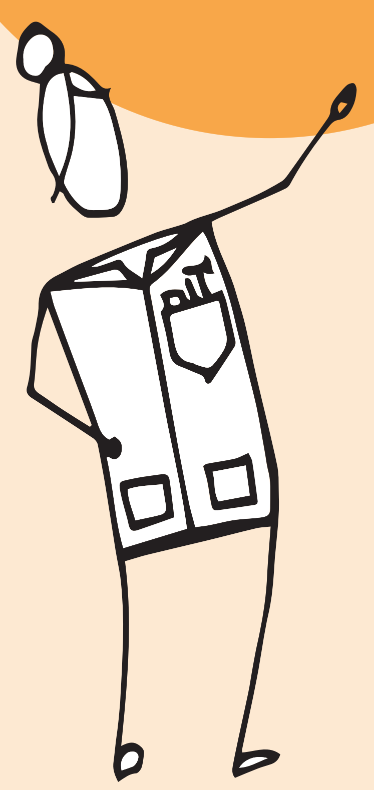
DesigNurse

The active involvement of nurses in improving their own work environment



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Thesis Report

DesigNurse: The active involvement of nurses in improving their own work environment

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Master Thesis

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ABSTRACT

DesigNurse: Active involvement of nurses in improving their own work environment

The high workload of nurses could be decreased by solutions that improve the work environment. Solutions that are currently made are not implemented effectively on the units. This report will describe a design project leading to a way in which nurses can be involved in improving their own work environment which will lead to a decreased workload an more job satisfaction.

The first part of the report shows that there is a gap between the problems that nurses come across, and the solutions that are made at the technical departments. This shows that improvement opportunities nurses face do not reach the departments that could solve these opportunities.

To involve nurses, in order to decrease their workload and increase their job satisfaction, it is not only important for them to be involved in projects that are started at the technical departments. Participatory design theory shows that by giving users a voice in what could be improved in their work, not only will the solutions fit the context better, having a say in what happens will by itself add to the job satisfaction. Therefore the focus was reframed to: How can nurses be actively involved in improving the right opportunities, related to the products and services, that arise in their work environment.

The following chapter elaborates on different personas of nurses, what they currently do with improvement opportunities and what limits them in doing so.

Nurses currently improve the processes on their own units. This can be done by the nurses themselves. If an opportunity can not be improved on by nurses themselves, this opportunity will not be documented or improved upon.

What limits nurses in taking on these improvement opportunities?

1. Nurses have no way to take a fresh look at their work processes.
2. It is not clear who nurses can involve to improve their opportunities.
3. Nurses feel that: “Nothing ever happens with my ideas”.
4. There is a lack of feedback on input that the nurses do give.
5. Due to the high workload nurses are reluctant for responsibility of an improvement.

An enthusiastic Head of Department with connections or an improvement opportunity with high urgency could push nurses to take on an improvement opportunity. Then a nurse still has to find a way how.

Based on the insights of this research a design goal was formulated to create a design that can take away the limitations that are experienced by nurses.

Design a participatory design process to improve the work environment of nurses, in which all relevant stakeholders are included and actively involved.

The ideation phase describes how the active role of nurses was chosen. Where nurses are not only there to share ideas but that they have to skills to be beneficial in coming up with solutions.
For a nurse to be actively involved, they need time and the ability to take responsibility. Though activating nurses without other relevant stakeholders also having time and responsibility, the workload and job satisfaction will not improve. Therefore the design of “De Ontwerkgroep” was made.

“De Ontwerkgroep” is a multidisciplinary team that has the goal of improving the work environment of nurses. This team exists of three roles, the DesigNurse, the Design Engineer and the Design Facilitator. These three roles work together in an improvement process where the DesigNurses gather improvement opportunities from the units. The team shares the improvement opportunities and prioritizes them. The entire team even the DesigNurses are involved in generating solutions. After which the Design Engineers make or buy a prototype to test.

This design shows the roll of all the stakeholders that need to be involved for a nurse to be able to be actively part of improving their own work environment. It takes away the beforementioned limitations and creates a clear process in which improvements can be made. It allows nurses to use the critical mindset some of them already have.

This design is a communication tool, to show a board of a hospital what is needed in order for nurses to be actively involved in improving their work environment. Which is in line with the vision of continuous improvement and innovation. When a hospital decides to implement this design some steps are suggested in the future recommendations.

CONTENT

10 Introduction
12 Project COUNT
13 Project brief
13 Project question
14 Project approach
16 Context exploration
18 Exploration Methods
19 Hospitals
20 Defining the question
20 Work environment
21 Design and innovation
23 The involvement of nurses
26 Participatory design in health sciences
28 Improvement processes in hospitals
30 Challenging the question
31 Reframing the question
32 Research
34 Nurses
40 Current situation (bottlenecks)
44 Range of improvement opportunities
48 Stakeholders
50 Design brief
52 Ideation
54 Methods
55 Defining the process
57 Defining the active involvement of nurses
66 Final concept
68 Team
69 Roles
73 Decision moments
75 Beyond the improvement board
76 Nurse interaction
77 Communication of the design
78 Value
80 Evaluation & Recommendations
84 Conclusion
86 Reflection
88 References

INTORDUCTION

Introduction

This project has been commissioned by the project COUNT of the research group Co-Design of the University of Applied Sciences Utrecht. This introduction will elaborate on the Project COUNT and the context of their project. It will explain the connection between Project COUNT and the project that is documented in this report. The project brief will introduce the question that started this project, as well as the approach that was used for this project.

COUNT

"Communication and Operation on the Unit between Nurses and Technology"

This project was commissioned by the research project COUNT of the University of Applied Sciences Utrecht.

COUNT is a collaboration between different research groups of the University of Applied Sciences Utrecht. The research groups of design: Co Design, Digital Smart Services and Process innovation and Information systems, together with the research group of Technology for Healthcare innovation.

The researchers from these different research groups work together with students and two hospitals and are supported by four companies with expertise in design for healthcare.

The project started one year ago and originated from the research of Daniëlle Vossenbeld, on the nurse's perspective within innovation at the UMC Utrecht. The topic of her research turned out to be very broad for only one PhD study, so the UMC Utrecht went to the University of Applied Sciences Utrecht and together they initiated the following question.

How can non-direct care related technology be designed in such a way that nurses can get more satisfaction from their work (so they can spend more time on direct care related tasks)?

Context of the question

High workload nurses:
In the nursing ward of hospitals there is a high workload for nurses. There are not enough schooled nurses to fill all the hours and the demand for nurses is increasing (Capaciteitsorgaan, 2016). The main responsibility of nurses is taking care of the patients in the hospital. Over time the administrative tasks started to take up more and more time. This resulted in nurses spending only one third of their workdays actually in contact with their patients (Levenstam & Bergebom Engberg, 1997). Because of the heavy workload the nurses are getting less job satisfaction. Nurses get the most joy out of being in contact with their patients.

The high workload makes it a less attractive job for new potential nurses and causes a decrease in the quality of the care.

Designs that do not fit:
By using new technologies the workload of nurses can be decreased, giving them more time to spent on their patients.

There have been a lot of "workload decreasing innovations" for the health care sector, but only 30% of them have been implemented. Other solutions were found not to be in line with the current way of working and the systems that nurses already have to use. Making it more time consuming, so not worth using (Kuo , Liu , & Ma, 2013).

Preceding projects:

In the first year of the project students of different disciplines worked on projects for COUNT. Nursing students together with Co-Design students created journeys of different nurses on different wards and tried to identify improvement opportunities. Other Nursing students researched the competences that nurses might need for participating in innovation projects. Two business students researched what happens when a nurse has an idea and the journey that idea will take.

Project question
The project that is described in this report started with a question that arose during the COUNT project. This paragraph will elaborate on this question and explain the approach that was used to answer this question with a design.

To tackle the high workload, it could help if the improvements that are developed are in line with the way nurses work and are implemented effectively. This is why COUNT came up with the following question:

How and when can nurses be actively involved in the design and innovation of their own work environment?

By involving nurses in the design and innovation process, the fit of the design could be better, as well as the acceptance of a new product.

The goal of the project has been summarised into this goal pyramid seen below. Where, implementing improvements effectively, can effect in lower work pressure. Lower work pressure can in turn lead to higher job satisfaction of nurses.

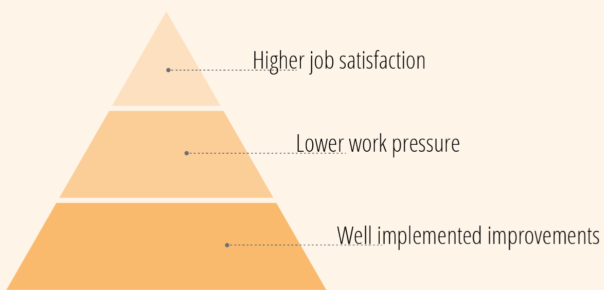


Figure 1: Project goals described in the form of a pyramid to show causuality

In this paragraph, we will break down the main question into sub questions, that arise from sections of the main question. The sub questions will be the start for the exploration phase. During the project this question will be detailed based on the exploration.

Work environment
What is the work environment of nurses?
Who is part of this work environment?
What in the work environment could be designed or innovated?

Design and innovation
What does design and innovation of the work environment mean? What does a design or innovation process look like? What does the current design/innovation process look like in a hospital?

Nurses being actively involved
What does it mean to be actively involved as a nurse in improving the work environment? How are they involved currently and what makes that not active yet?

To answer these sub questions and create a design to answer the main question, a design and research process was done. The next chapter will explain the process step by step.

Project Approach

Due to the complexity of a large organisation like a hospital and the amount of people involved, a research and design process is applied. By using a design approach, a complex system like a hospital can be analysed, understood and improved.

This paragraph explains the steps of this project.

Explorative Research

To create an understanding of designing and innovating within a large organisation of a hospital, explorative research has been done into various parts of this context.

The explorative research is done, based on the design question and sub questions. This leads to a general understanding of the topic and the people involved.

Reframe

After this first exploration, the problem was reframed and a new, more specific, focus and goal were defined. This led to a second iteration of research.

Focussed Research

After this first exploration, the problem was reframed and a new, more specific, focus and goal were stated. This led to a second iteration of more focussed research based on this new question.

Define

After the research, a better understanding of the context and involved stakeholders was created, which lead to a design goal.

Develop

The development phase can be divided into two parts. The first ideation phase was done to find a definition of the “level of involvement” of a nurse being involved. Whereas the second part was to find out the level of activity of other involved stakeholders.

During the develop phase, brainstorm sessions have been done with design students and design professionals. In addition, a design sprint was done in the hospital, with a design team, which included participation moments with nurses.

Deliver

A final design has been a combination of the different roles that were created during the develop phase. The final design has been evaluated by different Heads of Nursing Units of the st. Antonius as well as the innovation manager of the UMC and project managers of the UMC.

EXPLORATIVE RESEARCH

Introduction

The research phase of this project can be divided into two sections. An explorative research to grasp the context of designing and innovating in hospitals, how nurses are currently involved and what being involved can mean. After which the question for this project was reframed. A second focussed research was done to look more closely at the nurses and their disposition towards being involved, as well as factors that can influence the involvement of nurses.

To gain a feeling for the context and to dissect the main question, an explorative research has been done into the hospital. This chapter will elaborate on the results of the explorative research.
This will include:

- The structure of a hospital.
- Departments that are involved in improving nursing units.
- What design/innovation means and if that is applicable for this project.
- What a design and innovation process looks like.
- The role nurses currently have in improving their work environment.
- The approach of participatory design and how participatory design is used in involving nurses.

The result of this exploration is a reframing of the question and a more specific goal and focus.
The second research will include:

- Nurses and their disposition towards being involved.
- Limiting factors for nurses to be involved.
- Limiting factors from supporting departments for nurses to be involved.

This will result in a design goal.

EXPLORATION METHODS

To start a design project, the first step is understanding the context. Therefore an exploratory research has been done. (Delft Design Guide, Creative problem solving, 2013)

To start the exploratory research, a scope and a focus was made to define the areas of content. (Sanders & Stappers, 2016)

The focus is on the role of nurses in designing and innovating their work environment. The scope surrounding the focus is designing and innovating in a hospital, which has to do with the design/innovation departments and the processes they go through.

For the research phase different research activities have been done.

Interviews with experts on improvement within the hospital.

- Researcher HU/UMC
- Innovation Manager UMC
- Project Manager MatrIX project
- Heads of Department st. Antonius.
- Klinisch fysicus KFI st. Antonius.
- Chief nurse information officer / Head of Department st Antonius.
- Observation and semi structured interviews with nurses and nurses assistants

A case study

- Design sprint COUNT (UMC)

Literature research

- Transcripts of previous interviews with nurses regarding this topic.
- Literature research regarding participation of nurses in hospital improvement.

Interviews with nurses in the st. Antonius Hospital.

- 2 interviewed by me.
- 5 interviewed by a colleague

Persona session with COUNT researcher/designer.

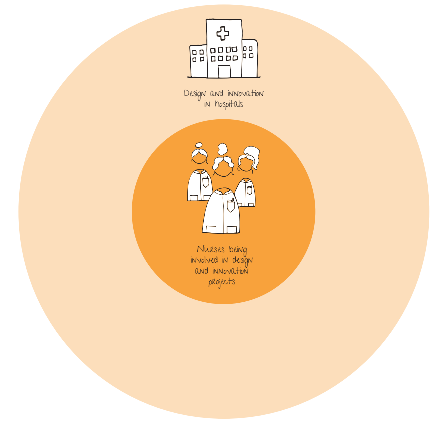


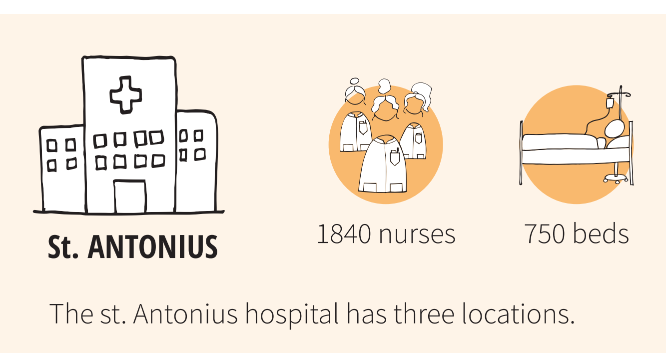
Figure 2: The scope and the focus of the explorative research.

Image 1: Observation day 1 UMC Utrecht

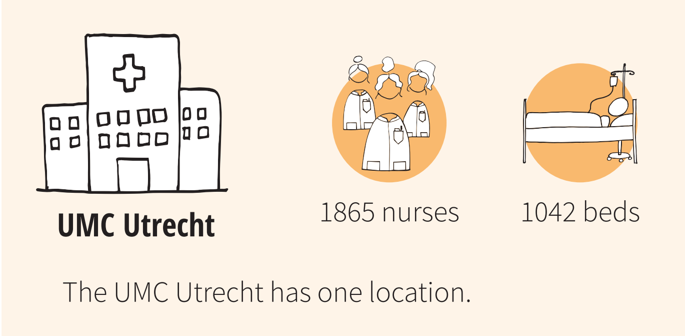
HOSPITALS

Simmilarities and differences

The exploration took place in two hospitals: the st. Antonius hospital in Nieuwegein and the UMC hospital in Utrecht. These hospitals are different from each other in some ways. To understand how a new design can be used in these hospitals we start by looking at those differences.



(Over het st. Antonius Ziekenhuis, 2018)



(Rara hoeveel medewerkers heeft het UMC Utrecht?, 2016)

The differences between these hospitals is that in the UMC Utrecht the divisions are more separate then in the st. Antonius. In the UMC Utrecht they currently have one project that is working on improving across departments. Where in the st. Antonius they have more cross-departmental services. Another difference in this project is that from the st. Antonius hospital three department heads and 8 nursing units are involved in the project COUNT. Where from the UMC Utrecht the managers of the technical departments are involved. This creates different perspectives.

