Public summary BSc Thesis Industrial Design Engineering

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Introduction

The bachelor assignment aimed to design a telephony integration within an Electronic Health Record (EHR) called MediKIT developed by Nedap, located in Groenlo, The Netherlands. The focus was on exploring the needs of General Practitioner (GP) assistants. EHRs were specially designed to store and collect patient data. Many physician practices worked with outdated software systems that could cause frustration among healthcare workers and longer working hours, highlighting the need for optimization. In both the healthcare sector and other sectors, the integration of computer telephony was used to integrate a telephony system within a software system [1]. It could differ per system what was possible, but in every case, the telecommunication providers ensured that calls were managed more efficiently.

Design method and strategy

At the beginning of the design process, research questions were developed to ensure that the research was structured and focused on a specific goal. The main research question was divided into three central questions which could be categorized into GP assistants as users, the EHR as the product, and the possibilities of integrating a telephony system into the EHR, see Figure 1.

A co-design method was applied to understand the GP assistants and gaining insight into how the GP assistants thought and operated to create a shared vision of the new integration. This human element played a key role in shaping the final design, particularly in terms of user daily tasks and workflows. The insights gained from these activities enabled the creation of an interaction design that was not only functional but also tailored to the specific contexts of the users. The main design strategy for this assignment combined a user-centred design (UCD) approach and a Design Thinking (DT) method. UCD was used for the design of the new integration interface, while DT addressed the thought process behind user needs and ensured that the solution was viable in the real world, supported by tests throughout development. Figure 1 shows how the steps of DT and UCD were combined, where each step fulfilled a specific goal in the design process.
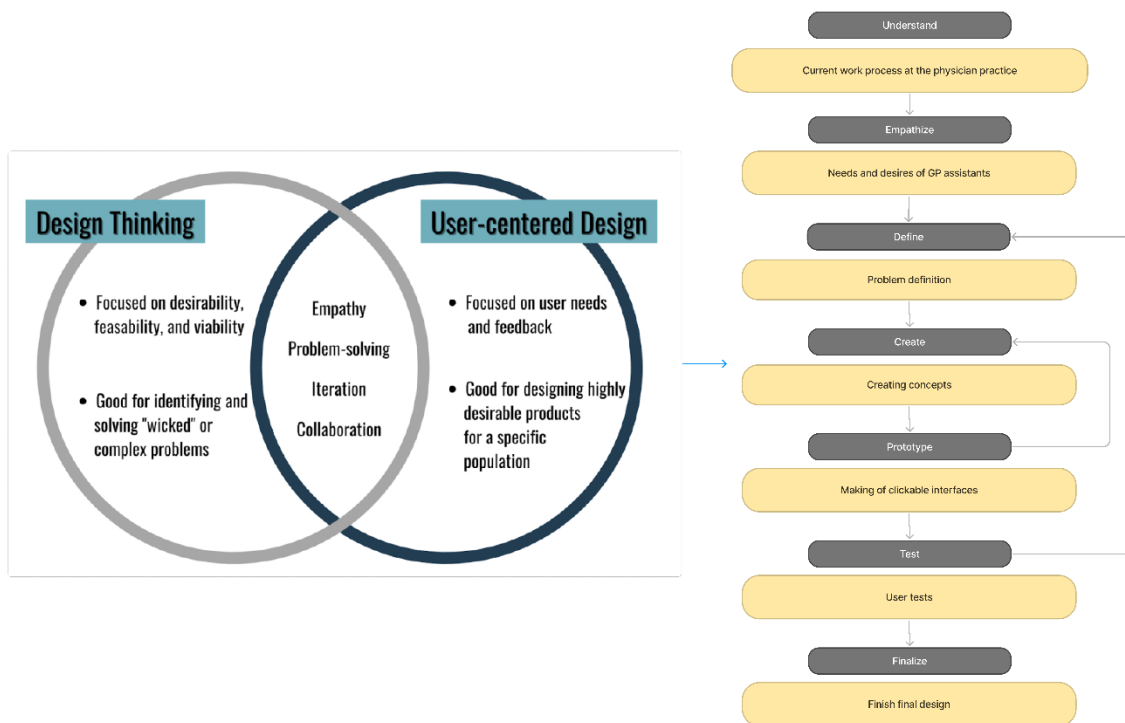
Figure 1 Combined UCD and DT design steps

Concept development

The first steps in the concept phase specified the challenges and limitations of the GP assistants in their daily tasks, by incorporating the GP assistants from the beginning in the design process. From survey research, it became clear that the need to integrate a telephony system in the EHR was desired, and multiple features were listed that had to be shown in the main telephone interface. A physician practice was visited and together with several research methods and analyses, the work processes were described. Points of attention were written down that served as the first steps in working towards several concepts. A user flow diagram of the deep integration of the telephony system was made, showing every necessary step to use a telephony system in the EHR based on the workflow of the GP assistants. At the end of the concept phase, two clickable prototypes were created to be assessed by the GP assistants, which consisted of four different elements to be compared, namely the colour, the interface of the current call, the buttons, and the looks of an incoming emergency line.

