Previously, the setup of Cid services was changed using intermediaries: A contact person in the user's organization and an operator at Sonera. This made the task somewhat laborious and time-consuming. Being able to do changes essentially in real-time provides new opportunities of use, but these opportunities might not yet be fully identified in the customer organizations.

#### **4.2.2 Internal User Roles**

Internal users are users working for Sonera in sales, configuration and support. The tasks of these users are more diverse than those of the external users, and the user

interface contains significantly more functionality. The most important internal user roles are *internal master user*, *project manager* and *customer support person*. The user interface of external users is accessible by internal users, but internal users often prefer to perform tasks related to updating Cid services using the more system-oriented power-user user interface available to them. This user interface has been partly transferred from a legacy system that Cid Manager replaced and is effective when doing several changes to a customer's services at a time. As an effect of internal users utilizing this alternative path, their knowledge of how external users use the system is often limited.

### **4.3 Development Environment**

The development of Cid Manager is carried out by Sonera and Novo Group, with Novo Group responsible for implementation. Although the original Cid Manager software project was started in 2000, the development of Cid Manager is ongoing. After Cid Manager was taken into production use in 2001, new incremental versions have been introduced roughly three times a year.

A new version of the system usually consists of a number of tasks including implementations of new reachability products, other new features, improvements to existing functionality and bug fixes. Ideas to improvements and new features are collected from different sources, including development teams in both companies as well as customer support and training. Ideas are listed with brief descriptions for later implementation. The most valuable ideas are then chosen for functional specification. These specifications are thereafter reviewed, implemented and included in the next version of the system.

The staffing of the project has varied with between five to nine people at Novo and two to three people at Sonera actively working with development. In the previous development work on Cid Manager, user-centered design has not been an issue of great importance: An experienced internal user has participated in the design process, but less experienced internal or external users have not been involved. Feedback on the system has been collected from users through customer support and

training. No user testing or systematic usability inspections have previously been made. The details of user interface design have in many cases been left as the responsibility of individual developers. Usability problems have been fixed as discovered by members of the development team or reported by users and deemed serious enough to justify the effort.

Prior to the effort presented in this report, the developers at Novo have had some contact with experienced internal master users of the system, but very little contact with external users. Therefore, they did not feel well informed on issues concerning the users of the system<sup>6</sup>. Team members at Sonera rated their knowledge of users better than did developers at Novo, although there was room for improvement on this part too.

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<sup>6</sup> This was verified by a survey done before the results of the user research phase were presented. See section 5.6

## **5 FROM USERS TO PERSONAS: METHODOLOGY**

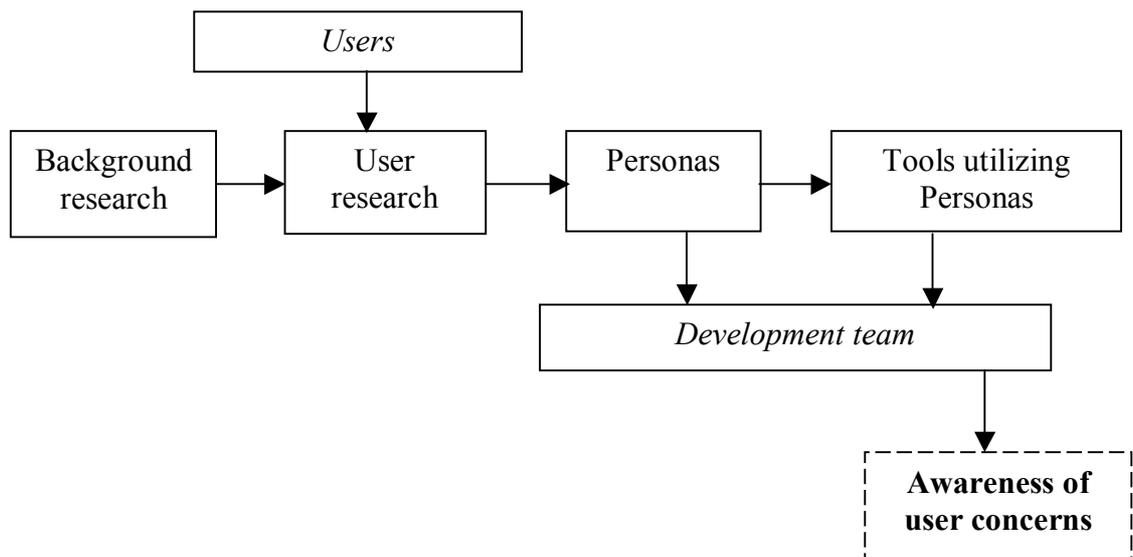
Having identified the need for usability work in the Cid Manager project as well as the lacking familiarity with users and their concerns, a persona effort was undertaken. The persona method was chosen for the following reasons:

- The amount of background work and cost needed for creating personas was considered reasonable with respect to the expected benefits.
- Personas was seen as a method that could be easily incorporated with existing processes in the project, thus helping the project to include usability issues on a longer term.
- Management supported the method, although it hadn't been used in the organization before.