EXPLORATIVE RESEARCH RESULTS

Work environment

Before figuring out the active role of nurses to design and innovate their work environment, it will be necessary to know what the work environment of nurses actually is. Which departments in the hospital are involved with designing and innovating. Finally, what, in their environment, can be better designed or innovated on?

Nursing units

In this project, the focus is on the nursing units within a hospital. Nurses work in a hospital on a nursing unit. Most nurses are connected to one unit, where they work with a set team. Some nurses work on two units and only freelance nurses see more units, depending on where they are needed.

What are the things on the unit that can be designed or innovated on?

COUNT has a focus on non-care related improvements, this means the products and services nurses use in their work. These vary from automatic lights in the bathroom, to carts which can hold all the devices they need for the monitoring of the patients.

" Op de ICT afdeling praten ze over AI terwijl we op de afdeling de overdracht elke dag gewoon uitprinten." – Afdelingshoofd st. Antonius.

This shows that on some departments they are thinking about long term changes and improvements. Whereas on the unit everyone is working on the daily care that needs to be delivered now.

Work environment of nurses definition:

In this project the focus will be on products and services, that nurses use for their work, that are non-directly care related. Such as: Computers on wheels, apparatus carts, infusion pump connection clips etc.

Even though units differ in speciality, a lot of the products and services nurses use, are similar on every unit. Which means that some products are relevant for the entire hospital. That is why the work environment in this project means not only a nurse's own unit, but also the other units in the hospital.

Therefore, for this project, the work environment will be specified as the non – direct care related products and services on a unit or in the entire hospital.

This paragraph will dive into the definition of design and innovation and what process could be linked to that. To know when nurses are, or could be, involved, it is necessary to know what steps are taken in this process.

Design process

In the image below you will see the widely excepted visualization of the design process: the Double Diamond by the British Design Council. (Ball, 2019)

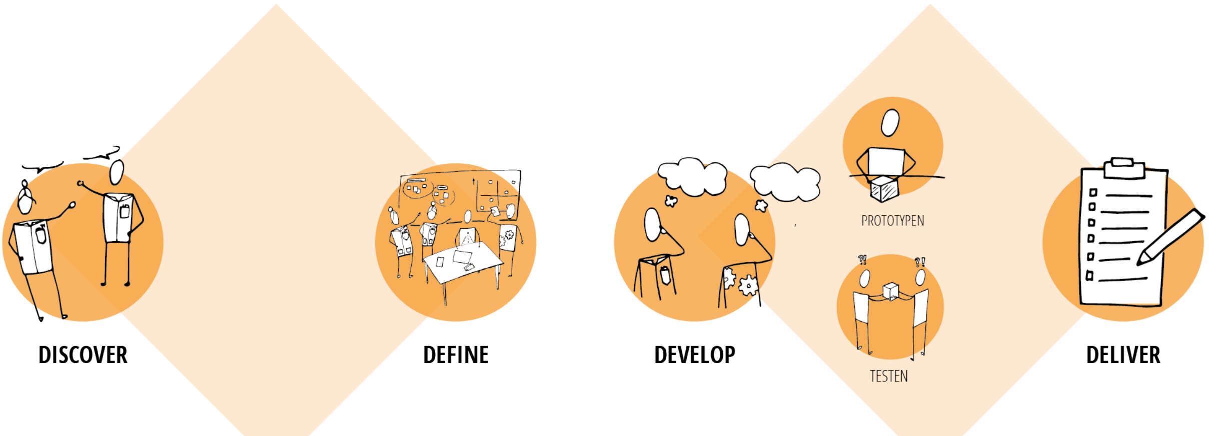


Figure 3: The Double Diamond, a common depiction of the design process.

The double diamond is a simple representation of the iterating process of design. It shows the four steps: Discover, Define, Develop and deliver.

In the Discover phase the process starts with exploring and understanding the challenge and the context of the challenge. Diverging and finding out as much relevant knowledge about the users and the context surrounding the challenge. All the things you have learned in the first phase are then gathered together and analysed to converge towards a clearly defined goal. This goal is the starting point to diverge into all the possible ways this goal can be reached. By prototyping, testing and evaluating the possibilities are filtered to one solution that will reach the goal in the desired way of the users.

This process, or parts of this process can be repeated when necessary as shown in image x. This is done in the first diamond to make sure the right goal is created. In the second diamond the iterations lead to a better fitting design.

In this project the double diamond model is used in two ways:

1. **As a lens.**
The double is used in this project as a lens to pinpoint when in this process nurses are involved with innovation and what steps are taken by stakeholders in the current situation.

2. **As a format**
The double diamond will be used as a format to envision a process in which nurses are involved in an active way.

Defining design and innovation

Innovation is a word that is used in many companies in different ways and has different definitions. S. P. Taylor (2017) compared different definitions and defined elements that are part of the definition of innovation. Innovating is a creative process of making something new, implemented broadly and it adds value. Innovation is regarded as things that are radically new.

In a design process, an innovation can be created when the result is something radically new, but therefore it needs to be widely spread and accepted to add value as defined by Taylor (2017).

Design can also be used to create incremental improvements. Designs that are not radically new but that do reach the goal and in their way add value. This can be seen as improvements.

When taking a look at the non-direct care related products, it shows that opportunities which are subject to the design and innovation process, are not as radical as the definition of innovation would describe. The new products that could be designed, or existing technologies that could be implemented, are more incremental. Such as a new connection clip for infusion pumps. The new connection they are making already exists, just not yet in combination with the infusion pump.

Improving

This leads to the rewording of “design and innovation” to “improving”. The problems on the unit could be solved with new or existing products and therefore do not need to be radically new to be a good improvement.

By focusing on improving the work environment the scope of the project becomes smaller. Where design and innovation are associated with long processes, an improvement can be created in a smaller period of time. The word improvement is therefore less loaded with expectations.

Improvements of the units are more short term and can exist just in the organization. This creates more focus on the nurses themselves and the improvement opportunities that they experience. Where nurses can be an actor in this process in contrast to just being a responder in pilot tests of large digital innovations (changes).

Improvement process

This design process can also be used as an improvement process where the develop phase can also be used to find existing technologies that fit the goal. Though with a purchased product, new ways of working should also be “designed” to make sure nurses can learn a cohesive way of working with that new technology. Therefore, this iterative process is seen in this project as an improvement process.

Er is dan een bed ontwikkeld die je kan kopen, de vraag is dan hoe organiseren we dat dan in het huis zelf? Hoe werkt het dan logistiek? Bij veel product innovaties zitten er proces innovaties bij. - Innovatie Manager UMC,

Designing and innovating has been defined as improving, based on an improvement process. Which includes making new products, but also implementing existing technologies.

To find out what it means “to be actively involved as a nurse”, first the current level of being involved will be assessed . This paragraph will elaborate on when and how nurses are involved in making improvements currently and by whom. The departments that could involve nurses are introduced after which the double diamond model is used to find the moments of involvement.

Supporting departments

There are several support departments within the hospital. Four of those departments are involved, when talking about improving the units of nurses. These will be introduced in this paragraph.

MTKF / KFI

The departments of ‘medische technologie en klinische fysica’ (UMC Utrecht) or ‘klinische fysica en instrumenten’ (st. Antonius) are responsible for the products within the hospital. (in this report the abbreviations of MTKF and KFI are used) The products range from ear thermometers to CAT scanners and everything in between. Both of these departments are able to make and buy new products.

The departments MTKF and KFI are responsible for improving the products in the hospital and are therefore an important stakeholder in this project.

IT

The IT department is responsible for the digital products that are used in the hospital, for example the EPD (electronic patient dossier). The EPD is used by doctors and nurses, and it is a big part of the work that nurses have to do. Therefore, the EPD plays a part in the work processes of nurses and can be subject to improvement.

Facilities

The facilities department is responsible for the building and interior of the hospital. They are in charge of the physical work environment of nurses, which therefore can also be the subject of improvement.

Lean (Antonius) “Samen voor de Patiënt” (UMC)

In the st Antonius hospital, there is a lean department which is responsible for the process of the daily huddle and improvement boards that are used on the unit to gather improvements. They have a focus on process improvements on units. “Samen voor de Patient” is a similar department in the UMC Utrecht that has introduced improvement boards to the units.

Within the hospital, these are the departments that are related to the improvement of the work environment of nurses. Research was done into KFI/MTKF and IT on how they involve nurses.

Improvement departments involving nurses

Working in the second diamond

The most involvement of nurses with current projects can be found in the last phase of the improvement process. There are two main ways of involvement that currently happen:

- After purchasing a new product or designing one, project teams pilot test these products with nurses. (Jaspers, 2019)
- When it is time to create a new contract for new equipment, the team responsible for this tender will ask nurses for input.

Both of these ways of involvement reside in the second diamond of the model. Both have already decided what needs to be made or bought. Nurses are involved afterwards to test how it can fit in their work environment.

It is important that you test the final design with the users, but if that is the first time that they are involved, than that can not be seen as active involvement in the improvement process. (Sanders & Stappers, 2016) By adding involvement of nurses in the first diamond, the improvement is not only easy to use by nurses but it is also a problem nurses experience that is improved on.

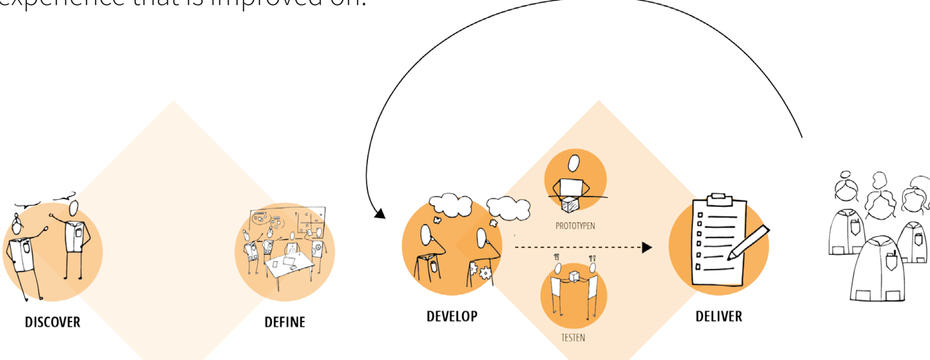


Figure 4: The Double Diamond. When nurses are only involved in the second diamond the first diamond is not being used.

Involved during lunch or their own time

The moments that nurses are asked to be involved, is currently mostly in their break time. When they are asked to be involved in their worktime, they experience this as time they actually have to spent with their patients. This could lead to nurses being tired of participating, if this will become a regular activity during their breaks. (Vossebeld, van der Lugt, & Schuurmans, 2018)

Perceived involvement

When nurses are involved in decision making, and other nurses are not aware that nurses were involved, the end result can still not have the desired acceptance in the entire hospital.
When nurses do not perceive the feeling that someone has been listening to them, it can be more difficult to implement something new.

Conclusion

Nurses are involved mostly in the second diamond of the improvement process. This is done during break time of nurses, or during time, they feel, they need to spent with their patients. The involvement of nurses is not perceived by every nurse, which could work against implementation.

This can be seen as a small involvement of nurses, that is mostly focussed on the second diamond of the improvement process seen in the figure above.

Nurses working on improvements

Nurses are involved in a limited way by other departments. What do they themselves do with improving their work environment? This paragraph will dive into the way nurses work on improving their work environment.

Improvement board

To define what could be improved on the unit, nurses have an Improvement Board in which they gather flaws in their work processes. On the Improvement Board they gather opportunities to improve and give someone responsibility to work on this. This system works well for problems in their processes that they can solve themselves. When a problem becomes more complex, for example the improvement opportunity requires to buy new tubes that do not get air bubbles in them. Then a single nurse is not able to solve this problem by themselves. What happens then is that the opportunity will eventually disappear from the Improvement Board.

Het zijn vooral dingen die op de afdeling gebeuren, bepaalde dingen waar we gewoon tegenaan lopen. Want echt grote dingen worden daar niet opgezet eigenlijk. – verpleegkundige A3 st. Antonius (Rossen, 2019)

"Walk into a wall"

This does not mean that there are no ideas or opportunities that nurses think of to improve. When nurses have an idea, that they think could improve a problem they encounter, and they want to see if it can work, they feel like they walk into a wall.

At the department of MTKF they also notice that nurses do not come to them with improvement opportunities. (Jaspers, 2019)

The department that could improve products for nurses, does not receive opportunities for improvement and are not inclined to seek after them themselves. Which leads to little improvements on the nursing units. It takes an active approach to gather the improvement opportunities from nurses (Jaspers, 2019).

Conclusion

Nurses do think of opportunities about things that can be improved in their work environment, but are limited in taking these ideas to the right people. They are stuck in the first diamond, without being able to take their opportunities further.

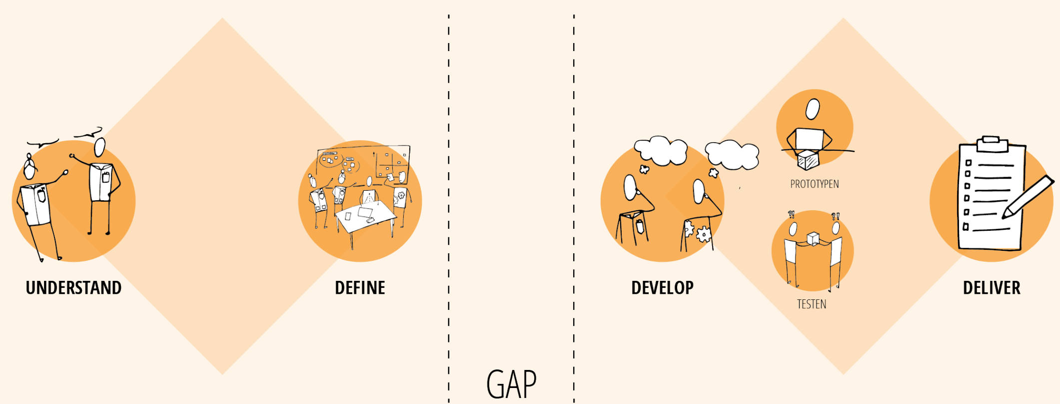


Figure 5: The Double Diamond. Showing the gap between the diamonds that has been identified in the hospital context.

PARTICIPATORY DESIGN

In Health Sciences

After looking at the possibilities of participatory design in health care, Clemsen et al. (2007) showed that, by using a multidisciplinary team and a participatory design process, it holds many advantages for combining technology and healthcare.

They stated, that they experienced, how playful and creative interaction, in a group of participants, released important knowledge in all the participants, enabling them to combine their opinions in a productive process, to solve a significant clinical problem. (Clemensen, Larsen, Kyng, & Kirkevold, 2007)

There are several examples of projects in healthcare that use a participatory design approach. As a designer, this is an approach we are educated in and are familiar with. But what is participatory design? What is the goal of participatory design? Lastly, what are the benefits of using a participatory design process, for improving the work environment of nurses?

This paragraph will elaborate on the participatory design approach and why this is chosen as the approach, for involving nurses in this project.

Participatory design

What is participatory design?

Participatory design is an approach in which designers use the knowledge of their users in the design process. (Spinuzzi, 2004)

This is a method that originated in Scandinavia, where its focus was to improve the workplace in a democratic way. Even though it has since evolved into a wider used approach, in both product and service design, this origin has direct links to what this project aims to do for nurses, namely, improving the work environment of nurses, with the active involvement of nurses. (Bodker, 1996)

What is the goal of participatory design?

The higher goal of participatory design is to improve the quality of life of workers/users. Participatory design creates a way for users, to take control over their own work place. Where the results of the process aim to give the users the ability to do their tasks with ease. (Spinuzzi, 2004)

This can be seen as improving the work environment, by giving users an active role in the improvement process.

What methods are used in participatory design?

There are different moments, in the design process, in which it is possible to involve users. It can range from keeping users up to date on the process, to actively co creating the end result.

Spinuzzi (2004) mentions that there can be at least three stages: initial exploration, discovery and prototyping. In these phases there are several ways to involve users. In the initial exploration, observation and interviews can be done; the workplace could be visited; or artefacts examined. In the discovery phase, storyboards or future workshops could be a way to involve users, in deciding what direction the solution should take. In the prototyping step, different ways of making and testing prototypes are mentioned, such as: role play, paper prototypes and mock-ups. The methods used, can be different, regarding the goal of the project.

