

ACTIVITY THEORY DRIVEN SYSTEM ANALYSIS OF COMPLEX HEALTHCARE PROCESSES

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ACTIVITY THEORY DRIVEN SYSTEM ANALYSIS OF COMPLEX HEALTHCARE PROCESSES

Complete Research

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Abstract

The patient discharge process is one of the most critical and complex healthcare processes as it involves several actors with a variety of skills and roles working towards the outcome of effective and efficient discharge of a patient from a hospital. This paper used a case study of the patient discharge process of two care units in a large urban hospital in which we analysed the process as an activity system using activity theory methodology. Through the case study we collected data from 63 non-participant observations interviews, 5 semi-structured interviews and document analysis. We analysed the data with the Activity-Oriented Design Method (AODM) and revealed eighteen contradictions in the discharge process activity system. The contradictions include information or documentation issues but also organizational and process issues, emphasizing that Hospital Information System (HIS) design for complex processes is a sociotechnical endeavor. Addressing these contradictions is an initial stage for systems analysis for the design of a health information system to improve the discharge planning process.

Keywords: Discharge Planning, Discharge Rounds, Activity Theory, Contradiction Analysis

1 Introduction

Transition processes like patient discharge (i.e., transition from care center to care center or home) or handover from clinician to clinician are complex processes for healthcare professionals, caregivers, and patients. Transitional activities (e.g., emergency to intensive care transfers) are complex because of the number of interactions that must be coordinated, and they vary in complexity by the number of components and the degree of their interrelatedness (Kannampallil et al. 2011). As patients move across different care settings during the course of their treatment and recovery, it is critical to maintain a rapid, safe, and smooth transition within the continuum of care. Transition processes are interdisciplinary hospital-wide processes that must be undertaken to assist patients and their families in developing a feasible post-hospital plan of care (Buchbinder and Shanks 2007). It involves a variety of activities including social work assessment, counselling, consultation, patient and family education, and chart documentation. Because of its complexity, transition planning requires a wide range of clinical and organizational skills to address the needs of the patient, family and healthcare system in an efficient and effective way (Tennier 1997). According to Carroll and Dowling (2007), the key elements for successful transition planning are communication, coordination, education, patient participation, and collaboration between healthcare personnel.

Effective transition processes are crucial for providing quality care to patients. In fact, care transitions are a major quality improvement challenge (Cotter et al. 2002). Effective discharge may reduce the length of hospital stay or readmission rates, which would free up capacity when there is a shortage of hospital beds (Scott et al. 2004; Wong et al. 2011). Unfortunately, the reality is that patient transitions are a source of communication, coordination and information exchange difficulties and potentially medical errors (Kalkman 2010; Abraham et al. 2012). Moreover, the organizational environment of the hospital affects patient transition planning. This means that policies and legislation determine how transition planning is carried out. Hospital's goals and structure, technology and ideology may be more powerful from the professional perspective in patient transition planning (Iglehart 1990).

The challenge with discharge planning is that it is an activity that is a combination of different individual and collective actions. We argue that many of the above described issues, inefficiencies, and miscommunications occur because of the lack of alignment of different aspects (i.e., clinical, organizational, etc.). While a Health Information Systems (HIS) can enhance information intensive and complex processes such as patient discharge planning, HIS design requires understanding of not only the activity as a whole but also its actions and how they interact as part of the discharge process. While the representation of healthcare processes as interacting processes has been well described in the literature (Coiera 2003; Kannampallil et al. 2011), there are no systematic approaches for doing so to enable systems analysis of integrated healthcare processes. Situation Awareness (SA) is defined as an individual's perception of the information within an activity environment, comprehension of its meaning, and anticipation of potential future states (Endsley 1995). Activity Theory (AT) can provide a systematic way of understanding an activity, its components, and its actions to define the various situations that comprise integrated collaborative activities. Research on AT has introduced the notion of contradictions that refer to conflicts, problems, or misfits between elements of an activity or between activities. Identifying contradictions will allow us to identify and understand the different situations (i.e., sources of communication or information issues) as part of systems analysis (Kuutti 1996).

The diverse range of actors, processes and information flows that comprise the patient discharge planning process would greatly benefit from automation through HISs. However, automating practices without a sound model is a precursor to unintended consequences (Ash, Berg, & Coiera, 2004). Before we can design a HIS to support the discharge planning activity, we need to understand the activity and the associated complexities within it. While existing research has identified the complex and interrelated nature of the discharge process, there are no studies that have articulated the

complexity from the perspective of activity analysis. The objective of this paper is therefore to analyze the patient discharge process of two care units in a large urban hospital as an activity system using the Activity-Oriented Design Method (AODM). From our analysis we identify issues and inefficiencies (we refer to them as contradictions) as a first step towards the design and implementation of a HIS to support the patient discharge process.

