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## Accreditation and Participatory Design in the Healthcare Sector

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**Abstract.** We revisit the role of participatory design approaches in the light of the accreditation regime currently imposed on the Danish healthcare sector. We describe effects-driven IT development as an instrument supporting sustained participatory design. Effects-driven IT development includes specifying, realizing, and measuring the effects from using an information technology. This approach aligns with much of the logic in accreditation but is distinguished by its focus on effects, whereas current accreditation approaches focus on processes. Thereby, effects-driven IT development might support challenging parts of the accreditation process and fit well with clinical evidence-based thinking. We describe and compare effects-driven IT development with accreditation, in terms of the Danish Quality Model which is used throughout the Danish healthcare sector, and we discuss the prospects and challenges of combining these two approaches.

**Keywords:** Accreditation, Participatory Design, Effects-Driven IT Development, Healthcare

### 1 Introduction

The theme of the 38th Information Systems Research Conference in Scandinavia (IRIS38) is *System design for, with and by users* referring to the famous IFIP WG 9.1 working conference held in 1982 that also had this theme [1]. More than 30 years later we now revisit the traditional understanding of the roles of users and designers as well as different development approaches that place emphasis on users' empowerment, motivation, and inclusion in designing, shaping, innovating, and co-creating information systems. The conference theme challenges us to consider these new forms of participation, persuasion, and design—*for, with and by users*—both in the sense of understanding the phenomenon better and in devising better support for it.

Many things have changed since the IFIP conference in 1982 – but the struggle to promote participatory design remains. In the 1980s the field of information systems

was dominated by standalone systems developed more or less from scratch. Approaches to information systems development were focusing on the early design of these systems, and participatory design was heavily influenced by attempts to collaborate with trade unions: At the IFIP conference in 1982 systems design with trade unions was a key reflection in 15 out of 33 (45%) of the papers [1]. Today, most systems are based on standard platforms and we have entered an “era of configurability” [2]. Information systems development includes ‘infrastructuring’, that is sustained sociotechnical approaches in which information systems are seen as evolving information infrastructures [3]. Management is no longer approached from a power/conflict perspective with participatory design researchers collaborating with trade unions. Instead, participatory design approaches have been devised to accommodate both business and workplace realities [4]. In the context of the Danish healthcare sector, participatory design meets a discourse dominated by the Danish Healthcare Quality Programme (ikas.dk) and a process-oriented accreditation system using the Danish Quality Model (DQM). Accreditation with the DQM is a method of quality improvement based on external audits of healthcare organizations’ compliance with standards concerning their processes.

In this article we respond to the IRIS conference theme by reflecting on a contemporary approach to participatory design, effects-driven IT development [5], and how we experience that this approach supports designing for, with and by users in the Danish healthcare sector. We pursue the research question: *How can participatory design be shaped and promoted to respond to the reality of clinicians and their existing quality assurance systems?* We investigate and describe how the effects-driven IT development approach supports the logic and process of the Danish national accreditation system and, secondarily, the regime of evidence-based clinical guidelines.

In the following we (a) describe the accreditation regime in the Danish healthcare sector, (b) outline the effects-driven IT development approach, (c) presents a case exemplifying effects-driven IT development ‘in action’ by focusing on the concrete effect of obtaining “fasting periods closer to the required six hours before operation”, (d) discuss how effects-driven IT development supports but is different from accreditation and how the effect from the presented case also supports a knowledge system dominated by evidence-based clinical guidelines.

## **2 Accreditation in the Danish Healthcare Sector**

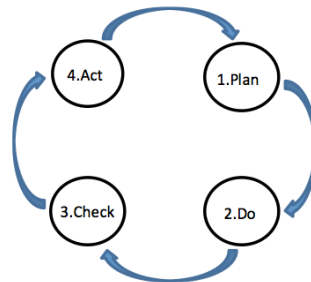
Accreditation is a method to quality development of organizations where you evaluate the organization’s compliance with quality standards through external audits. The quality standards are known in advance and are checked by external auditors at regular visits to the organization. If the organization is accredited it is a recognition of the organization in the sense that it is supposed to be competent and to be able to perform its tasks in accordance with the quality standards [6].

DQM is part of the national strategy for quality development in Danish healthcare. This model has been developed and is maintained by the Danish Institute for Quality and Accreditation in Healthcare [7]. The aim of DQM is to improve the quality of

clinical pathways, to contribute to the improvement of the clinical, organizational, and patient-perceived quality and, to make the quality of the healthcare sector visible and transparent. Another aim is to foster learning and quality development in the healthcare sector through a continuous evaluation of hospitals and other healthcare organizations.