Participatory design as a way of sharing your values

Jukema (2018) stresses, that the methods and the mindset during co-creation in personalised healthcare, can have positive effect on the solutions from the process and the atmosphere on the unit. Additionally, the paper states, that the participatory approach is also a way of sharing your values. Of recognizing and acknowledging the expertise that the involved participants, like nurses, bring to the process.

To take away the feeling of not being heard, that nurses have, participatory design can show them, that they are being acknowledged for their expertise.

Conclusion

Participatory design was created, to improve the work of users, with the democratic involvement of those users. This can cause better suited solutions, as well as agency among participants. This can lead to better implemented technologies, based on the right questions. In addition, using a participatory design approach, can show the value that an organisation places on the expertise of the involved nurses.

IMPROVEMENT PROCESSES

In Hospitals

Improving the work environment of nurses, is not a new challenge. There are already ways in which hospitals try to work on this challenge. This paragraph will explain some examples and share the insights of existing improvement processes.

TCAB

'Transforming Care at the Bedside' is an approach, created by the Robert Wood Johnson Foundation. TCAB is an approach, where front line staff is involved in the improvement of the care on the units.

The TCAB approach allows nurses to think of ways, to improve the care on their unit; after which they themselves decide, which ideas to continue with. The involved nurses, on the TCAB units, are then in charge of testing these ideas, before deciding to implement them or not. The TCAB approach allows front line staff to make a lot of the decisions and try new things. (Lavizzo-Mourey & Berwick)

This method is based on harnessing the talent of frontline staff and has been tested by units of several hospitals throughout the US.

Insights

By giving nurses time to work on improvement, they showed, that 71% of the improvements they came up with and tested, were adopted in the long term. Where 39% also were transferred to other units. After a while, nurses ended up being less hesitant towards the initiative. The real changes that result from the initiative, could inspire others.

The units, that were part of the TCAB initiative, resulted in having less nurses turnover than average. (Needleman , et al., 2009)

By involving nurses in this active way, the goals, of working on the right ideas and implementing them well, are reached. It also resulted in less nurse turnover, which is an important goal for a hospital, in a time where nursing staff is limited.

What this approach lacks, regarding the goals set in this project, is combining the talents that nurses have, with the technical knowhow of engineers/designers. Nurses were trained to gain skills, needed for taking part in the TCAB approach (Garrett, 2012). Therefore, the results of this approach, will always be limited by the knowledge of the nurses involved.

Conclusion

Involving nurses in an active way, regarding the improvement of their work, does lead to less turnover and better implemented ideas. Though letting nurses do it by themselves, limits the results of the solutions they can come up with.

Create 4 care

Create4care is a collaboration between the Erasmus MC in Rotterdam and the University of Applied Sciences of Rotterdam. In the Create4Care lab, design, engineering and health care students can work on problems that nurses encountered in their work. The problems that these students work on, are submitted by nurses themselves. This has resulted in numerous new products, that can decrease the workload of nurses.

The goal of the Create4Care lab, is not only making real solutions for these problems that come from the nurses practice, but also to create a mindset, in which nurses do not accept sloppy work processes and look critical at their own work environment. (Helder, et al.)

Insights
As shown by the results of the projects, done for the Create4Care lab: if engineers work on the right problems that nurses really encounter, new solutions can be made to improve their work. Engineers are, in this case, the students.

Conclusion
If nurses and engineers combine their strengths, it can result in successful improvements for the work environment of nurses.

Washing hands vs infection

In a hospital in Pennsylvania the surgeon Gewande explains in his book 'Better' how involving nurses and other staff in fighting infection was the most effective way to get results.

It has been known a long time that if doctors and nurses do not wash their hands each time they come in contact with sick patients, they are the ones spreading bacteria through the hospital.

Many ways to improve washing hands have been thought off, but they are never completely adopted. After a while they tend to be used less.

These ideas were all created for nurses not by or with nurses.

So a new team was inspired by an example of malnourished children.
Families with malnourished children were also sick of other people telling them what to do. So instead a couple looked for people in the community who showed "positive deviance" and did not have mal nourished children. These families were used to spread the word.

This team set out to find out the ideas that the frontline staff has about the topic of preventing infection. They did sessions with groups of frontline staff. After eight of those sessions, the same ideas started to arise in the sessions. They did continue until at least thirty three sessions, because they saw a shift in the norm. Participants of the sessions started to change little things themselves. Nurses who wouldn't mention washing hands to doctors started doing so because other nurses did as well.

By being part of the session front line staff got the chance to innovate for themselves for the first time. (Gewande, 2007)

Conclusion
Designing for nurses is not always the way to go. Allowing nurses to innovate for themselves can create more results than you can hope for. Not only are there ideas that they will implement, there is also an ownership of the use of these ideas.

This example shows clearly the reason why nurses should be involved from an early stage in improving the work environment instead of others improving it for them.

CHALLENGING THE QUESTION

Adding a goal to the project

Now we know, that nurses are involved by other departments, in the second diamond of the improvement process. We also found out that ideas or problems* that nurses encounter, that have to do with improving the work environment, stay on the units and only sometimes make it to the departments that can work on them.

Do these projects solve the improvement opportunities that nurses come up with? Will, just involving nurses more in the second diamond, lead to the end goal of higher job satisfaction and less nurse turnover?

This is why an extra goal was added to the goal pyramid. Not only making sure that improvements are implemented well, but that the right problems are improved.

How can a participatory process reach the goals set in the goal pyramid?
By involving nurses in making decisions about what opportunities are worked on, it creates a direction that nurses feel needs to be improved. By giving nurses a voice in what could be improved it will generate ownership for a new design which will make implementation easier.

In addition to working on the right problems and implementing them well, having agency and a voice in deciding what can be improved, will also add to a higher job satisfaction for nurses. (Pacheco & Webber, 2016) By adding the first diamond to the process and involving nurses in both diamonds , a design can contribute to the job satisfaction of nurses directly and indirectly. As well as use the skills nurses already have and use it for implementing ideas amongst each other. (Gewande, 2007)

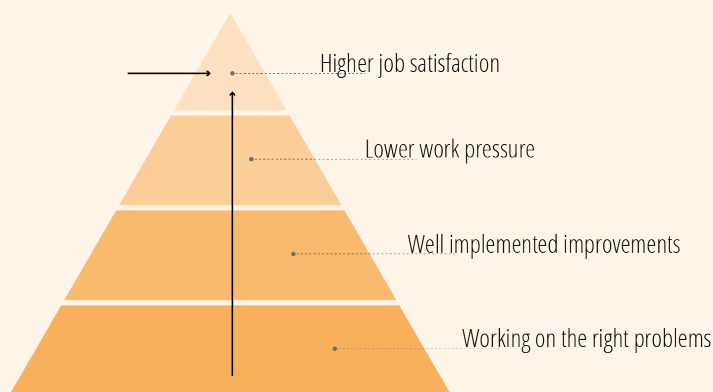


Figure 6: The project goals including the extra goal.

The exploration led to a definition of the question, but it also challenged the question. This leads to a new project goal, which will be explained in the following chapter.

**Ideas and problems related to the improvement of the work environment will from now on be called 'improvement opportunities'.*

REFRAMING THE QUESTION

New Project Question

After exploring the context, the design question has been defined in more detail and a new goal was added. This chapter will introduce the new project question.

The original question:

How and when can nurses be actively involved in designing and innovating their own work environment?

Work environment nurses

For this project, the work environment will be specified as the non – direct care related products and services on a unit or in the entire hospital.

Design and innovation

Designing and innovating has been defined as improving, based on an improvement process. Which includes making new products, but also implementing existing technologies.

Actively involved

Nurses are currently, mostly, involved in the end phase of the improvement process, by participating in pilots. Some projects involve nurses in the develop phase, but the moment of involvement is either in the time they need to spend with patients, or in their own time. When nurses have opportunities that they like to see improved, they have a feeling of walking into a wall.

This shows that the active involvement of nurses in the improvement process is limited.

Participatory design

By involving users in the process of improvement, the result will be solutions that fit to the context as well as agency among users.

Goal

A goal was added to the project, of working on the right improvement opportunities for nurses.

How can nurses be actively involved in improving the right opportunities, related to the products and services, that arise in their work environment.

FOCUSSED RESEARCH

Introduction

Due to the new project question, new sub questions arose.

Nurses

How do nurses feel about being involved in improving their work environment?
Are there differences in nurses, regarding being involved in improving their work environment?

Current situation

What happens in the current situation when nurses find an improvement opportunity?
What supports them in taking action and what limits them?

Improvement related departments

What does the interaction between nurses and the improvement related departments look like?

Further research has been done to answer these new sub questions. This chapter will ealbore on the results of this further research.

NURSES

Their disposition towards being involved in improving their own work environment

Before being able to design for nurses, it is important to understand what they do and how they feel about improving their work environment. This chapter will give insight in the context of a nurse and their disposition towards submitting improvement opportunities.

Nurses

As a nurse you can work a day, evening or night shift. During your shift, you will be responsible for respectively +/- 5, 10 or 16 patients. Your job is to take care of the patients, in the rooms that you are responsible for, and everything related to that. This includes checking up with patients, monitoring them, giving them medicine, to cleaning (or throwing away) the pots the patients urinate and defecate in. Nurses are the ones who apply catheters, stomach pumps and intravenous drips to the patient. Next to that, they are also involved in planning which patients will leave, when and in which rooms the next patients can reside in. All this is supposed to be documented well, so they spend a lot of time writing down measurements and descriptions of the patient's situation.

The patient is the focus of a nurse

As you can see, the work that nurses do is wide ranged, but it all revolves around the patients. Nurses work is all for the patients, that is the reason that they do this job. They are responsible for their wellbeing. This shows in their reactions about improvements and makes them more passionate for problems that affect their patients.

"De patiënt staat op nummer 1, dat is waarom ze problemen die ze tegen komen accepteren" – Afdelingshoofd F2, st. Antonius.

"Het wordt dan beter voor de patiënt, voor mij hoeft het niet per se beter, maar ik vind het belangrijk dat het verbeterd voor de patiënt." – Verpleegkundige C2 st. Antonius. (Rossen, 2019)

Feels like extra work

Time spent on other activities (related to improving the unit for example) is currently time that they feel they need to spend with their patients. This makes doing something else feel like extra work. Which makes involving nurses more of a challenge.

Solution driven

Nurses can encounter different problems and nuisances on a day to day basis. Their time is limited and focused on the patients. This causes nurses to come up with quick fixes, or ways to work around what doesn't work for them.

"Ik denk dat veel van deze "olifantenpaadjes" bestaan, op alle afdelingen!" – CNIO st. Antonius

This way of working around the problems you encounter, is a familiar state for nurses during a busy work day, because they have to do their job, which is taking care of the patients.

Opportunity for being involved

Even though they might work around problems now, they do have a solution focused mindset, which, when given the time, can also create more long term solutions. This is an opportunity for involving nurses in the improvement process.

Teamwork

While working on the unit, nurses work closely together. They help each other out, when one nurse has a busier day than the other. They have a team feeling, they are responsible for their unit together.

When there is an improvement idea, or another non patient related task, a nurse can get an schedule free day. This is a day in which they work, and get paid, but are not responsible for any patients. Then they can work on something on their own.

"We zijn samen verantwoordelijk voor de afdeling" -verpleegkundige st. Antonius (Rossen, 2019)

Why is improving not also done together?

Why is teamwork, that is a big part of their role as caregiver, not also a part of their role as care improvers? This is an opportunity for the final design.

"not another task we have to do"

Nurses have experienced that if extra tasks need to be done on the unit, these tasks end up their responsibility.

Nurses are the first point of contact, so if anything goes wrong, the patients and families will complain with them first. That is not a nice feeling, so instead they take on responsibilities beyond their job descriptions. This leads to an even higher workload.

What they want to do, not have to do

Everything that has nothing to do with taking care of patients, feels like an extra task to nurses. Improving their own work environment should not be on the list of tasks they have to do. But it should be a task for nurses who want to do it.

Example:

When the bathrooms are too dirty the cleaning crew has the right not to clean it. (which is a bit strange in the first place) So instead of leaving the bathroom dirty and getting all the complaints nurses will just clean it.

Project fear

As mentioned before, when an improvement problem/idea arises that is more complex, no action is taken. Sometimes nurses withhold improvement opportunities, because they know it means, that they will be the ones that have to do extra work to try and improve it. This means you have the responsibility of this project, the proverbial monkey on your shoulder.

Vraag: "Wat gebeurd er als je met een idee naar je team leider gaat?"
Antwoord: "Dan worden we aan het werk gezet."
Verpleegkundige C2 F3 A2 – st. Antonius
Design Sprint st. Antonius

More work is actively avoided

When nurses have to take single responsibility of solving a problem, some of them will not take on that responsibility. Even assertive nurses can be busy with other things and not feel they have the time to do it.

Having shared responsibility can create less stress on one single nurse and can make improving feel like less hassle.

Lots of improvement opportunities

Currently nurses do not often go somewhere with their ideas, they do not always know who to go to.

Quote:

When asked, nurses have a lot of opportunities that they like to see improved. Which means that, if there is a way to gather these opportunities, a lot can be improved.

A solution should consider that, asking nurses to go somewhere with their ideas, without any other support, it does not work well.

Example:
Nutricia:

A researcher from the HU was at a unit and talked to some nurses about probe feeding. They had all these remarks about the use and content of the probe feeding. The researcher asked if they mentioned these things to Nutricia, the producer of the probe feeding. Which got answered with: "no, those people from Nutricia are not going to listen to us.

So the researcher went and gathered a group of people from Nutricia and the hospital to talk about the problems with probe feeding. They sent nurses an email and the researcher even went to some units, to tell them that these people were at a certain place to hear about their problems.

Only one nurse showed up to tell them about her problems.

Afterwards one man from Nutricia shadowed and talked to several nurses on a unit, to find out for himself what could be improved. That lead to interesting insights in what could be better.

PERSONAS

Different nurses different needs

As explained in the previous chapter, both hospitals have about 1850 nurses. These nurses are not all equally excited to be actively involved with improving their work environment.

During this research, differences between nurses in their disposition towards improving was observed. The results of several previous researches for the COUNT project also showed differences between nurses. This lead to the decision to create persona's. The earlier research done by COUNT and this research were combined to create these personas.

A short description of the personas will follow. (full personas can be found in appendix 5)

The Improver

The Improver is a nurse who is interested in improving the care on their unit. She is an enthusiastic and energetic person, who knows that better solutions are possible and wants to see this happen in the hospital as well.

The Team Player

The Team Player is a nurse that sees improvement opportunities, but has his focus more on the team aspect. The team player does not talk a lot about improvements, unless he is asked about it. He gets his satisfaction from having a busy day with patients, while also having fun with his colleagues.

The Ethicist

The Ethicist has been a nurse for a longer period of time and has seen the benefits, but also the disadvantages, of new technologies. She will make time with her nurses for taking part in projects, but only if she is absolutely sure that it will be a useful result. She is sceptical, but mostly to protect the nurses on her unit for losing time they can better spent with their patients.

The quick fixer

The quick fixer is a nurse whose main priority is giving care. She knows some things can be better, but she believes that that is for someone else to fix. In the mean time she creates quick fixes, to solve problems that she might run into. Her time is spent preferably as much with the patients as possible.

When designing an active role for nurses, the persona of The Improver is most promising to design for. These kind of nurses have a more intrinsic motivation to be part of an improvement process. Therefore, in this project the focus will be on these nurses, "The Improvers" as seen on the right.

de verbeteraar

Safiya, 32

Senior Verpleegkundige, heeft net een aanbod gekregen om CNIO te worden.