The paper is organized as follows. In Section 2 we detail our methodology, namely activity oriented design. In Section 3 we analyze the patient discharge activity system using the methodology in question and identify its contradictions. In Sections 4 we briefly discuss our findings followed by concluding remarks in Section 5.

2 Methodology

Activity Theory (AT) methodology has emerged as a suitable analytical framework for analysing different human activities and revealing contradictions/tensions that allow us to understand the activity better and to realize what issues should be solved with the help of IS (Kuutti 1996). The Activity-Oriented Design Method (AODM), developed by (Mwanza 2001; Mwanza 2002) and based on the Engeström (1987) model is employed in this study. This methodology is appropriate since it allows us to meet our research objective of systematically analyzing the contradictions of an activity system (the patient discharge planning process).

2.1 Activity Theory

Activity theory (AT) is an interdisciplinary methodology that facilitates the understanding of an activity and its change over time while interacting with other activities. AT does not aim to replace other methodological approaches of system requirements analysis but rather supplements them and enables us to: (1) explore activity as a dynamic phenomenon; (2) better realize the nature of the activity by capturing all aspects of an activity system; (3) analyze how system components function together to meet subjects' motives and goals; and (4) isolate problems to develop solutions. AT has been acknowledged as a highly effective research methodology in various fields including IS design and human-computer interaction (Engeström 1987; Kuutti 1996; Engeström 1999). First generation AT relies on the concept of artifact-mediated and object-oriented activity, whereby humans' interactions with their environment are not direct, but are mediated by physical and cognitive tools (Leontjev 1978; Vygotsky 1978). *An activity is an object-directed process motivated to transform an object to an output.* Transformation of the object, which can be material or not (e.g., idea, work plan, etc.) is essential for the activity's existence. Objects with embedded motivations distinguish numerous activities. A subject uses material and/or cognitive instruments/tools to manipulate and transform the object. In second generation AT (Engeström 1987) the subject exists in a community which shares the same object and the community has a set of rules for the subject to follow. Rules cover explicit and implicit norms and conventions and social relations within a community. Division of labour refers to the explicit and implicit organization of the community. An activity system can be visualized in a triangle presentation (Figure 1). Engeström (1999) argues that the study of a mediated activity should consider how elements interact with each other within an activity system. Thus, while an "activity" is the basic unit of analysis, AT encompasses participating social actors, the technological and non-technological tools they employ, the rules and norms of the social or socio-technical context, and the roles and responsibilities of participating actors. For the sake of simplicity, AT components and mediators can be interpreted through the lenses of "wh" questions: *who* (subject) interacts with *what* (object) and *why* (motivation that leads to outcome); *by what means* subject interacts with object (tools); *who else* is involved in this interaction (community); *how* the subject interacts with object and

community (rules); and *who does what* in this activity (division of labour/roles – vertical and horizontal).

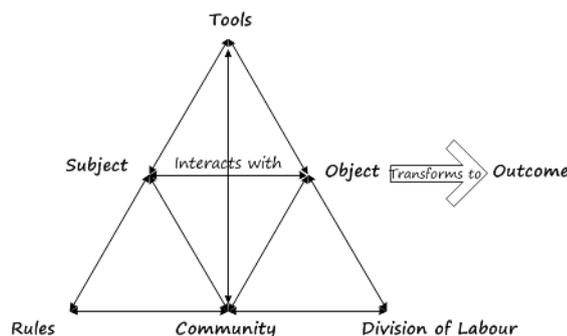


Figure 1. Activity Theory

Vygotsky, Leontjev, and later Engeström stressed that activity should be considered as social/collective and driven by motivation (Leontjev 1978; Vygotsky 1978; Engeström 1999). The distinction between individual goal-oriented action and collective/team object oriented and motive-driven activity is of critical importance in activity theory (Engeström 1999). A collective activity is oriented towards the modification of an object, which is seen as raw material that should be processed into a final product (i.e., activity's outcome). This transformation is driven by a shared motive that represents the common ideology of the community. However, accomplishing the collective object transformation should be decomposed into specific goals to be achieved by individual actions. The individual actions consist of automatic operations driven by conditions. Activity, action, and operation levels correspond to “why” (motivation), “what” (goal), and “how” (condition).

2.2 Activity System Contradictions

An activity system is dynamic, constantly passing through transformation cycles improving qualitative parameters of the system. Contradictions play a central role in these transformations. When contradictions become explicit they require solutions to overcome them and lead to a new transformation cycle.

Kuutti (1996) defines contradictions as “*a misfit within elements, between them, between different activities, or between different developmental phases of a single activity. Contradictions manifest themselves as problems, ruptures, breakdowns, and clashes. Activity theory sees contradictions as sources of development; activities are virtually always in the process of working through contradictions.* (p. 34)”. Engeström et al. (1997) described contradictions as unintentional deviations from the script, and stressed that their identification can be used as input for the development of revised activities (Engeström 1987; Engeström 2001).

