



Norwegian Centre for
E-health Research

Intended and Unintended Consequences of Implementing a Nursing App

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Bio

- I am a senior researcher at Norwegian Centre for E-health Research at the department for integrated care.
- I have a background as a Bioengineer, a master's degree in e-health and telemedicine from 2010
- In 2014-2018 I did a qualitative PhD related to the development of an openEHR based electronic patient record system (EPJ) in Norway
- I have worked at NSE since 2014
- My research interests relates to:
 - interoperability
 - interaction to exchange data within and between healthcare systems
 - digitalization of healthcare services
 - evaluation of technology supported health service innovation





Norwegian centre for e-health research

- A multidisciplinary research centre established in 2016 with a national mandate to *support national needs for research and analysis in e-health, telemedicine and mobile health, including evaluation research and health technology assessment of e-health*
- Situated in Tromsø and have about 100 employees
- Both regional, national and international research on different aspects of e-health
- Four focus areas:



Integrated care:
Research on digital solutions to promote overall patient pathways.



Health data and analytics: Research on how health data can be used to predict detect and treat illness.



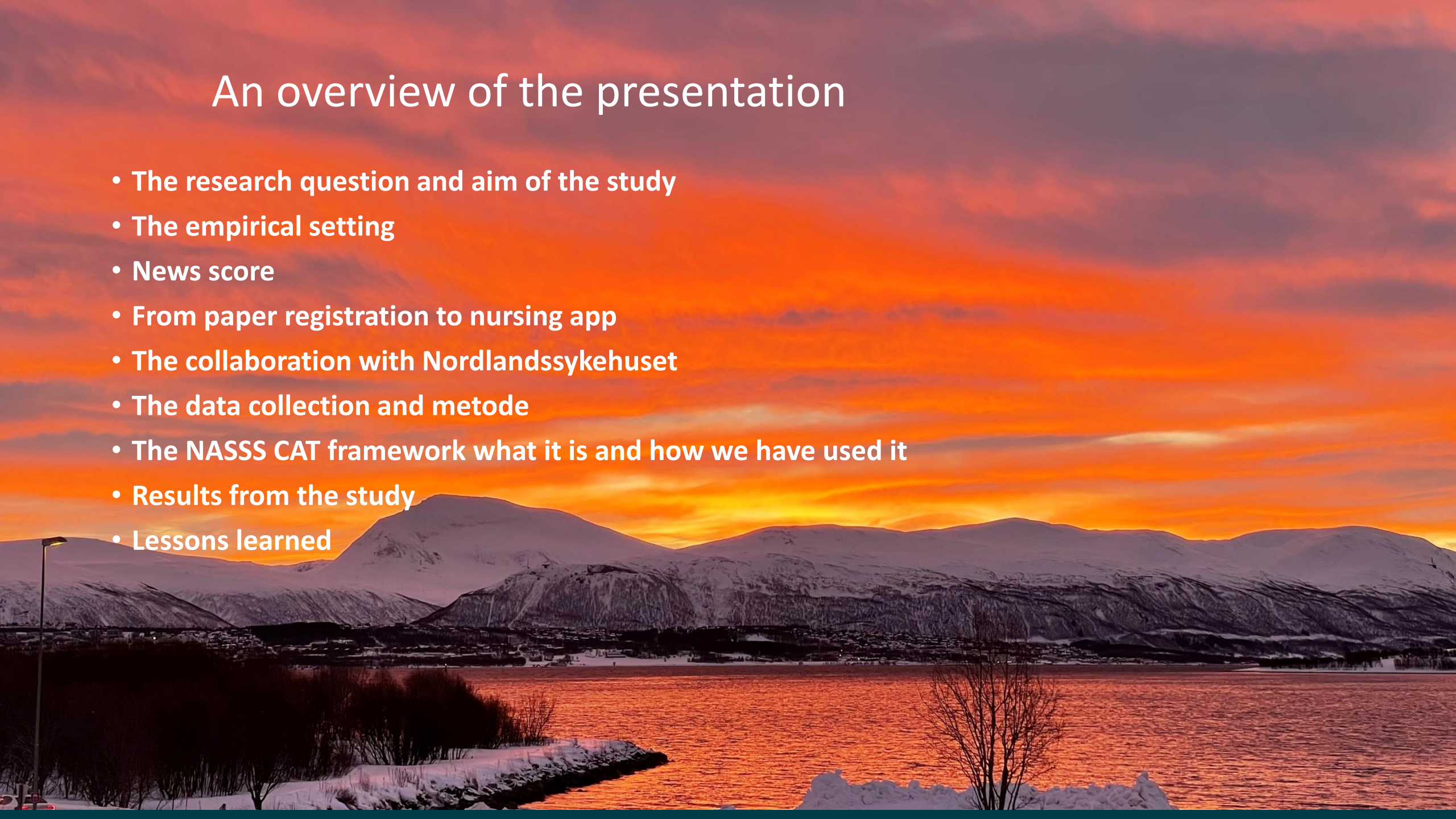
Digital health services:
Research on national digital health services.



