9 THE SITUATEDNESS OF WORK PRACTICES AND ORGANIZATIONAL CULTURE: Implications for Information Systems Innovation Uptake

Faraja Teddy Igira
University of Oslo
Oslo, Norway

Abstract   *This paper addresses the themes of work practices and organizational culture as situated actions and the implications for information systems innovation uptake. It reports on research being conducted in Tanzania that brings an ethnographic research approach to understanding relations between local health care practices and health information systems (HIS) development, by asking how health workers' practices and everyday actions are influenced by the context of their specific situation. The research is being conducted in the context of a globally distributed open source software project to introduce and enhance health information systems (HIS) in developing countries. Drawing on cultural historical activity theory, the study highlights the need for understanding each information system user's and each organization's specific and detailed work processes and how situational and organizational factors may come together with the HIS innovation processes in meeting the challenges discussed. In order to establish fully the potential of activity theory to HIS innovation processes, situatedness of work practices focusing on the organization context is emphasized.*

Keywords   Information systems, work practices, organizational culture, situated action, cultural historical activity theory, innovation uptake.

1   INTRODUCTION

Tanzania, like many other developing countries, has in recent years been attempting to develop and implement a health information systems (HIS) in the context of a globally distributed open source software project known as the Health Information Systems Programme (HISP) (see Braa et al. 2004; Lungo 2005). HISP aims at strengthening and further developing HIS in public health in an expanding network of developing countries including South Africa, Mozambique, Tanzania, Malawi, India, China, and Vietnam (for details, see Braa and Herdberg 2002; Braa et al. 2004). These HIS innovation initiatives are taking place in a context that is historically and culturally shaped (Bardram 1997); work practices (collection, storage, analysis, and transmission of routine health data throughout the health care administrative hierarchy) and health workers' everyday actions are influenced by the context of their specific situations. The work practices and existing health workers' actions are often in tension with situational, individual, and organizational factors of work. Organizational contexts in particular settings should be explored in depth to understand their effects on information systems innovation processes (Grudin 1996). Related to this, Avison and Myers (1995) highlight the importance of understanding organizational culture in IS development.

   This paper presents useful perspectives on work practices and organizational culture as situated actions. The focus is on the local[1] situatedness of health workers' work practices as key sites for understanding the cultural-historical constitution of coexisting modes of practice and potentials for change. The relationship between work practices and organizational culture will be explored, as well as how organizational culture limits activities. The setting is the Tanzanian HIS (comprising the health facility level, district level, regional level, and the national level; see Figure 1). However, the focus in this paper is on the health facility level and district level because it is at these levels where health care work practices can be observed. The other levels (regional and national level) are more administrative in nature. The view is to understand how health workers' working practices and everyday actions are influenced by the context of their specific situations. Furthermore, the analysis explores the influence of climate on innovation uptake including the interaction between multiple organizational contexts. Cultural historical activity theory (CHAT) provides a potentially useful framework for understanding the mutual shaping of context and work practice. However, its ability to address the situated nature of work is limited.

   The rest of the paper is organized as follows: Section 2 outlines a theoretical framework for the study of work practices and organizational culture, and the concepts from CHAT. Section 3 provides details on the context, setting and research methods. Based on the empirical work within the Coast region, section 4 describes the work practices and organizational culture that surround the HIS in Tanzania. Section 5 presents an analysis of the empirical data based on the key concepts drawn from CHAT. Finally, in section 6, concluding remarks arising from the study are presented.

---

   [1]*Local* in this paper refers to the particular context, for example, the health care organization in Tanzania in this case.

2   CULTURAL HISTORICAL ACTIVITY THEORY (CHAT)

Originating in the former Soviet Union (Leontjev 1978; Vygotski 1978), cultural historical activity theory (CHAT) is a philosophical framework for studying different forms of human praxis as developmental processes with both the individual and social level interlinked (Engeström 1999c; Leontjev 1978). While individual actions can only be understood through the activity of which they are a part, activities are culturally and historically created and recreated. Human activities reflect real-life phenomena and not just theoretical constructs.

CHAT interprets work practices as activities and it explores the links between event and context. Therefore, using CHAT, the fundamental unit of analysis is the human work activity (Bardram 1997; Blackler et al. 2000). This human work activity reflects a number of people (subjects) working on a shared object (for example, health care data collection), not necessarily in the same time and place (for example, in different health facilities), to produce a joint outcome (for example, health care services improvement). In developmental processes using CHAT,

> [The] analysis is focused on the communication, coordination and collaboration required of members of teams and participants in networks to accomplish actions that are guided by *goals* of the actions at hand and to instantiate the *object of the activity* that motivates the activity system (Bratteteig and Gregory 1999, p. 168).