2.3 Activity-Oriented Design Method

This study uses the Activity-Oriented Design Method (AODM) to identify activity system contradictions. AODM operationalizes AT through the four stages listed in Table 1 and described in detail below the table.

Stage 1. An activity system is defined using an eight-step-model comprised of interpretation of an activity (1), its components [subjects (2), object (3), and community (4)], mediators [tools (5), rules (6), and division of labour (7)] and outcome (8). The eight components are mapped in Engeström's model (Figure 1).

Stage 1: Defining Activity System - Eight Step Model	The Eight Step Model put theory into practice by interpreting the situation being examined in terms of AT based elements of the human activity system.
Stage 2: Activity Notation	Reduces complexity in the situation being examined by facilitating decompositions or breaking down of a complex activity system into sub-activities in order to facilitate detailed investigation.
Stage 3: Research Questions	Puts AT into practice by generating research questions based on sub-activity triangles (i.e., decomposed models of human activity) that are used to support data gathering and analysis.
Stage 4: Data collection and Technique of Mapping Operational Processes	Communicates research insight by modeling inter-relations of operational processes and by modeling study findings (e.g., contradictions identified in the analysis of human practices).

Table 1. AODM methodological tools (Mwanza 2002)

Stage 2. Analysing an activity system as a whole can be challenging due to its complexity. Hence, at this stage, called Activity Notation, the activity system is decomposed into manageable sub-activity triangles. To break down an activity system into sub-activity combinations, Mwanza (2002) proposed three rules-of-thumb: (1) an "Actor" is represented either by the Subject or Community component of the triangle activity model; (2) a "Mediator" is represented by one of the mediators (Tools, Rules or Division of Labour) of the activity system; and (3) the "Object" on which the activity is focused.

Stage 3. Six potential combinations revealed in the previous stage should be associated either with generic questions (e.g., What Tools do the Subjects use to achieve their Objective and how?) or questions specific to the context of the activity (e.g., How does the whiteboard help the team facilitate the safe and effective transition of patients towards discharge?).

Stage 4. Collect data associated with the questions generated in the previous stage. The collected data should be analysed and interpreted in terms of AT's notion of contradiction.

3 System Analysis

3.1 Data Collection

Data collection involved field observations, semi-structured interviews and analysis of paper documents used in the discharge planning process. A trained qualitative research assistant conducted 63 non-participant observations of the Discharge Round process in two clinical units of a large urban hospital. The two units studied have similar patient populations. The discharge rounds are held every morning for approximately 15-30 minutes to discuss status updates and issues relevant to patient discharge.

Five semi-structured open-ended interviews with participants from the discharge process including the clinical manager were also conducted from December 2011 to October 2012. Each interview lasted between 30 to 60 minutes, and the questions focused on (a) understanding the discharge process; (b) understanding how healthcare practitioners interact with the discharge process; (c) tools and strategies used for communication and collaboration among the clinical teams; (d) rules followed by clinicians during the discharge process; (e) workflow of the discharge process and responsibilities of clinicians; (f) technical and organizational barriers that impact the effectiveness and efficiency of the discharge process; and (g) participants' recommendations for improving the discharge process.

In addition, two follow-up meetings were conducted with discharge round participants to gain greater understanding of the collected data, and to further illuminate our analysis of the discharge round process. Each of these interviews lasted between 30 to 60 minutes.

3.2 Defining the Activity System

In order to obtain an understanding of the studied activity system, its components (Figure 1) were described following the eight-step model (Mwanza 2002). These are detailed below.

Activity. For this study, the activity is the patient discharge round process. Each discharge round takes approximately 20 minutes. In such rounds, various healthcare professionals with various expertise and perspectives get together to review all the patients in the unit “*to safely and effectively transition patients towards discharge*”. The discharge rounds are held in rooms facilitated with large whiteboards where all the patients in the units are listed and healthcare professionals are able to quickly see each patient’s discharge status.

Subjects. The healthcare professionals who participate in the discharge rounds are listed as follows: Unit Clinical Manager (CM), Liaison Nurse (LN), Registered Nurse (RN), Social Worker (SW), Occupational Therapist (OT), Physiotherapist (PT), and Community Care Rep. (CC). Healthcare professionals can be involved in individual and group actions.

Community. Two units of an acute care hospital, external patient locations (i.e., care centres, long-term care homes, patient homes).

Object. The object (or objective) of this activity is to facilitate safe and effective transition of patients towards discharge, a goal that is shared by all the healthcare professionals described above.

Outcome. Better patient-centered care in the hospital and better continuity of care with the community after discharge.

Tools. A variety of communication, coordination, and information exchange tools are employed in this activity system. A *whiteboard* serves as the central tool for communication, coordination, and information exchange between healthcare professionals. The whiteboard is the centre of the activity, representing situation awareness about each patient but there are several underlying processes that develop the awareness. Documents used for communicating information among the health care professionals throughout the discharge round were also analysed. Document analysis helped us understand the information directly/indirectly used in the discharge round. The following documents were analyzed: Transfer/Admission Checklist; Discharge Rounds Meeting Charter; Discharge Instructions/Follow-up Appointments Form; Patient Discharge Checklist; Nursing Policy, Procedure, Protocol Manual; Patient Admission History Form; Nursing Worksheet; and Consultation Form.

