The users' role in configuring large healthcare suite systems

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Abstract. The main objective of comprehensive electronic health record suites is to meet the needs of various users across healthcare institutions. These EHR suites offer extensive configurability, allowing customization to accommodate diverse professional practices and user requirements. This customization process demands careful preparation, involving close collaboration between expert configurators and end-users to design the necessary functionality. We explore this collaboration across different phases of the project. Empirically, we investigate the preparation and implementation of the Epic EHR system by the vendor Epic in the Central Norway region.

Introduction

The main objective of comprehensive electronic health record (EHR) suites is to meet the needs of various users across healthcare institutions. These EHR suites, including Epic, Cerner, and InterSystems, offer extensive configurability, allowing customization to accommodate diverse professional practices and user

requirements [1]. This customization process demands careful preparation, involving close collaboration between expert configurators (builders) and end-users to design the necessary functionality. We want to explore this collaboration, not as a snapshot in time, but across different phases of the project. Therefore, we pose the following research question: What are the opportunities for users to influence configuration processes before, during, and after the go-live of large healthcare suite systems?

Empirically, we investigate the preparation and implementation of the Epic EHR system by the vendor Epic in the Central Norway region, encompassing all its hospitals, general practitioners, home-care services, and nursing homes. In this position paper, our focus is on the hospital context. Conceptually, we draw on the CSCW field, which has a long tradition of attending to the users' perspective in local practice (Fitzpatrick and Ellingsen, 2013).

Method

We adopted an interpretive research approach, which considers a phenomenon from different perspectives (Klein and Myers, 1999; Walsham, 1995). Our data covered the period 2018–2024 and were based on various information sources: interviews, public and internal reports, and national policy documents. We conducted 30 interviews with various personnel (top management, physicians, nurses, and secretaries) involved in the Health Platform program. The interviews were open-ended but mostly focused on the expectations and experiences of Epic. All interviews were transcribed for analysis.

Background on the Health Platform project

The Health Platform is a regional program jointly owned by the Central Norway Regional Health Authority and Trondheim Municipality (Ellingsen et al., 2022). In 2019, the program signed a NOK 2.7 billion (EUR 270 million) contract with Epic Systems Corporation to implement the Epic EHR suite in Central Norway, including all hospitals, general practitioner clinics, nursing homes, and home care services. As a suite, Epic is relatively self-contained and is supposed to provide most of the functionality needed by health personnel, either in ready-to-use form or through configuration by expert configurators or so-called builders to meet the various health professionals' needs - before, during, and after implementation. In the preparation phase, the users were invited to take part in customizing the system, adding content, and setting up workflows and information flows. As a part of this, a hierarchy of formal decision fora of subject matter experts were set up to facilitate a negotiated solution. In addition, the role as subject matter

coordinators were established to coordinate the activities of the subject matter experts.

Trondheim Municipality implemented it on 1 May 2022, while the large St Olav's Hospital implemented it on 12 November 2022.

Results

The initial phase

In preparation for the configuration process, the Health Platform analysts and builders presented the configuration tool to the users as various workflows requiring IT support. They explained how the tool worked and said the users could decide for themselves how they should use it, and they promised the users that they would accommodate their needs in all relevant aspects.

At this stage the Health Platform (and Epic) didn't have any working software to present to users to illustrate how things might work. What they could show were some bits and pieces of video snippets and PowerPoint slides depicting how things could look in the future. Thus, this initial phase came as a surprise for the users, as it was difficult for them to envision what a configured system would look like.

During the first workshops, the Health Platform builders attempted to understand the various practices by presenting terms and questions in Excel sheets. They also had to respond to questions about unknown terms such as 'types of visits', which later proved to be essential in workflows. The same 'types of visits' mentioned in the quote above turned out to be a recurring problematic issue over several years. Neither the Health Platform analysts nor the end-users were aware of the significance of these visit types for the rest of the system and how everything should function and fit together. For the users, it was a completely new concept, and in their feedback to the builders, they connected it to what they were familiar with from their practice. It turned out that it had a different meaning and impact on the new system.

