Humanistic vs. instrumental goals — how mindfulness about goal-conflicts impact IT-related change endeavors in healthcare

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Abstract

Health IT is expected to support both humanistic and instrumental goals, by, e.g., improving both quality and efficiency in healthcare. However, health IT is also triggering or reinforcing conflicts between these goals. These conflicts then often result in failure to achieve intended outcomes such as improved healthcare quality, safety, and efficiency.

By proposing an activity theoretical perspective on IT-related change, this study assumes that outcomes of such endeavors are dependent on actors being mindful of these conflicts and how the IS and complementary resources. Analyzing data collected in four IT-related change projects, supports this assumption: data shows that outcome relate to the ability of actors to understand the interplay between humanistic and instrumental goals among the diverse stakeholders. Mindfulness regarding these conflicts is necessary to efficiently develop and implement changes to IS that balance conflicting perspectives and realize expected outcomes. The implications encourage research and practice alike to develop interventions that help to increase understanding and mindfulness of the interplay between IS and the other elements of collective activities in healthcare.

1 Introduction

Healthcare is complex and fragmented in nature (Gail Greig et al., 2012). It involves significant collaboration and coordination among an array of professional disciplines, stakeholders, and artefacts within a complex setting (Kannampallil et al., 2011). Interactions are governed by historically established and evolving social orders. These are mediated and produced by relations of power, knowledge, and identity (Fichman et al., 2011; Halford et al., 2010) and shaped by both humanistic and instrumental goals.

Humanistic goals put the patient at the center and view the health of patients as the most important good (Allwood & Selart, 2010). Instrumental goals focus on the commercial value of healthcare (Sarker et al.,

2019). While depending on each other, the goals are sometimes also contradictory (Benbya et al., 2020). Goals may have different priorities and competing values, which often leads to conflicting goals, within and between actors in healthcare. These tensions may also influence related information technology (IT) change efforts.

Health IT is expected to support both humanistic and instrumental goals, by, e.g., improving both quality and efficiency in healthcare (Agarwal et al., 2010; Goldzweig et al., 2009). However, prior research also shows that health IT is also related to conflicts between these goals, which cause unintended consequences of implementing or adapting information systems (IS) (Weeger et al., 2021). Ultimately, this results in failure to achieve intended outcomes such as improved quality, safety, and efficiency of healthcare (Jones et al., 2014). There is evidence that these failures are due to IS potential to emphasize one goal dimension at the expense of another (Weeger et al., 2021).

Extant literature on post-implementation issues using various theories shows that implementation outcomes are contingent on functioning and synchronized systems. These systems comprise the IS and complementary resources, particularly people and their goals, established work routines, organizational culture, and their interrelation (see e.g., Allen et al., 2013b; Laumer et al., 2016; Malaurent & Avison, 2015; Strong & Volkoff, 2010; Sykes et al., 2014). Literature also shows that IS implementation success is dependent on the integration of diverse perspectives on these complexities (Charaf et al., 2013; Tesch et al., 2009).

Although the existing literature so far provides only preliminary evidence (Weeger et al., 2021), we assume that actors involved in IT-related change efforts must be particularly mindful of the conflicts between humanistic and instrumental goals and how the IS and complementary resources relate to these. "Mindfulness refers to an individual's continuous scrutiny and refinement of expectations based on new experiences, appreciation of subtleties, and identification of novel aspects of context" and has

been shown to be relevant, e.g., for good health and personal relationships (Thatcher et al., 2018). Mindfulness seems to be particularly relevant in healthcare, which is deeply characterized by such conflicts (Fichman et al., 2011; G. Greig et al., 2012). To better understand these relationships, we pose the following research question: *How does stakeholders' mindfulness of goal-conflicts impact the outcomes of IT-related change in healthcare?*

Supported by contemporary research in IS (see e.g., Allen et al., 2013a; Karanasios & Allen, 2013), we maintain that activity theory is especially suited for our purpose of analyzing tensions induced by the goal-conflicts. We thus develop an activity theoretical perspective on IS implementation that allows us to explore these tensions (denoted as contradictions in the context of AT), the mindfulness of involved actors and its effect on the outcomes of IT-related change in healthcare. This novel perspective guides the analysis of data collected in multiple minor implementation projects related to an existing large-scale IS and helps explain the sometimes quite unexpected outcomes of these projects.