The DQM covers different areas of the Danish healthcare sector including the hospitals. The accreditation standards for hospitals are divided into organizational standards, general standards related to clinical pathways, and standards related to patient diagnoses. Organizational standards include standards for management, quality- and risk-management, documentation and data management, hiring, organization of work and competences, hygiene and infections, emergency plans, instruments and technology, and finally buildings and supplies. General standards for clinical pathways include standards for patient involvement, patient information and communication, coordination and continuity, reception, evaluation and planning, diagnostics, administering medicine, observation, invasive treatment, intensive treatment, nourishment, rehabilitation, prevention and health promotion, patient transfer, patient transport, and the handling of dying patients. Three standards relate to patient diagnoses: a standard concerning the production and use of clinical guidelines about the treatment of patient groups, a standard about treatment in the intensive care unit, and a standard about the hospitals' planning of concrete clinical pathways.

The DQM builds on a circular model of systematic quality development consisting of the phases plan, do, check, and act (see Fig. 1.)



**Fig. 1.** The four phases of DQM: 1. Plan, 2. Do, 3. Check, and 4. Act.

Standards in all the above-mentioned areas are related to the phases of the quality circle with indicators. One indicator for each phase (plan, do, check, act). The indicator related to “plan” checks whether the hospital has a document that describes how the quality goal of the given accreditation standard is to be obtained. The indicator related to “do” checks whether the hospital has implemented the standard. The indicator related to “check” examines whether the hospital monitors the quality of the hospital’s structures, processes and delivered services. Finally, the indicator related to “act” checks whether the hospital evaluates the results from the monitoring and has prioritized and taken action in cases where quality problems have been identified.

Let us give an example: The standard for ‘information in relation to the transfer of patients between departments and hospitals’. This standard is described as follows:

“When a patient is transferred to another department at the same or a different hospital, relevant and sufficient information is passed on” [7, p. 163].

It is explained that all hospitals should as a minimum have a guideline describing the kinds of information that should be passed on. This guideline should as a minimum contain an overview over the information to be documented and passed on when patients are being transferred including: (a) the reason for the transfer, (b) an updated treatment plan with information about the patient’s diagnosis, pathway, treatment until now, and planned examinations, (c) an updated status from the nurses with information about the nursing plan and appointments made with the primary sector, (d) information about the patient’s current prescription medicine, (e) documentation of the information the patient has received about the cause for his/her transfer, and (f) information about relatives, including what information they have received about the transfer, who the closest relative is, and whether there are children or youngsters involved.

The standard explains that it is to be used by all departments involved in the treatment of patients. And there are four indicators related to the standard:

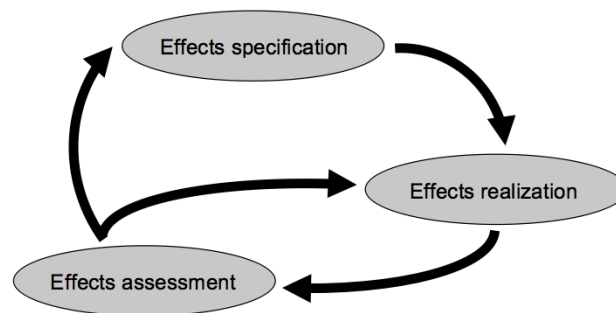
Indicator 1 relates to “plan” and explains what the auditor shall check and look for: “there exists a guideline for transfers between departments and hospitals”. Indicator 2, relating to “do”, points out that what the auditor should look for is “when patients are transferred relevant information is passed on in accordance with the hospital’s guideline”. Indicator 3, relating to “check”, is formulated as “the hospital has goals for the quality of information passed on when patients are transferred between departments and hospitals. And whether goals are met is evaluated at least twice during a three year period using quantitative or qualitative methods or a combination of these”. Finally, indicator 4 states that the auditor should check whether “the hospital has taken steps to improve the quality of the information passed on in relation to transfers between departments and hospitals. And that the effect of the action taken is evaluated and that it has been concluded that it had the “wished-for” effect or that new action has been taken if the “wished-for” effect was not realized”.

