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User Participation in Design of a Process Oriented Medical Record – When and How?

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Abstract

User participation is crucial to the success of a project but the challenge is to determine how and when to involve the users. Our experience from a project designing a Process Oriented Medical Record (POMR) is that choice of user participation methods must be based on the degree of expected organizational change and the type of design questions to be answered.

Keywords:

electronic health record, user participation

Introduction

When implementing EHR systems, changes are introduced in the organization. It is therefore crucial to the success of a project to have the users participating in all the phases of the project [1]. The purpose of involving the users differs in the phases of the project, for instance system specification, system assessment, designing user interfaces or facilitating end user ownership to the system. One of the challenges of involving users in the design of clinical systems is to determine which methods to use and when to use them.

Materials and methods

The EHR project intended to purchase an interdisciplinary POMR for about 25.000 clinical users in the Capital Region of Denmark. Before project initiation it was decided that the EHR should:

- be interdisciplinary
- be problem oriented
- contain the concept of period of care
- contain highly structured data
- make it possible to reuse data for different purposes, for example quality assurance, management information, research and billing

The vast majority of the region's hospitals use monodisciplinary, chronological paper based records and the designed interdisciplinary POMR would therefore introduce a new concept for clinical documentation and thereby the introduction of Second-order changes in the organization [2].

The clinical users participated right from the beginning of the project and during the design phase more than 100 clinical users were involved in the project. Being able to support the users in making decisions about an interdisciplinary POMR required different methods based on the type of questions to be answered.

In the early phases of the project the methods were primarily based on textual descriptions of the IT-system's functionality that were reviewed by the users and later discussed on follow-up workshops. Later in the project more visually based methods were used and in total we used four fundamentally different methods of user participation in the design of the system:

1. Focus groups - Review and discussions of the system specification documents
2. Scenario based approach – designing data presentation facilitating clinical overview of the POMR
3. Use case[3] – describing process oriented data capture
4. Prototyping and usability testing – deciding principles for data capture

Results

The focus groups were used to review and discuss system specifications. The specifications consisted of textual descriptions of the POMR functionality complemented with user interface sketches. The review process resulted in hundreds of comments from the clinicians including

- comments to the documents wording
- rejections of functionality
- proposing new functionality
- concerns about the described functionality

Focus groups reviewing and discussing system specifications often left users in great uncertainty of whether the POMR could support the clinical workflows.

In the next phase of the project *the scenario method* was introduced to design the user interface for obtaining overview of the POMR. Relevant articles about the subject 'reading the medical record' were initially examined, discussed and combined with clinical practice resulting in nine generic clinical scenarios.

The method had the advantage of relating the known daily workflow to the needs of data presentation and thereby linking the two concepts of clinical documentation (chronological based record and process oriented record).

The Use case method was introduced to focus on the system's necessary workflow support in capturing data. The result was long textual structured descriptions of data capturing processes. The clinicians found the production of new long textual descriptions difficult and time-consuming and the use case method wasn't suitable for a large involvement of clinicians. Nevertheless applying the use case method in small interdisciplinary groups answered several questions about how the system should support clinical workflows.

Prototypes and their usability testing were considered the most inspiring method by the clinicians, visualizing the new concept of clinical documentation and facilitating concrete decisions about the user interface. The prototypes were tested for usability by clinicians and the principles for documentation in the POMR could be decided on this background.

The prototype method established the best conditions for the clinicians making decisions about the new system's functionality. The vendor agreed in this observation, but considered this method the most demanding as regards the use of resources.

Discussion

It was evident that many of the 100 clinicians who were involved in the project found it difficult to relate the textual descriptions of the POMR system to the future clinical practise. The POMR would introduce a second order change in the organization and the need for a more sophisticated method to visualize the system's impact to the future clinical practice was identified.

The scenario method made it possible for many of the clinicians to see how the EHR could change and actually support clinical work. Thereby the clinicians could more precisely express their need for different surveys of the data in a patient's EHR. The scenario method doesn't contain elements to structure and detail the steps in work practise and therefore this method was found most suitable for answering generic questions about data presentation.

The use case method was difficult to use for the clinicians, but made it possible for the IT consultants from the customer and the vendor to gain a common understanding of the need for process support by the system. Searching for and piecing together the information to make a clinical survey of the relevant data in the patient record is not a logical step by step procedure and the use case method was therefore primarily used to describe data capturing processes.

Finally and on the background of the above mentioned methods it was possible for the vendor to make prototypes that were understood and accepted by the coming users. The prototypes could visualize the system functionality and the support of the future clinical documentation process but still the visualisation of the consequences for the future clinical work practise were missing. In case of second order changes to the organization it could be necessary to test the prototypes in medical settings or in medical simulation environments.

In summary the total design phase using four methods for user participation was a protracted and time consuming process that could have been conducted better if the understanding of the purpose of user participation and the complexity of the questions to be answered had been better described in advance.

The possibilities and limitations of the four user participation methods are well described in the literature[3][4][5] but in addition our project identified a need for a reflective approach to choose between the different methods based on the degree of organizational change and type of design questions. Examples of questions to be answered before choosing the method to user participation could be:

- Which degree of organizational change will the system implementation cause?
- How many end users are to be involved in decisions about the system design?
- Are the questions about data capturing or data presentation?
- Are the questions about principles or detailed functionality
- Is the purpose to facilitate end user ownership or to capture detailed information about clinical practise?

Conclusion

Our experience regarding the development of an interdisciplinary POMR shows that one universal method of user participation in system design does not exist. Decision about methods of user participation must be based on the degree of organizational change and the concrete system design questions to be answered (data presentation or data capturing) in the design process.

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