The goal of the persona effort was to collect information about users, raise awareness of user concerns and provide tools for user-centered development work in the Cid Manager project. This would be done by identifying user characteristics and goals and synthesize these into personas. In addition, material to assist in the communication of the personas to the developers was created, as well as instructions on how to use the personas in conjunction with existing processes. Finally, the successfulness of the effort, in terms of increased knowledge and awareness of user concerns, would be evaluated. This chapter describes the methodology used for the effort. The methodology for persona creation and communication aimed to follow current recommendations as presented in section 3.3.

### **5.1 Outline of Persona Effort**

The persona effort was carried out in spring and summer 2003, with the user research phase performed during a period of one month in May and June 2003. The author of this thesis planned and carried out the entire persona effort, from background research to persona introduction. Personnel at Sonera and Novo provided feedback and suggestions on the process. An outline of the work process that was followed is presented in Figure 4.



**Figure 4: Outline of persona effort**

The work was started with a background research, where currently available material on Cid Manager users was collected and reviewed. Based on this research and literature on the subject, a user study was planned and carried out. The results from this study were used to develop personas, which were communicated to the developers. Some templates and instructions that would help utilize the personas in existing processes were also developed and introduced to the developers. As a result of these actions, raised awareness for user concerns in the development team and an increased focus on user-centeredness was hoped to be achieved.

## 5.2 Background Research

Before starting the actual user study, some background research was carried out. First, material that was available to Sonera's customers was reviewed. This material mainly consisted of user manuals and instructions for Cid Manager master and end users. The material was used to get an understanding of how Cid Manager was expected to be used from Sonera's point of view. Some marketing material was also reviewed, to identify the marketing perspective of the Cid services and what user groups these were targeted at.

Next, current training practices were acquainted with. This was done by reviewing the material used in the one-day Cid Manager master user training provided by Sonera and interviewing the person in charge for customer support and training at Sonera. This interview also provided some background on current customer support practices. Based on this information, common practices and problems in customer organizations relating to Cid Manager could be identified.

There was, as earlier stated, not much organized knowledge of users and user concerns in the development team, especially on the part of the team working for Novo. The information available was not centrally documented and mostly anecdotal in nature, originating from user feedback through customer support or training.

Log data of the system proved to be a valuable source of information. Cid Manager generates history information with timestamps, customer Ids and user Ids of changes that are made to Cid services in the IN. By combining this history information with user and customer data, user activity could be effectively analyzed on a per-customer and per-user role basis. This analysis revealed that a large number of registered users were passive, with only infrequent uses of the system. In a number of companies, Cid Manager had not been used at all, although a master user had been assigned in the organization. In these companies, changes to Cid services were still done using customer support at Sonera.

### **5.3 User and Task Analysis**

Based on the current needs of the project and the background research it was decided that personas were to be created for two user roles: External master users and external end users<sup>7</sup>. Internal users were not targeted in this effort, as project management felt that these users were already easily accessible at this point. Of the external roles, the master user was a logical target for investigation, as this was the

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<sup>7</sup> The user roles in Cid Manager are presented in section 4.2

group with the highest usage at the moment. The tasks of an office administrator were considered so similar to those of a master user that a separate persona was not justified for the time being. The information manager role was not considered central to the service at this point and thus also left outside the study. The end user, however, although currently not very frequently used, was seen as critical for the service and thus chosen for the study.

Before starting the user research phase, a “persona hypothesis” was created, as suggested by Cooper and Reimann (2003). This was a “best guess” for how the users were imagined to be, based on what was known about them and served as a basis for planning the interview and other user research.

Semi-structured interviewing was the primary method of information elicitation. An interview outline was followed during the interviews, but the focus of the interviews changed over time, aiming at more specific information in the later interviews. After the interview, a brief observation was carried out with master users working with Cid Manager, to gain more insight into the use of the product at the moment. This is an approach recommended by many practitioners (e.g. Beyer and Holzblatt, 1998; Hackos and Redish, 1998). Some of the end users were also asked to keep a diary of their incoming calls during a week, to find out more about how they use their phones in different situations.

The interviewee candidates were chosen by analyzing activity logs of the system. The candidates were contacted by phone, and meetings were set up in the premises of the interviewee. When the interview couldn't be carried out in the direct work setting of the interviewee, the actual work settings could in most cases be acquainted with during the observation phase. A total of 15 people participated in the user research phase. Eight of these represent master users and seven end users. With this number of participants in the study, patterns clearly started to emerge. It was deemed that additional participants would not provide much new to the study, so the material was considered saturated, which is a requirement for a qualitative study (Eskola and Suoranta, 1998).

As a whole, the data collection phase for the personas was an application of the approach presented by Cooper and Reimann (2003), which was followed as closely as possible given the description available. This was seen as the most practical approach to this particular context. Very little concrete supplemental user data was available, which made the approach based on different forms of data proposed by Grudin and Pruitt (2002) inapplicable. As the system was already in use, a more quantitative approach as proposed by Sinha (2003) would have neglected the opportunity to observe current users in action.