Our study's findings suggest that stakeholders who are mindful of the underlying tensions between humanistic and instrumental goals within the activity system achieve the intended outcomes more likely. Moreover, the study reconfirms scant IS research, showing that framing relevant real-world issues in light of AT enables IS research to better account for the context of IT-related change (Allen et al., 2013b).

2 Background

2.1 Activity Theory

According to activity theory (AT), contradictions are the driving force for the advancement of collective human activities (Engeström, 2001), where "equilibrium is an exception and tensions, disturbances and local innovations are the rule" (Cole & Engeström, 1993). Putting the theory into an economic context, activities refer to what people do collectively within an organization (e.g., patient care in a hospital) (Albert et al., 2015). AT views the enhancement of these activities (e.g., by means of digitization) as a process of adapting the social and material resources through which they are enacted in such a way that emergent and historically accumulated contradictions are resolved or at least mitigated (Cole & Engeström, 1993).

Following AT, a key characteristic of human activity is its collective, object-oriented, and mediated nature (Engeström, 1995; Leont'ev, 1978; Vygotsky & Cole, 1978). Collective means that human activity

is always enacted by multiple actors—the subject(s) that work on some object (e.g., physicians and nurses) and the community that reflects all actors that revolve and evolve around the object (e.g., payers). Such collective activities require rules and norms as well as a division of labor to guide the actions and interactions of all actors involved (Kaptelinin, 2005; Nicolini et al., 2012). Object-orientedness means that human activity is always directed towards a concrete or abstract entity that moves from potential 'raw material' or 'problem space' to a meaningful shape that forms the outcome of the activity (e.g., patients' health) (Engeström, 1999, 2001). The object motivates the collective activity, determines individual goals and actions within, and only takes shape and acquires its value by means of the activity (Engeström, 1999). Thus, the object drives the collective activity while it takes shape and acquires its value by being transformed by subjects to achieve the intended outcome (e.g., improved or at least not declining health status).

Lastly, mediation implies that humans do not directly interact with their environment. Rather, their actions and interactions are mediated using both cognitive and material tools that are empowered with experience and skills collected over time (e.g., IS). This tool-mediated relationship between the subject of an activity and its object, however, only reflects "the tip of an iceberg" (Engeström, 1999, p. 66). The less visible mediators of the collective activity are the community, the rules, and the division of labor the actors have agreed on.

AT frames these elements of human activities in a coherent system. This system is called the activity system (AS), which AT introduces as a basic unit of analysis and analytical framework. The AS allows for the analysis of the social- and time-dependent context of human activities, including the goal-tensions (Engeström, 2001). The AS is organized around the *object, e.g., the health of a patient,* and the outcome aimed at (e.g., the patient's health status) is achieved by subjects' activities transforming the object. The object drives the actions and interactions of the subjects, which, in turn, are mediated by artificial *tools* (cognitive and material), *rules* (i.e., explicit regulatory requirements and the implicit norms and culture), the *division of labor,* including hierarchies as well as definition of roles and responsibilities, and the *community* that is also interested in the object (i.e., other stakeholders).

The actions and interactions of the subject and the community takes place within this system. These actions are "always, explicitly or implicitly, characterized by ambiguity, surprise, interpretation, sense making, and potential for change" (Engeström, 2001, p. 134). As the object always involves tensions

between its use value and its exchange value, AS do inherently bear the potential for goal-conflicts. The use value reflects the needs that are fulfilled by transforming the object. In healthcare, the use value is inherently tied to humanistic goals. In contrast, the exchange value of the object refers to the commercial value of the activity, which is related to instrumental goals.

Healthcare and healthcare actors are primarily driven by humanistic goals, defining patient health as the most important good, and treatment often requires a long-term health trajectory rather than efficiently fighting an isolated disease (Allwood & Selart, 2010). Nevertheless, instrumental goals like efficiency and productivity become increasingly important (Sarker et al., 2019), creating a contradiction between these goals.

AT states that ASs evolve over time so that such tensions are mitigated in a way that the object still motivates the collective activity by providing both use and exchange value (Engeström, 1999). These tensions, thus, drive change within human activities, including the adaption and/or implementation of new tools. Such changes are set in place to better realize the use and/or exchange value of the object by modifying the AS and creating a new developmental phase of the activity (Allen et al., 2013b).