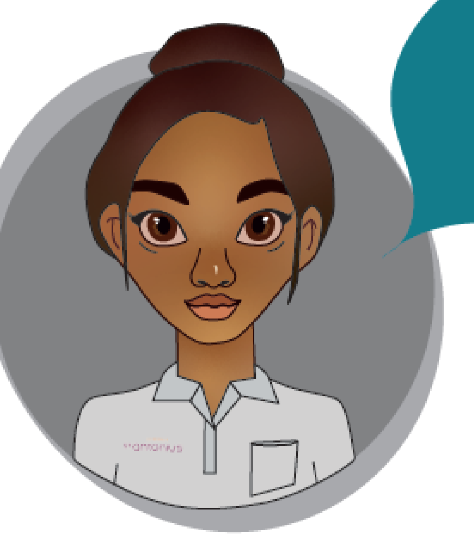
Samenwonend met man Vince (werkt in de ICT) en dochter Zoë van 1,5.

Lezen, bordspelletjes en watersporten.

Haar enthousiasme, veelzijdigheid en doorzettingsvermogen.

Verouderde technologie, traagheid van de ziekhuisorganisatie, niet de juiste personen/bedrijven kunnen vinden voor projecten.

Wil graag de beste zorg leveren, vooroplopen, haar team inspireren en de verpleegkundigen de regie geven.



"Er bestaat al zo veel slimme technologie, waarom hebben we dat nog niet in de zorg?"

OVER SAFIYA

Safiya werkt als hoofdverpleegkundige in het St. Antonius ziekenhuis in Nieuwegein. Ze heeft veel plezier in haar werk en is er ook goed in, dat is goed te merken want in korte tijd heeft ze al meerdere "promoties" gehad en haar collega's zijn altijd blij als ze er is. Al tijdens haar studie was ze een zeer gemotiveerde student, enkele van haar stages deed ze in het buitenland. Mede door deze kennis en ervaring is haar motivatie om als maar te verbeteren ontstaan.

Technologie kan zo veel slimmer en beter worden ingezet! Ze weet wat er allemaal mogelijk is door wat haar man Vince haar vertelt, hij is namelijk ICT-er bij een tech-gigant. Safiya wil graag dat verpleegkundigen betrokken worden bij innoveren, maar ze ziet ook dat dit vaak erg moeilijk is, door alle drukte en de grote tekorten in de zorg. Maar ze is vastbesloten om hier een oplossing voor te vinden, daarom is ze constant op zoek naar initiatieven waar ze bij aan kan haken, de keerzijde is dat ze hier ook veel tijd aan kwijt is en dat haar agenda overvol is.

CURRENT SITUATION

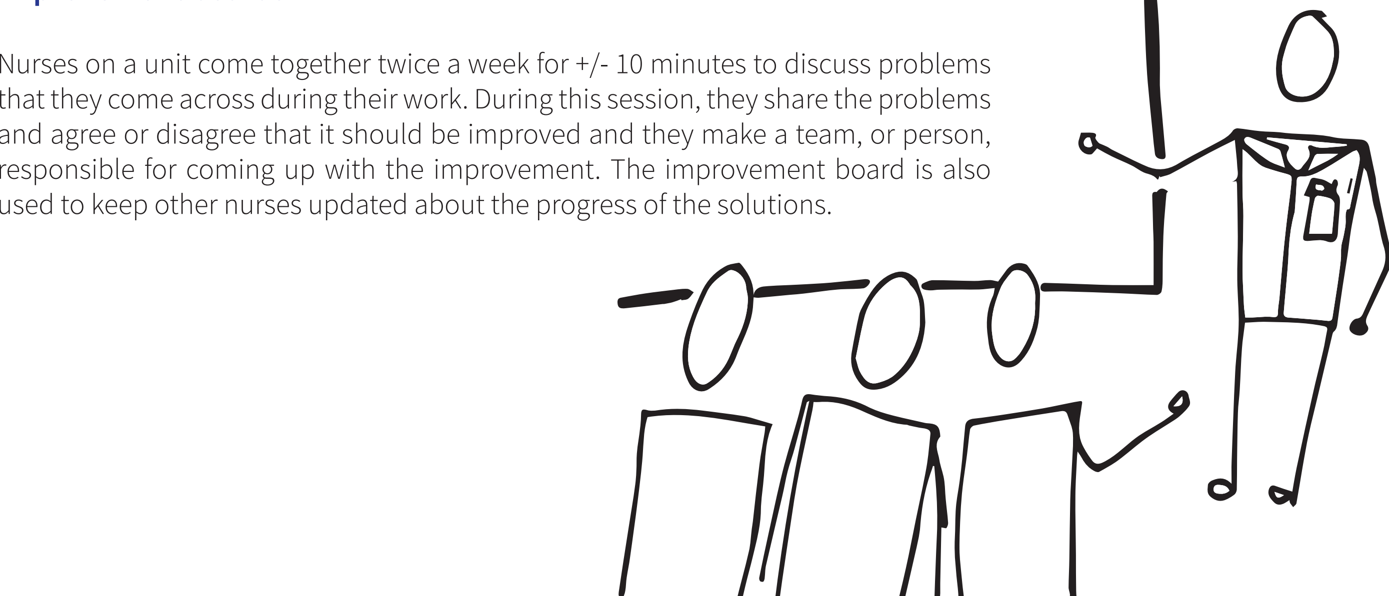
Nurses working on improvement

Research was done, to find out what nurses do, or do not do, with improvement opportunities that arise in their work environment.

This paragraph shows the current situation of improving the work environment from a nurse's point of view. The main insights, that enable or disable nurses to be involved, are discussed. These insights are important criteria that are used in the design process.

Improvement boards

Nurses on a unit come together twice a week for +/- 10 minutes to discuss problems that they come across during their work. During this session, they share the problems and agree or disagree that it should be improved and they make a team, or person, responsible for coming up with the improvement. The improvement board is also used to keep other nurses updated about the progress of the solutions.



This improvement board works well, when talking about process improvements that nurses can solve themselves. When improvement opportunities arise, that go beyond the knowledge of nurses, these opportunities are left for what they are. Eventually they disappear from the board, unless a nurse takes the responsibility.

Each unit has its own improvement board. The boards are physical, which results in units improving similar problems in their own way, without sharing knowledge.

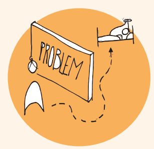
"Soms heb ik het idee dat we allemaal het wiel opnieuw aan het uitvinden zijn, terwijl ik denk dat er iemand anders al eerder een oplossing hiervoor heeft bedacht." Verpleegkundige C2 st. Antonius (Rossen, 2019)

Conclusion
The improvement boards works well for improving the work processes, but is limiting for improvement opportunities regarding the work environment. Every unit works on improving the unit separately, which creates double work in the hospital.

Nurse taking action with an improvement opportunity

Current situations

In the current context there are three situations identified in which nurses can reside regarding to improvement opportunities.



1. A nurse encounters a problem but works around it.

A nurse encounters a problem during her work, finds a way to work around it, because taking care of their patients is most important.
If you ask her/him about it, they will explain the problem in detail, but they don't actively seek to talk about it to someone.

2. A nurse recognizes a problem to be an improvement opportunity.

A nurse recognizes a problem and wants to have it improved, only doesn't know how it can be improved. She/he talks about this problem with colleagues, who also agree that this is a problem. But now what?

3. A nurse has an idea related to an improvement opportunity.

A nurse has encountered a problem, has identified it as an improvement opportunity and has come up with an idea that could solve/improve this problem. She/he talks about it with different colleagues, who agree that it could indeed be a good idea.
The problem is that he/she cannot create this idea themselves, because there is technology involved.

Journey map

These situations show the starting point for nurses to step into the improvement process. But what happens when a nurse wants to take action in one of these situations.
When trying to map a journey of what a nurse does or can do with an improvement opportunity, it

Image 2: Journey: What happens when a nurse has a problem or idea?

This journey shows, that there is no clear path for a nurse to take and that there are many moments in which nurses can drop out of the process. This lead to the question, what limits nurses in taking on these improvement opportunities?

BOTTLENECKS

Disablers - Enablers

Disablers:

As seen in the journey, there are a lot of different paths, which also shows that there is no clear path for a nurse to take action on an improvement opportunity. This paragraph will dive into the reasons that a nurse will not continue to pursue this improvement opportunity.

No way to take a fresh look at work processes

When working on the unit the focus of a nurse is on the patient. Therefore they work around problems that they encounter in their work environment. During their work, taking care of the patients is their primary goal. In combination with a high workload, it does not leave room to re-evaluate the way they work. It is difficult for nurse s to take a step back and let go of the current way of working, to envision their work environment in a different way. During a normal workday they do not have time to think of long-term solutions. If there is time made free to think about an improvement opportunity, the feeling of having to help out colleagues with patient care, will pull them away anyway. Causing them to keep on working in the way they have been working. This makes it difficult for nurses to come up with new ways to improve their work environment

Not clear who nurses can involve

When a nurse has an idea or a problem, it is not clear what they can do. There is not a set person that they can contact, or clear actions they can take. Having to figure out what to do with an improvement opportunity and having to find out to whom and where to go, takes more time and effort. This causes nurses to accept the problem for what it is and fall back to working around the problem.

No appreciation

Over time, nurses have tried to change things, but after seeing little changed, it has made them sceptical. Ideas disappear quickly and nurses see little to none of their ideas being picked up, even if they put a lot of work into it, which is very discouraging

"Daar kun je dus een foutmelding over aandragen, maar heb er al zoveel gedaan en zie geen resultaat dus ik doe het niet meer." Verpleegkundige afdeling F2 st Antonius. (Rossen, 2019)

This feeling, is linked to the fact that nurses are not taken as seriously by other departments. On the unit a nurse is empowered to take on these improvement opportunities and they can get time to do so. But when in contact with other departments these feelings fade.

This feeling can hold nurses back from taking action when an improvement opportunity arises.

Lack of feedback on input

When you have a problem with the EPD, you can fill in a ticket. This will be sent to the IT department and they can take a look at the problem. When these tickets are sent, there is no system of feedback. The ticket gets send, but what happens with it is unknown.

Not knowing if, or when, anything happens with their suggestion, can discourage nurses from sending in their suggestions in the future.

Reluctant for responsibility of an improvement

When you are the one, who starts to talk about an improvement opportunity, and you want to have it improved, you are the one that will end up having the responsibility of solving it. Nurses are not really keen on having these extra responsibilities on top of their work. This causes nurses to not even mention improvement opportunities. Nurses workload is already high and therefore, do not need another project to be responsible for.

Enablers

Enthusiastic Head of Department with connections

What could help take an improvement opportunity a step further, is an enthusiastic Head of Department, who knows the exact person you can go to for help. The Head of Department is a position that is close to nurses and who is around on their unit, so they can more easily talk to them.

Urgency / patient value

When an improvement opportunity becomes more urgent. For example when the problem effects the patients, nurses are more willing to make time for improving this opportunity. When patient safety is at stake, more can be done.
The more urgent the problem the less disabling the other factors will be.

Conclusion

In the current context, nurses improve their work processes by using the improvement board. When an improvement opportunity arises that require more knowledge, that nurses do not have, an improvement opportunity is not taken on as a responsibility. Not knowing who to involve, not having time to think of improvement opportunities, not feeling heard and having no time for more responsibilities disable nurses on taking on improvement opportunities. A supportive team leader or an urgent problem can take away some of the disabling factors but this is not always the case.

IMPROVEMENT OPPORTUNITIES

The range of improvement opportunities

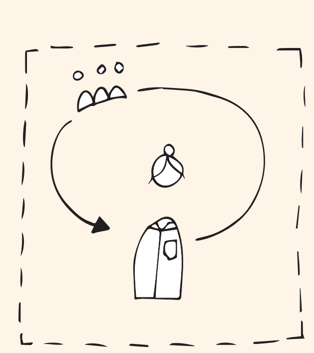
To define the key stakeholders of the process it is important to understand the type of improvement opportunities that arise, and the differences between them. A selection of specific types of improvement opportunities will define who can and should be involved an creates boundaries to the solution space.

Improving spaces

When looking at the possible improvement opportunities and the examples that arose during this project, several differences can be found.

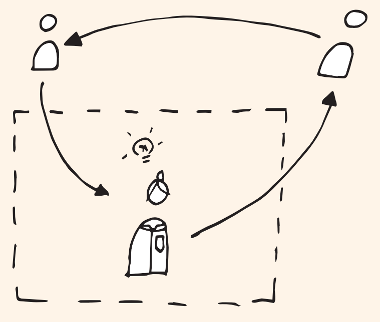
The size of the improvements differ, which has an effect on the time it takes to create the improvement as well as the stakeholders involved.

In the image below you see three types of improvements.



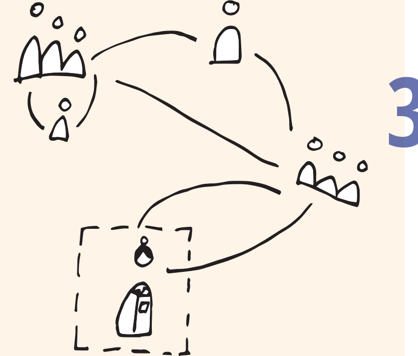
1

Improvements nurses can do themselves, it falls within their context.
These are improvements in their own processes which they currently improve using the Improvement Board.



2

Improvements for which nurses need one or two other expertise's to make it happen.
These improvements are more product related, like a infusion pump clip or a cart which can carry all the measuring equipment they need. These are new or existing products that can be designed or bought.



3

Improvements that are large and need a number op people to make it happen.
For example the MAtriX project in the UMC. Which is a large project that wants to improve the products of nursing units in the entire hospital. This project is a long term improvement.

These improvement opportunities also differ in time. The first situation is short term, in days or weeks. Where the second situation could take months. In the third situation are improvements on a larger scale that easily take years to implement.

Conclusion

The decision was made to focus on the improvement space of implementing existing products and designing products like in situation 2.

These improvement spaces are not too complex and therefore the number of involved stakeholders is limited. Focusing on these improvement spaces is a logical step up from only improving improvement processes. These are topics which nurses have an opinion on, and can add value to the improvement processes of the opportunities.

In this situation it does not take years to experience the result of the efforts that nurses put in. Which could cause the goals of implemented improvements and lower workload to be partly reached in a shorter amount of time.

SUPPORTING DEPARTMENTS
Stakeholder map

Now that we know what nurses do, how they feel about improving their work environment and what enables and disables them to do something with an improvement opportunity, we will take a look at the other parties that are involved. Within the hospital there are different departments and people that could be a part of an improvement process. This chapter shares insights about their part in improving the work environment of nurses.

A stakeholder map was made, to show the people involved in the work environment of nurses and how frequent they interact with nurses. This is an illustration that the gap mentioned in the previous chapter between the first and the second diamond is a gap that is also felt by nurses. They placed the technical departments far away from themselves.

First circle
In the first circle, you see *nurses and their colleagues* from their unit. They interact a lot on a daily basis. *The patient* is in the inner circle, being the focus of nurses. *Nursing students* are in the first circle, because they are part of the workforce on the unit and all nurses interact with them.
A Super User is in the first circle, because this role is held by a nurse. Each unit has a super user(s) for specific products/services like the EPD. These nurses have a bit more knowledge about that specific topic and can help their colleagues, when they do not understand something.

Second circle
Team Leader is the person in charge of the nurses, during their shifts. *The Head of Department* is in charge of the entire department. Both are around on the unit and are in contact with the nurses regularly.
The Stockroom is in the second circle, because nurses interact with the stockroom themselves for things they need. In contrast to the other departments in the third circle, because they do not directly interact with those often.

Third circle
In the third circle are the three technical departments, as explained in the previous chapter, *KFI/MTKF, IT and Facilities*. These departments are little in contact with nurses and therefore in the third circle.
The last role in the third circle, is the function of *Chief Nursing Information Officer.*
The CNIO leads the region in the strategy, development and implementation of Information Technology to support nursing, nursing practice and clinical applications, collaborating with area CNOs on the clinical and administrative decision-making process. (Himss, n.d.)
Nurses in the st. Antonius hospital do know the person who has this function, but not the function itself

Fourth circle
Even though I experienced a rare moment where a *board* member actually came on the unit, the board has the biggest distance from nurses and nursing practice.