## **2.1 The Critique of the Danish Quality Model**

The DQM has been criticized by physicians [8]. The former head of the Union of Chief Physicians has criticized the lack of evidence and documentation for the positive effects of using the model. He has also questioned whether the economic resources used to administer it are well spent, just as he has complained about the amount of administrative work needed to run the model. While the DQM standards primarily focus on processes, the former head of the Union of Chief Physicians thinks that what should be focused on are the results or outcomes of treatments. He suggests that nationally developed clinical guidelines aimed at improving the quality of treatment outcomes represent a better alternative than the DQM. The unions of chief physicians have thus stated: “Our proposal will mean that we will measure the result instead of processes and, that the employees do not have to spend time on all kinds of non-relevant questionnaires” [9, p. 4].

### 3 Effects-Driven IT Development

Effects-driven IT development is a sociotechnical instrument for managing IT projects [5]. It aims to support sustained participatory-design processes by providing a focus on the effects to be achieved by users through their adoption and use of a system [10]: “Simply put, the overall idea is to capture the purpose of a system in terms of effects that are both measurable and meaningful to the users, and to systematically evaluate whether these effects are attained during real use of the system” [11, p. 62]. The overall process and focus of effects-driven IT development include three activities, as outlined in Fig. 2.



**Fig. 2.** Effects-driven IT development [5, p. 6].

During effects specification the users (and their managers) specify and prioritize the effects they would like to obtain by using a specific system. Effects may be specified through workshops and a desired effect may comprise a description of the effect, how the effect can be measured, the current status with respect to obtaining the effect, a plan for the intervention needed to obtain the effect, who is responsible for the intervention, any known barriers and challenges for obtaining the effect, a list of stakeholders, and so forth.

Effects are realized through interventions where work processes and organization are changed and technology support is provided. The process of realizing effects might comprise new or reconfigured cooperative procedures, new or reconfigured technologies, as well as communicating and implementing new practices for using the technologies.

Finally, and importantly, the effects are assessed periodically or, if possible, continuously. The latter might be the case if information about whether the effect is obtained can be extracted automatically from the system and visualized in a manner that shows the evolving effect-achievement status.

The arrows in Fig. 2 indicate that the instrument is shaped by the specified effects, which provide the focus for the realization. The assessments inform the interventions aimed at realizing the effects or lead to reconsideration of the specified effects. While the effect – the target – is clearly identified, the way to obtain the effect – the process – is worked out on the basis of iteratively experimenting with different interventions, as indicated by the arrows.

Effects-driven IT development comprises an overall management instrument targeting specific and concrete results through an ongoing iterative process of interventions, including configuration and re-configuration of systems while they are in real use. It also supports a participatory design process by involving users in all three key activities indicated in Fig. 2. The process can be viewed as sustained participatory design [11] or as support for local infrastructuring activities [12].

#### **4 Case: Effects-Driven IT Development at a Hospital**

Effects-driven IT development is used for optimizing clinical work processes at Nykøbing Falster Hospital in Denmark. Through an action research project researchers (authors of this article) collaborate with clinicians about optimizing patient transfers between departments. In the fall of 2014, the researchers held a series of workshops with clinicians to specify wished-for effects. The clinicians at these workshops included physicians, nurses, and secretaries from multiple departments. Effects were specified through a process of initial brainstorming followed by discussion, gradual refinement, and prioritization. In the spring of 2015, the researchers have met with a core group of three clinicians for a couple of hours every second week. The meetings have served to plan and follow-up on the realization of the prioritized effects and to prepare for the effects assessment. In-between the meetings the three clinicians – a nurse and two secretaries – have been responsible for implementing the effects in their departments. In the following, we describe the content and current outcome of this project, which will continue with effects assessment in the fall of 2015.

Nykøbing Falster Hospital has – as one of the first hospitals in Denmark – recently deployed electronic whiteboards (eWB) in all departments. The eWBs have replaced the dry-erase whiteboards that are typical of all hospital departments in Denmark and abroad and used to maintain an overview of the patients currently in the department.

The eWB in a department displays information about the patients in that department. The eWB is a highly configurable technology and can be configured to display information targeted to the needs of the individual departments, including information such as patient location (room), triage level, diagnosis, attending physician/nurse, status of the clinical care plan, and blood test results. In addition to support for the communication and coordination internally in the departments, the eWB is to support communication and coordination among the departments. The eWB application is web-based and accessible through large wall-mounted touchscreens, through the hospital's many PCs, and through smartphones and tablets carried by some of the clinicians. The eWB, thus, functions as a new information infrastructure [3] and as a tool interconnecting the departments by providing shared access to transient and logistic information about the patients.