Personal e-health:
Research on how welfare technology influence healthcare services for citizens.

An overview of the presentation

- The research question and aim of the study
- The empirical setting
- News score
- From paper registration to nursing app
- The collaboration with Nordlandssykehuset
- The data collection and metode
- The NASSS CAT framework what it is and how we have used it
- Results from the study
- Lessons learned





The aim of the paper

Outline consequences generated by implementing a nursing app for clinical registration at point of care in a Norwegian hospital

**Research question:
What are the intended and unintended socio technical consequences of implementing a nursing app?**



Nordlandssykehuset

- Nordlandssykehuset is one of four health trusts in Northern Norway
- Employing 4700 healthcare professionals and provide services for 136 000 inhabitants
- They implemented a nursing app for all departments, both somatic and psychiatric from 2020-2021
- The nursing app was mainly used for NEWS registration





Early warning score - NEWS

- Monitoring patients clinical status is in Norway conducted with an Early warning score (NEWS)
- NEWS is used to detect clinical deterioration in adult patients and a key element of improving patient outcomes and safety
- NEWS includes vital signs like blood pressure, heart rate, respiration rate and oxygen saturation.
- Demanding task to conduct and follow the patients NEWS score and the task is often delayed or missed





From paper-based to digital NEWS registration

Before the app, measuring the vital signs was mainly a paper-based procedure

Transferring information is challenging, and might affect patient outcome

It is important that the early warning score is communicate as fast and efficiently

Electronic support tools facilitating timelier and safer recording of vital signs are important to explore

The mechanisms involved in implementing and using digital tools for NEWS registration is mainly unvisited



The goals of implementing the nursing app

- To improve the NEWS registration workflow
- Increase the digital maturity of the organization.
- Test the use of mobile phone for clinical practice
- Start the work of digitizing paper-based processes





Collaboration with Nordlandssykehuset

Nordlandssykehuset wanted to learn qualitative evaluation

NSE wanted to learn more about lightweight technology implementation

Impressed with Nordlandssykehuset

- The way they embrace research
- The way they run their ICT infrastructure

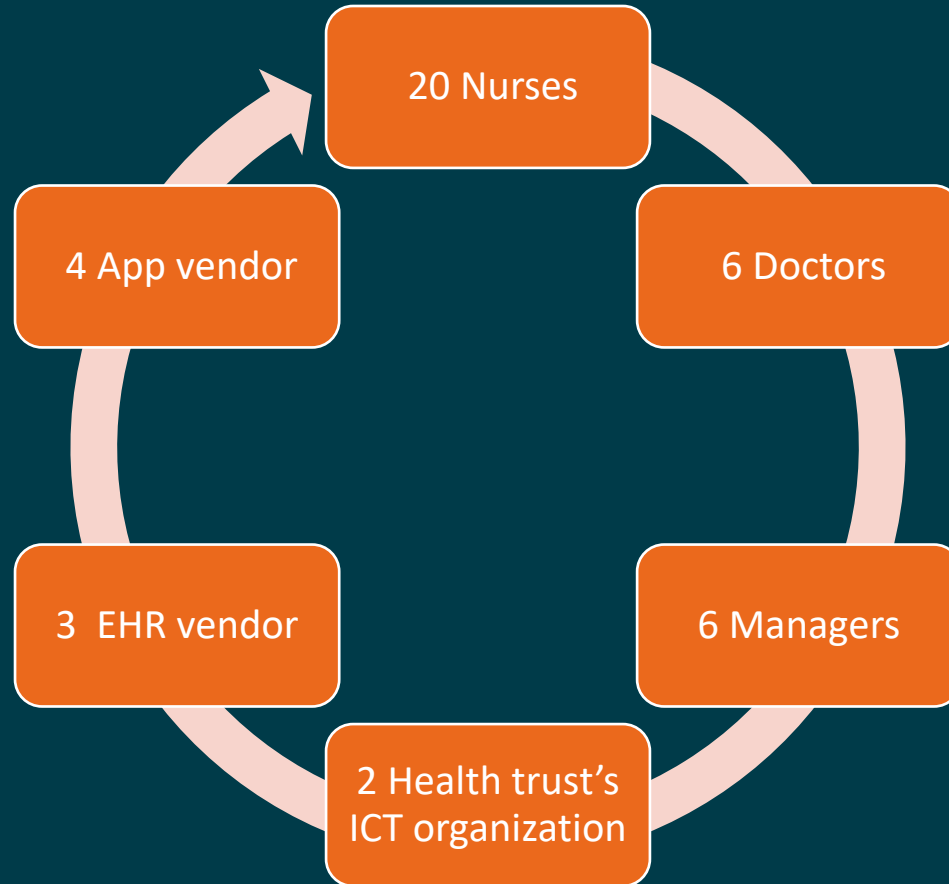
The easiest partners we have collaborated with