Although a common advice in the field of user and task analysis is that members of the development team should participate in interviews and site visits (Hackos and Redish, 1998; Beyer and Holzblatt, 1999; Cooper and Reimann, 2003), the author carried out the user research phase alone. This was also the only significant diversion from the approach to collect data presented by Cooper and Reimann (2003). The reasons not to include developers in research were scheduling and resources. During the time of the interviews, a new version of the product was in a crucial phase, so it was not deemed possible to allocate developers to participate in the interviews. Due to the upcoming vacation period, it was also not possible to postpone the user research. To compensate for this shortcoming, the development team was held up to date with the status of the user research. Not having the development team participate in the user research made the later communication of findings and personas even more important.

### **5.3.1 Master Users**

Eight users were studied for the master user persona. The study participants were selected so that half of the participants represented infrequent users and the other half represented more frequent users. Assigned master users, who had used the system only marginally or not at all, were not included in the study. A summary of the interviewed master users is presented in Table 2.

<i>Participant</i>	<i>Job group</i>	<i>Company size</i>	<i>Frequency of use</i>
<b>P1</b>	Assistant / secretary	1-10	Less than once a month
<b>P2</b>	Assistant / secretary	10-100	Monthly
<b>P3</b>	IT services	10-100	Weekly
<b>P4</b>	IT services	10-100	Monthly
<b>P5</b>	Reception	100-1000	Monthly
<b>P6</b>	IT services	100-1000	Weekly
<b>P7</b>	Assistant / secretary	1-10	Weekly
<b>P8</b>	Customer support	1000+	Daily

**Table 2: Summary of participating master users**

The site visits, including interview and observation lasted from 45 minutes to 2 hours. Of the eight participants, six were observed using Cid Manager. Those participants, who didn't have a task they needed to perform with Cid Manager at the time of the visit, were asked to show how they carried out the previous task they had done.

The main topics that were covered during the interview were the following:

- What does a typical workday look like?
- What is the role of controlled reachability in the organization?
- How was Cid Manager taken into use in the organization?
- How is Cid Manager currently used?
- How are Cid services used in the organization? How well is the service known?

### **5.3.2 End Users**

The study of end users differed somewhat in nature from the research done with master users. Whereas master users would use Cid Manager to set up call routing in a company, end users are the users with personal interests in the service – their own reachability. Therefore, controlled reachability was one of the main issues of the end user study.

Seven people were studied for the end user personas. Three of these were current end users of Cid Manager, whereas the other four were people who used the Cid service but not Cid Manager, and were judged to be potential users of Cid Manager.

The participants were interviewed for 15-45 minutes. There were some difficulties finding suitable interviewees for the end user role, as being a potential user for the system usually implied a busy schedule. For this reason, four of the participants were people working for Sonera or Novo. These participants, however, had no technical knowledge of Cid Manager.

The main topics that were covered during the interview were the following:

- What does a typical workday look like? How much moving around is needed?
- What means of information technology (phone, fax, e-mail etc.) are used, and to which purposes?
- What is the role of controlled reachability in work and free time? How is it handled?
- Use of telephone in different situations (meetings, free time).
- Cid services and Cid Manager: Current and potential uses.

Four participants were also asked to keep a diary of incoming calls and changes to call routings for the period of seven days. The diary also contained some general questions on issues related to telephone use and reachability<sup>8</sup>. Two diaries were returned.

## **5.4 From Research to Personas**

Interviews and observation sessions were recorded with audio recording equipment and later summarized in writing. The summaries were reviewed and variables considered relevant were identified from the material. Separate variable sets were identified for the two subject groups. Each study participant was then mapped to the variables of his group. The scales of the variables were approximate, but it was ensured that the mapping of a subject to a variable was correct relative to other subjects on the same variable. Some examples of variables for the master user group are shown in Table 3.

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<sup>8</sup> An example diary page is shown in Appendix A

<i>Variable</i>	<i>Scale</i>
Attitude towards information technology	Cautious, defensive <-> Experimental, curious
Knowledge of Sonera telephony services	Inadequate <-> Extensive
Frequency of Cid Manager use	Daily <-> Less than once a month
Peer support for Cid Manager	Only user in organization <-> Other knowledgeable user(s) in organization

**Table 3 : Variables used to analyze master users**

From this grouping of data, patterns were identified. Participants in the master user role were identified as belonging to one of four groups. One of these groups, having only one member, was not considered relevant, as the subject comprising this group clearly stated that she was the wrong person for handling the master user role in her organization. Another group, consisting mainly of IT-professionals, was also not considered interesting as these had extensive experience with different systems and showed no difficulties in handling Cid Manager. Relevant findings from these two groups were integrated into the other two groups, which were chosen to be refined into personas. This process followed the recommendations of Cooper and Reimann (2003). The two remaining groups could be characterized as master users in small organizations and master users in large companies with Cid services in active use.

The group that was chosen to be represented by a primary persona was master users in small organizations. These were usually employees with secretarial jobs, who were well familiar with computers and common office applications and were also users of other business-related computer systems, such as CRM applications. They had often not attended the Cid Manager training provided by Sonera: One participant stated that she had “planned to [attend training], but then never got around to it”. They were also not well aware of the Cid services available through Cid Manager or familiar with setting up end user accounts in their company. As one participant explained: “No one [in my company] has requested an end user account,

so I've never set one up". Being the Cid Manager master user was one of many miscellaneous duties that had been assigned to them.

