Flexibility First, Then Standardize: A Strategy for Growing Inter-Departmental Systems

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Abstract

Any attempt to use IT to standardize work practices faces the challenge of finding a balance between standardization and flexibility. In implementing electronic whiteboards with the goal of standardizing inter-departmental practices, a hospital in Denmark chose to follow the strategy of "flexibility first, then standardization." To improve the local grounding of the system, they first focused on flexibility by configuring the whiteboards to support intra-departmental practices. Subsequently, they focused on standardization by using the whiteboards to negotiate standardization of inter-departmental practices. This paper investigates the chosen strategy and finds: that super users on many wards managed to configure the whiteboard to support intra-departmental practices; that initiatives to standardize inter-departmental practices improved coordination of certain processes; and that the chosen strategy posed a challenge for finding the right time and manner to shift the balance from flexibility to standardization.

Keywords:

Standardization; Electronic Whiteboards; Organizational Implementation.

Introduction

The design and implementation of IT systems in hospitals has received increased attention as a way to improve healthcare through standardization [1, 10]. The standardization of health data facilitates comparison between departments and hospitals which subsequently allows decision-makers to make informed decisions about best practices [11], while standardization of clinical practice has shown to improve quality and reduce pa-

tient harm [9]. The reach of standards can vary; some have global reach and have already been crafted (e.g. International Classification of Diseases), while others are national, regional or even more local (e.g. a department developing a list of diagnoses for their own use). Clinicians will often perceive standardization as an unwelcome constraint on their practice, and any attempt to standardize practices through the design and implementation of IT systems is faced with the challenge of balancing the need for standardization against the clinicians' need for a technology that can support flexibility of use [2, 5]. Some have proposed to find this balance by first focusing on standardization and then configuring the standards to the local context, or in other words: first standardize, then localize [2].

This paper reports a case where the reverse approach was chosen. The case consists of the development of an electronic whiteboard system for hospitals in Region Zealand, Denmark. The system was designed in collaboration between a Norwegian vendor, Region Zealand, and Roskilde University. In 2009, the system was implemented at the four Emergency Departments in the region with the purpose of supporting their maintaining an overview of the patients at the department. The system is web-based and the basic layout of the whiteboards can be likened to a spread-sheet, with a row for each patient and columns displaying selected information about the patient such as triage level, room, chief complaint, responsible nurse, responsible physician, and current treatment activity (see Figure 1).

In the beginning of 2013 the whiteboard system was introduced at all departments in one of the hospitals in the region. The purpose of this implementation was to support and improve inter-departmental practices through standardization.

Figure 1 – The electronic whiteboard system.

Because the whiteboard system is highly customizable, the whiteboards could be configured to fit and support the practices in the wards. In order to circumvent resistance of a top-down standardization attempt, it was decided to postpone standardization attempts and to focus on securing the local grounding of the system in the wards. Selected super users were appointed to be responsible for the implementation on their respective wards, which included configuring the system to support their intra-departmental practices. These super users were shown pre-configured templates (e.g. Figure 1) and were then trained to re-configure the templates; by adding or removing columns, deciding how data should be inserted and displayed and so forth. In addition, they were trained in how to configure views or filters that the other users could activate by clicking on a button; for example if the users wished to only see patients with a certain problem, or only patients in a certain part of the ward.

The approach in the beginning of the implementation primarily focused on flexibility and configuring the whiteboards to local contexts. When the system had been configured to support intra-departmental practices and had been in use for a while, the management facilitated activities where clinicians from different departments were called together to use the whiteboards as a starting point to negotiate standardization of inter-departmental practices. This paper investigates to what extent the chosen approach of "flexibility first, then standardize," which in the managers' perspective has been a viable approach for finding a balance between standardization and flexibility in the implementation process.

Related Work

This section summarizes previous work in the following three areas: 1) the benefits and potential of standardization within healthcare; 2) the importance of developing technologies that support flexibility of use; and 3) the challenge of finding a balance between standardization and flexibility.