However, these changes might also introduce new perspectives and interests within the AS that may amplify or contradict existing ones (Groleau et al., 2012). Consequently, such adaptations need not necessarily lead to ASs with fewer tensions. Instead, the result of such changes may be a state of the AS that is characterized by conflicting elements and troubled interrelations. AT conceptualizes such conflicting elements within ASs and the resulting tensions as contradictions. These contradictions oppose "the overall motive of the system, the aim or purpose that subjects within the system are individually or collectively striving toward" (Allen et al., 2013b, p. 840).

2.2 Activity Theory and IT-related Change

Considering the origins of tensions that drive IT-related change, we agree with Avgerou (2001, p. 50) that "innovation inside an organization is rarely a result of its 'free choice' and action; it is to a large extent determined by events, trends, pressures, opportunities, or restrictions." We thus assume that IT-related change is often triggered by changes in other elements of the AS such as the rules. These changes are often caused externally such as policy or competition and lead to tensions within the ASs. Such emergent and accumulated tensions within ASs are often manifested as humanistic and instrumental goal-conflicts.

For instance, healthcare is increasingly shaped by cost considerations, which are often at odds with the historically dominant humanistic motive of healthcare to treat patients first and foremost. Such external forces may cause actors to begin to question the status quo of their activity, imagine how it can be adjusted, and eventually subject elements of the AS to change to mitigate emergent tensions. Often, the tools developed over time are found to be unable to provide the capabilities needed to efficiently balance the goal-conflicts and are thus subjected to change.

Following the tenets of AT, emergent and accumulated tensions are the driving force of IT-related change. These are conceptualized as the process of modifying one or multiple ASs by introducing or changing an IS. IT-related change, thus, aims at resolving tensions within and between activities by adapting the tools used. Based on these considerations, success of IT-related change is reflected in redefined and reconfigured ASs with fewer tensions. Successful IS implementation projects, thus, resolve or mitigate the tensions that triggered IT-related change and do not induce new tensions or worsen existing ones. If existing tensions are sustained or amplified even during the end phase of the change (i.e., refreezing) (Burnes, 2004), IT-related change efforts must be viewed as a failure. Such tensions are often manifested in user resistance or missed efficiency gains (Weeger et al., 2021). Figure 1 summarizes these considerations.

Applying this AT-informed perspective on IT-related change informs us that people shaping such change efforts must recognize the functioning of the IS—a mediating tool within a system of other tools, rules, and a division of labor. They also need to consider that the ASs to be changed reflect experience and skills accumulated over time and are most likely to involve divergent interests.

In addition, we expect that adapting IS in ASs that have evolved culturally and historically will not, per se, resolve tensions within these systems. Rather, the people involved must be mindful of the tensions that triggered the change. Without such mindfulness, they cannot align the elements of the AS sufficiently. Consequently, we assume that IT-related change in healthcare require a mindfulness of the people involved, particularly regarding the AS(s) and the situated and contested goals that characterize it. As IT-related change has the capability to mitigate and worsen tensions between use and exchange value, it is essential for those involved in IT-related change in healthcare to be mindful of the conflicts between humanistic and instrumental goals, their origins and
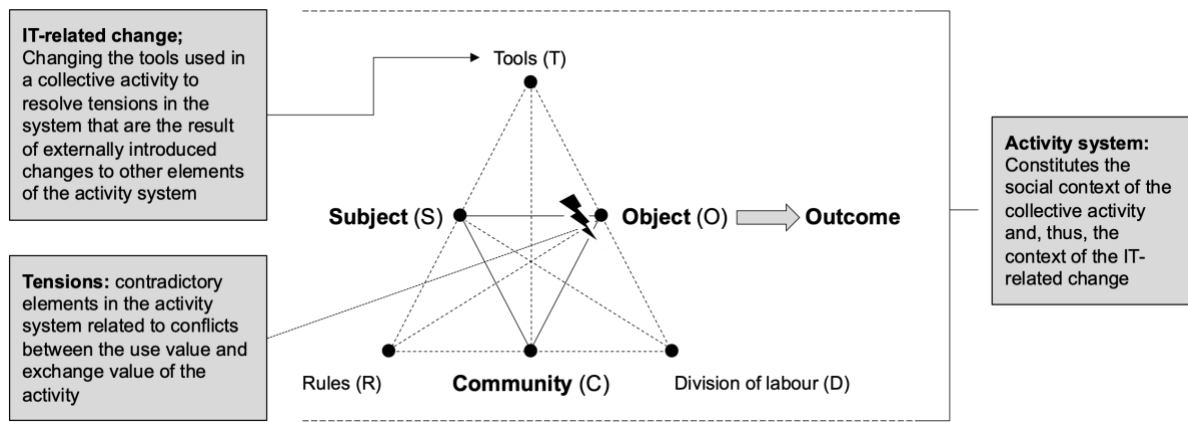
Figure 1: AT perspective on IT-related change

how IS relates to these. We thus assume that IT-related change will only be then successful when such mindfulness is given.