Rules. The discharge round protocol starts with the Clinical Manager who asks all the registered nurses to give updates on their patients’ status. Nurses have a maximum of 30 seconds per patient to give their update. Other participants may offer feedback on the given updates if appropriate. While the updates and feedback are given, the clinical manager updates the patients’ status on the whiteboard. Once the update is done, the Liaison Nurse comments on and may request consults (PT, OT, SW, CC, etc.) from other team members, if required. The Liaison Nurse may also ask questions to the registered nurses in order to identify any changes in the patients’ conditions that require communication with the physician to modify the care plan. Finally other participants may also give updates on that patient, for example, saying whether the patient has had requested consults (i.e., physiotherapy) and whether their consults should still be done. Usually four to five patients are assigned to each of the registered nurses and updates on each patient are given in a similar way, as explained above. Once all the reports on the patients are given, the clinical manager ends the discharge rounds session, but some of the participants may carry on short discussions on a few patients. There are different procedures for discharge that are within 24 hours, within 48 hours and longer than 3 days.

Division of Labour. An understanding of the roles and responsibilities of the subjects involved in discharge planning (Table 2) helps the healthcare professionals to develop situation awareness as part of the discharge planning process.

Subjects	Division of Labour
Unit Clinical Manager (CM)	Ensuring that quality is not compromised and day-to-day operations are efficient. Specifically ensures that effective discharge planning begins at time of admission.
Liaison Nurse (LN)	The clinical lead of the unit who represents the medical team in discharge rounds. S/he is the one who carries information from the medical team to the rounds, and if there are challenges, s/he would bring it back to the medical team as well.
Registered Nurse (RN)	Responsible for the provision of care towards meeting the holistic needs of patients.
Social Worker (SW)	Drives the social challenges for discharge and applies clinical intervention methods to meet both the patient's and organization's interests.
Occupational Therapist (OT)	Responsible for providing patient care services such as assessment, treatment, and education in order to meet the needs and expectations of the patient on receipt of an authorized referral.
Physiotherapist (PT)	Responsible for providing patient care services such as assessment, treatment, and education related to physical needs of the patient
Community Care Rep. (CC)	Facilitates community discharging and represents the community services which provide ongoing care for patients when needed beyond hospitalization.

Table 2. Subjects and Division of Labour

Figure 2 incorporates all components and mediators to represent the activity system for the patient discharge round process.

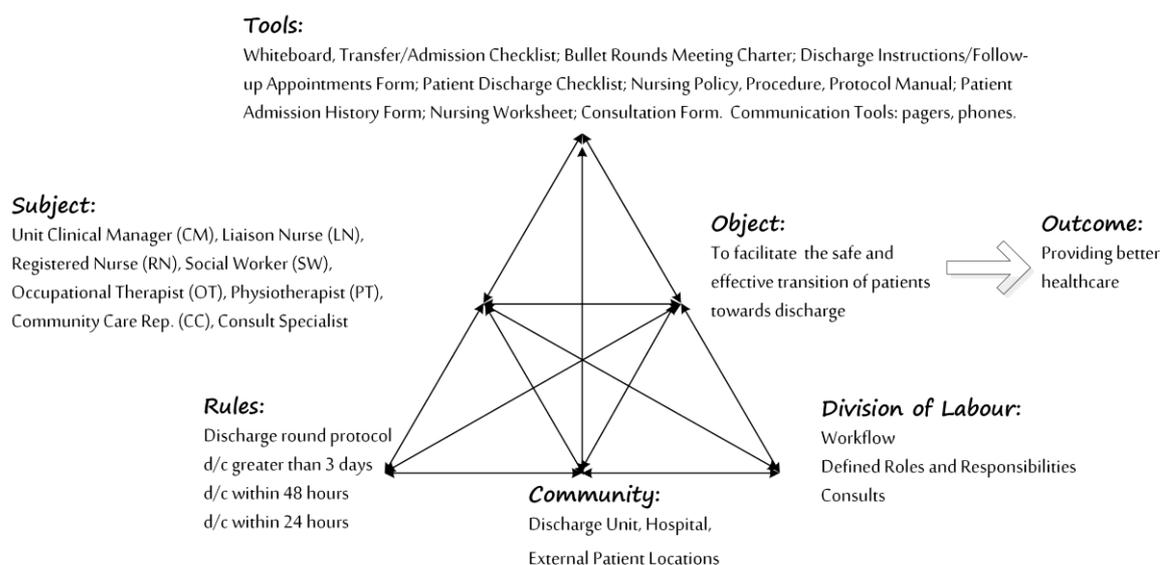


Figure 2. Discharge Rounds Activity System

3.3 Activity Notation

The patients' discharge rounds activity system is decomposed in six sub-systems, three of which refer to Subject-Mediator-Object relationships and three to Community-Mediator-Object relationships. The six sub-systems are represented in Figure 3 by their six associated triangles.