One of the overall aims of deploying eWBs throughout the hospital is to support patient transfers between departments. The project was initiated the fall of 2014 by involving the departments that need the tightest coordination regarding patient transfers: the departments involved in operations. The project includes the department

performing the operations and the departments with patients admitted for parenchymal and orthopedic surgical treatment.

In a series of workshops clinicians from the involved departments discussed and specified a total of nine desired effects. Two effects ended up being prioritized, and one of these was the effect “fasting periods closer to the required six hours before operation”. Patients must fast (abstain from food) for at least six hours prior to anesthesia. Most patients, however, are fasting much longer than six hours due to obstacles and complexities in operation planning, including the postponement and cancellation of planned operations due to the arrival of more severe acute cases. Fasting for a long time causes emotional and physiological stress to the patient and is a known clinical risk factor [13] for elderly malnourished patients, patients with diabetes, patients with an ulcer (e.g., decubitus ulcers), and others.

There were several reasons why a shorter fasting period was prioritized as an important effect:

- It is a concrete, well-known and frequent problem, generally acknowledged among clinicians, directly related to the quality of patient treatment, and thus easy to reach agreement upon (for both management and clinicians) as a desirable goal.
- The physicians know that long fasting periods are a threat to health and recovery of the patients.
- The nurses experience, almost on a daily basis, frustrated patients who have been fasting for, say, 10, 12, or 15 hours and still do not know when they are going to be operated.
- The effect is relatively simple to measure and assess.
- Optimizing the fasting period involves most of the coordination related to the transfer of patients to the operating department.

The way to realize the effect is, however, complex and requires changes to the procedures and practices for negotiating, coordinating and communicating operating schedules, planning, and patient transfers. A core group of three clinicians, one from each involved department, was established to plan the realization, including: (a) analyzing the three department’s procedures and practices, (b) suggesting interdepartmental models of cooperation, (c) initiating new cooperative procedures and terminology, (d) re-configuring the eWB to support the realization of the effect, (e) communicating new ways of using the eWB, and (f) monitoring, evaluating, and following-up on changes, interventions, and the need for further initiatives. At the time of writing this article, the group has completed a first iteration of (a) through (d): the eWB has been re-configured and a new release of the eWB has been deployed across the hospital.

Effects assessment is possible both continuously and periodically. The eWB is re-configured with two new columns that display the point in time when a patient started to fast along with the time (number of hours and minutes) that has elapsed since the start of the fast. This way the clinicians have continuous access to the fasting status of each patient scheduled for operation and may take this information into account when planning the patient trajectory. Periodically, the recorded start of the fast and the end of the fast (recorded on the eWB as the start of the operation) can be used as input to reports showing statistics of fasting periods for different groups of patients, including

the average length of fasting for the last week's patients, for parenchymal or orthopedic surgical treatments, for acute patients or planned operations, and the like.

## 5 Discussion

The main points and conclusions of the discussion are summarized in Table 1 below.

The DQM builds on the quality model plan-do-check-act. It moreover builds on the assumption that if it is documented that standards about processes are described and it is checked whether they are followed by a hospital then the quality of the hospital's services including treatments given to patients will improve. Instead of focusing on the wished-for outcome or result in terms of quality the DQM focuses on assuring that certain processes are present and take place in certain ways and merely assumes that the wished-for outcome (better quality of the services delivered to patients) will somehow surface automatically and by itself.

**Table 1.** DQM and effects-driven IT development compared.

Characteristic	DQM	Effects-driven IT development
Aim and concern	Quality improvement through process standards and standards related to patients' diagnoses	Effects-driven participatory design of IT systems
Focus	Indicators of four phases: plan, do, check, act (see Fig. 1)	Specifying, realizing, and assessing effects (see Fig. 2)
Weick 1: Gets people into action	By directing attention toward documenting and learning the accreditation standards and by auditor visits every third year	Through involving people in specifying and prioritizing measurable wished-for effects.
Weick 2: Gives people a direction (through values or whatever)	People should learn and comply with the standards	People should systematically pursue the wished-for effects
Weick 3: Supplies legitimate explanations that are energizing and enable actions to be repeated and over time become "routine"	Does not supply legitimate explanations and struggles to enable actions to become routine	Effects specified from the "inside", legitimate explanations that have the potential to enable repeatable actions
Contribution if DQM and effects-driven IT development is combined	Contributes knowledge about process and patient standards that may influence wished-for effects.	Contributes a sustained focus on whether current processes serve wished-for effects



In effects-driven IT development the connection between results and processes is the reverse. Here it is assumed that the processes that cause certain effects are complex and will have to be “discovered” as the iterative participatory design process moves along. Some processes performed in certain ways may yield the wished-for effects, others may not. The needed interventions and the specific relationship between processes and wished-for effects are open and empirical questions.

