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### Goal incongruence

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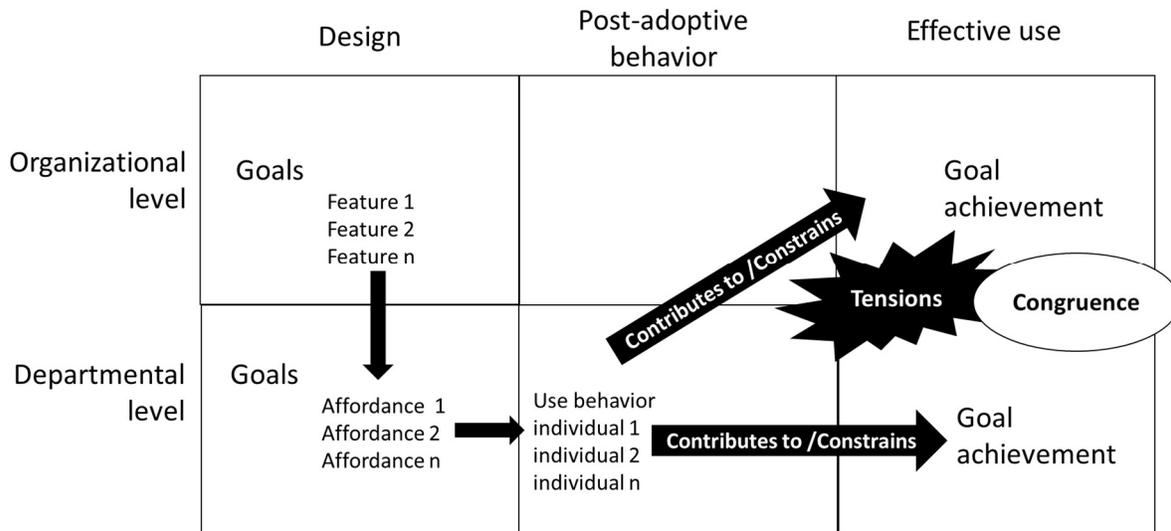
# **Goal Incongruence: Tensions in the Effective Use of Electronic Health Records across Levels and Specialties**

## ***HITS- Health Information Technology Symposium***

Electronic Health Records (EHRs) can provide significant benefits for healthcare organizations, such as enhanced patient safety and quality of care, improved communication and coordination amongst medical professionals, and eventually, reduced costs (Harrison et al. 2007; King et al. 2014). These benefits can only be reaped if the EHR is effectively used. In this paper, we problematize the concept ‘effective use’ in multi-level, multi-actor use environments. Effective use of an information system has been conceptualized as ‘*system use in a way that helps attain the goals for using the system*’ (Burton-Jones & Grange 2012). These goals can be unilaterally determined at the power center within an organization, or by a range of stakeholders (Burton-Jones & Grange 2012). In the case study reported here, the use-levels consist of the hospital (focal actor: board), medical specialties (focal actor: department boards) and individuals (focal actor: professionals). We unravel how the potential multiplicity of goals for the EHR across these levels and across different actors per level adds complexity to the concept of ‘effective use’.

On an aggregate level the actors involved may well have shared goals for the EHR in the way of contributing to quality of care, patient safety and efficiency. We argue, however, that in translating such goals into the concrete design of EHR functionalities and features, these seemingly similar goals across levels and actors may turn out to be incongruent. If such incongruence occurs, it will lead to tensions for the users that will need to be coped with, and preferably resolved, in post-adoptive use behavior (Boonstra et al., 2017). This line of reasoning, as depicted in the descriptive model in Figure 1, raises the empirical question ‘*how goal incongruence gets reflected in end-users’ experience of tensions and how these are coped with in the emerging EHR use patterns?*’ Theoretically, we reflect on what kinds of use patterns can be

considered effective when goal incongruence is prevalent. These issues led to our explorative case study of post-adoption use patterns of three common EHR functionalities and features.



**Figure 1: Descriptive model**

Post-adoption studies have mostly focused on either the organizational level (Burton-Jones & Volkoff 2017) or the individual level (Agarwal & Karahanna 2000; Burton-Jones & Grange 2013). Effective use is scrutinized in different industries, whereby research predominantly focused on effective use at the individual level (Burton-Jones & Gallivan 2007; Lamb & Kling 2003). However, the phenomenon effective use in the healthcare context, especially in hospitals, is not fully understood. Hospitals consist of mostly hierarchically managed shared facilities, like wards, and a set of semi-autonomous medical specialties often organized in departments. Decision-making about the clinical work processes is mainly decentralized to these departments (Greenhalgh et al. 2004). Yet, the adoption literature has largely neglected differences in post-adoptive behavior across departments. Here, we explore how such differences may emerge as a consequence of goal incongruence between the hospital and the department level actors.

Our research aim is to enhance our understanding of how tensions emerge in post-adoptive use behaviour as a consequence of goal incongruence materialized in the design of EHR functionalities and features and what are the theoretical implications for the conceptualization of

effective EHR use. The term post-adoptive behavior is used here to refer to *'the myriad feature adoption decisions, feature use behaviours, and feature extension behaviours made by a user after an EHR application has been made accessible to the user, and applied by the user in accomplishing his/her work activities'* (Jasperson et al. 2005). To enhance our understanding of such behaviour, EHR (non-)use patterns need to be identified, causes analyzed, and constraining issues revealed.