3 Methodology

We use a multi-case study to better understand how mindfulness of conflicting goals impacts the outcomes of IT-related change. We analyze small projects aimed to adapt a large-scale health IS within a German hospital. Below, we present the research site and how we approached data collection and analysis.

3.1 Research Site and Selection of Cases

The teaching hospital employs almost 8,000 people and provides health care services for approximately 400,000 patients per year. The hospital employs an Electronic Medical Record (EMR) to support medical and administrative processes within and across all clinics and departments.

The implementation of the EMR within the hospital started approximately ten years ago and has been constantly adapted. Even ten years later, misalignments, advances in medical practice, and current developments such as technological and regulatory require adaptations to the EMR. The hospital invests much effort to implement adaptations and extensions to the EMR to maintain it as fit-for-purpose and improve efficiency of healthcare delivery.

The change requests and related data such as status information, requirements, and minutes are managed using a project management tool. After obtaining permission from the Ethics Council, the research team had gained access to this tool to select four projects with contrasting outcomes that have been scheduled for the time span of data collection and extract relevant data. The cases have been selected based on following criteria: conflicting objectives, involvement of relevant stakeholders and accessibility of actors during

the planned time span for data collection. In total, we present four cases, which we denote as C1 through C4. Table 1 below provides an overview.

3.2 Data Collection

Data collection took place between January and July 2015. Data about the change process as well as about the status before and after the change were collected for each project. We utilized multiple data sources and methods to cross-check perceptions and to ensure credibility and plausibility. The main data sources are documents extracted from the management tool (e.g., change request document, requirements, minutes of project and steering committee meetings, mail conversations), semi-structured interviews (Yin, 2009) with at least one representative from IT and one medical stakeholder (see Table 1) and observations and casual conversations after implementation of the changes (documented in a research diary).

Table 1. Interviews

Function	Age (sex)	Cases	Interviews
EMR developer	46-60 (f)	C1	1 (50 min)
IT Manager	46-60 (m)	C1	2 (40 min)
Department manager	46-60 (m)	C1	1 (55 min)
Senior nurse	46-60 (f)	C1	1 (30 min)
EMR consultant	46-60 (m)	C2, C4	2 (90 min)
Senior nurse	31-45 (f)	C2	1 (50 min)
Organ donor rep.	46-60 (m)	C3	1 (55 min)
EMR consultant	46-60 (m)	C3	1 (30 min)
Senior physician	46-60 (m)	C4	1 (45 min)
Senior physician	46-60 (m)	C4	1 (45 min)
Quality manager	46-60 (m)	C4	1 (70 min)

The document analysis, interviews, and observations have been geared to gain a solid and

plausible understanding of the activity to be changed, the tensions that triggered these changes, the change outcomes and the actors understanding of the AS, their anticipation of the current and future role of the IS and their mindfulness regarding goal-conflicts.

Each interview was audiotaped and transcribed. We re-questioned some of our interviewees on-site (e.g., during our observation of the change outcomes) to address further queries that emerged during other interviews and/our analysis of the collected data. The insights gained during the observations and the casual conversations were immediately recorded in a case diary. These data helped us to gain further understanding of the activity to be changed, develop problem, and process descriptions, and collect information on how the change was executed. In total, we spent about two weeks on site and collected approximately 9 hours of interview material.

3.3 Data Analysis

We took an interpretative perspective to make sense of the data, particularly to identify the ASs, its tensions and the teams' mindfulness of those (Walsham, 1995; Yin, 2009). In line with Eisenhardt (1989) recommendation, we reflected on recent empirical findings and developed an initial version of our AT perspective on IT-related change before analyzing our data. Our interpretative approach to identifying relevant parts and giving meaning to data was structured by two analysis cycles.

The first cycle, which occurred in parallel to data collection, aimed to condense the material and to develop a full picture of the AS, the change process, and its outcome. We used NVivo 9 to manage, analyze and code the data. When inconsistencies arose, the researchers reviewed the data and re-questioned the interviewees until the inconsistencies could be resolved. Once the data collection was complete, narrative case descriptions encompassing the goals, process, and outcomes of the change project were created as a team effort.