Figure 7: Stakeholder map

Now we know the departments, and the distance they have to the nurses. What causes nurses to not go to these departments and what could be opportunities or limitations that these departments pose.

No clear application or feedback structure when an idea is proposed

A clinical physicist from the KFI department from the st. Antonius hospital, mentioned that nurses do come by, once in a while, with a question to improve or fix something. There is no clear way of submitting an idea, except for walking in and addressing someone. Afterwards, there is also not a structured way, in which they can get back to the nurses about their improvement opportunity. This causes nurses to feel frustrated by problems, that they think are not getting handled, while in fact a different person than whom they talked to, could be working on a project related to their problem. Feeding the feeling of not being heard.

The innovation manager of MTKF, a similar department in the UMC Utrecht hospital, mentioned that they noticed that nurses do not come to them.

This shows that it does not happen often, that nurses take their improvement opportunities to the supporting departments. Because there is not clear way how to do so, and no way of knowing what happens afterwards

Improvement opportunities are not documented

As mentioned before, nurses map some of their improvement opportunities on improvement boards on the unit. The improvements on these boards are only on there, until they are solved, or, if no one takes it on, they will end up disappearing from the board. The improvement opportunities and solutions units think of, are not captured or stored. This causes different units to try and solve similar opportunities. The improvement opportunities end up, sort of, floating around the hospital by hearsay.

Heads of Department have their own way of getting things done

Heads of Nursing Departments are more familiar with the other departments within the hospital. They have their own people they will go to, if they want something to be done. They have their own ways to take an improvement opportunity a step further. These paths, that the heads of department take, are not familiar to nurses and not clear within the hospital.

Ik probeer verpleegkundige zo te sturen dat ze met ideeën naar mij toe komen, zo kan ik het overzicht bewaren en ze naar de juiste persoon doorsturen. – Teamhoofd C2/A2 st. Antonius (Rossen, 2019)

This also indicates the lack of clear structure for improvement opportunities within the hospital. Though if you can find the right person who will take on the responsibility it could lead to improvements

Capacity of supporting departments limiting

When you do manage to get your improvement opportunity at either of the supporting departments, they have a waiting list. Not taking on each improvement opportunity brought to them immediately, is not very strange. Though if the hospital wants to focus on continuous improvement, the capacity of the supporting departments should be taken into account.

CONCLUSION

The research, into how and when nurses are currently involved in improving the opportunities that arise in their work environment, has shown, that nurses encounter different bottlenecks, when taking action with an improvement opportunity that arises.

The research can be concluded in several parts:

Nurses:

Nurses have different dispositions towards being involved with improving their work environment.
All nurses are focussed on delivering the best care for their patients and come up with quick fixes to deal with the problems they encounter in their work day.
Due to understaffing and busy days, nurses are hesitant to submit improvement ideas, for then they will become responsible to do something about it. They work as a team on giving care, but when it comes to improving care, they can get time to do that alone.

No clear process for nurses to improve their work environment.

The improvement board works as tool to improve the work processes of nurses, but is limiting when a problem requires other skills, beyond that of a nurse, to solve it. When an idea regarding these problems arises, nurses do not know to whom they can go.

On the other side, at the departments of IT and KFI/MTKF there is no structure for feedback, when nurses submit improvement opportunities. Leaving nurses unknowing if anything will be done about their improvement opportunity.

More limiting factors than supporting factors.

Nurses are limited by a fear of responsibility, a lack of time to think about improving, specifically by the feeling of not being heard and simply because they do not know to whom they can go.

When taking these limitations away, there could be a way in which nurses can be involved more actively.

Distance between nurses and technical departments.

The distance, between the technical departments and the nurses, is one of the larges distances felt by nurses. They are rarely in contact with each other. This makes the barrier, to go to them, high.

The technical departments have a waiting list for projects to tackle. Their capacity could be a limiting factor for improving the work environment of nurses.

On the basis of this research, a design goal was formulated. This will be explained in the next chapter.

DESIGN BRIEF

Based on the research that followed the reframed question: How can nurses be actively involved in improving the right opportunities that arise in their work environment. A design goal was formulated to structure the design process. This chapter will explain the design goal.

Design goal:

The lack of process for a nurse to follow, when they have an improvement opportunity, is one of the most limiting factors to take action. When there is no clear way of working together, between the technical departments and the nurses, it does not make sense to look just at the role of nurses. Therefore the following design goal has been created.

Design a participatory design process for improving the work environment of nurses, including the role of the stakeholders involved.

Persona:

The design goal will be looked at with a focus on nurses, who are affiliated with the persona of 'The Improver'.

Motivating the design goal

Nurses are limited by not knowing what to do if they find themselves in either of the three situations described in the previous chapter. Creating a process leads to clear actions for nurses which can take away the disabling factors that stand in the way of them working on improving their own work environment.

By focusing on the improver persona you empower nurses with intrinsic motivation to be the example of taking action with improvement opportunities.

The design goal poses a participatory design process. When thinking of users being involved, the first approach that comes to mind is participatory design. Even though participatory design can be done in many ways, the approach can provide building block for a process in which user are involved in an active way.

The design goals poses, "active involvement", for both nurses and engineers. This is done to make sure that if improvement opportunities arise there is a real possibility that they can be improved. Combining the contextual knowledge of nurses as well as the technical knowledge of engineers to fuel the improvement process.

IDEATION

Introduction

This chapter will elaborate on the decisions that led to the final design. To create the role of all stakeholders, the role of the nurses was designed first. After which the other roles were created to support the role of the nurses.

This chapter will show the design of the process steps and the role of the nurses and engineers. The decisions made regarding the design are based on several concepts that were generated in the ideation phase as well as the previously explained research.

IDEATION
Activities

During the ideation phase different activities were undertaken to design different concepts.

- Brainstorming
  - With students
  - With professionals from COUNT
- Design Sprint
- Individual or duo brainstorming

Image 3: Design Sprint st. Antonius Hospital, Pre Presentation .

Image 4: Design Sprint st. Antonius Hospital, Final Presentation.

During the ideation phase the steps of the improvement process have been explored. To design an active role for nurses and engineers a decision needs to be made regarding the steps of the process that the nurses and engineers can play a role in. This paragraph will elaborate on the decisions made regarding the steps of the improvement process.

Double Diamond
In the first exploration a general process has been explained: The double diamond. (Ball, 2019) This iterative process is the basis of this improvement process. To be able to design the involvement of nurses and engineers it is necessary to define the four phases of the Double Diamond into more specific steps.

Participatory design
In the theory of participatory design, three phases are highlighted: exploration, discovery and prototyping. Each of these phases could include different activities based on the goal of the project. Though it does show that there needs to be a way to understand the context of nurses, to find out what they run into and to test ideas that are created. (Spinuzzi, 2004)

TCAB
The process of TCAB shows that there needs to be a way for, in their case, front line staff to share problems that they run into. (Dearmon, et al., 2013)This can be similar in the process of improving the work environment.

The four phases of the double diamond were divided into the following steps:

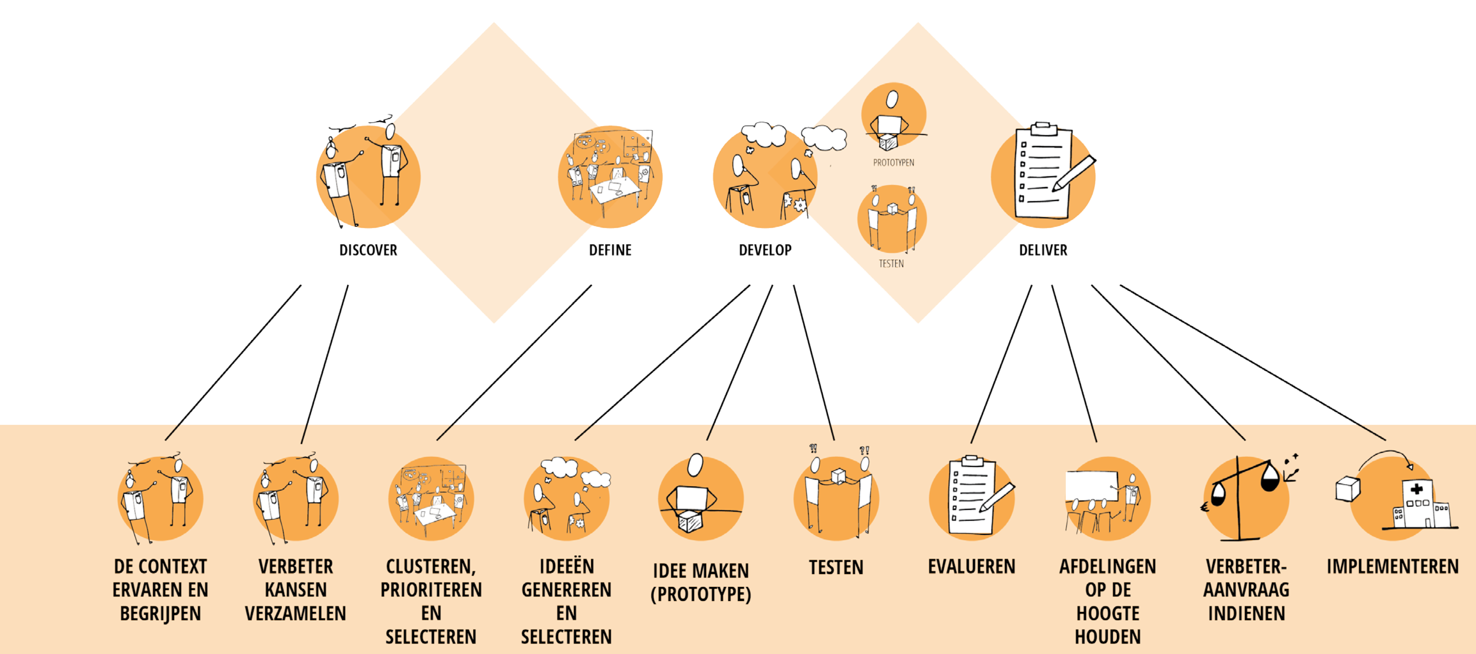


Figure 8: Double Diamond devided in seperate process steps.

Discover

Understand the work environment

It is important to have an understanding of the work that nurses do before it is possible to improve their work.

Gather improvement opportunities

Identifying what can be improved is an important step for nurses to be involved in, so they can share their expert opinions. Improving what nurses feel that needs to be improved shows that you are listening to them, which in return can create more motivation to be involved.

Define

Prioritize improvement opportunities

By prioritising the improvement opportunities, the opportunities that can create the biggest impact will be worked on first.

Develop

Generating ideas

When an opportunity is chosen, this is the phase in which ideas are generated that could grasp these opportunities. This can include existing technologies or new designs.

Selection of a solution

An idea with the most potential can be selected to be tested.

Making a prototype

There are several ways in which a design can be tried out. Making a prototype on paper or from scrap material, even role play can be a way of prototyping. Creating a physical representation of the idea can generate concrete reaction of the nurses the design is tested it with. This makes the time used from nurses wile testing more efficient. (Design Sprint UMC)

Testing

To validate the idea it should be tested by different users in different situations. Testing preliminary designs gives the nurses a way to give feedback on what works and what doesn't work for them. This way nurses are already aware of what improvements are worked on, which can make them feel part of the process, which can in turn build a feeling of ownership of the end result. It also tests an idea before large investments are made.

Deliver

Evaluating

In a participatory design process it is important to keep on reflecting on the process. Is this the idea that will solve this problem for us or does it just create more work? By evaluating along the way, the focus stays sharp on a goal that is relevant.

During the process nurses on the units should be kept up to date.

By updating nurses you create these moments of reflection as well as letting them know what is going on with the input they gave for the process. Which in turn also increases the feeling that someone is listening to them.

Implementation request

After an improvement has been tested and evaluated, a request can be submitted for funding. The results from the evaluation can be the argumentation for why this improvement is worth investing in.

Implementation

When the request is accepted, the improvement can be implemented on the nursing units in the entire hospital.

This process will be used in the ideation phase, as a way in which nurses and engineers can be actively involved.

ACTIVE INVOLVEMENT
Concepts

Now that the steps of an improvement process are created in more detail, the role of the stakeholders within this process, like nurses and engineers, can be designed.

To choose the ideal level of involvement for nurses, different concepts were created and analysed. The concepts show different ways in which nurses can be involved in this process.

This paragraph highlights the different concepts and the level of nurse involvement these concepts represent. Based on the research the concepts were evaluated and an ideal level of involvement has been created for nurses.

Concept 1: Design Sprint

During a Sprint week in the St. Antonius hospital, a concept was designed by the researchers/designers of the COUNT project and myself with input from nurses and the Heads of three nursing departments.

The design sprint was focussed on the question: What can a nurse do when an improvement idea arises that has to do with technology?

The following concept is the result of the design sprint:

When an improvement idea arises a nurse can write it down on the “innovation board” on their unit. Here the idea can be shared and different nurses can give input on the idea.

A new role is added to the hospital of “Improvement Connector”. He/she is responsible for taking these improvement ideas to the right department that can work on a solution.

As a tool they have a template to fill in together with the nurse who proposed the idea, to understand where the idea comes from. Then they save the improvement idea in a database. The database has an option where nurses can vote on the ideas that they think should be developed. Then the Improvement Connector takes these ideas to the departments that can actualise these ideas.

Nurses involvement.

In this concept the responsibility of nurses is to come up with improvement ideas and write them down on the Innovation Board. Afterwards they are partially involved by diving into the idea more together with the Improvement Connector as well as being updated by the improvement idea database on the progress of the actualisation.

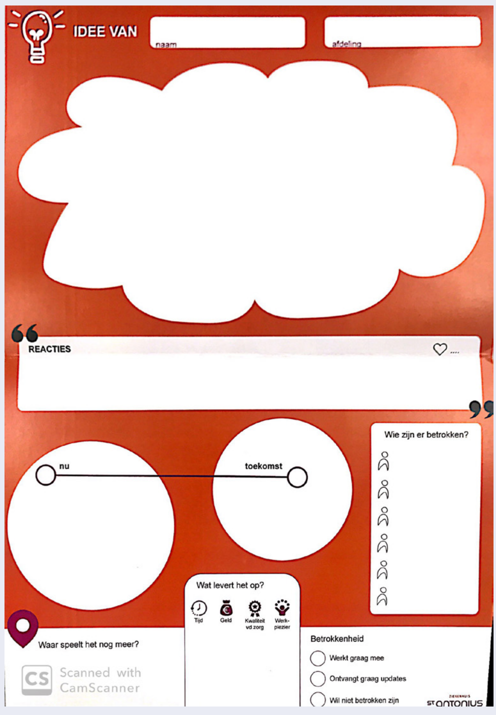

IDEE VAN
naam
afdeling
REACTIES
nu
toekomst
Wie zijn er betrokken?
Wat levert het op?
Tijd
Geld
Kwaliteit vd zorg
Werk-plezier
Waar speelt het nog meer?
Betrokkenheid
Werkt graag mee
Ontvangt graag updates
Wil niet betrokken zijn
Scanned with CamScanner
st antonius

Image 5: Concept 1, Idea description form.

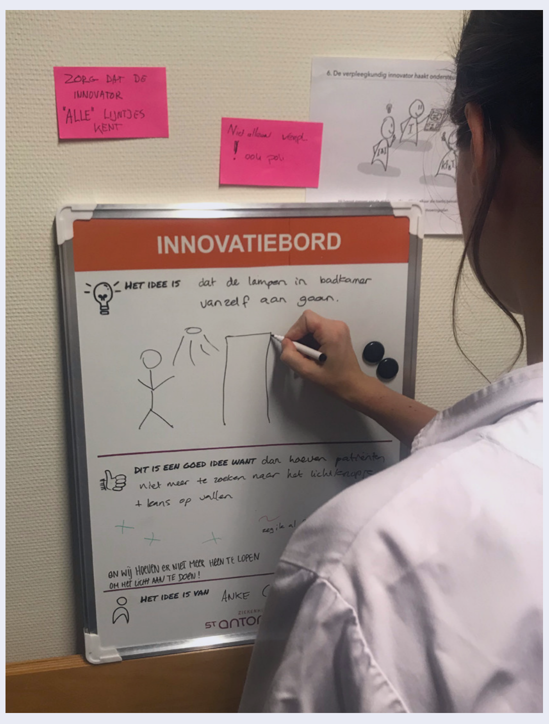


Image 6: Concept 1, Innovation board for nurses.