3.4 Research Questions

The following generic questions were used to gather information to extract potential contradictions:

- How do Tools (e.g., the whiteboard) help Subjects (e.g., CM) to facilitate the safe and effective transition of patients towards discharge? (S-T-O)
- How do Rules affect the way Subjects facilitate the safe and effective transition of patients towards discharge? (S-R-O)
- How does the Division of Labour influence the way Subjects facilitate the safe and effective transition of patients towards discharge? (S-DL-O)
- How do Tools help the Community to facilitate the safe and effective transition of patients towards discharge? (C-T-O)
- How do Rules affect the way the Community facilitates the safe and effective transition of patients towards discharge? (C-R-O)
- How does the Division of Labour influence the way the Community facilitates the safe and effective transition of patients towards discharge? (C-DL-O)

3.5 Data Analysis

As a result of our 63 field observations of the discharge round process as well as the five semi-structured and open-ended interviews, we identified contradictions in the discharge round process. Contradictions were revealed by analysing answers through the lenses of the sub-activities questions. These contradictions are presented in the scheme of sub-activities and the means by which each contradiction is derived from each sub-activity is described below. A summary of the analysis of each sub-activity and the contradictions that were identified is presented in Figure 3. Arrows from sub-activities in Figure 3 are directed to the associated contradictions. Moreover, as can be seen in Figure 3 some contradictions have two incoming arrows; this indicates that such contradictions are associated with both subject and community driven sub-activities. Participant quotations are presented as recorded but with irrelevant words or phrases such as ‘um’ or ‘you know’ removed for clarity. Any wording that is used to bridge participant’s phrases for clarity appears in square brackets.

Subject-Tool-Object (S-T-O)

Incomplete Situation Awareness: SA plays an important role in monitoring the patient’s condition, prioritizing tasks and anticipating urgent events (Reader et al., 2011). Lack of awareness was the most referenced contradiction among our identified issues, which was also stressed during our interviews. The following example supports our claim in this regard:

“I think people see the value in it [IN DAILYCENSUS] but then again it’s the awareness, and some people are like... “It’s sad but really not my problem that emergency is full. I have my patients up here; what do you want me to do about it?” ... I can see what we need to do and we need to get the patients up, and we’d rather get our patients up earlier in the day.” Interview One

Error-prone Situations: Situations where there is a potential for making an error, especially in terms of providing incorrect information. Two error prone instances were noticed during the on-site observations of the discharge rounds. One, a nurse came to report on her patients with no paper sheet and started to give her report based on memory. Two, nurses were paged twice in order to attend discharge rounds. Arriving late (or not at all) means that updates may not be exchanged with the team in a timely manner or possibly not at all. Nurses may not always arrive on time or not be able to attend discharge rounds if they are busy caring for their patients during the time discharge rounds are being held. The lack of information or incorrect information could have a negative impact on planning the patient’s discharge, although the unit manager may be in a position to provide updated information on the patient.

The problematic situations described above should be identified and analyzed to develop appropriate policies and practices to mitigate the problems. In addition, all the clinical team members should be alerted to error-prone situations to emphasize accountability for their actions (Endsley 1995).

Manual Process: This relates to situations where the clinical team members, who would prefer to focus their efforts on pertinent clinical issues, are instead required to perform several paper-based and manual tasks as part of the discharge process.

“I think it’s just the trail of information. If the patient is there for a long time, we’re relying on progress notes in the chart, but I think if there was an enhanced technology that was updated, [we would know that] four days ago we talked about this, and it’s done or it’s not done.” Interview One.