During the second cycle, we intensively analyzed the condensed data and created an AT-driven concept matrix (Miles & Huberman, 1994) involving the characteristics of the AT (pre- and post-change) as well as the goal-conflict mindfulness of the team. This matrix enabled us to identify patterns that helped us to better understand how mindfulness relate to success of IT-related changes (Yin, 2009). Both cycles iteratively combined theoretical consideration, assumption development, data coding, and alignment of empirical patterns identified in the data with underlying theory (Walsham, 1995).

4 Results

Table 2 provides an overview of the four cases. Below, we present our analysis of the change trigger, the goal-related tensions, the outcomes, the mindfulness of the AS and how it shaped the outcomes. We start with briefly outlining the triggers of the changes and related goal conflicts.

4.1 Triggers and Goal Conflicts

The trigger of the change projects is either difficulties to achieve instrumental or humanistic goals. In C1 and C2 the requestors of the change have not been able to deal with increasing cost pressures as issued by hospitals management with the available tools. In C3 and C4, requestors asked to use the EMR to enforce documentation related to quality of care.

Though in all four cases, changes to the EMR (tool) were identified as means to solve identified problems, there have not only been tensions between the actors and the ability of the toolset to achieve either instrumental or humanistic goals. The analysis of the AS also revealed object-related tensions between use and exchange value—changing the tools so that it better allows for achieving efficiency goals without implementing further changes to the AS might fosters conflicts with quality of care and vice versa.

4.2 Mindfulness Regarding the Conflicts

At least after testing the first iteration of the transport request and management tool in the EMR, the IT staff in C1 had developed a good understanding of the conflicting goals that characterize patient and material transport. The team has understood that it is necessary to balance the effects of the tool on humanistic and instrumental goals. They also became aware of the (often more) implicit roles and responsibilities of the wards and transport unit (e.g., ensuring that transports are prioritized and that the patient is ready for transport or not waiting too long). These insights have then not only guided the feature development and implementation but also the agreement on complementary rules that govern the transportation activities.

Data on C2 shows that the team involved in the change process has not only understood the instrumental goals for improving bed utilization planning as prescribed by institutional rules. They have also been aware that this goal contradicts the humanistic objectives of medical staff and the related implicit *rules* and *division of labor* on the wards. Aligning the conflicting goals, the implicit rules and the routines, requires the EM to allow for easy ad-hoc

Table 2. Overview of cases

Case	Trigger & goal conflicts	Mindfulness	Change outcome	Effects of mindfulness
C1	To lower cost, transportation requests should be placed and managed (prioritized, planned, executed) using the EMR (and an extension); increased efficiency might impact convenience for patients	IT staff considered that simply shifting the workflow to the EMR renders routines for manual coordination and prioritization of transports impossible and hamper convenience and waiting times for patients	95% of all transports are requested and managed using the EMR; manual efforts (e.g., coordination by phone) have been significantly reduced; specific rules ensure priorities and patient-focus during peak times	Considering the evolved distribution of labor to mitigate the efficiency vs. patient-convenience conflict enabled IT not only to adapt the EMR but also to propose a routine for peak times that allow to balance both goals
C2	To improve bed utilization (and management reporting), the planning and monitoring done by ward mgmt. should be transferred from paper to the EMR; conflicts with usual ad-hoc allocation to better serve patients	IT staff noted that doing the planning in the EMR without requiring medical staff to document ad-hoc changes, would not only lead to bad KPIs but also to conflicts between ward mgmt. (instrumental goals) and physicians (humanistic goals)	The adapted planning tool allows ward management not only to plan and to report bed utilization but also to keep track of the real utilization without causing additional effort for the medical staff, while still allowing for ad-hoc changes	Taking the conflicting goals between ward management and physicians seriously allowed to envision and implement a solution that balances transparency (planning and monitoring) and adaptability for unplanned variations
C3	To better comply with regulatory requirements, a mandatory workflow organ donation education documentation should be implemented; conflicts with time constraints for direct patient care	IT staff has not considered the conflict between caring well and efficiency; they assumed, physicians are just not interested in organ donor education and mandatory fields will force them to educate patients	The EMR workflow is implemented, but the documentation is still fragmented; organ donor representative is working on getting additional directives to enforce documentation	As IT and the requestor failed to consider the tensions that characterize the care of (dying) patients seriously, they could have not envisioned effective changes to the activity beyond adapting the EMR
C4	To improve patient safety, the WHO safety-checklist should be transferred from paper to a EMR workflow; conflicts with efficiency goals at the surgery (additional effort)	IT was aware that senior surgeons have a strong focus on efficiency and do not want to "waste" any time, while other actors with fewer power see the need in doing the checklist to increase patient safety	Most physicians use the checklist; though, some skip it by ticking the emergency checkbox or making fun of some items (that to not focus on efficiency), less powerful actors dare not contradict	The team considered the goal-conflict between the efficiency focus of some surgeons and patient-safety of others; but instead of escalating it to trigger a cultural change, a workaround was designed