In our field research, starting from the theoretical insights summarized above, we specifically explore the conceptual distinction between effective EHR use at the hospital and at the department levels. The empirical basis of this research stems from the implementation of an EHR in a Dutch hospital. We adopted a qualitative case study approach, with a focus on medical specialists' post-adoption behaviors, since these users have full authorizations to use the system's functionalities. The selected case site implemented a new organization-wide EHR in 2017 and we collected our data approximately a year thereafter. This implementation allowed us to develop insights into the possible tensions emerging for these end-users as a result of goal incongruence across levels and actors, and to observe the consequences for effective use in the resulting post-adoption behaviors. For this purpose, the research design comprised a single case with a sample of four embedded units, i.e., diverse medical specialist departments. Our descriptive model guided our research steps. Based on the project documentation and earlier interviews, we identified three hospital-wide goals for this EHR: enhanced patient safety, increased efficiency, and standardization of work processes. After consultation with the leading project managers, we then choose three key features common to many EHRs that, according to the terms-of-use, had been explicitly meant to contribute to these goals, namely: (1) Pre-specified Order sets, (2) Problem list and Medical history, and (3) Smart tools. The second step was to analyze the (variation in) post-adoptive behavior patterns across the four medical specialties regarding these features. We conducted 24 interviews and observed meetings. The third step was to describe the (in)congruence between organizational and specialties' goals in the design of these functionalities

and then analyze (the coping with) any emerging tensions in the effective use of the system by the professionals.

The use of *order sets* enhanced standardization and improved efficiency in areas of surgeries, pre- and post-operative care, and hospital admission. However, the effectiveness of the order sets depended on the extent to which the order sets were congruent with the departmental level patient care. In three departments (A, B and D) the order sets had been adjusted to departmental patient care and the medical specialists only had to adapt minimally. Within these departments, the medical specialists used the system much more intensively than in the fourth department (C) where the order sets were incongruent with their standardized patient care and required the physicians to make either many adaptations, or not use the order sets.

The highest variation in post-adoptive behavior was found in the *problem list and medical history*. It was expected that the use of these functionalities would contribute to enhanced patient safety and standardization of work processes. Department A collectively decided not to make use of the problem list and medical history and instead adopted workarounds to achieve the departmental goal of efficiency in the face of the high daily volume of patients. Nonetheless, department A was better able to achieve their departmental goals since the workarounds were highly effective within the department. We conclude that this department had the most generic and standardized work processes, and the most strict agreements regarding the use of the EHR.

In three of the four departments, a high variation in post-adoptive user behavior could be observed, since a part of the medical specialists used the problem list and medical history in accordance with the organizational policy, whilst the other part did not use it at all, or only partial. This can be explained by the high amount of time that is required to enter the necessary data in the problem list and the medical history. The high variation in post-adoptive behavior is problematic, since this heterogeneous and unreliable way of data entry can lead to reduced patient safety, decreased efficiency and decreased standardization of work processes on both

departmental and organizational level. Tensions emerged between adherence to the organizational policy by appropriately making use of the problem list and medical history, and increasing efficiency and devoting more time and resources to patients. Adherence to the organizational policy can be perceived as effective use at the organizational level, while non-use or partial use resulted in a higher level of efficiency on departmental level. High variation in post-adoptive behavior resulted in a suboptimal level of effective use on both departmental and organizational level.

In two of the four departments, the intensive use of *Smart Tools* contributed to enhanced efficiency and to standardization of work processes on departmental level. The use of Smart Tools in writing medical letters was conceived as effective within these two departments. In other departments it was indicated that the inconvenient interface and the content of the templates, as part of the surface structure (Wand & Weber, 1995), impeded the use of Smart Tools. Nonetheless, for 15 of the 24 medical specialists, the use of Smart Links accelerated the process of writing medical letters. Smart Templates encouraged the medical specialists to work in a uniform manner, realizing effective use of this feature in terms of standardization.

This research enhances our understanding on how effective use can be achieved at the department level, and eventually, on the hospital level. We find that goal congruence led to more uniform use patterns of medical specialists from the same specialty, contributing to effective use at both the hospital and department level. In contrast, in case of incongruent goals, uniform collective use patterns within a department contributed to effective use at the department level, but may not constitute effective use from the perspective of the hospital level. Finally, where goal incongruence was met with variation in individual use patterns within a department it constrained effective use both for the department and hospital level.

Burton-Jones and Grange (2013) already recognized that different stakeholders can determine different goals for a system, in this case the hospital's goals and the departments' goals.

We explored how this complicates the concept effective use. This study adds to the literature by demonstrating how effective use for actors at the departmental level does not necessarily accord with effective use for the hospital level, whose actors translated their goals into the system design. We specifically highlight that even when the aggregate goals for the system seem shared across levels, the goals for the system-in-use may turn out to be incongruent. Hereby, tensions emerge for the end users that get tackled in a variety of ways. If the initially similar goals at the hospital and the department level do not get aligned in the system design, the goals for the system-in-use become de facto incongruent constraining effective use. The designed affordances can then constrain a department's goal achievement unless its members collectively devise a (partial) work-around.

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