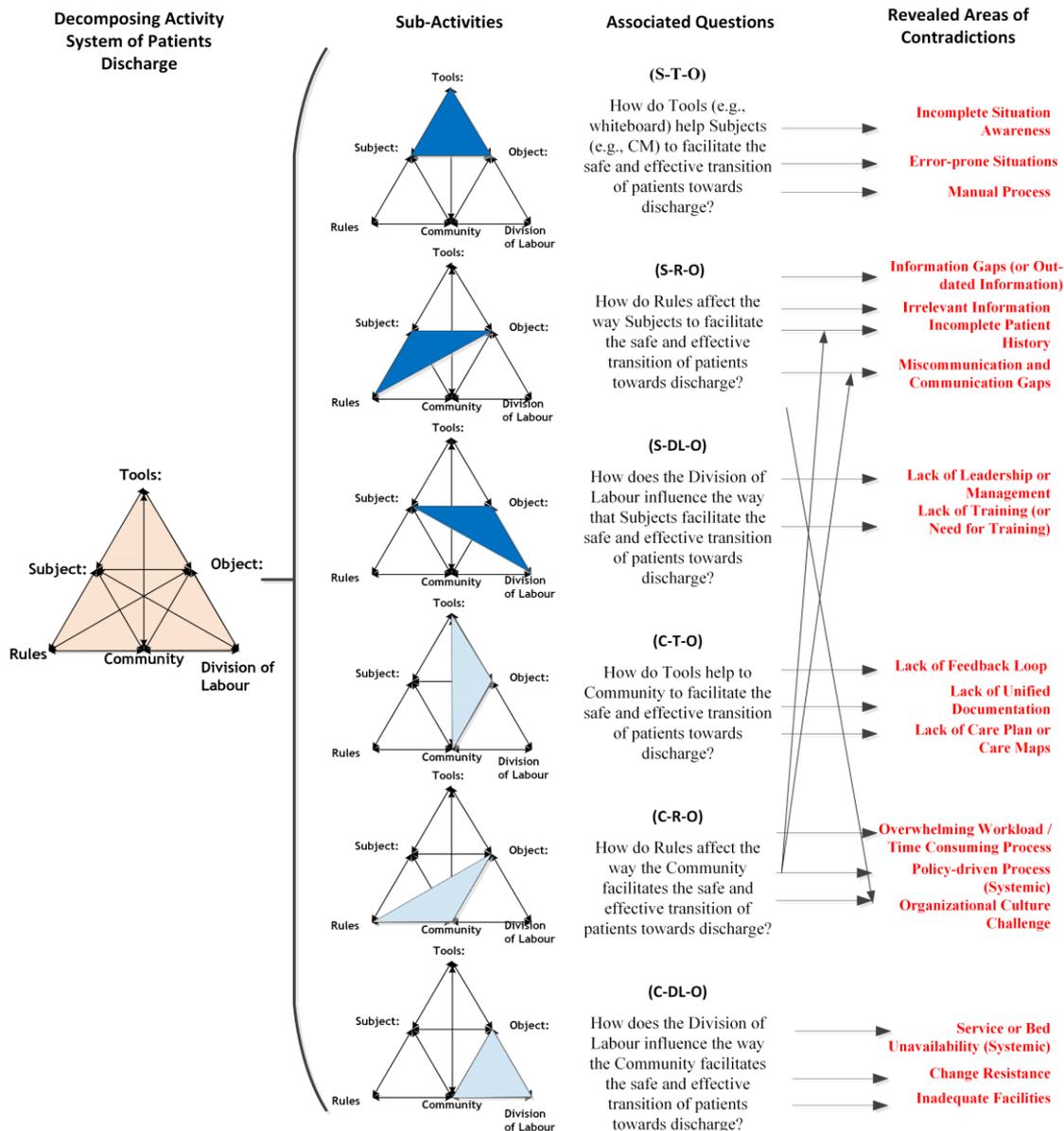


Figure 3. Analysis of Patient Discharge Process

Subject-Rules-Object (S-R-O)

Miscommunication and Communication Gaps: As stated in an interview, “the biggest common contradiction of everything is communication and lack of triggers”. Miscommunication and communication gaps refer to situations where there are breakdowns in information transfer as well as communication barriers in care delivery. Miscommunication may occur at different levels. For

example, it may happen between the clinical team members and may impact their ability to provide high-quality care. Miscommunication can also occur as a result of misinterpretation of information due to extensive passing of messages. The following quote describes this situation:

“...a lot of times I may convey a message to you and ask you to convey it to somebody else, and then it gets lost in translation.” Interview One.

Information Gaps (or Out-dated Information): Information gaps are situations where either no information is available or a specific request for information cannot be fulfilled. In this situation clinical team members fail to provide the required information (or the given information is out-dated). Lack of information may result in uninformed decision making leading to delay in discharging the patients and/or for some patients it may lead to readmission to the hospital after discharge because all issues were not properly dealt with. Below is an example of a situation where information gaps were claimed to be a barrier for effective discharge:

“If we’re waiting for hospital to home, and I remember that we had eight people that were waiting hospital to home, but we don’t know when it’s going to start, and if s/he’s [THE COMMUNITY CARE REP] is not there, we don’t get that information. But it’s somewhere, right? It’s somewhere in the system.” Interview Two.

Irrelevant Information: This refers to situations where the information provided during the discharge round is out of scope. For example, RNs may provide information that is relevant to patient care but not to the discharge process. The following excerpt illustrates such a situation:

“Like I said, those two nurses that still come in, and they’re just the people that want to give a full report on their patients, and then, what they’re saying is very relevant, it’s just, we don’t need to know what their blood pressure was and all, at that moment.” Interview Two.

The implication of the above situation is that it takes away from the time allocated for each patient and reduces the time spent on decision-making about relevant issues. Therefore, key decisions might not be made in time, resulting in delayed discharge.