Some users reflect on that it could have been beneficial to have some form of basic training in the fundamental principles of the Health Platform for those who were tasked with answering the builders' questions. However, this was also problematic, as one of them reflects as an afterthought, "because the system was not yet built". The preliminary status of the software also became an issue during the initial training courses for the users. Since the system wasn't configured yet, the users were informed that it wouldn't function as presented until the configuration was complete. This made the training sessions partly useless, and some participants argued that these courses should rather have been informational

meetings where the developers could present the progress made in the building process.

Along the way

When the project started in 2019, the Health Platform stated that the subject matter experts should take all user-related decisions. Whenever these experts disagreed, the level above, comprising professional leaders, should take the decisions. Later, during 2021, the decision structure was radically changed. The Health Platform established several taskforce-group related areas that needed especial attention, namely workflows and NPR reporting. The task force got an independent role and was thus disconnected from the existing decision hierarchies. This made the decision tree difficult to understand because if there was disagreement between the subject matter experts who were in the task force and those who were not, it was unclear who had the authority to address matters. Accordingly, the level of formality was seen as a challenge due to fighting over what was most important as well as the lack of possibility to be creative together.

In addition, the lack of overview was worsened by the silo-based organization of the configuration process as Health Platform builders and subject matter experts typically focused on delimited parts of workflows. It wasn't until each group had completed their work and the workflows were integrated for end-to-end testing that they could assess whether they functioned properly.

Another issue where technical limitations in the software. When secretaries at clinics are grappling with the challenge of managing lengthy waiting lists. It's crucial for them to assign codes to different patient groups for efficient searchability of those scheduled for various examinations, but his was not possible. Epic's work lists only allow sorting one column at a time, limiting usability, especially given the multitude of waiting lists at each clinic. In response, secretaries got a new field on the waiting list called "waiting list subgroup," enabling entry of numerical codes, with each unit defining their meanings. Secretaries considered this to be a very simple solution, but the configurators said to them, "This was what we are able to do; this is what you will get."

Gradually, it became apparent that builders made decisions without involving users. This stood in glaring contrast to how the configuration process of Epic was envisioned: Builders at the Health Platform should present solution alternatives to the subject matter experts who then should decide the best alternative. However, as the builders progressed to this point, they had been working on this for quite some time and taken many crucial decisions without consulting the users. As a result, for many decisions, there were only minor ones to be made, such as fine-tuning what had already been configured.

In use

A key "sales promise" with the Epic suite is that (expert) users can run continuous optimization processes (that is, configuration) of the software after implementation. Actually, such optimization has been much needed, not at least because of misplaced decisions made in earlier phases due to a lack of understanding among Health Platform builders and subject matter experts of what they were dealing with. Accordingly, new insights in recent years should prompt some corrections and redesign of the software, but many users are hesitant to raise the issue because so many resources and efforts have been invested in making it work in the first place, and "then it is stupid not to use it, you know" as some put it ironically.

However, direct errors in the software must be dealt with in any case, for example if a physician adds a patient to a waiting list, and no one monitors it, this may have grave consequences for patients. A secretary explained that last week (in 2024) she found two patients on an unmonitored waiting list who should have been admitted to the hospital in 2022, and this is not unusual. Unfortunately, there is no warnings in the system that tell the users that something is wrong.

While some upgrades (optimizations) of the system are for the better, users experience that rollouts of new versions come with a lot of unintended consequences in other parts of the system, and "that is where the newspaper headlines start" as a secretary explained. Solving these new issues may also be problematic because it may be hard to find the person at the Health Platform support service who has sufficient insight into the domain and the specific issue in question.

Lately, the users have got the impression that the builders rather than fixing real errors, focus on making layout changes, such as moving the search field from the right side to the left side of the screen, moving a line, color changes, and changing the icon "turning wheel" on the screen to a beating heart, etc.

Possible discussion points

Possible theoretical framework?

What kind of additional empirical data could add insight to the case?

Challenges of formal users participating in the configuration of large healthcare suite systems?

Any role for creativity?

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