rescheduling. That without taxing physicians as they "are overloaded with administrative tasks – they seem to lack time for further documentation" (a nurse).

In contrast, the team responsible for C3 have not considered the humanistic-instrumental tension that characterize organ donor education documentation. They have assumed that physicians ignore the need to document organ donor education (*rule*) as they lack of interest (*object*). This could be simply cured by adding a workflow with mandatory fields to the EMR (*tool*). At the wards, however, physicians often do not have the time and focus to document the organ donor education, even though they have performed it. They rather use the time for taking care of the patients.

C4 aimed at implementing a board directive to enforce the use of the WHO safety checklist in surgery (*rule*) by means of the EMR (*tool*). It was assumed that the existing paper-based safety checklist was unable to facilitate the mandatory use of the checklist. Therefore, the implementation of the checklist as a compulsory workflow within the EMR was requested. Though, IT staff has also developed a good understanding of the tensions between efficiency-

related and patient-safety-related goals, they have overestimated the power of the EMR to force the WHO checklist and underestimated the implicit *rules* in the surgery. The latter allows senior physicians to emphasize efficiency goals over patient safety (documentation) by skipping or overriding some aspects of the WHO checklist. The culture does allow any dissent from others, even if a EMR workflow requires them to apply the checklist.

4.3 Change Outcomes

Following our definition of success of IT-related change, the outcome of C1 and C2 can be marked as success. In both cases, the adaptations of the ASs, particularly the EMR, ultimately lead to redefined and reconfigured ASs with fewer tensions.

In C1 the modified ERM enables to organize patient and material transports between the wards and central units more efficiently, while it ensures that the patients do not suffer from the increased efficiency (e.g., because they are not yet ready for transport or need to wait longer because of the automated prioritization). At the end of our data collection period,

95% of all transportation requests are performed using the EMR. In C2, not only planning and monitoring of bed-utilization was improved. The tool also enabled the ward manager to easily consider ad-hoc changes without negatively impacting the KPI (which is not hospital management's purpose but necessary here) and increasing administrative effort for physicians.

In contrast, the adaptations to the EMR in C3 have not led to a significant mitigation of the tension that characterize the activity system. The reason for performing organ donor education is to discuss a potential donation with the (dying) patients and family members to increase mindfulness for the importance of organ donors and, ultimately, to increase the donor rate (humanistic goal). However, instrumental goals such as documenting the education and meeting time constraints limit actors' ability and/or motivation to complete the documentation. The adapted system forces physicians to complete the documentation by means of mandatory fields. However, physicians found workarounds to skip or trick the workflow.

Outcomes of C4 are slightly better, though the main tension remains unmitigated. The WHO safety checklist was transferred from paper to the EMR to better track its execution, while reducing the effort required completing the checklist. Despite these measures, still some physicians, often senior ones, use some workarounds to skip the checklist, while nurses and junior physicians feel uncomfortable with doing so as they see much value for patient safety. The resistance to using the safety checklist exactly as intended, thus, is not, as assumed, just related to the materiality of the tool (paper vs. EMR), but rather to the efficiency-trimmed and hierarchical culture in the central surgery.

4.4 Effects of Mindfulness

In C1, the people involved in the change initially failed to recognize that implementing changes to the EMR would also affect existing conventions currently governing the complex interplay between the various parties involved (*division of labor*). This changed after testing the first iteration. Then, for instance, the team found out that the central surgery unit sometimes reschedules patients on short notice in the morning. This is enabled by the tool, but, in practice, requires additional, direct notifications of the wards to ensure that the patients are ready or must not wait too long for the transportation. IT thus aligned the EMR and the modes of task distribution in a way that it can efficiently mediate between the wards and the logistic staff, particularly during peak times. This enabled the hospital to increase efficiency without sacrificing patient-focus and required flexibility in peak times.