For the end users, three user types were identified. The subjects belonging to one of these types were, as it turned out, not interested in managing their reachability by themselves. These would rather have someone else handle the tasks for them; this could be an assistant or a secretary. From the aspect of Cid Manager, these subjects would be indirect users and potentially interesting as such. However, for the end user role, their relevance was minor and the group was thus not distilled into a persona. The remaining two groups could be characterized as marketing people who were advanced information technology users and middle management on the move.

The primary persona for end users was synthesized from participants that worked in marketing or middle management in somewhat conservative businesses such as real-estate or manufacturing and were roughly in their fifties. These would use both desk and mobile phones and often have a secretary that could take calls when they themselves could not. Regularly meeting with customers in different parts of town was part of their jobs and some of the participants would also work from home at times. A narrative description of the persona that was created based on this group can be found in section 6.1.2.

A total of four personas were thus chosen for use in the future development of the product, a primary and a secondary persona for each user role. Although Cooper and Reimann (2003) suggest the possibility of having a larger number of personas in different persona types, the number in this application was limited to four in order to concentrate on the most relevant personas. An outline of this persona gallery is presented in section 6.1.

## **5.5 Persona Communication**

Making the created personas understood and accepted in the development team is a central success factor for a persona project (Pruitt and Grudin, 2003; Blomquist and Arvola 2002). In order to achieve this, the communication of personas was planned

to stretch over a period of time and include different ways of communicating the personas and the uses of these. The communication of the personas aimed to follow recommendations made by Pruitt and Grudin (2003), as the authors clearly had taken the communication aspect of personas into account and their methods were reported to be successful.

At the start of the persona effort, the development team was informed of the method and of the planned execution of the effort. Except for the author of this thesis, none of the members on the team were familiar with using personas. As mentioned earlier, it was not possible for members of the development team to participate in the user research due to resource issues. However, during the user research phase, the development team was kept up to date on the progress of the research in weekly project meetings.

When the user research was finished and initial personas had been created based on the collected data, the findings of the user research as well as the initial personas were introduced to the development team in a two-hour interactive presentation, followed by discussion of the personas and their use in the project. After this presentation, there was a passive phase in the communication for about a month, as most of the development team was on summer vacation.

During this phase, materials were prepared for the full-scaled introduction of the personas. This material included:

- **Foundation documents** of the personas. A foundation document, as proposed by Grudin and Pruitt (2003), functions as a central storage for the information on a persona and includes detailed background information on the persona. This information is presented in the form of bullet points. Each foundation document was 2-3 pages in length.
- **Narrative descriptions** of the personas. These were about one page in length, describing the persona and a typical workday in his or her life and could serve as an introduction to the personas for team members and other stakeholders. An example narrative description is presented in section 6.1.2.

- **Summary and comparison charts**, where the primary and secondary personas from both user roles were compared on different aspects and differences between the personas were highlighted.
- **A poster** with persona information to be displayed in the facilities of the development team. This poster included pictures and narratives of the two primary personas and a comparison of primary and secondary personas. A scaled-down version of the poster is shown in Figure 5.
- **“Personal” e-mails** from the personas to the developers. As proposed by Grudin and Pruitt (2003), e-mail accounts were created for the personas and informational e-mails were sent in the names of the personas to the developers.
- **Instructions and examples** on how personas could be used in different phases of software development work (early scenarios, requirements specification, user interface design, review sessions and testing).



Figure 5: Persona poster

Pictures to represent the personas were chosen from magazines. This was done to acquire realistic photos of Finnish people, which is difficult when using stock photo libraries. It was also not deemed appropriate to use pictures of the actual participants

of the study. The photos were systematically used when presenting the personas to give them a more human feel.

When the materials were ready, the personas were officially introduced to the development team in a workshop-style kick-off meeting. Due to vacations, two months had passed between the early results of the user research phase and the persona kick-off. At the meeting, uses of personas were discussed and some initial steps to include personas in the software design process of the project were agreed upon. Separate kick-off meetings were held on Novo and Sonera.

Following the kick-off, walk-through sessions of common tasks from the point of view of the persona was carried out with members of the development team. One developer and the author of this thesis participated in each session, which was planned to be a hands-on introduction to the personas and to the line of thought that should be applied when using personas. The task and persona varied between users. In addition to accustoming developers to think in terms of personas, a second goal was to identify and raise awareness of common usability problems in the system.

## **5.6 Evaluation of Persona Effort**

To evaluate the impact of the persona effort on the development team, the attitudes towards user-centered work and perceived current knowledge of user issues were measured early and later in the persona effort. The first measurement was done with a survey in early June before the preliminary results of the user research phase were presented to the development team. In the survey, members of the development team were asked to evaluate the attitudes towards user issues in current work practices and their own knowledge of user characteristics and tasks. The aim of this measurement was to establish a view of the current situation on these issues before the personas were introduced to the team. A survey was used in order to quantify the results and compare them with later measurements. The survey questions can be found in Appendix B.