Incomplete Patient History: This applies to situations where not enough information is provided about the patient upon her/his admission to the hospital, or the information given during the discharge rounds is incomplete. For example, if the SWs do not provide enough historical information about the patient taken from their families, then informed discharge decisions may not be made.

“...if relatives come in, it’s very quick to get a history of what they were or weren’t doing, but many times there’s a call to that facility for an update or a status.” Interview One.

Subject-Division-of-Labour-Object (S-DL-O)

Lack of Leadership or Management: This refers to situations in which the discharge process is not managed effectively due to lack of leadership. In such situations, for example, the given instructions are not followed by the nurses, or nurses do not arrive on time. The following excerpt supports such a claim:

“...when they’re all there, when all of the allied health team is there, when all of the liaison nurses are there and if someone takes the leadership on running the rounds,. things work really well. When there’s no manager or acting manager, someone there running the rounds, things go haywire because people don’t really follow along.” Interview Four.

Lack of Training (or Need for Training): There are situations where the clinical team members fail to accomplish required tasks for a situation, mainly because of lack of training. This includes situations where providing training would be a logical step for improving the situation. The following excerpt illustrates such situations:

“And it’s hard when you have nurses who aren’t from that unit, if they come from the pool, if they’re short; they’re not familiar with discharge rounds, because they’re not done universally, so it’s very hard for them to jump in. But they do try.” Interview Three.

Community-Tool-Object (C-T-O)

Lack of Feedback Loops: This relates to situations where there is a lack of a feedback loop between the attending physician and the clinical team members so up-to-date information may not be communicated to the attending physician. As a result, the clinical team members are not aware that a new care plan has been developed or, if requested, consults have actually been done. The following excerpt provides an example of such a situation:

“There’s no accountability in terms of paper flow, being able to track who said they were going to follow up on that, so the following day, it may come back up, and somebody may say, “Oh yeah, I did submit that consult,” but if it wasn’t, maybe it’s left for a few days.” Interview One.

Lack of Unified Documentation: This refers to situations where patient information is spread across many documents and systems, or even across the clinical team members, making it difficult to quickly find the right information when needed. This also includes situations where the amount of paperwork is overwhelming for the clinical team members, as well as situations where there are redundancies or inconsistency in documentation. The following excerpt describes this situation:

“Well so many papers, like our documentation, it’s a catalogue. It’s absolutely overwhelming, the amount of paperwork that you need to do. There’s so many opportunities, like why everybody needs to chart the same history. You know, four different people chart. Like that...” Interview One.

Lack of Care Plan or Care Maps: This refers to situations where the care plans are not clear or there are no care plans in place for keeping them on track. Due to the lack of care plans, the clinical team members need to read all notes to determine current and past problems and effective interventions. The following excerpt supports this claim:

“I think there’s lots of opportunity for improvement. I think care maps or care plans keep everybody on track. It might not be perfect, but you can pick and choose what you want out of the care map to keep everybody [on track]: “Day 1, are they walking, yes/no. Consider physio.” Interview One.

Community-Rules-Object (C-R-O)

Miscommunication and Communication Gaps: Miscommunication may also occur between health professionals in the hospital and those external to the hospital (e.g., community centre, patient’s family, family physician). A common communication gap is in the coordination of discharge planning, which may delay a patient’s discharge from the hospital. The following excerpt illustrates this level of miscommunication:

“If we’re waiting for hospital to home, and I remember that we had like eight people that were waiting hospital to home, but we don’t know when it’s gonna start, and if she [THE COMMUNITY CARE REPRESENTATIVE] is not there, we don’t get that information.” Interview Two.

Policy-driven Process: This refers to the processes that are derived from government legislations and protocols. Such processes should be followed by the clinical team members as they may impact care planning and when a patient can be discharged. The following situation describes how a patient had to go to a long-term care facility but the clinical team first had to go through a policy-driven process in order to meet the government’s protocol:

“...that’s a [government]-driven legislation thing that they have to re-apply for the beds, and then it has to go through the case manager, they have to do a full assessment and resubmit to [the] long-term care facility.” Interview One

Organizational Culture Challenge: This refers to situations in which carrying out the discharge process effectively is impacted by the culture and structure of the workplace. The following examples illustrate that:

“In acute care, we do too much for our patients. It’s just that mindset that if you’re in acute care and if you don’t do everything for that patient, you’re not providing the care that they need...but if they go [else]where, it’s a total different mind shift.” Interview One.

Overwhelming Workload / Time Consuming Process: This refers to situations where the amount of work and time needed for completing discharge-related tasks are beyond the capabilities and expectations of clinical team members. Overwhelming workloads may reduce the abilities of clinical team members to deliver all necessary care. The following excerpt describes this situation:

“I think social work sometimes feel a little overwhelmed, because social work gets more complex patients, and social work carry a lot from the beginning right till the minute they leave the hospital.” Interview One.