The medical director participated in our project





Qualitative interpretive method

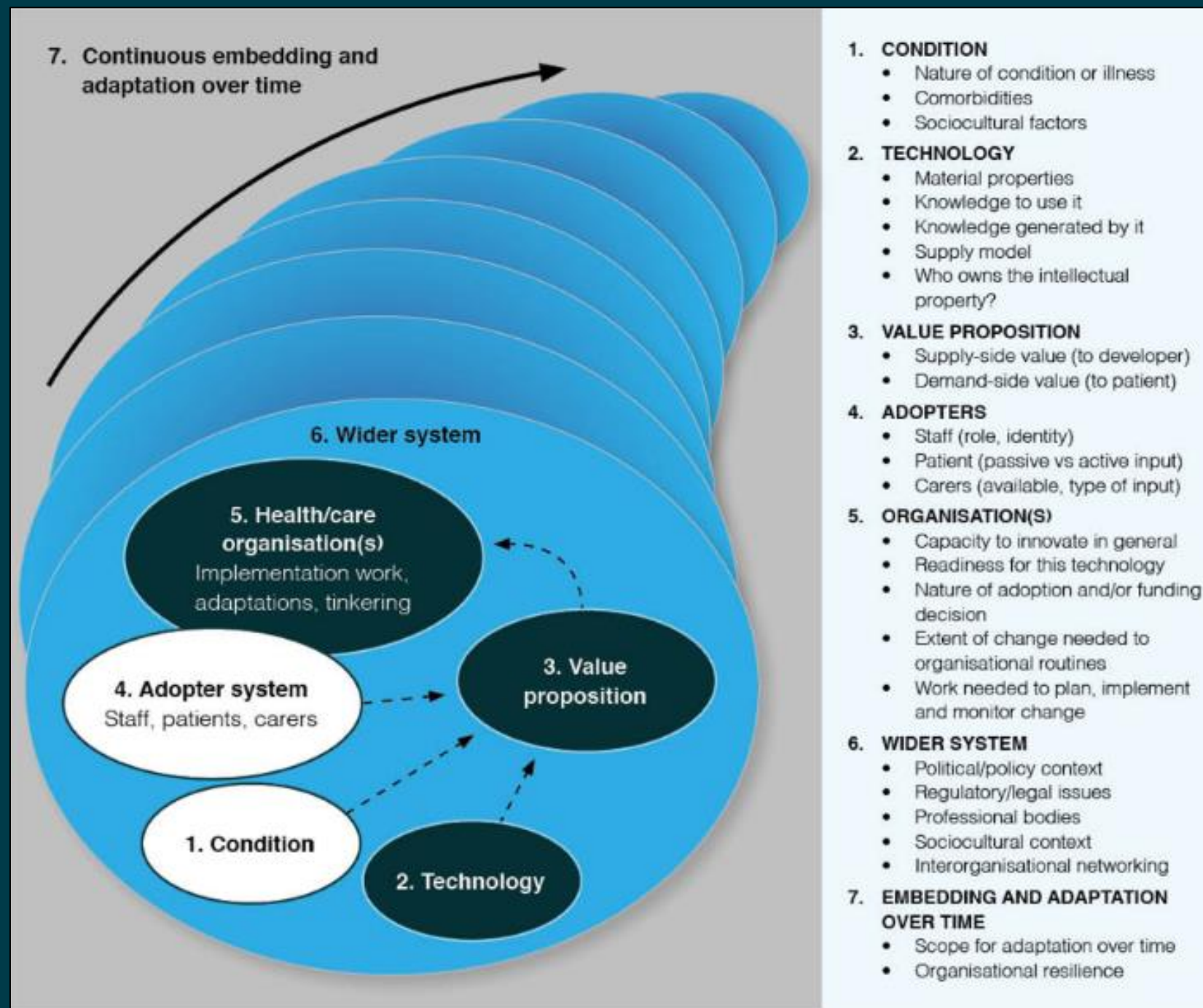


- Data collected a year after the nursing app was implemented
- 22 semi structured interviews
- Single and focus group interviews
- Interview guide designed to provide overview of the socio-technical aspects of the implementation