The second measurement was carried out in late September. This was three months after the initial presentation of the personas and approximately one month after the last active communication efforts on personas were made<sup>9</sup>. The second measurement included the survey questions from the first measurement, as well as questions aimed at assessing the usefulness of the persona effort from the point of view of the developers. In addition to the surveys, two developers were also interviewed for the second measurement. The aim of this measurement was to establish what effect the persona effort had had on the development team on the issues under study and ultimately provide answers to the research questions set for the study. The results of the evaluation are presented in the following chapter.

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<sup>9</sup> Most members of the development team had spent one month or more on vacation during this time.

## 6 RESULTS

This chapter presents an overview of the results of the persona effort and the evaluation of the process and methods. First, the persona gallery that was created is outlined and then the evaluation of the persona introduction and communication phase is presented.

### 6.1 Created Personas

Based on the user research that was carried out and described in chapter 5, a gallery of four personas was created. Some information on these personas is presented here to give the reader a sense of what was delivered for use in the Cid Manager project. Details of the personas are left out as proprietary information.

#### 6.1.1 Persona Gallery

Four personas were created, a primary and a secondary persona for both of the user roles that were under investigation. An overview of these four personas is shown in Table 4.

	<i>Sirkku</i>	<i>Anja</i>	<i>Matti</i>	<i>Leena</i>
Persona type	Master user, primary persona	Master user, secondary persona	End user, primary persona	End user, secondary persona
Job title	Managerial assistant	Customer Adviser	Business Manager	Sales Manager
Use of Cid Manager	Non-frequent, the master user role is one of many miscellaneous work duties	Frequent, managing telephony is Anja's main responsibility	Occasional, few simple tasks	Occasional, more varying reachability needs

	<i>Sirkku</i>	<i>Anja</i>	<i>Matti</i>	<i>Leena</i>
Goal when using Cid Manager	Get changes done to routings without making mistakes	Keep reachability in the company at a high level, Get things done efficiently in Cid Manager	Keep personal reachability high. Change phone routings independent of time and place.	Assure that customers get to speak with someone who can assist them. Preserve free time.

**Table 4: Overview of persona gallery**

For the master users, *Sirkku* was chosen as a primary persona and thus as a primary design target. Not having received training in the use of the system, she requires basic concepts and tasks to be easy to grasp and online help to be available. *Sirkku* works for a small company, where the use of Cid services is not widespread. Therefore, *Sirkku* uses Cid Manager infrequently. This implies that she usually won't remember how she performed a certain task the last time she used the system. In contrast, *Anja* uses Cid Manager frequently, as telephony issues is her main responsibility in the large company she works for. She performs basic tasks routinely and is also familiar with some more advanced features of the system. Cid services are used in many different ways in the company. *Anja* has also developed some personal tricks to use Cid Manager more efficiently. From the point of view of user interface design, the system needs to be intuitive enough for *Sirkku* to use, but still efficient for *Anja*. More advanced features might also be developed with *Anja* in mind.

The tasks that end users will want to achieve are more limited than master users and therefore the two end user personas do not differ in their central characteristics to the same extent as the master users do. However, the main difference between the two is that *Matti's* work is organized in a way that his reachability can be managed by switching between a few simple call routing configurations. *Leena*, on the other hand, will require more advanced reachability services, and she might also be ready to do some extra work to achieve this.

### 6.1.2 Example Persona: Matti

Below is a narrative description of one of the personas, Matti. This was one of the deliverables that were created in order to communicate the personas to the developers and other stakeholders. Similar descriptions were created of the other personas. The range of deliverables that were created is described in section 5.5.

“ Matti Vuorela works as a Business Manager for a company in the real-estate business employing roughly 300 people. Matti’s job consists of managerial tasks and working with selected customers. In practice, Matti handles administrative tasks with the goal of creating a positive work environment for his subordinates as well as taking care of customers to ensure future orders. Matti has worked in this position for some years, so he is familiar with most of the customer representatives he works with.

Matti’s workday normally starts when he steps in his car in the morning. ‘The car is a good place to take care of work-related calls, you’re undisturbed at least for the duration of the trip.’ Most of the day is then spent in front of the computer or at the phone. On an average day, Matti also has a meeting ‘on the field’, in the premises of a customer.

When you’re on the move a lot, it’s nice if you can have your calls follow you. ‘I used to transfer calls from my desk phone. However, when I do the transfer from Cid Manager, I can still see who is calling, which is a great benefit. Sometimes I work from home. At these occasions, it’s good to be able to transfer all calls without going to the office.’

If Matti is out of the office for a longer time, in order to go to a meeting or seminar, Matti uses the reserve chain, which he has configured using the Cid service. This causes his calls to be transferred to his secretary. If she is not able to answer, the call goes to Matti’s voice mail.

In his free time and when on vacation, Matti would rather not be disturbed by business calls, so they are directly transferred to his voice mail. He can then return the calls at a more suitable occasion.“

## **6.2 Persona Adoption**

Following the creation of personas and supporting materials, the personas were introduced in the project. Some new work practices were also agreed upon in order to include the personas in the existing development process. The following sections present the use of personas in the project and the evaluation of the persona effort.