Community-Division-of-Labour-Object (C-DL-O)

Service or Bed Unavailability: This applies to situations where there is no service (such as rehab, LTC, etc.) available for in-patients who are waiting to be discharged. This also includes situations where there is a lack of healthcare professionals for performing specific tasks or giving special services. The following excerpt further illustrates these issues:

“[Community Care] does a great job, but the thing is, is they can only arrange the services when they’re available. And then, if there’s lots of beds, perfect, but if they’re full, we have to hold these patients.” Interview One.

Resistance to Change: This refers to situations where the organization, in our case the clinical unit(s), is not fully ready to introduce changes into its processes or organizational structure, which might adversely impact processes. The following quote further illustrate this situation:

“We see change. I think since the official project ended, there’s been a regression in the process, which is disappointing, because a lot of effort was put into it by the [original] team and by the unit as well. But there’s definitely a regression in terms of how effective it is...” Interview Four.

Inadequate Facilities: This refers to situations where the limitations of the facilities, for instance limited physical space, may directly or indirectly affect the effectiveness and efficiency of the discharge process. The following excerpt illustrates such situations:

“Yes. There’s a staff lounge; however, the one thing the unit is lacking is a room for a physician to take a family into, to discuss things. So if you have a palliative patient for example, there’s no physical spot to take that family into and go over goals of care, or discuss patient conditions.” Interview Three.

4 Discussion

Transition processes such as patient discharge are challenging because of the number of agents, tasks and information that interact as part of the process. HISs can support transitional processes but a crucial first step is the need to model the process prior to HIS design. HIS implementation without an adequate model to inform design leads to unintended consequences including communication issues, creation of new or more work, poor fit with clinical workflow, differences in needs between different user groups (i.e., clinicians and administrators) and even adverse events such as medical errors (Ash et al. 2004; Harrison et al. 2007). Therefore, prior to designing HISs that support integrated activities we need to understand the nature of the integrated activities. While previous studies have highlighted the complex and interrelated nature of discharge processes there are no studies that have provided a systematic way analyzing and modeling the processes. The findings from this paper address that shortcoming by using activity theory to define the sub-activities and the constraints that impair the ability to safely and effectively conduct the hospital discharge planning process. This paper has made a contribution to both theory and practice. For theory we have illustrated the use of activity theory and the AODM method for analyzing a complex healthcare process and revealing contradictions of the activity system. We have made a contribution to practice by using the contradictions as a first step for systems analysis for HIS design to support the patient discharge planning process.

A key contribution from our paper is the identification of six categories of contradictions that impede the safe and effective conduct of the discharge planning process. In total, we identified 18 contradictions. Nine of the contradictions are related to the Subject-related sub-activities revealing a contradiction associated with the lack of or inefficiency with existing tools, established rules, and division of labour. The other 9 contradictions are at the community or organizational level and included leadership, training, culture and resistance to adopting new policies. Identification of the community (hospital level) contradictions emphasizes that HIS design is not only an information or technical endeavor but rather is a sociotechnical exercise. While the information related contradictions can be addressed by providing better information access, data entry or care plans through an HIS, the community (hospital level) contradictions (i.e., cultural change, leadership) must also be addressed if an HIS is to achieve its desired outcomes. Our identification of contradictions extends existing research on HIS design for integrated activities in that we have identified specific contradictions that impede the achievement of the overarching goal of an activity system. These contradictions should be studied as part of systems analysis and design to support HIS design for integrated activities.

Our findings also highlighted that one of the challenges in designing HISs to support team based activities such as discharge planning is a process chasm between individual providers and the clinical team. This occurs when processes are developed to support individual providers rather than the clinical team. For example, a lack of feedback loops to inform team members about updates to a patient's care plan and inconsistent documentation are two examples of individual processes that spawn issues at the clinical team level. These processes evolved to support individual providers rather than the collaborative team. Our identification of the processes that create the individual-collaborative chasm can help reduce the presence of the contradictions by ensuring that these processes are developed from a collaborative perspective.

5 Conclusion

Patient discharge planning is a complex and interlaced process. While previous studies have highlighted the complexity and interrelatedness of the patient discharge process they have not provided the means of analyzing and modeling the complexity. The AODM approach used in this paper addresses that shortcoming by providing the means of analyzing an activity system to identify contradictions that impede the achievement of the overarching goal of an activity system. In defining the contradictions we also identified that HIS design for discharge planning is not just about information or technical requirements but rather also requires organizational and process considerations. Limitations of the study are that we have only studied the discharge process on two clinical units and one acute care hospital. We anticipate other contradictions may be identified in other settings. Future work of ours will be to evaluate our findings with the discharge process in other settings. We also plan to extend our findings by using Business Process Modelling (BPM) approaches to formalize the analysis and modeling of complex healthcare processes. One such approach is Business Process Redesign (BPR) which consists of improving an entire, cross-functional business process, such as the ones proposed in (Netjes, et al., 2010). Finally we plan to use our findings to design and evaluate HISs to support the discharge planning process.

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