Concept 2: The Council of Improvements

In the second concept one nurse of each unit is in charge of collecting the improvement opportunities. Once a month they come together to share the improvement opportunities from the different units. In this session they cluster and combine the improvement opportunities and prioritize the opportunities that they think are most important. One or two delegates of the Council of improvement opportunities take the most important opportunities to a meeting with two delegates from the development department and the purchasing department. There they pitch their opportunities to these departments. They can decide to work on these improvement opportunities. These meetings are also used for updating the nurses on the progress of previous opportunities.

Nurses involvement

In this concept, nurses on the unit are responsible for sharing their ideas with one Council nurse. That nurse is responsible together with the Council nurses from other departments to share, prioritize and pitch the improvement opportunities.

Concept 2: The Improvement Nurse

In this concept there will be a team of Improvement Nurses. They will gather the improvement opportunities from their colleagues. They pick one or more that they defined as most important and generate ideas to solve these problems. Then they make a prototype and test this on the units. They have a moment to evaluate if the idea is a go, a no go, or if it needs to be changed. If the nurses have tested and evaluated and the results show that this idea will improve the work environment, they can involve an (innovation) manager who will make a business case to decide whether or not it is possible to invest in this idea.

To be an Improvement Nurse there is a design thinking training that you have to follow to become more familiar with the idea generation, selection and prototyping tools.

Nurses involvement:
In this concept the nurses are responsible for sharing their improvement opportunities with the Improvement Nurse, just as in concept 2. The Improvement Nurses in this concept are involved in the entire improvement process up until the point a decision for investing needs to be made.

The level of involvement of a nurse in each of the concepts have been mapped as seen in the image below. In the first concept the nurses do not have an active role, while in the third concept the nurses are in charge of the whole process.

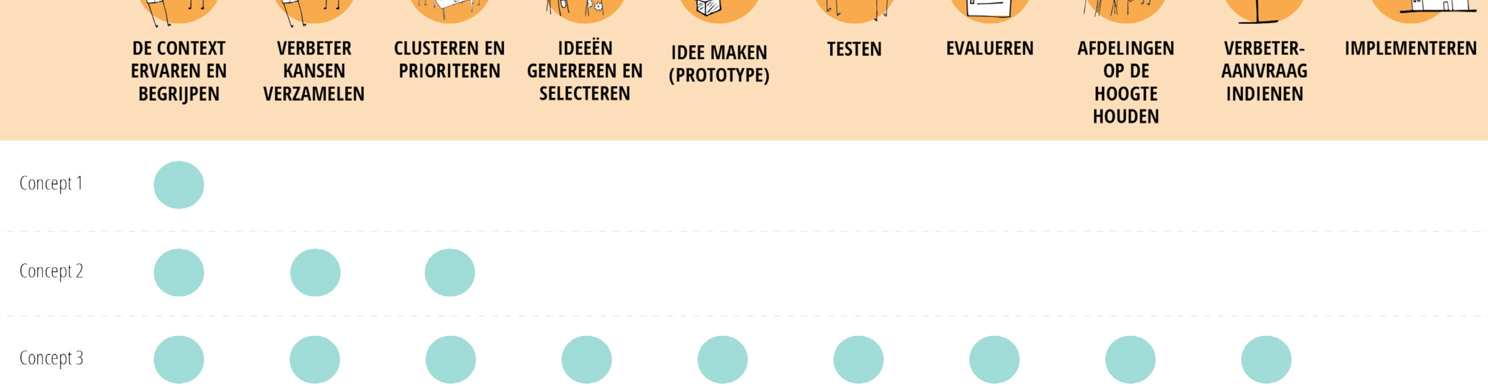


Figure 9: Level of activity of nurses in the three concepts.

Evaluation of the concepts based on the research described previously, resulted in several decisions for the final design.

Two types of involvement for nurses

A decision was made to make a separation between nurses and how they are involved in the improvement process. It was decided that one nurse of a unit can be involved more intensively that the rest of the nurses on their unit.

The active role can be taken on by a nurse that is in line with the Improver persona. This persona is a nurse who has affiliation with improving and doing something more than just give care. The differences that were shown by the personas support the decision to create different levels of involvement.

By having some nurses actively involved:

- It can ensure that the problems tackled by the engineers, are those that arise on the nursing units.
- The limitation of having to take single responsibility as a nurse when an idea arises is taken away.
- Clear steps are created for other nurses when they encounter an improvement opportunity.
- A short feedback loop can be created between the active nurses and the other nurses on the unit.

Connection between different units

The research has shown that improvement ideas do not transcend to other units. This is an important factor for creating effective solutions. By working on improvement opportunities that relate to more than one unit, the impact of the improvement will increase. This conclusions led to deciding on having nurses from different units work together.

Activities within the process

A decision was made about what it means to be actively involved as a nurse. The activities that entail being actively involved are:

Gathering improvement opportunities.

Nurses know each other and share their ideas and frustrations currently. Giving one nurse the responsibility to gather the improvement opportunities on the unit creates an easy interaction for the other nurses. Secondly, nurses understand what the improvement opportunities are based on. They understand the context, which makes sharing improvement opportunities easier. This is an insight that arose during the Sprint Week in the St. Antonius hospital, where nurses and Heads of the nursing departments mentioned that the "Improvement Connector" should have a nursing background to understand where the opportunities come from.

Sharing and selecting improvement opportunities

The nurses who collect the improvement opportunities are best equipped to share them. By sharing the opportunities that arise on the different departments, an initial moment is created where nurses can learn from other units on how they might work differently. This information goes straight back to the units.

By clustering the improvement opportunities, areas of improvement can be identified. By making the decision together, the final improvement will already have support from the ones making the decision.

Ideation

The decision was made to include the nurses in thinking of ways the opportunity can be improved. The research has shown that nurses have a solution driven mindset. Combined with their knowledge of the context, this can be an asset when generating ideas for improvement opportunities. The first two concepts do not take advantage of nurses' skills.

Making a prototype

Nurses should not be part of the actual making or buying of a prototype since that is not their expertise. In concept three the role of nurses is so big that it will require more time than nurses can spare to be actively involved.

Nurses can take the time while engineers are making a prototype, to arrange a moment on their unit where the prototype can be tested.

Evaluation

Even though nurses were not actively involved in testing, they should still be part of the evaluation. This way they are aware of the continuation of the project and can report back to the nurses on their unit. This is important to diminish the limitation of getting no feedback on the input nurses deliver as shown in the research.

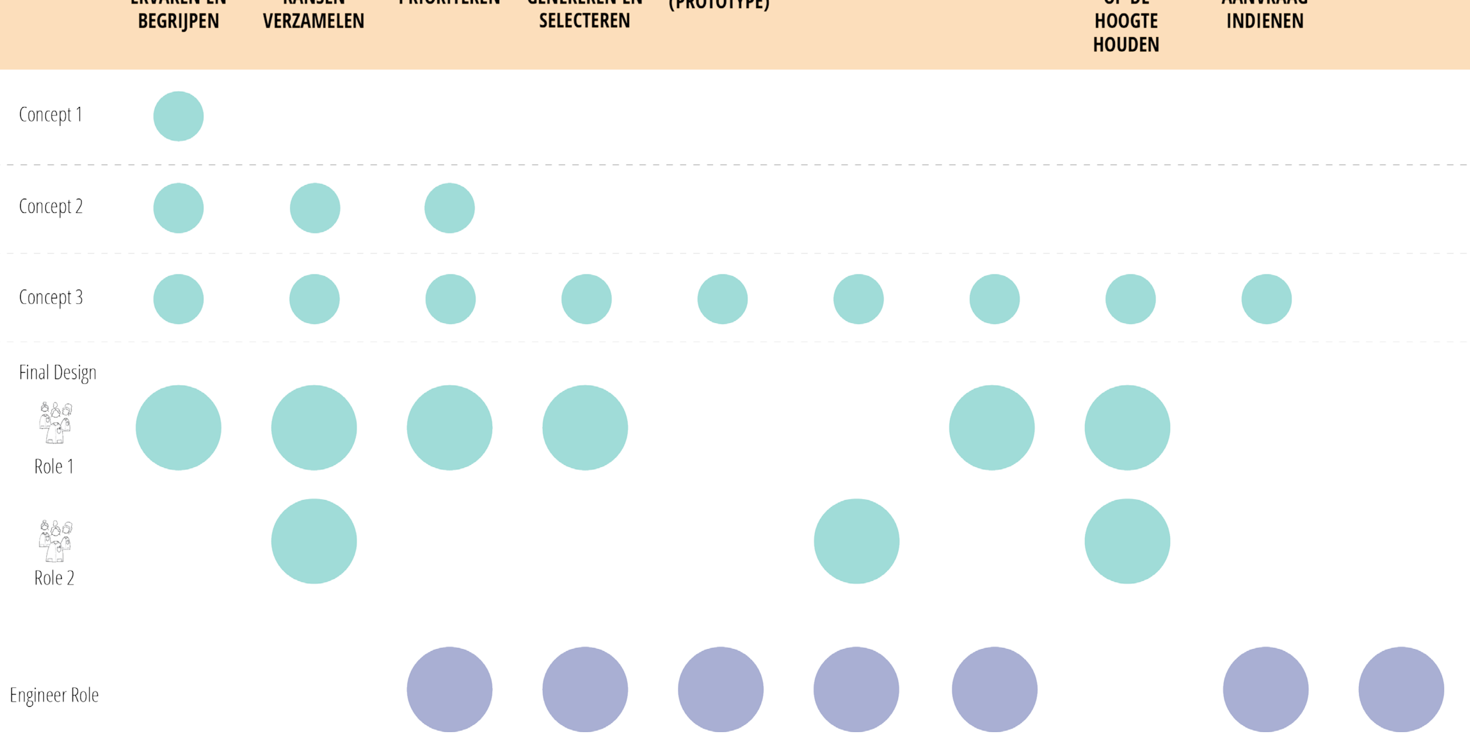


Figure 9: Level of activity of nurses in the three concepts, including the chosen level of activity for two types of nurses and engineers.

Active role Engineer

If nurses play an active role in gathering improvement opportunities, someone should be responsible for trying to improve on those opportunities. That is why the engineer needs to play an active role in this process.

Involved early

The engineer should be involved in an early stage. When nurses share their improvement opportunities, this is a moment for an engineer to gain a greater understanding about the problems that nurses encounter. If the engineer knows more about the context for which they are designing, the adaptation to the context improves.

Playing to the stakeholder's strengths

When ideas are generated and an idea is selected, the engineer is the one who can buy or make a prototype to test on the unit. This is their expertise and this is where their role is most prominent.

CONCLUSION
Stakeholder Roles

The ideation phase led to several decisions for the final design. The steps of the improvement process were detailed. Decisions were made regarding the involvement of nurses. The role of engineers has been adapted to the involvement of nurses. Next to the roles of the nurses and engineers, there are more stakeholders involved. The role of these stakeholders will be added in the final design.

This paragraph will conclude the decisions made in the ideation phase after which the final design will be presented.

The steps of the process are based on the phases in the double diamond. Separate steps that are important for improving the nursing units were described, these can be seen in the visual to the right.

Nurses are involved in this process in two ways. An active role and an involved role. Some nurses represent the nurses on their unit in the improvement process. They are actively involved in the first half of the process as seen on the visual on the right. This includes thinking of solutions because nurses possess the skills needed for thinking creatively about solutions. This skill should be put to good use.

The other nurses on the unit can submit their improvement opportunities to the more involved nurses, and play a part in giving feedback on decisions and designs.

This takes away the limitations of not knowing where to go, not getting any feedback and having to take single responsibility for an improvement opportunity.

Some engineers should be given time to work on the improvements for nursing units. They should be involved in the early stages of sharing improvement opportunities, for then they are more emerged in the context they will be working for. Engineers take charge the moment ideas need to be made or bought and tested, as seen in the visual.

This way of working together takes advantage of the skills of both nurses and engineers and keeps nurses involved in the process of improving.

The following chapter will elaborate on a final design that incorporates the decisions made in the ideation phase. A way of working is proposed as well as a description of the people involved, in more detail.

PROCES STAPPEN

DE CONTEXT ERVAREN EN BEGRIJPEN

VERBETER KANSEN VERZAMELEN

CLUSTEREN EN PRIORITEREN

IDEEËN GENEREREN EN SELECTEREN

IDEE MAKEN (PROTOTYPE)

TESTEN

EVALUEREN

AFDELINGEN OP DE HOOGTE HOUDEN

VERBETER-AANVRAAG INDIENEN

IMPLEMENTEREN

Final Design

Role 1

Role 2

Engineer Role

Figure 10: Chosen level of activity for two types of nurses and engineers.

FINAL DESIGN

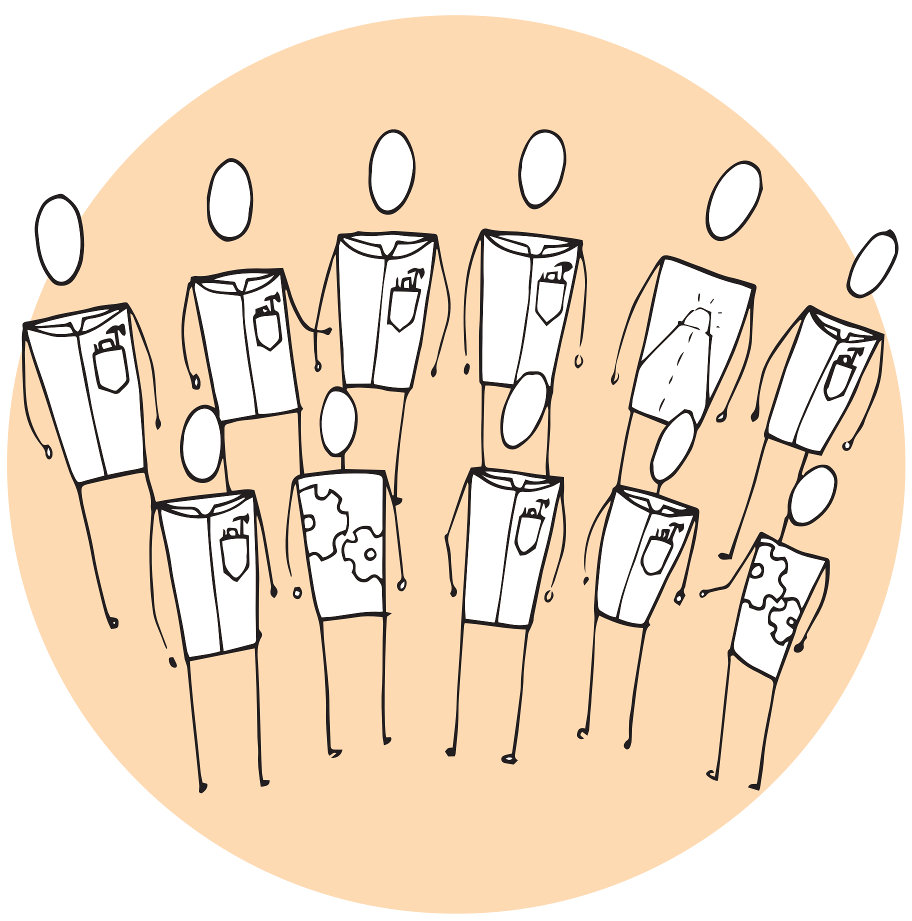
Introduction

With this final concept I aim to show what a way of working together between engineers and nurses could look like within a hospital. To show that responsibility for improving the work environment of nurses needs to come from both nursing units as well as development/purchasing departments. That when a clear process is used, both nurses and engineers can play an active role without limitations and frustrations. Where they are responsible for doing what they have expertise in. It will also elaborate on the other stakeholders that need to be involved for the nurses and the engineers to be able to be involved in this way.