### **6.2.1 Work Practices**

After introducing the personas in the project, there was some discussion on how these should be used to best fit into the existing work practices. Scenarios with personas as actors were seen as a tool that could be successfully integrated in different phases of development work. Simple scenarios were seen to be especially useful in the early phases of specification, to gain a common understanding in the development team of what an improvement or a new feature was supposed to accomplish. Using personas as actors in these scenarios was seen to increase their value significantly. It was agreed that development ideas that are listed for later specification (see section 4.3) should include a scenario with a persona whenever this was applicable, in order to better document the functional objective of the idea.

Following the general objective of a more user-centered focus that was stated in the project, there was also an increased emphasis on more detailed specifications of interaction and user interface design. Here, personas were taken in as a tool to evaluate design proposals. Questions like “Would Matti know what this element does?” and “Would Anja benefit from this feature?” were used to lead the discussion on these issues.

Personas have also been included in the checklist that is used in review sessions, in which functional specifications are reviewed before being implemented. The

checklist has received positive feedback from developers that have taken part in review sessions, although the lack of an internal user in the persona gallery has proved to be a shortcoming. A follow-up on the persona effort presented here is underway to complete the persona gallery with internal user personas.

## **6.2.2 Feedback from Developers**

Developers on average found the work done with personas to be valuable and provided positive feedback on both personas as a method and the personas created in the project. In general, increased knowledge of user characteristics and concerns to the developer team was very welcome, as this clearly had been an issue that needed improvement. However, the interest in personas as a method and in the personas created for the project was not shared by all developers. One developer commented that he had been busy enough with other work and thus his activity in, and familiarity with the persona effort was nonexistent. Another developer stated that although he found the user research very useful, he did not feel comfortable with thinking in terms of personas and would continue to reason about user concerns in a way he was accustomed to. On the other hand, other team members gave very positive feedback on using personas and found it to be an excellent way of making user characteristics concrete in the design work.

In particular, team members concerned with specification and change management deemed introducing scenarios in the specification work very useful. These team members found that scenarios provided much needed focus on user goals instead of technical solutions in the early phases of specification work.

On Sonera, the introduction of personas was not quite as visible as on Novo. The main reason was surely that the research was carried out by a team member working for Novo. Another influencing factor was that Sonera team members previously had more user knowledge. However, the persona method as well as the created personas received positive feedback on this part of the development team too.

### 6.2.3 Evaluation Results

The team members' familiarity with user characteristics was measured by asking them to evaluate their knowledge on six variables using a scale from one to four<sup>10</sup>. These variables covered different aspects of user characteristics for both master users and end users. In comparison with the pre-persona survey, developers clearly evaluated themselves having a better knowledge of user concerns after the persona effort. Instances of the score '1', indicating no knowledge of the issue, dropped from 21 to 8, with two participants accounting for all of these instances.

The status of usability work in the project from the point of view of the developers was also evaluated. This was done both before and after the persona effort by asking developers to rate the availability of user data as well as the ability, support and resources available for making designs that serve users. As could be expected, the availability of user data was rated higher after the persona effort. The other variables were largely uninfluenced by the persona effort. This was somewhat surprising considering the management support the persona effort had received. One explanation might be that this support was already accounted for in the earlier survey.

Team members rated the importance of considering user needs and goals in their own work very high, even more so after the persona effort. When reflected against the developers' opinions on the status of usability work in the project, however, it seemed that they do not feel empowered to do as much for these issues as they would like to. After the persona effort, on the other hand, developers rated their possibilities of influencing the design of the system as better than before, indicating an increase in the level of empowerment for the developers.

To identify which characteristics of the personas developers considered relevant, developers were asked what aspects of the personas they had found useful in their work and how they would describe the primary personas to a new project member.

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<sup>10</sup> The alternative "Knowledge of this is not relevant for my work" was also given. For survey questions and alternatives see Appendix B.

These questions proved to be somewhat difficult to answer, and generated mainly general answers on how personas can help the development. Some specific characteristics were however also identified. Frequency of use, most common tasks and the personas' level of knowledge of the system seemed to be the issues considered most important.

When evaluating the usefulness of different sources of information, the presentations held on the subject were clearly the most valued, as can be seen from Table 5. The other sources were all valued roughly equally useful, with the exception of the "personal" emails from the personas, which received a clearly lower score. Contrary to what was expected, the walk-through sessions of common tasks using personas received ratings that were only slightly above average compared to other sources of information. This although the sessions were individual, created discussion on usability issues and were perceived as successful by the author. The high ratings for the presentation can be partly attributed to the fact that the author had worked with the project as a developer and thus had a good knowledge of what issues were new and probably of interest to the development team.

<i>Information source</i>	<i>Avg. Novo</i>	<i>Avg. Sonera</i>	<i>Avg. all</i>
Presentations	3,67	3,00	3,44
Written documentation	2,50	2,67	2,56
Posters	2,67	2,00	2,44
Walk-through sessions	2,80	NA *)	2,80
Practical work with personas	2,80	2,50	2,71
"Personal e-mails	1,80	NA *)	1,80
Informal discussions	3,00	2,00	2,60

**Table 5: Evaluation of persona information sources.**

\*) Source was only available to team members on Novo

## 7 CONCLUSIONS

In this chapter, the fulfillment of the objectives of the research stated in chapter 1 is evaluated. Answers to the research questions presented in the same chapter are answered to the extent possible. The relationship between the results from this research and previous research is also examined.