Several studies have pointed to the potential benefits of standardization. Some have stressed the importance of standardizing health data in order to enable comparisons and thus to allow decision-makers to make informed decisions about best practices [11]. Others have found that the standardization of practice through protocols and checklists has shown to improve quality and reduce patient harm [9]. It has also been argued that the development and implementation of IT holds the potential to improve quality and increase patient-safety through the standardization of otherwise error-prone work processes [1].

When designing and implementing technology, researchers have increasingly acknowledged that it is impossible to design a perfect system prior to actual use [2]. This acknowledgement has motivated the development of approaches that allow for local customization and reconfiguration to be performed after the implementation of the technology, when the users have had the opportunity to use the technologies in their real work [3, 6, 7]. It follows that in order to support customization and reconfiguration, the implemented technology must be configurable and flexible; in other words, it must allow for continued design-in-use [7]. Flexibility in this sense refers to developing technology that allows for further changes and reconfigurations as well as flexibility in the patterns of use [5]. However, most design-in-use approaches do not explicitly address the challenges that arise when the agenda of allowing flexibility clashes with the agenda of standardizing practices across departments, specializations and staff-groups.

Although IT can potentially support standardization, clinicians may perceive the IT as a constraint on the way they usually go about their work on various wards. This is a well-known issue within the research area of information infrastructures [2]. In order for an inter-departmental IT system – like the one described here – to be adopted by the clinicians, it has to be useful in the local context [4]. The agenda of standardization inevitably is faced with the challenge of finding a balance between standardization and flexibility [2]. Finding this balance is, however, no easy task. In their study of the customization process of an electronic triage and tracking system that was configured to be used in eight Canadian emergency departments Bjørn et al. [2] realized that it was impossible to reach a shared (standardized) solution without constraining crucial work in the departments. They therefore proposed to find the balance between standardization and flexibility by first having actors from different departments focusing on how much can be standardized without constraining local flexibility and then focus on configuring the standardized template to the local context. In other words, they proposed the approach: first standardize, then localize [2]. The approach reported in this paper suggests the opposite: focusing on flexibility first and then standardization. In the following discussion, the chosen approach will be discussed and evaluated in relation to the approach proposed by Bjørn et al.

Method

The study was conducted at a medium sized hospital in Region Zealand, Denmark, where the author has followed the implementation and use of the whiteboard system for two years. The study was approved by the hospital management. The findings are primarily based on semi-structured interviews with managers that on different levels have been responsible for managing the implementation process. Table 1 provides an overview of the interviewed managers and their responsibilities. Local Coordinator 1 (LC1) was a nurse with special qualifications who in September 2012 was asked to be a system administrator and to support the implementation process. She held this position until December 2013. At the time of our study, LC2 was the local coordinator.

Table 1 – List of Interviews

Position	Responsibilities
Deputy Director of the Hospital	Head of the local steering committee
Regional Project Manager	Managing the regional project
Local Coordinator 1	Managing the local implementation process
Local Coordinator 2	Managing the local implementation process
Chief Physician	Managerial responsibilities within the surgical department

The interviews were semi-structured. An interview guide was sent to the interviewees prior to the interviews. The guide mainly revolved around the topics: what have the challenges been in regards to managing the implementation process and how have they been dealt with; what initiatives have been taken in order to achieve standardization; how have you dealt with the challenge of balancing standardization and flexibility.

All five managers agreed to have the interviews audio-recorded. The interviews were subsequently transcribed and

analyzed according to a grounded theory approach. Each interview was coded using an open-coding process. The codes were registered in a spreadsheet along with a short description as well as an indication of which interview they originated from. The initial codes were then arranged and re-arranged through an iterative process until the three overall categories emerged: 1) Flexibility and the local: The facilitation of a user-driven process focusing on local grounding to support intra-departmental coordination; 2) Standardization and the global: The need for managerial support when standardizing inter-departmental coordination; and 3) The challenges of balancing these two concerns.