C2 shows a similar effect. When IT staff considered the conflicting goals of ward management and physicians, they mindfully developed a solution that did not prioritize one goal and sacrifice the other. In the end, the implemented EMR enhancement allowed the ward management to plan and handle ad hoc rescheduling more efficiently without increasing the physicians' administrative burden or limiting their flexibility when needed.

In contrast, the team of C3 has just focused on the goals of the organ donor representative (enforcing compliance to the rule) and ignored the partly conflicting goals of the medical professionals. Result: no improvement on the status quo, existing tensions were rather intensified.

In a similar vein, C4 shows that ignoring implicit rules that have developed over time increases the risk of failure. The team realized only after implementing the change that using an EMR workflow to enforce the application of the WHO checklist contest the efficiency goals of some physicians in the surgery unit. In addition, they recognized that the ERM is not capable of overriding the effect of implicit norms within the surgery, particularly the norm not to challenge the authority of (senior) surgeons. Therefore, the changes to the EMR turned out to reinforce tensions between the humanistic and instrumental goals, which are not evenly shared across the healthcare professionals. The team underestimated the mediating effect of implicit rules and overestimated the role of the adapted EMR.

According to our informants, senior physicians reacted to nurses' requests to complete the EMR workflow like "just click through all these items, we are not filling out the questionnaire now, I think that's useless anyway". Missing mindfulness of the conflicting goals and unwritten rules in the surgery hindered the team to identify the root cause of the tensions and propose a solution that mitigates these.

5 Discussion

Overall, this study shows that mindfulness of conflicts between humanistic and instrumental goals as well as their systemic causes helps to adapt and implement health IT in a way that it balances these conflicts and allows to achieve the intended goals. Findings show that teams that are aware of the object-related tensions within the AS and consider how the EMR mediates these tensions, are more likely to implement changes successfully. As outlined above, the teams responsible for those IT-related change efforts marked as success have not only been mindful of goal-related tensions, they also carefully considered how changes to the EMR might affect other elements

of the AS and, thus, anticipated how to adapt the EMR to mitigate the goal-related tensions.

In contrast, findings indicate that weak mindfulness of the AS, the tensions, and the role of the IS explains why tensions could not have been mitigated and, ultimately, goals have not been achieved. Particularly limited consideration of how the EMR, explicit and implicit rules, as well as the division of labor interact in medical activity and relate to goals the hospital wants and needs to achieve, lead to insufficient results.

Though the findings of this interpretative multi-case study need to be tested in other settings (Lee & Baskerville, 2003), they offer first evidence that our activity theoretical perspective on IS implementation increases our understanding of how mindfulness of conflicts between humanistic and instrumental goals impacts outcomes of IT-related change. In addition, the analysis of the AS helps to identify the causes of the conflicts and supplementary adaptations to complementary elements that are critical to mitigate tensions within the systems.

Our data shows that the goal-conflicts that characterize healthcare are rooted in complex systems that have developed over time and are difficult to change. We show that the AS concept and the notion of tensions within these systems helps to identify the causes of the goal-conflicts and to better understand how the elements of the AS, particularly the IS used, relate to these. Data indicates that not only divergent perspectives on the object of healthcare, but also the complex interplay of cultural-historical conventions constituted by rules/norms, the division of labor as well as the tools used have a high chance of being overlooked in such change endeavors. Regarding our research question, our study provides evidence that the degree to which teams concerned with such IT-related chances are mindful of and considered these aspects of the activity systems is related to the success of such initiatives. Before we discuss these findings in detail and lay out theoretical and managerial implications, we will acknowledge the limitations of this study.

5.1 Limitations

As with any study of this nature, our study is limited in certain ways. First, the data were collected in 2015 in a single large hospital in Germany and cover a limited time span of seven months. Given the persistence of the difficulties in implementing health IT and the rather small scope of the changes, the conclusions drawn are still valid. However, further studies with more recent data will help to increase confidence in the findings. Second, while improving comparability, the sample size of four cases sharing a similar technological and organizational background limits the potential for generalization. However, as this paper aims to generalize from theoretical to empirical statements, it still offers some valuable contributions to academia and practice (Lee & Baskerville, 2003). Third, the time span at our disposal for evaluating the outcomes of the cases was admittedly short. To verify our theoretical and empirical insights, further research might employ multiple longitudinal case studies in various organizational settings and cultures.