This chapter will elaborate on all the aspects of the final design, the team, the roles of nurses and engineers, the process that they will use and how it builds further on existing practices. The moments of decision making. Lastly, the benefits of implementing this design are explained.

FINAL DESIGN

De Ontwerkgroep



The final concept is: **De Ontwerkgroep**

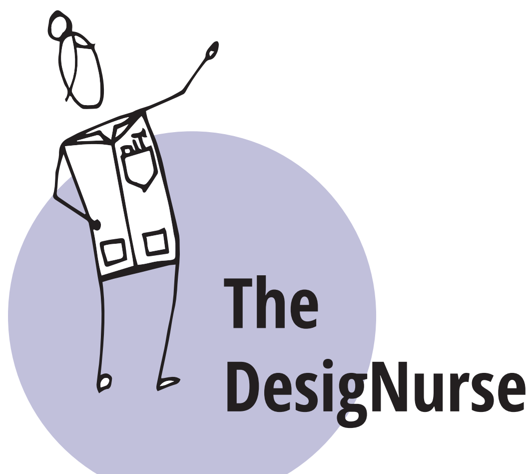
‘De Ontwerkgroep’ is one team in the hospital that consists of members with the following roles:

- The DesigNurse (minimum of 3 in the team)
- The Design Engineer (minimum of 1 in the team)
- The Design Facilitator (no more than 1 on the team)

‘De Ontwerkgroep’ is responsible for improving the products and services on the nursing units, by taking the steps shown in the process poster. The people in ‘De Ontwerkgroep’ will get time and authority to make decisions to be able to go through the steps of the improvement process.

The following paragraphs will explain this concept in more detail.

TEAM ROLES



The DesigNurse

The DesigNurse, is a responsibility for one nurse on (preferably) every unit. She/he is responsible for improving the products and services on the units in the hospital.

"Het is goed om een DesigNurse te hebben op elke afdeling, om de verbinding onderling te steunen en de laagdrempeligheid te behouden." - Afdelingshoofd A3 St. Antonius hospital.

The DesigNurse works together with the other DesigNurses and the rest of 'De Ontwerkgroep'. They are responsible for gathering the improvement opportunities that arise on their unit. They share them with 'De Ontwerkgroep' to combine and prioritise the improvement opportunities.

The DesigNurse will be in the lead in gathering and structuring the improvement opportunities and will be involved in coming up with ideas, but is not responsible for making anything. They are the line of communication with the other nurses on their unit to keep them updated on what is happening.

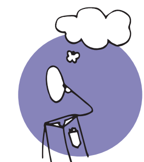
By involving nurses in thinking of ideas, their solution driven mind set is put to good use. By being part of this process, agency is generated for these nurses over the improvement process. This enthusiasm and ownership can then be transferred to their on the unit.

As explained in the image, nurses will decide the priority of opportunities, given that they validate these decision with their colleagues. They get the time to be involved in the activities and are allowed to make arrangements on the unit if a prototype needs to be tested.

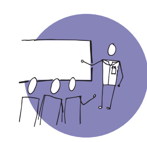
The DesigNurses are also responsible for keeping the head of their department up to date on the process. This is done to include them in the process, since they will be the ones deciding if the improvement can be implemented.

Ophalen van verbeterkansen op de eigen afdeling

Delen en prioriteren van verbeterkansen

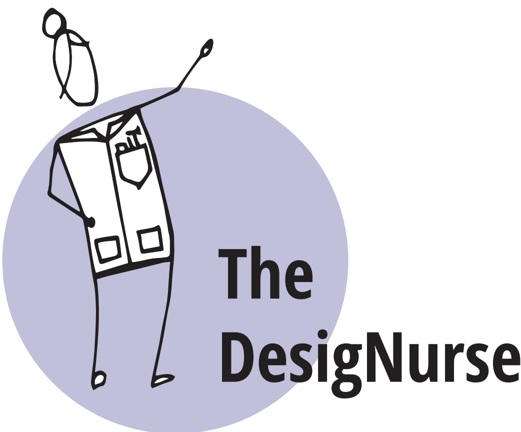


Meedenken over mogelijke oplossingen



Op de hoogte houden van collega's

Evalueren van geteste oplossingen



The DesigNurse

Time suggestion:

For the DesigNurse to function properly in 'De Ontwerkgroep', and not to add to their workload it is important that the DesigNurses get time allocated for this role. This time can be 1 day per month, or 2 hours per week. This time is in line with other roles nurses on the unit fulfil. This decision resulted from the evaluation with a head of department. By making it similar to other roles on the unit it will be easier to implement.

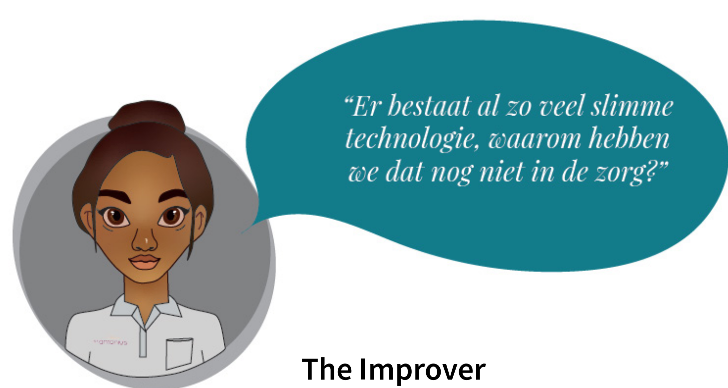
"Ik zou zeggen 1 dag in de maand voor een afdeling. Dat zou ik heel mooi vinden." – Afdelingshoofd A3 St. Antonius hospital.

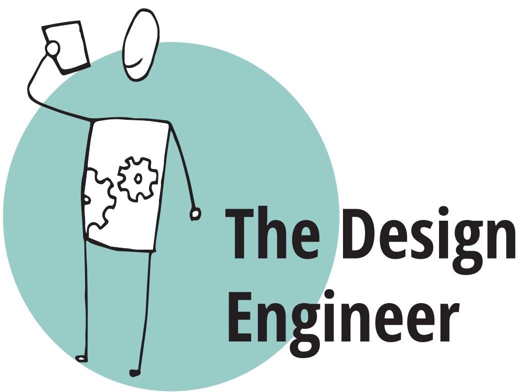
This time will be used to be part of activities with 'De Ontwerpgroep', gathering improvement opportunities on the unit and updating the unit and the head of department on the progress of the improvements.

A DesigNurse can be in this role for 3 to 5 years. This way you can experience the results from the effort that you put in at the beginning. After a learning curve of one or two projects you can add value in better way. The limit of time can be put in to involve new nurses with new ideas. This can give energy to the team once in a while. Though not all nurses should change roles at the same time, then the team could lose their cohesion. Having overlap could create a smoother handover.

Type of nurses

The role of DesigNurse is most efficient when filled by a nurse who is intrinsically motivated to improve the work environment. A nurse who has a certain level of analytical skill and who has some connection with technology. This can be a nurse in line with the persona of The Improver shown below and on page 39.





The Design Engineer

The Design Engineer can be one or more employees from the product purchase or development department in or outside the hospital. It is important that someone has this role and feels the responsibility to work together with the DesigNurses on ‘De Ontwerkgroep’.

As Design Engineer you are part of discussing the priority of the improvement opportunities. After choosing an opportunity you come together with the DesigNurses to think collectively about possible solutions. Then when a decision is made on which solution could work best, it is on the Design Engineer(s) to make or buy a prototype and make a test plan, which will be used to test on the units at a moment provided by the DesigNurses.

Being part of the sharing and prioritizing step of the improvement opportunities will give the Design Engineer context to where these opportunities come from. They can familiarize themselves with the topic before diving into a solution.

The Design Engineers will also have shared authority on deciding which opportunities to work on and what solution to test. They will also get time allocated to focus on these projects.

Time suggestion:

To make sure that collecting the improvement opportunities are not collected for nothing, time should be allocated for the Design Engineers to be part if the team. The Design Engineer will have 24 hours a month to use for ‘De Ontwerkgroep’, or 6 hours per week. This is more time than the DesigNurses, because making and buying a prototype and testing is more operational work and takes more time. For the Design Engineers this is also more a part of their job than an extra role, like the DesigNurse.

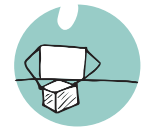
The Design Engineer is a role that can be fulfilled by the same person for a longer time, creating an understanding for the context of nurses. Then she or he is able to build on existing knowledge.

Who?

The Design Engineer can be an engineer or designer who already works in the hospital. They should have knowledge of technical production of products and understand existing technologies. The role can also be filled with engineering or design students, if there is a continuous working connection like an innovation lab.

Verbeterkansen prioriteren

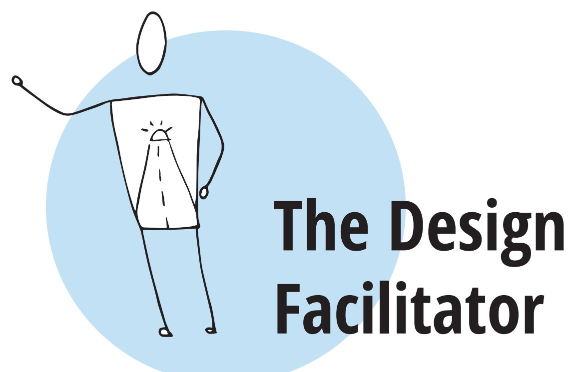
Meedenken over mogelijke oplossingen



Het kopen en of maken van prototypes

Het testen van verbeter-oplossingen

Evalueren van geteste oplossingen



The Design Facilitator

The Design Facilitator is the project leader of 'De Ontwerkgroep'. The Design Facilitator is the one who keeps the big picture in mind. She or he works on planning the improvement activities, leads the improvement meetings and makes sure everyone is up to date on what is going on.

The Design Facilitator can play a role in translating between engineers and nurses and can create common ground.

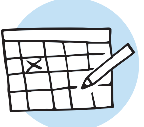
Besides keeping the team on track, is the Design Facilitator is also responsible for keeping the stakeholders involved, especially the heads of the nursing departments. When an idea with much potential is being tested, the Design Facilitator can introduce this idea in a meeting with all the heads of department. That way they can plan for possible investment into this new improvement.

If outside expertise is needed in the process, like legal advisors, the Design Facilitator can make sure the right experts are involved at the moment that they are needed.

This role should be filled by someone who has knowledge of the design process. The facilitator needs to be able to support the design activities and therefore needs to have an understanding of what is needed for these activities. This can be someone from an external company.

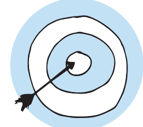
Time suggestion:
The Design Facilitator is the project leader of 'De Ontwerkgroep', and therefore spends time on planning the related activities as well as being a part of them. The Design Facilitator also spends time managing stakeholders of the process. Therefore the Design Facilitator requires 24 hours a month. This is also more time than the DesigNurses have. This is to make sure the activities where the DesigNurses participate in are efficient and the time they do have is used in the best way.

Who?
Due to the design nature of the steps in the process, it is important that the Design Facilitator has knowhow of the process and how to facilitate such a process. The role could be filled by an external designer or a project leader with design knowledge already working for the hospital.

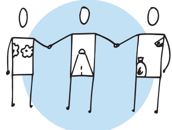


Plannen van Ontwerkgroep activiteiten

Leiden van Ontwerkgroep vergaderingen



Houdt de overkoepelende doel in de gaten



Stakeholder management

DECISION MAKING

Moments of decision making in the improvement process

During the process of improving, several decisions need to be made. To make the process as smooth as possible it is important to clarify who can make which decision. This paragraph will elaborate on the decision moment of the improvement process.

Clustering and prioritizing

When the improvement opportunities are gathered, a decision needs to be made regarding the importance of the improvement opportunities. Which opportunities are worth improving and which opportunities are not that urgent or just a small annoyance.

Values:

- Work satisfaction
- Patient safety
- Efficiency
- Quality of care
- ... other values can be defined by the team before prioritizing the opportunities.

Who will get the authority to make these decisions and who has a voice in this decision?
The authority of making this decision lies with 'De Ontwerkgroep'. Though keeping in mind that nurses on the units have played a part in submitting the improvement opportunities, it is important to keep them involved.

After clustering the opportunities, 'De Ontwerkgroep' will make a first draft of a short list of opportunities they think are most urgent/impactful to work on. The DesigNurses will take this short list back to the units and discuss them with their colleagues. The input gathered will be used in making a decision about what improvement opportunity (cluster) they will move forward with.

Idea Generation

After brainstorming on possible solutions for the improvement opportunities, a decision needs to be made about the specific solution that will solve the opportunity in the best/most realistic way.

Values:

- Impact
- Ease of implementation
- Cost of testing

Who:

The authority of making this decision lies with 'De Ontwerkgroep'. They can rely on the knowledge of the technical members of the team to make an estimate of ease of implementation and on the nurses estimation of the possible impact.

Evaluation

After testing the solution, the solution will be evaluated based on the parameters set in the test plan. The evaluation will lead to a decision to adopt, adapt or abandon the idea.

Values:

- Does the idea do what is was intended to do?
- Does it improve the value defined in the selection of the improvement opportunity?
    - Work satisfaction for nurses
    - Patient safety
    - Efficiency
    - Quality of care
    - Other…

Who:

The decision will be made based on the results of the test, by 'De Ontwerkgroep'.

Investment request

When a solution was tested and found to improve the work environment in the desired way, a request can be sent in, explaining the investment based on the results of the test. A decision needs to be made whether it is possible to invest the amount of money it needs to be implemented.

Who:

The heads of the nursing departments have the ability to make decisions regarding investing in improvements. They are the ones deciding if an improvement can be implemented on their department. This is why the heads of department are involved in the improvement process. Both by the DesigNurse of their unit as well as the Design Facilitator. If they are involved in the process they are aware of the improvements coming, of the reasons why these improvements are important and how they benefit the unit.

The evaluation of the design showed that heads of department should be involved in an early stage and that both the DesigNurse and the Design facilitator can play a role in keeping them up to date.

"Ik wil graag op de hoogte gehouden worden door mijn DesigNurse". – Afdelingshoofd C3

"De Design Facilitator kan, als er een idee is gekozen om te testen, aansluiten bij een hoofden overleg." – Afdelingshoofd C3

IMPROVEMENT BOARD

Beyond the improvment board

As explained in the analysis of the report, the improvement board is a method for nurses to improve their work processes.

The benefits of the improvement board is the shared approvement of the opportunities, making someone responsible for improving and keeping others updated.

The improvement board works well for improvement opportunities related to work processes that nurses can solve themselves. The improvement board has limitations when it comes to improvement opportunities that require more knowledge and authority than nurses have. When this happens a nurse is limited in several ways, as explained in the analysis, to take this improvement opportunity a step further in the process.

Taking ideas a step further

The new process builds on the existing improvement board in several ways. Where it limits nurses to take on improvement opportunities that require more knowledge and jurisdiction, this new process allows the DesigNurse to take these improvement opportunities and bring them into the improvement process.

The improvement board will also function as a way of involving the fellow nurses in this improvement process. It is an already existing moment where they can suggest improvement opportunities, as well as a moment for the DesigNurse to share what the team has been up to.

NURSE INTERACTION

On the unit

On the unit nurses have different side responsibilities. This role of DesigNurse is similar to those roles. Where all nurses are aware and have some knowledge of the topics of different roles, like for example bedsores. There is one nurse who has more expertise on it. You can always talk to them if you are in a situation where that is applicable.

Same goes for the DesigNurse, everyone is aware of things that can be improved and responsible for sharing these improvement opportunities. The DesigNurse has the final responsibility of taking the opportunities into the improvement process.

DesigNurses take the input of their colleagues and in return update them on what happens along the way. In this, they have a communicative role on the unit and are the connection between the improvement process and the nurses on the unit.

Personas

As explained before, the DesigNurses are in line with 'the Improver' persona. On the unit the DesigNurse will also encounter the other personas. The Team Player will probably be one of the first personas that will start sharing improvement opportunities especially if they know the DesigNurse well. 'The Ethicist' could come around when the first improvements are being implemented and are really improving the unit. 'The Quick Fixer' might be the last persona to join, these are the colleagues that the DesigNurse needs to actively approach themselves.