Final design

From the tests done at two physician practices, the last points of feedback were incorporated in the final design of the telephone module; see Figure 2. By using a minimised design, no patient's data was lost to the great amount of information displayed on the screen during a phone call. The workflow in the figure is indicated with the black mouse cursor and the black arrow at the bottom of the figure. The final design included a telephone interface which displayed the current call, the waiting queue, multiple buttons for managing the phone call and a separate emergency notification. Also, the separate emergency notification is shown together with the option for transferring calls to a colleague, which was preferred by the GP assistants.
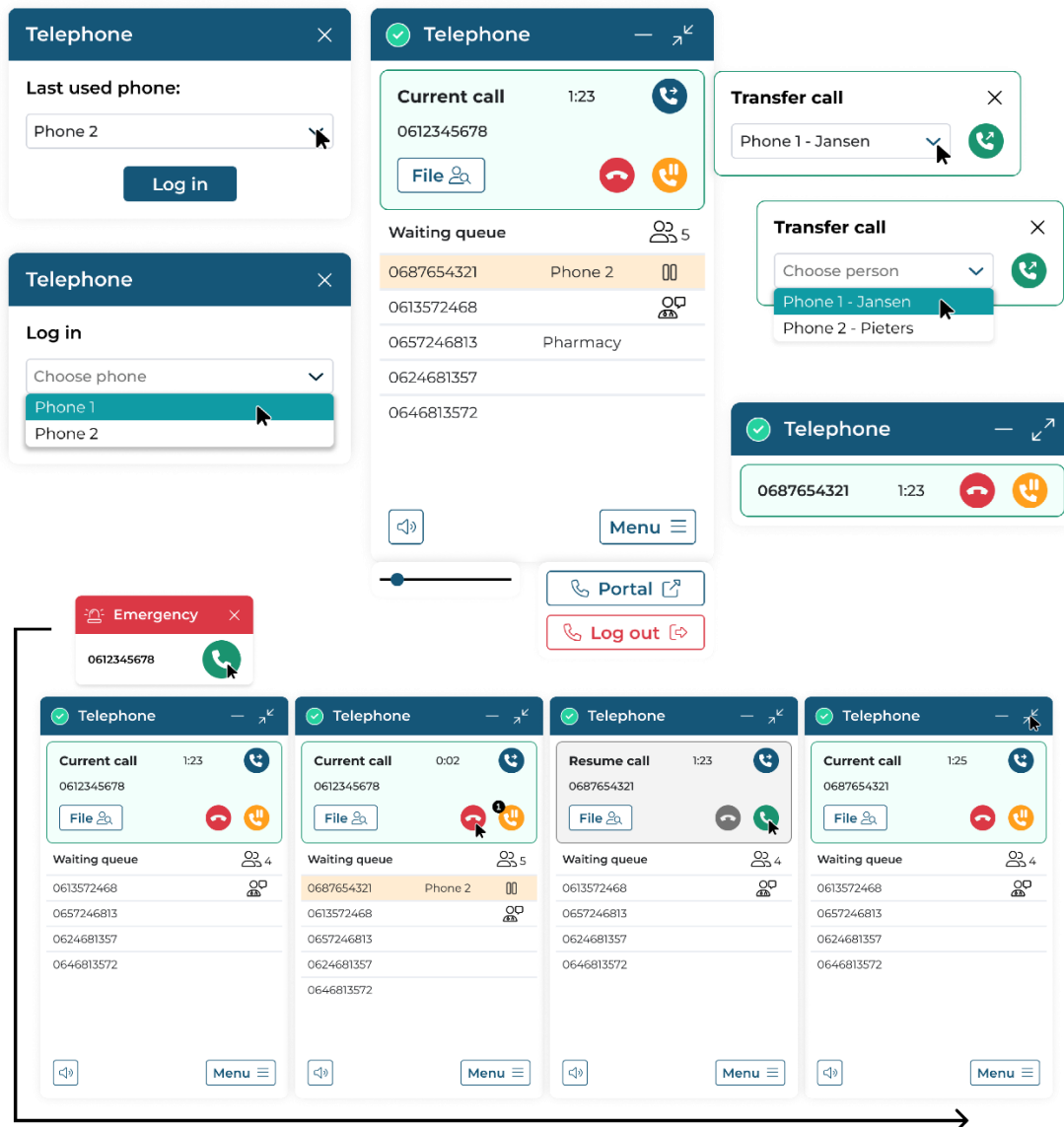
Figure 2 Iterations of the final design

The main question was how an EHR could be designed with a telephony integration system to better support and enhance the work processes of GP assistants. The co-design method together with a user-centred approach and design thinking method served as the basis for creating a complete interface with iterations based on various scenarios described by the GP assistants. This final design had been proven to be successful by both the GP assistants and Nedap, being used for presentations and short-term solutions for MediKIT.

References

1. Kent, D. "Computer telephony integration: What it is, benefits, & how it works." (Aug. 2024), [Online]. Available: https://www.nextiva.com/blog/computer-telephony-integration.html.