According to the organizational psychologist Karl E. Weick, any framework of quality improvement will improve performance if it accomplishes three things [14, p. 163]:

1. Gets people into action.
2. Gives people a direction (through values or whatever).
3. Supplies legitimate explanations that are energizing and enable actions to be repeated and over time become “routine”.

In the case of the DQM peoples’ actions are directed toward documenting and toward learning the accreditation standards so that they may get accredited when the auditors visit every third year. The direction in which people are impelled to act has to do with knowing and performing according to the accreditation standards. As a consequence, the attention of employees may drift from effects toward standards. Moreover – as mentioned above – the DQM has been met with critique from physicians. They want quality improvement systems that more directly target patients’ health, rather than “convert” quality improvement into filling out questionnaires (such as those related to the DQM), which do not directly target patients’ health and may, therefore, appear irrelevant. It does not seem, then, as though the accreditation system represented by the DQM supplies legitimate explanations that are energizing and can be relied on to generate new routines – at least not among the physicians. Rather, the physicians appear to perceive the standards as somewhat foreign to medical work, something imposed from the “outside”.

Effects-driven IT development gets users, designers, and sometimes researchers into action by involving all of them in the analysis of the design problem, the formulation of measurable, “wished-for” effects, and the search for solutions. The measurable “wished-for” effects are identified and specified by the participants and, thereby, make sense to those involved and give a shared sense of the direction in which they need to move. Moreover, the effects and the actions required to realize them make immediate sense to those involved because they are a result of their collective process. The “wished-for” effects are thus formulated from the “inside” by users, designers (and sometimes researchers). As a consequence legitimate explanations that are energizing and hold the potential to enable repeatable actions are more likely to result.

A combination of the DQM and its standards with effects-driven IT development could provide the strengths of both methods and counter the drift of participants’ attention from effects toward standards. The DQM and its standards focus on the quality of processes but connect only indirectly to outcomes and results. Effects-driven IT development focuses on effects and devises processes in a manner specifically targeted at producing specified effects. As a general instrument for managing IT projects, effects-driven IT development does not make statements about which clinical processes are most relevant for producing high-quality outcomes at hospitals. Combining effects-driven IT development with DQM could over time lead

to a more contextualized approach that ties together the process standards of the DQM with the concrete measurable effects of effects-driven IT development.

Participatory design builds on a positive learning and motivation theory suggesting that people are more inclined to implement solutions if they are involved in defining what the problems are, what may solve them, and what the wished-for effects may be. Using an effects-driven approach would involve participants and create ownership to the problems, solutions as well as wished-for effects related to the implementation of hospital standards. The standards and the concrete results that the standards should help the hospital to obtain would be in focus for the joint quality-improvement activity. The relevance and quality of standards and processes would be measured in relation to their consequences for specified, wished-for outcomes, rather than on the basis of whether specified processes were taking place. This would be one but not the only possible answer to the critique that physicians have raised against the DQM.

## 6 Conclusion

The DQM gets people into action, directs attention, and tries to legitimate itself by introducing a standard as for instance the standard for ‘information in relation to the transfer of patients between departments and hospitals’ and indicators for documenting that “plan”, “do”, “check”, and “act” processes are in place. However, without measuring whether “wished-for” effects are achieved, process standards may direct clinicians’ attention toward complying with standards and, thereby, somewhat away from the effects of treatment on patient health. Physicians have criticized this approach, which appears to be perceived as introduced from “the outside”.

Effects-driven IT development specifies, contributes to realizing, and assesses “wished-for” effects in a more direct manner. Wished-for effects, for instance related to patient transfer and fasting, are formulated from inside the departments, make immediate sense to clinicians, and are thus legitimate and mobilizing from the outset. Clinicians get motivated to go into action, direct their attention toward effects, and find that what they are doing is legitimate and makes sense, as illustrated in our case about effects related to fasting.

The DQM and the participatory design approach effects-driven IT development may however complement each other, if combined. The standards provided by the DQM contribute process knowledge and alignment. The effects-driven assessments provided by effects-driven IT development contribute a sustained focus on whether current processes serve wished-for effects.

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