5.2 Theoretical and Practical Implications

On the theoretical plane, we have developed an AT-based perspective on IT-related change. This perspective emphasizes the complex and controversial nature of human activities. The conflicts between use value, reflected by humanistic goals, and exchange value, reflected by instrumental goals, are particularly visible in healthcare activities. IT-based tools play an increasingly important role in these activities. They mediate the relations between and within other socially constructed elements of human activity (Engeström, 2001) including conflicting goals of various actors (i.e., subject, community), their perspectives, and the social constituents developed over time (i.e., rules, division of labor). This has four important implications for theory and practice.

First, we show that conceptualizing IT-related change as a process of resolving problems caused by contradictions within activity systems increases our understanding of the complex and contested collective activities in healthcare. Though AT is more of a descriptive meta-theory than a predictive theory, its notion of activity systems helps to see how the goal-conflicts materialize in collective activity system and impact the role of the IS within. In this regard, employing activity systems as the primary units of analysis shifts the focus from individual interaction with technology to the macro level of the collective while acknowledging the importance of individual actions that are produced by and produce the collective activity. The empirical findings indicate that IT-related change in healthcare should not overemphasize fit between a system and singular goals but also to consider how IS relates to the collective goals, which, in turn, impact perceptions on the individual level.

This study encourages to shift the focus to the complex interplay of IS with multiple actors, explicit and implicit rules, dynamic divisions of labor, the cultural-historical aspects of these elements and the goal-conflicts they produce. To better understand the role of these conflicts, further research may oscillate between micro and macro-levels of analysis and thus come up with richer interpretations of IT-related

change in healthcare. However, already this research informs practice to widen the focus when planning IT-related change by using strategies that strengthen mindfulness for the macro level and its conflicts. Methods like scenario building, elaboration, and counterargument may reveal goal-related conflicts, help to better understand their origins and to design and implement change successfully.

Second, the empirical evidence of this study stresses that IT-related change in healthcare is often triggered by the limitations of existing tools to sufficiently address humanistic or instrumental goals within its social context. Though, the ability of the IS to achieve these goals is not only contingent its functional capabilities but rather on the interplay with the social elements of the activities. The findings imply that mindfulness of these systems and how adaptations to the IS can mitigate goal-conflicts is critical for success of such IT-related change initiatives. Such mindfulness considers how the adapted IS will impact the systems of tools, rules, and a division of labour, particularly regarding the tensions within these systems and the abilities and limitations of the IS to mitigate or reinforce these.

Prior research emphasizes that we have only limited understanding of the type and nature of relevant contextual particularities surrounding IT-related change (Avgerou, 2001; Dwivedi et al., 2015). Taking an AT-informed perspective may help both academia to address this major weakness in IS research as well as practitioners to guide IT-related change in complex settings. Below, we propose some questions that should be asked before and during IT-related change endeavors:

- *Which goal-conflicts are visible? How do they relate to contradictions within the AS? Which of these can and/or should be resolved or mitigated prior to adapting the IS?*
- *Does the (adapted) IS over-emphasize a single perspective or does it reinforce contradictions between divergent perspectives?*
- *Does the IS limit other members of the activity system in achieving their objectives, particularly less visible aspects of the object?*
- *What are important conventions and tools that mediate interests, traditions, and actions of actors? How do they interrelate? How does the (adapted) IS relate to these?*

Third, as already reflected in the questions and in line with deliberations on sociomateriality, our AT lens on IT-related change stresses the inseparability of IS and the collective activities in which they are embedded (Jones, 2014). The empirical findings show that the entanglement of the social and the material

(Orlikowski & Scott, 2008) reinforces and mitigates goal-related conflicts. Here, AT provides the theoretical and analytical concepts that can be leveraged by research and practice to identify the roots and increase awareness of these. Design, implementation, and use of technologies should benefit from enhanced understanding and mindful handling of goal-related conflicts.

Research might benefit from using the concept of contradictions and tensions within activity systems to further enhance our understanding of IT-related change. Particularly regarding the aspects of the context that need to be thoughtfully considered during change initiatives. Future studies may, for instance, identify factors and mechanisms that enables teams responsible for IT-related change to identify goal-related conflicts and their origins as well as to design IT-related change that can mitigate these conflicts.

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