Evaluation

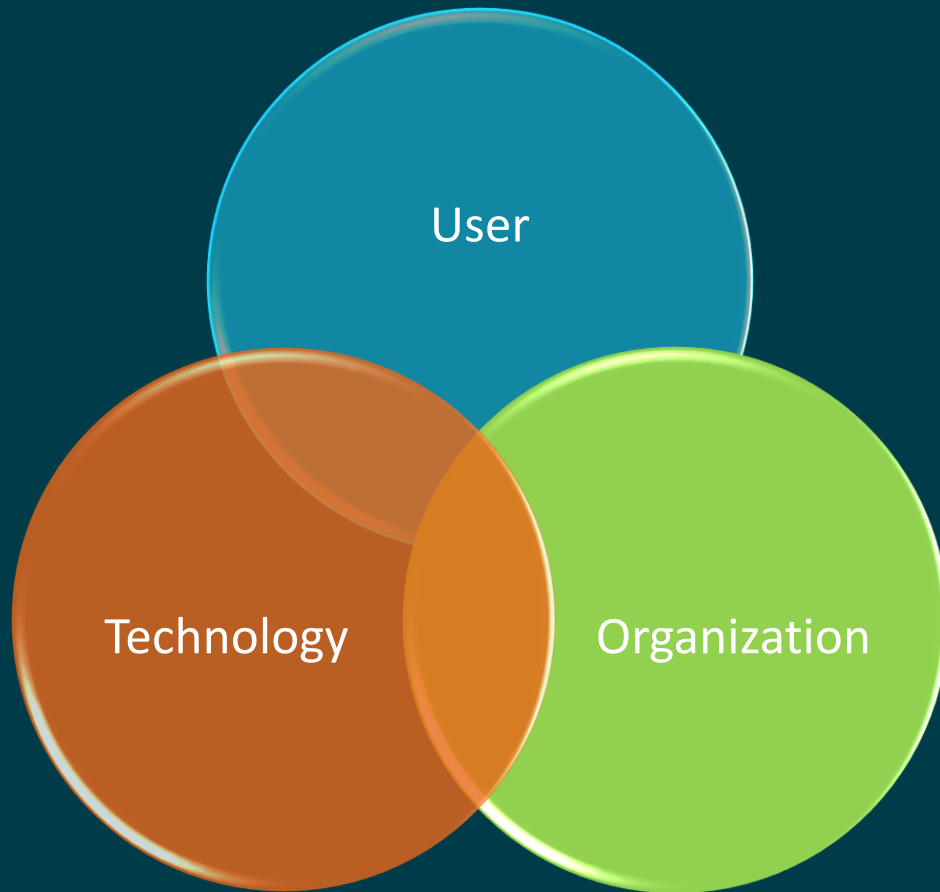
- Used the NASSS framework as the evaluation framework
- NASSS is set to:
 - guide and evaluate the success or failure of technology implementations in organizations
 - Assess complexity in an implementation process





Collaboration between research and clinical practice

Why use NASSS?



- Clinicians/managers recognize the categories and find them relevant
- Well defined framework, tested out for use in clinical practice
- Includes categories that are necessary when doing a socio technical evaluation (technology, organization, adopters etc.)
- Provides an overview of the complexity in a project and which parts to address further
- Flexible framework that can be adjusted to different projects

☰ Results – overall a successful implementation

A few quotes from the interviews:

«I have never implemented something new that has been so positively received. Its simply the easiest we have introduced» - Leader

«It was just like «boom» and it was implemented. It has worked very well. We started using it for NEWS and gradually more things were included in the app based on feedback from us» - Nurse

«When I talk about it, I can hear that it sounds almost like science fiction it was so easy to implement» - Doctor