Results

Flexibility to Achieve Local Grounding

Even though the purpose of the implementation was to support and standardize inter-departmental practices, it was decided to focus first on achieving the local grounding of the system through a user-driven process. The message that the management wanted to send to the users was: *"We have been saying: we know that you are doing a great job. We know that you have the knowledge, competences and the abilities to make this even better."* (project manager). The initial focus therefore concentrated on supporting the wards in configuring the system to support intra-departmental practices.

A nurse with special qualifications from the surgical department was appointed as local coordinator. She was trained to be a system administrator and was asked to support the implementation process and to train selected users in configuring and using the system. During the fall of 2012, hospital management asked the hospital department managers to appoint 2-3 clinicians from each ward. These clinicians were given the responsibility of being super users. The super users' responsibility was to support the implementation process in their respective wards by configuring the whiteboard and teaching their colleagues how to use it. The process of training the super users to take on this responsibility started with workshops, where they were trained in configuring the whiteboard. After these introductory workshops, super users were further encouraged to attend additional workshops, where they could come and receive support in configuring their whiteboards. These workshops were, however, optional and only the super users from some of the wards chose to accept the offer. When asked why these workshops were optional, the local coordinator replied: *"We wanted to say that we really do not have an agenda. Because you should bring your agenda to us! We are just here to help you, if you need help with changing the columns, making filters etc."* (LC1). Because the management chose to focus on flexibility first, the super users were given free reins as to how they chose to configure the whiteboards. According to the local coordinator, this strategy was chosen because it was expected to increase the chances of a successful implementation if the super users (and the other clinicians in the ward) felt like they could influence the appearance of the whiteboards. However, because the system was intended to support inter-departmental communication, it was important to secure a basic level of standardization. There were, therefore, some columns that the super users were required to include in their configuration of the whiteboard. These columns were referred to as "global columns" and displayed information like social security number, name, problem and plan. For some of these global columns, it was up to the super users to decide what and how data should be registered in

them. When deciding how the problem-column should be used, some super users created a list of problems that were typical for their ward and the end-users were then required to choose one of these predefined problems when entering data into the column. On other wards, end-users were allowed to write free-text in the problem-column.

The super users were encouraged to configure the whiteboard system to support their intra-departmental practices by focusing on their daily routines. The interviewed chief physician explained how he and the other super users from his ward had solved this task: *"Nurses, secretaries and I [...] defined what we wanted to see in the morning. Those 20-25 patients that we were going to treat. We wanted to get an overview. You had to look at your workday and say: how do we configure this to our work while simultaneously realizing that you may need to change your organization."* (Chief physician). This quote shows that the super users were not oblivious to the fact that even though they focused on configuring the whiteboards to their existing practices, they also realized that the whiteboards would potentially change the way they went about their work. The chief physician explained that he saw this configuration process as a fantastic opportunity, because it was the first time that he had participated in an implementation process where he had an opportunity to say what he wanted the system to look like. According to the local coordinator, many wards succeeded in configuring the whiteboards to support their intra-departmental practices.

Increased Standardization

It did, however, become increasingly clear to the clinicians that there was a need for increased standardization, if the system was to be used to support inter-departmental practices. Even though the super users had been required to include the global columns in order to enable inter-departmental communication, they could – if they felt that one of these columns was less important on their ward – choose to configure their whiteboards in such a way that these columns were not easily seen (and therefore typically ignored) by the clinicians on their ward. Additionally, most wards made frequent use of the predefined views that the super users had configured and these views only displayed selected columns. Because the whiteboards differed from ward to ward, clinicians in one ward did not know what clinicians in others wards actually saw: *"Everybody was like: I want it to be like this and I want the columns to be there and the views to search for that and that. And yes, the message was: you can get what you want. But when we wanted to communicate then we discovered that we couldn't. The information that I put into the system did not reach the intended receiver."* (chief physician). The chief physician pointed out that because of the lack of standardization with regards to columns and views, the super users realized that if they wanted to ensure that the information on the whiteboard reached the intended receiver, they had to cooperate with super users in other wards: *"If anyone wanted to inform another ward or group about something, then you had to say [to the super user in the other ward]: you have to modify your filter to include information from this field."* (chief physician). Thus, even though information was entered into the system with the intent of sharing it with another ward, the lack of standardization in terms of the appearance of the whiteboard meant that the system in practice could not be used to support inter-departmental communication.