To support these interactions on the unit tools could be developed based on the personas.

Welke tools kunnen we die DesigNurses bieden om die verbeterkansen op te halen? – Innovatiemanager UMC

This will be elaborated in the chapter of recommendations.

The Improver

The Quick Fixer

The Ethicist

The Team Player

COMMUNICATION OF THE DESIGN

Persuading the Board

This design creates a way for hospitals to support their nurses in taking an active role in improving the hospital.

For this design to be implemented, time and budget need to be allocated. It is the decision of the board of the hospital to implement this team and allocate this time and budget for it.

Therefore the design that was made is a communication tool. Heads of department and members of COUNT can use it to convince a hospital board of implementing this participatory improvement process in their organization.

Every hospital is different, therefore the tool can be used to discuss the way that this process can fit within their organization.

The Poster (hangs on the wall)
The poster as seen in appendix 8 describes the steps of the improvement process. It shows the stakeholders that are involved with the process. The circles show at what moments the different stakeholders are involved in this process and in what way.

The moments of decision making are described below the stakeholders as well as the benefits of this design.

The Cards (in your hands)
The individual roles of the team, just as the team itself are described in more detail on the separate cards. These show what the roles mean and what is needed for a person to taken on this role, time, responsibilities and characteristics.

Having the overview of all the roles that are needed for a process like this one to work, will support in having the conversation.

Maar heel goed dat je het zo duidelijk hebt ontworpen en op papier hebt gezet. Dat maakt het ook inzichtelijk dat je al deze rollen nodig hebt. – Afdelingshoofd F2 st. Antonius

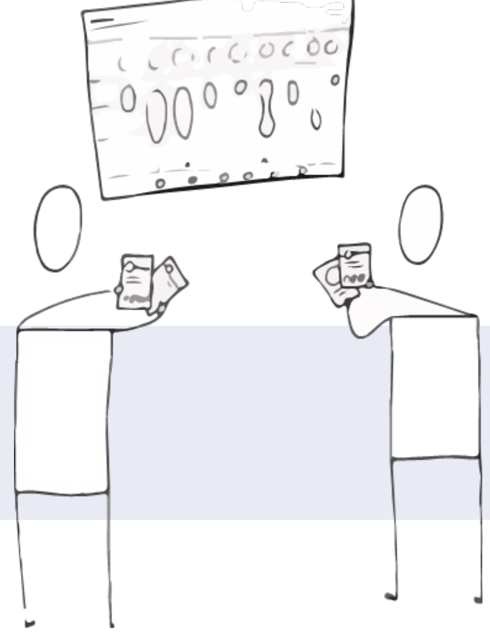


Figure 11: Interaction with the final design.

Image 7: Final poster and cards.

FINAL DESIGN
Validating the final design

Does this design meet the design goal? Does it take away the limitations that nurses feel in tacking action with improvement opportunities? How does it add to reaching the goals set in the goal pyramid?

This paragraph will explain how this design can create a way for all nurses to be a part of improving their own work environment. How that will lead to the right problems that are solved, the solutions better implemented and how these solutions as well as the process itself contribute to the job satisfaction of nurses.

Taking away limitations
This design can take away the limitations that nurses feel when an improvement opportunity arises because of the following.

A way to take a fresh look at work processes
Giving the DesigNurses time to take part in the improvement activities will create a moment where they can look at their own work in a different way. Facilitated by the Design Facilitator, one of the improvement activities can be envisioning their own work environment in an ideal scenario. Which can lead to new ways of solving the problems they encounter currently.

Clear things nurses can do
This team will be known in the hospital due to the fact that one nurse from each department is part of this team. Creating this awareness will make it clear to nurses on the unit that when they encounter an improvement opportunity, they can go to the DesigNurse on their unit. Creating an easy and clear action for when an improvement opportunity arises.

The DesigNurses will already be in contact with other team members, the improvement makers and facilitator. Who can in turn invite other experts, if necessary, to be involved with an improvement opportunity.

Something happens with my input!
The lack of feeling of appreciated, that nothing happens with the ideas that nurses generate, might diminish over time. When solutions to improvement opportunities that they encounter start to be implemented, this might generate the feeling that someone is listening to what nurses have to say.

Being up to date on the process
The limitation of little feedback on the input of nurses, is solved by creating a moment during the improvement board sessions, where the DesigNurse gives an update about the progress of the projects. Creating a democratic atmosphere where the nurses on the unit can give input on the prioritization of the improvement opportunities also creates a feedback moment, about what happened with the opportunities they submitted.

Shared responsibility
By giving the responsibility but also the authority and time to one nurse, it is possible for that nurse to start improving, together with the team. The only responsibility that is left for the rest of the nurses on the unit is to submit the improvement opportunities to the DesigNurse and participate in prototype tests, which both will take significantly less time that having the responsibility of a complete improvement.

Improvement opportunities are documented
In the process of collecting, sharing and prioritizing, the improvement opportunities are documented. Therefore, when other projects in the organization are working on projects related to the improvement

opportunities, they can get input from “De Ontwerkgroep”.
This leads to a clear overview of improvement opportunities for the organization.

Heads of Department do not need to be leading in the process anymore
The heads of nursing departments are still involved in the improvement process. Instead of having to pull their own strings to get something done, they are involved by “De Ontwerkgroep” in a clearly structured process.

Capacity of supporting departments
The limitation of the capacity of the supporting departments is now diminished, by making engineers responsible for working on the improvements of nursing departments.

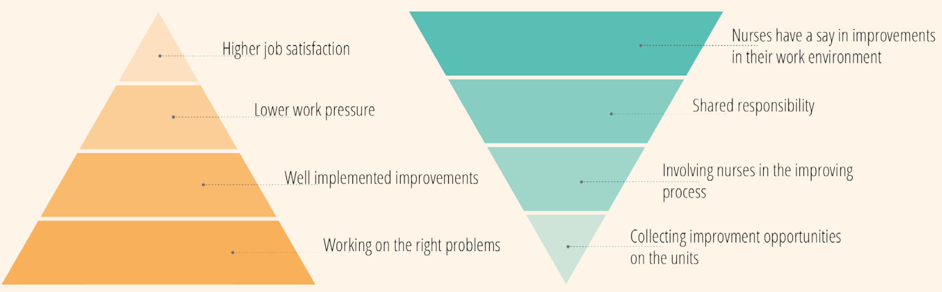


Figure 12: Goal pyramid with reverse pyramid showing how to reach the goals.

Goals:

How does this design reach the goals that were set for this project on page 30? The diamonds seen above show on the left the set goals for this project. The diamond on the right shows the way this design reaches those goales. These ways are elaborated here.

Working on the right problems
By giving nurses a voice in which improvement opportunities to work on. The actual frustrations on the unit will be improved. So therefore the right problems will be solved by solutions that fit the context.

Well implemented improvements
Involving not only the DesigNurses but the nurses on the unit, will created a feeling of ownership of the result. Nurses have created the starting point on what to improve and how to improve it, the result has been tested with them. Therefore they are aware of an improvement on the horizon. This ownership will increase the adoption of the improvement.

Lower workload and higher job satisfaction
More implemented technologies that aim to decrease the workload, could contribute to lower work pressure. That lower work pressure can, in turn contribute to higher job satisfaction.
By implementing this design, nurses get a voice in what can be improved which will by itself also add to the job satisfaction of nurses. (Pacheco & Webber, 2016)

This design is based on harnessing the skills of both nurses and engineers. It helps engineers in understanding the context, while it supports nurses in taking the improvement opportunities from their unit to a place where they can be solved.

Implementing this design will not only lead to improvements on the unit. It will allow nurses to use their critical and creative mindset towards improving their own way of working. Giving them ownership of the solutions and autonomy within their work. (Gewande, 2007)

EVALUATION & RECOMMENDATIONS

Introduction

The final design was introduced to different stakeholders in the hospital. This was done to reflect on the fit of the design within the hospital. This chapter will elaborate on the results of this evaluation. It will explain all the points of evaluation and how they are either incorporated in the design or how they lead to recommendations.

EVALUATION

Insights incorporated in the design

The final design has been evaluated with two heads of department of the St. Antonius hospital and the innovation manager of the UMC. It was also presented to several stakeholders of the COUNT project in a quarterly meeting of the COUNT project.

This chapter will discuss the positive reactions that were received about the design. Then the points of evaluation will be discussed in two steps. First the points of evaluation that have already been incorporated in the design will be discussed. Secondly the points of evaluation that lead to future research or recommendations will be discussed.

Positive reactions:

The two Heads of nursing departments that have evaluated the design were enthusiastic about the design. Some quotes below show their interest in the end result.

"Ik vind het mooi en ik wil het heel graag hebben!"

"Maar heel goed dat je het zo duidelijk hebt ontworpen en op papier hebt gezet. Dat maakt het ook inzichtelijk dat je al deze rollen nodig hebt."

"Ik vond het heel erg leuk om te zien, en ik wordt er erg enthousiast van."

"Het ontwerp voorziet van onze behoeftes."

- Heads of Department st. Antonius

The design fits with the current situation. Nurses can have an extra role and be in a team with others. Getting some time for that is possible. The newness about this is the goal of the team and the design nature of the activities.

Evaluation points already incorporated in the design:

Decision makers
The involvement of Heads of Department in the process, for they are the ones that can make a decision on investing in improvements.

A department head mentioned that she would like to be in close contact with her DesigNurse to know what is going on. When a good idea is starting to be realised the Design Facilitator can play a role in convincing the heads of department of this new improvement.

Time
Time is an important condition for this design to work. Appointing the roles without creating a moment to fulfil these roles only adds more workload and frustration.
The problem with time is that there is a limit number of nurses, and the time with the patients should be covered.

The evaluation showed that it is possible for a nurse to get one day a month to work on "de Ontwerkgroep". More time can be invested in the other two roles to make sure that the time nurses do get is used wisely and efficiently.

RECOMMENDATIONS

Next steps for the design

Persuading the organisation.

The final design was found to fit within the way of working of the St. Antonius hospital. An initial investment needs to be done for it to be implemented in the hospital. The biggest challenge that was mentioned was persuading the organisation of the value of this design.

The complete description that the communication of this design delivers does help in explaining the value of the design process. Though it was mentioned that a calculation of what the improvements can deliver in time or quality of the care, could substantiate the design and validate an investment.

Recommendation:
To be able to convince a board of the hospital, a small pilot version of the design can be set up. The first result of this pilot can be used to generate an estimate of what 'de Ontwerkgroep' can deliver, with which they can convince the board of the hospital to further invest in this design.

1. Pilot test
Small version of the team, one Design Facilitator, one Design Engineer and a minimum of three DesigNurses. With a minimum of half a year, to be able to go through the process and come up with an improvement. This improvement can be used in two ways. It can be an example to calculate the impact that the improvements made by 'De Ontwerkgroep' will generate, to argue the investment in a bigger team. Secondly, the first improvement can be used as a success story to inspire other nurses to be part of the team. Then the pilot can be used to persuade the board of the hospital to invest in the full team.

2. Set up a team
If the hospital board has been convinced, 'De Ontwerkgroep' can be formed. This will include finding nurses for the role of DesigNurse. The process should start with a kick off activity that can generate a team bond and initial energy to get started.

3. Improvements
Once the team is in full swing it will start producing improvements. Then it is important that the way of working and the collaborations with the Heads of Departments runs smoothly.

Tools and interactions on the unit

It was mentioned during the evaluation that nurses work in shifts and that it can be possible not to work with the DesigNurse for three weeks. This causes that they might not know who the DesigNurse is or nurses keep walking around with their improvement opportunities.

Recommendation:
A way for the DesigNurse to be recognized, and how nurses can interact with the DesigNurse can be further explored.

This interaction should be created together with possible DesigNurses and nurses on the unit. This could be done if a pilot is being executed. The DesigNurses that are part of the pilot can together with their colleagues think of ways to interact with each other that fit with their needs.

CONCLUSION

This project started with the question:

How and when can nurses be involved in improving their own work environment.

This report has shown the broad exploration where the entire way of working in a hospital has been looked at. The way nurses are involved currently was mapped based on the double diamond. Additional insights on participatory design and job satisfaction showed that the current situation could be elevated.

By involving nurses not only in the second phase of the double diamond but from the very beginning. This would not only be adding value to implementing improvements, it would also make sure the right problems are worked on. To create an atmosphere in which nurses are able to innovate which will in turn also add to a higher job satisfaction.

The results lead to a reframing of the question towards a more effective question.

How can nurses be actively involved in improving the right opportunities, related to the products and services, that arise in their work environment.

After the question was reframed user research was done into how nurses and other stakeholders experience the current situation. The differences in nurses was mapped in four persona's. The limiting and supporting factors they encounter when an idea arises was listed. These were used as tools during designing and the evaluation of the final design. Based on the design goal:

Design a participatory design process to improve the work environment of nurses, in which all relevant stakeholders are included and actively involved.

This research lead to a final design. A participatory improvement process in which nurses, engineers, a facilitator and the Heads of the nursing departments play a role. Each role is clearly described and mapped when they are involved in the process.

The design fits nurses, the way nurses work, and is inline with the way the organization makes decisions currently. It takes away the limitations found in the research and makes use of the different personas that were identified. This makes it a feasible design.

The deliverables were made to communicate the design in a clear and complete way. To show that it requires more than just the nurses, for the nurses to be able to be actively involved. It can be used to convince the right people in the organization that an initial investment in this team can lead to well implemented improvements and happier nurses.

The design is not only a viable option for the st. Antonius hospital. The design hands a communication tool that includes the ingredients for a process that could be applied in other hospitals as well.

So when asking the question:
How can nurses be actively involved in improving the right opportunities, related to the products and services, that arise in their work environment.

By either being or working with a DesigNurse on the unit, nurses are able to share improvement opportunities. After which they are updated about the progress and involved in testing the result. This shows the nurses that they are being heard and that improving their work environment is important.

REFLECTION

This project in the last have year has had it's ups and downs but mostly I learned a lot.

I started this project excited to dive into the context of nurses and hospitals. To find out what I as a designer could contribute to the improvement of their work environment. After taking this journey through a broad context in which I definitely got a little lost some times, I ended up with what I believe is a valuable contribution. A design that with a small investment can improve the work environment of nurses continuously.

I started with the idea of designing tools, for either engineers to involve nurses or for nurses to work on improvement opportunities. After researching the context and thinking of tools for nurses, I found out that that was not the most valuable thing that I as a designer could do. Therefore I ended up with a result I had not expected beforehand. This I believe is the strength but also the personal challenge in design. You never know what is really needed before you have emerged yourself in the context. It takes confidence to start a project with a certain idea of the result but halfway changing that. Not only do you need to be sure that that is the better direction, you also need to convince you stakeholders that it is the right direction.

Pinpointing a valuable goal is a strength designers have, and I believe that this project has taught me a lot about how to do that myself.

In my case, I was very lucky with the people in the COUNT project who were really open in letting me find out the question behind the question.

Before starting the project I planned on working with the contextmapping approach. I ended up not doing that because the project asked for a different approach. Instead of practicing a method I have experience with, this project challenged me to try new things. The project required not only the perspective of nurses, but also that of engineers and managers and processes in the organization. Looking at all these perspectives and including them in the design has enhanced my empathic skills.

Working with two hospitals, the different team members of COUNT and the two coaches from the TU Delft as taught me about stakeholder management. That I can be more assertive in telling my story and not only trying to incorporate everyone's feedback.

The process of this project has shown me my strengths and weaknesses in the design process. It has also shown me that slowly being aware of the weaknesses, I can conquer them. Where I am good at diving into a context and combining a lot of different insights together, creating a clear structure is not my strong suit. When I stayed too broad for too long at first, I focused to small afterwards. Finding a balance will be my challenge for the future.

Looking back at the project I am really quite proud of what I have done. Designing a small change in the organization from the perspective of nurses, that fits with the way things are currently done. This has given me confidence that as a designer I am not limited to designing what I know.

Thank you for reading this report.

Karin Tetteroo

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