Nurses experiences with the app

Positive

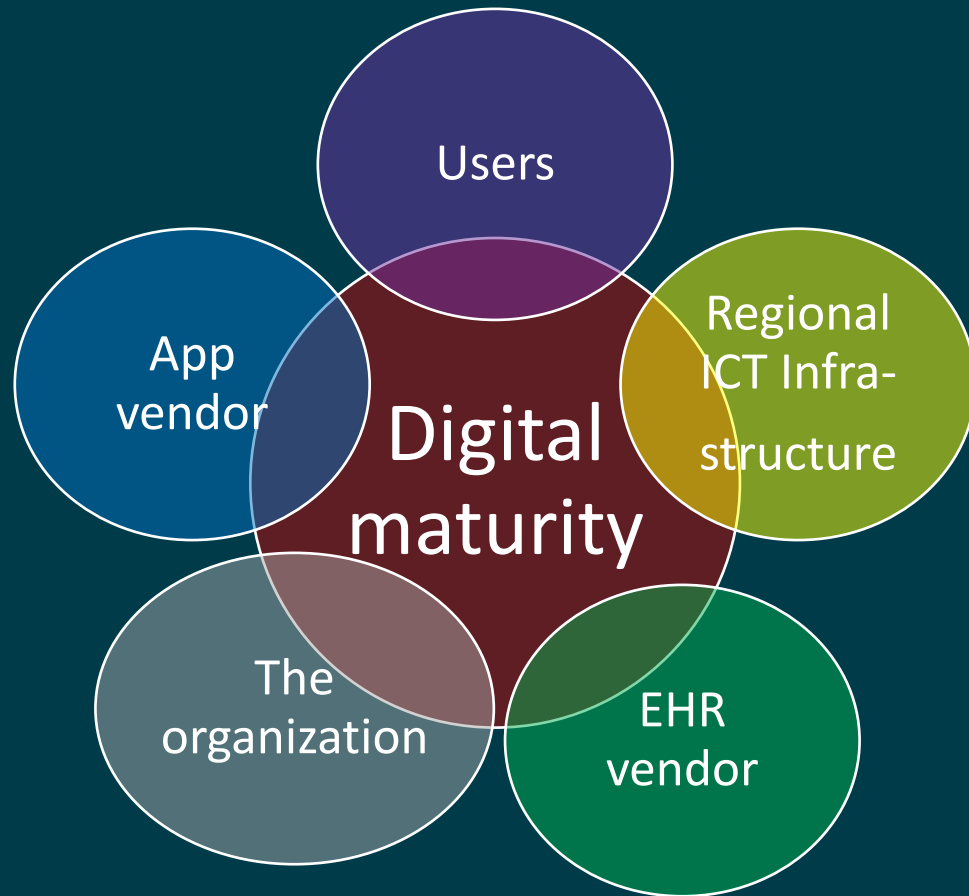
- Easy to use and learn
- Calculates the score automatically
- The vital signs are exported automatically to the EHR and to the electronic Whiteboards
- You find all NEWS on all patients in the app
- The workflow related to NEWS is improved
- No need for paper or double registration

- When the network is down they had to register on paper
- Sometimes the phones don't work
- Important to not focus too much on technology and forget to assess the patient
- Some register on paper and transfer to the app later on
- Impersonal for patients when using the phone bedside
- Not very time saving

Negative



Improved digital maturity



We see that the negative feedback mainly relates to lack of digital maturity for users, organization as well as the technological infrastructure

Nordlandssykehuset wanted to test out digital solutions for future use

The Regional ICT department needed to test the mobile infrastructure and the complex integrations

EHR vendor wanted to use apps for more functionality and test adding 3 part vendors to their system

To make the nursing app a success, it was important to provide a good collaboration between the EHR vendor, the app vendor, the regional ICT department and Nordlandssykehuset



An overview of the Unintended values of the implementation



Improved workflow for doctors



Better overview for department managers



Improved communication between professions and units



Improved digital competence makes healthcare personnel find more to include in the app



Improving doctors workflow



Receive NEWS score instantly

Find the NEWS score on their office computer

Find overview of trends for vital signs and NEWS in the same document

Less unnecessary calls from nurses

Less miscalculations

Easy to check trends for NEWS on patient at other departments if you are on call



Better overview for the department managers



Very easy to implement

Intuitive, timesaving and needs minimal training

More and improved use of electronic whiteboards

Improved overview of the workflow related to NEWS

Increased awareness and focus on NEWS

Good collaboration with ICT on support and maintenance

Improved communication between professions and units

Transfere



Improved collaboration between healthcare workers and units

Standardized language

Objective parameters

Updated NEWS score and correct calculations

Doctor can look at NEWS trends when discussing transferring patients



Improved digital competence makes healthcare personnel find more to include in the app



Improved digital competence made healthcare personnel suggest more forms and scores to include in the app

Easy to collaborate with the ICT department and the vendor on making changes to the app

Important that the app is flexible to change

Successful implementation - Lessons learned



The app provided users with instant value



The app fulfilled all the goals set by the health trust



The app generated several unexpected values



Qualitative evaluation and the NASS framework outlines values that are not measurable



A mature organization is essential for lightweight implementation to succeed



Implementing a mobile app designed for one specific purpose is a new way of supporting clinical practice



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Thanks for listening 😊

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