As it became increasingly clear to the clinicians that there was a need to increase standardization, the management also became increasingly aware that it was time to constrain the flex-

ibility that had been given to the wards. Therefore, super users and management across departments gathered to negotiate and agree on rules about how to configure and use the whiteboards to support inter-departmental communication.

It was decided to take a more top-down approach in order to initiate the standardization of selected inter-departmental work processes: *"We said: well, let us try to focus on certain work processes and then get some common ground regarding how we want it to be."* (LC1). The first example of the standardization of such an inter-departmental work process concerned the boarding of patients for surgery. The local coordinator convened managers and super users from the relevant departments to discuss how the boarding should be supported by the whiteboard: *"And they really got up to a discussion (...) and I thought, how can I close this discussion! (...) But in the end of the first meeting, they were about 80% in agreement."* (LC1). After a few more meetings, the involved clinicians agreed on a standard checklist that entailed 7 steps that were required in order to secure a safe transfer for patients that needed surgery. When all 7 items on the checklist had been checked, the patient could be transferred from the ward to the OR. The local coordinator configured the whiteboard to include this checklist to support the agreed inter-departmental work process. The standardization of the boarding of patients for surgery thus required super users and the management from several relevant departments to agree on a standard. When this standard had been agreed upon however, the work of implementing the standard still remained: the clinicians in the departments had to be trained in adhering to the standard and using the whiteboard in a structured way. For a few weeks, the clinicians could use both the old way of boarding patients (fax and phone) and the new way through the whiteboard. After a trial period, it was decided by the hospital management that all patients had to be boarded through the whiteboard. The process of using the whiteboard as a starting point to standardize inter-departmental work processes has subsequently also been used in other areas (for example for ordering physiotherapists). Presently, the hospital is pilot testing a new checklist in the whiteboards to be used in the referral of patients from the ED to other departments. The new checklist has also been designed based on a standardized practice that clinicians from relevant departments have agreed upon. The region now plans to implement these standards in other hospitals in the region, where the whiteboards are presently being implemented.

Another important issue in regard to standardization has to do with the standardization of data and how the whiteboards can be used to generate statistics about the workflow in departments and hospitals. Presently, the region is working to generate regional standards with regards to the content that is registered within the columns. This includes the generation of lists of classifications that the clinicians can choose from rather than typing free-text. According to the present local coordinator, there has been a wish to work on these classifications for a long time, but the whiteboards have been a catalyst for focusing on and negotiating much needed standardization across departments and hospitals in the region.

Balancing Flexibility and Standardization

When the whiteboards were implemented, the hospital management chose to pursue a bottom-up approach to improve the chances of local grounding. In this first phase, the focus was on flexibility, where the super users seemingly were given free rein to configure the system to support intra-departmental practices. When local grounding had been achieved, the management decided to proceed with the actual goal of standardiz-

ing inter-departmental practices. Several of the interviewed managers reported how it had been a challenge to make the transition from flexibility to standardization: *"When do you go from saying: use it, if it makes sense for you – to saying: Use it! When do you make that switch?"* (project manager). The deputy director felt that the transition was dependent upon whether the system was in use in the wards: *"When the basic use of the system was widely grounded in our organization (...) then we need to cut back on the free reins and work to control how we use the whiteboards."* (deputy director). Thus, the management should not focus on standardization until the system was being used to a sufficient degree in the wards.

The interviewed managers stressed that the standardization of inter-departmental practices had been highly dependent upon the engagement of the top management in the hospital. The deputy director stated that he too was aware of the importance of the top management's engagement and therefore recently made an official announcement that all departments are required to use the whiteboards to a certain degree and for selected practices. According to the initial local coordinator, the work to standardize inter-departmental practices prompted a shift in the managerial approach: *"It resulted in the use of some coercion. When we put these work processes into the system, we removed the old way of doing it. It was like saying: It is no longer a question of whether you want to or not. This is now the way to do it!"* (LC1). In order to agree on inter-departmental standards and to get the clinicians to adhere to them, the hospital management and the local coordinator chose to use some coercion and hence to constrain the flexibility that had been central in the first phase of the process.