The constructive goals of the thesis was to 1) Investigate two central user groups of the target application and 2) To create tools to aid the development team to use this information effectively. The first goal was certainly achieved. The user research phase proved comprehensive enough to collect much needed information on the two user groups chosen for study. The fulfillment of the second goal is somewhat harder to evaluate – to verify whether the information on users has been effectively used would require an evaluation of future versions of the system. This is, unfortunately, not possible within the scope of this thesis. However, based on the feedback from developers, one can conclude that personas are a tool that can be utilized to effectively use the collected information on users, at least if successfully integrated with existing work practices.

The following conclusions were made with respect to the research questions:

*1. Is the introduction of personas seen as useful from the point of view of the developers?*

The introduction of personas was rated as useful or somewhat useful by all members of the team. Nearly all team members also agreed that the personas added some value to simply presenting the results of the user research. On the other hand, there was some variation in the attitudes towards the method, and it seems that personas work better for some people than others. In the time period under study, the perceived usefulness had not yet translated into actual use of personas for all team members.

*2. Does the work done with personas increase the awareness of user concerns in the development team?*

In the case under study, the awareness of user concerns did indeed increase somewhat according to the evaluation. Already before the persona effort, developers rated the importance of user concerns in their own work as being high. The work done with personas also triggered discussions of general principles of usability in the project, which was seen as beneficial by several members of the development team.

*3. What information concerning the personas was memorable to the developers, and which characteristics were seen as important?*

The research was not able to give as clear answers to this question as had been hoped. It proved somewhat difficult for the developers to point out single characteristics. Characteristics that were identified were frequency of use, common tasks and users' knowledge of the system and problem domain. These characteristics are certainly important for the system under investigation, and user research had corrected some misconceptions on these issues. In future persona efforts, these characteristics should be carefully considered. On the other hand, it should come as no surprise to someone familiar with user-centered design that these issues were found important.

*4. Which means of communication were perceived as effective when introducing personas?*

In this research, presentations given by the author including some simple workshop-style tasks were rated most effective. The fact that the author was familiar with the project probably helped making the presentations effective. Most other means of communications used were also found reasonably effective. An important factor also seemed to be the relatively long duration of the persona effort, which enabled a stepwise introduction of the method.

In summary, the results of this research are for the most part in line with previous research. The persona method was well received in the team, although there seems to be individual differences in how well it fits different types of developers. The critical success factors identified in section 3.6 (evident links to research, successful communication and management support) were in place in the effort and clearly contributed to it's success. Naturally, personas alone will not save the day – it is also

essential that they are appropriately combined with other methods, such as scenarios, and integrated in work practices. This is especially true when introducing them later in a project, as was done in this case. In general, however, personas were found to be a good way to introduce aspects of user-centered thinking in the design process.

## 8 DISCUSSION

As noted in previous chapters, the persona effort could be characterized as a success. Personas have been included in development processes to some extent, and the focus on user needs in the project has increased. There are a number of factors that might have affected this outcome, all of which are not easily identifiable or replicable in future projects. In this chapter, I aim to discuss these factors and some interesting observations made during the course of this research. As previously stated, a complete evaluation of the success of the persona effort should also include an evaluation of how the introduction of personas affected the usability of the system being developed. Unfortunately, this was not possible within the scope of this thesis.

For the background research phase, it was found that interview subjects were easier to recruit than was expected. This might be due to the fact that the interviews were carried out in the premises of the interviewees. Not only is this a better setting for the interviews from a sociological perspective, it is of course also convenient for the interviewees. Watching interviewees work with the system proved very insightful. As has been stated by Beyer and Holzblatt (1998) and many others, watching people as they work is an indispensable source of information. What people say and what they do are indeed different.

Some of the interviewees were asked to keep diaries of their phone usage<sup>11</sup>. Although care was taken to make the diary as easy to fill in and return as possible (even a stamped return envelope was handed to the participants) and diaries were only given to persons who expressed their interest of actually returning them, only two of the four diaries given out were returned. Perhaps the interviewees should have been reminded of the diary to a greater extent than was done now. As carried out now, the results of the diary exercise were not worth the effort that was put in it.

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<sup>11</sup> This part of the research was described in section 5.3.2

An issue that should be taken into account when assessing the results presented in this thesis is that the author both created the personas and evaluated their successfulness. This can be seen as a source of bias towards a positive evaluation. A circumstance that might differ from a common setting when using personas is that the creator of the personas actually was a member of the development team, both before and after the creation of the personas, not an external usability specialist. This probably had a positive effect on the reported successfulness of the effort - other team members might not be as inclined to criticize the method as with an independent researcher. On the other hand, having a familiar team member advocate the new method will surely benefit the acceptance of it.

As Sinha (2003) argues, using qualitative research for personas will lead to different researchers creating different personas even based on the same material. The “correctness” of the created set of personas can surely be questioned. In general, the influence of the researcher on the results is an issue in qualitative research. In practice, however, I believe that the personas created during this effort are correct enough to be successfully used. Having followed commonly accepted guidelines for creating the personas should justify this claim.