The shift from flexibility to standardization also brought forth a shift in challenges. The deputy director explained that when the implementation was driven by super users, the main challenge was to reach decisions about inter-departmental practices. He did however also see the approach as a promising investment: *"It has some clear advantages in that you get to develop things that are clinically relevant."* (deputy director). With a more management-driven process, it is easier to make decisions about inter-departmental issues but it can be a challenge to foster good (clinically relevant) ideas: *"How do we make sure that we foster good ideas? How do we make sure that we realize what the best practice actually is?"* (deputy director). He therefore saw the importance of continued close cooperation with super users on every ward and setting up the proper forums to secure a bottom-up flow of knowledge and good ideas from the clinicians (in terms of how the whiteboards could be used to develop and standardize intra- and inter-departmental practices).

Discussion

As shown in the preceding section, the chosen strategy for the implementation of the whiteboards, in terms of finding a balance between standardization and flexibility, was one of "flexibility first, then standardize." The following discussion will focus on whether this approach was a viable alternative to Bjørn et al. [2] approach of first standardize, then localize.

In the first phase, the management chose to focus on flexibility by facilitating a user-driven approach and refraining from setting too many criteria for the super users. On many wards, this meant that enthusiastic super users welcomed the configurability of the system as an opportunity to influence both the appearance and the use of the system in their daily work. The decision to achieve local grounding before standardization

meant that the whiteboards were perceived as useful by the clinicians on wards, where super users had successfully configured the whiteboards. When the implementation entered the second phase, standardization, clinicians had already adopted the whiteboards in their local context and were becoming increasingly aware of the need for negotiating standards across wards. Even though this standardization process meant that some super users felt that they had to roll-back some of their changes, they acknowledged the standardization as a necessity if the whiteboards were to support inter-departmental coordination.

Due to the management in the first phase (flexibility) choosing not to set (or reveal) their agenda or boundary conditions for the change process, the super users in some wards never managed to incorporate the whiteboards into local practices; they simply did not know what was expected of them. Several of the managers acknowledged that the users had been given too much flexibility and too little direction. Their explanation was that the hospital management wanted the process to be user-driven. This however points to a somewhat misunderstood notion of what is required to manage a user-driven process. Within the tradition of Participatory Design, which is one of the central user-driven disciplines, it has been highlighted as to how important it is that the participants in the design have "close links to project management" [8]. According to Simon [12], an open-ended design process requires more of the users than a process with clear directives and she therefore argues for helping users in user-driven processes by "scaffolding" their participation. The management of user-driven processes thus requires the provision of supportive resources, tasks, and guidance upon which the super users can build their confidence and abilities.

When the management took more control in order to address standardization, they stated that there was a shift, where the process could no longer be driven by users; rather, the users had to be told what to do and how to use the whiteboards. In the light of the aforementioned scaffolding perspective, one might argue that both flexibility and standardization rely on the management scaffolding (super) users' participation in terms of how to use the whiteboards to improve and develop intra- as well as inter-departmental practices. When the deputy director stressed the importance of setting up forums to secure a continued bottom-up flow of knowledge and good ideas from clinicians, he was basically talking about how to scaffold a user-driven change process.

Conclusion

When implementing IT in an attempt to standardize inter-departmental practices, this study suggests that it can be a viable strategy to focus on flexibility first, then standardization. The first phase, flexibility, was succesful in terms of configuring the whiteboards to secure local grounding in most wards. In hindsight, however, several managers stated that the users had been given too much flexibility and too little direction. In the second phase, standardization, it was an advantage that the whiteboards had been widely adopted and that users experienced the need for standardization. The strategy also poses challenges in terms of managing the user-driven process, scaffolding the clinicians' participation, and in finding the right time and manner to transition from flexibility to standardizaiton.

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