One issue that might be of importance for the persona method is cultural differences. The vast majority of reports on persona efforts that were reviewed before the study were carried out in the United States. In fact, only the study by Blomquist and Arvola (2002) was carried out in Europe. This study was, as discussed in chapter 3, not successful. One might argue that designers and developers in the United States could view the use of personas more favorably than their European counterparts. This research gives some hints in this direction, as the results weren't quite as positive as most reported cases in the United States.

In the scope of the Cid Manager project, the persona effort has had a positive reception. Plans are underway to create personas for at least one more user group. This is indeed necessary in order to have personas available that cover most needs in the project. The initial persona effort described in this thesis was limited to two user groups in order to keep things simple: Introducing the persona method as well as four personas was seen as a big enough challenge for this phase. Now that this part

has been completed, enlarging the persona gallery and improving the methods can follow.

One result of this study is that interest in and acceptance of personas as a method can vary significantly between developers. To further investigate this aspect, it would be interesting to see what individual factors in developers affect the acceptance of the method. Might there be development teams, where personas rather shouldn't be used, and could this be known beforehand?

Another interesting extension of this research would be to follow the project over a longer timeframe. In one or two years, what will the state of usability work be? To what extent will the personas be used and will it be possible to keep the persona gallery up to date with a possibly changing user population? Will the gained interest in usability issues in the development team be permanent or decrease with time? In addition, if we assume that the usability of the system does increase, will this result in increased use of the system? This was, nevertheless, the primary motivation for the work carried out and only increased use could definitely prove the effort worthwhile.

To summarize, if a kick-start to usability work is needed in a software project, the introduction of personas can be recommended based on this research. There are, however, some important issues that should be noted: The person responsible for the persona effort will need some knowledge of usability methods or at least a genuine interest for these issues, as the process of creating personas differs somewhat from what is normally considered software development. There must also be support for the method, not only from management but also from developers and other team members. And finally, a successful persona introduction will require a long-term commitment. Creating personas will take days or weeks, but getting personas to really work in an ongoing project will take considerably longer and require continuous care.

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## **APPENDIX B: SURVEY QUESTIONNAIRE**

**1. Specify how the following statements match your point of view using the following scale:**

- 1 – Completely disagree
- 2 – Somewhat disagree
- 3 – Neither agree nor disagree
- 4 – Somewhat agree
- 5 – Completely agree

- 1.1 My knowledge of users of the system is better now than in the spring of 2003.
- 1.2 Personas are a good means of presenting user characteristics, needs and goals in a software project
- 1.3 I do not find personas to be a relevant method of dealing with users in a software project
- 1.4 The data collected from users has been useful to my work
- 1.5 The personas have added value to the data collected from the users (compared to the situation, where results would have been presented in a more traditional manner)
- 1.6 The created personas have been useful to my work

**2. What knowledge or characteristics in the created personas have been useful to your work?**

- For master users
- For end users

**3. In a few sentences, how would you describe the primary personas to a new project member? (Personas as a method need not be explained).**

- Master users
- End users

**4. There have been a number of activities aimed at presenting the personas, and additional information has been available in different documents. Rate the sources of information according to how useful you have found them using the following scale:**

0. I haven't familiarized myself with or taken part in this.
1. I didn't consider this source of information useful.
2. I found this source of information somewhat useful
3. I found this source of information useful
4. I found this source of information very useful

**The sources of information are the following:**

- Presentations (user research and persona kick-off)
- Written documentation
- Posters
- Walkthrough of common tasks using personas
- Practical work using personas
- "Personal" e-mails
- Informal discussions on the subject
- Other, what?

**10. Specify how the following statements match your point of view using the following scale:**

- 1 – Completely disagree
- 2 – Somewhat disagree
- 3 – Neither agree nor disagree
- 4 – Somewhat agree
- 5 – Completely agree

10.1 There has been enough information available on users and their needs in this project

10.2 It is currently possible to make good design decisions in the project from the point of view of the users

10.3 Members of the project are encouraged to design for user needs.

10.4 Sufficient resources are made available in the project to implement designs that serve user needs.

**11. In your work, how important do you consider taking user concerns in account? (1 – Not important at all, 2 – Not particularly important, 3 – Somewhat important, 4 – Important, 5 – very important)**

**12. In your own opinion, how much are you able to influence the functionality of Cid Manager, as it is experienced by the users? (1 – Not at all, 2 – A little, 3 – Somewhat, 4 – Significantly, 5 – Very significantly)**

**13. How would you evaluate your own knowledge of Cid Manager external users with respect to your work tasks? Evaluate the aspects listed below using the following scale:**

0. I don't care. Knowledge of this is not relevant for my work.
1. Don't know. I have no knowledge of this aspect
2. Partial knowledge. I have a rough knowledge of this aspect, but am not certain whether this knowledge is correct or complete
3. Good knowledge. I know as much as I believe is necessary for my work.
4. Excellent knowledge. I know a lot about this, and could also instruct others on this issue.

- End users
  - Communication and reachability needs
  - Users' common tasks and how these are performed
  - Users' knowledge about Cid Manager's functioning and terminology
- Master users
  - Users' computer skills
  - Users' common tasks and how these are performed
  - Users' knowledge about Cid Manager's functioning and terminology

**14. Other comments on personas or user concerns in software projects.**