CHAT interprets social structures as both the production of human activities and the context for them (e.g., structuration theory; Giddens 1984). By acting in the world, human beings meet the objective world, which is experienced through the activity (Bardram 1997). Consequently, human work activity has the following characteristics: it is directed toward a material or ideal object that distinguishes one activity from another, it is mediated by artifacts (tools, language, rules, and procedures), and it is social within a culture (Bardram 1997).

On the other hand, Engeström (1987, 1999b) emphasizes that unexpected difficulties emerge in the execution of day-to-day tasks, causing people to change their activities and simultaneously change themselves. CHAT features the intimate relations between factors that mediate activity and the activities themselves (Blackler et al. 2000). Thus, activity theory avoids treating individuals as if they can be understood in isolation from their contexts, and the contexts as if they exist in isolation from individuals. Hence, in CHAT, "it is the *doing* of the activity in a rich social matrix of people and artifact that grounds analysis" (Kaptelinin and Nardi 2006, p. 9).

In summary, CHAT helps to analyze and describe the work people are doing, how they are doing the work and with whom, and how collective learning may occur, a description of which provides a picture of a particular organizational culture. Further-more, CHAT offers a dialectical approach, open to change and recognition of the emer-gence of mundane innovation in everyday practice, with an emphasis on the social and holistic nature of individual and collective learning and human development. It is on this basis that CHAT is used for analyzing and discussing the local challenges in IS inno-vation uptake, focusing on work practices and organizational culture as situated actions.

2.1 Cultural Historical Activity Theory and Situated Actions

The term *situated actions* emphasizes the interrelationship between an action and its context of performance; it emphasizes the knowledgeability of actors and how they use common-sense practices/procedures to produce, analyze, and make sense of one another's actions and their local or situated circumstances (Doerry 1995). Every course of action is highly dependent upon its material and social circumstances focusing on interactions between actors and between actors and the environments of their action. By ignoring the influence of the environment on behavior, key features of the interaction between humans and the world are missed, such as the rich, nondeterministic nature of complex behavior. Situated action has been used as part of human–computer interaction studies (see, for examples, Bardram 1997; Suchman 1987). However, Nardi (1995) emphasizes that in addition to what situated action can help systems implementers understand, activity theory offers a set of perspectives on human activity and a set of concepts for describing that activity. These perspectives and concepts help to understand and describe the context, situation, and practice within a particular organization.

Studies have shown that information technology and information systems use is not a technical input–output relation between a person and the technology (Bardram 1997; Nardi 1995; Suchman 1987), that a much richer illustration of the user's situation is needed for IS innovation uptake. However, it is unclear how to formulate that illustration in a way that is not purely *ad hoc* (Nardi 1995). Here is where activity theory helps, by providing orienting concepts and perspectives. Activities within an organization are *post hoc* reconstructed and objectified so that they can be used in future. People work as collaborative actors in making sense out of the everyday world of actions. They (people) make use of embodied skills or past experiences to get them through a situation in the work practice. More importantly, participants in a situated action must define the work practice in the same way to maintain its success and stability (Kaptelinin 1992; Nardi 1992; Vygotsky 1978).

2.2 Organization Culture

An organization's culture refers to shared beliefs and values and has been described by Mullins (2002) as a reflection of how the organization is structured, how work is done, the aims of the organization, and how management and staff interact within the organization and with those outside. All of these aspects of organizational culture can be analyzed with CHAT. Furthermore, at the heart of organization development and improved performance is the need for effective information systems. IS innovation processes, however, do not take place in a vacuum but within the context of the organizational setting.

The organizational culture is not static. Over time, various groups such as employees, stakeholders, systems developers, and implementers help to influence it. The pervasive nature of organizational culture means that if change is to be brought about successfully, it is likely to involve change or shaping of the organizational culture. In a holistic system, any change will affect the organizational culture and the organizational culture will affect or constrain the change (Mullins 2002).

On the one hand, organizational culture has been found to play a significant role in IT management processes such as technology-driven change in organizations (Cabrera et al. 2001), groupware development and deployment (King 1996), and management of new systems development (Newman and Sabherwal 1996).

On the other hand, several researchers have encouraged the use of an organizational culture perspective for IS research (see, for example, Avison and Myers 1995; Dubé and Robey 1999; Iivari 2005; Nicholson and Sahay 2001; Robey and Azevedo 1994; Walsham 1993; Westrup et al. 2002). Some argue that IS researchers have to adapt insights from anthropology to study IS and organizational culture (Avison and Myers 1995; Westrup et al. 2002). Related work has explored a relativist position for the prospective IS research on organizational culture and change (Iivari 2005). Others have been influenced by the social theories, such as the theory of structuration (Giddens 1984; Orlikowski 1992). The conceptualization of organizational culture from a cultural perspective in IS research varies among researchers. Such concepts include organizational culture as lacking coherence as it is cross-cut by geographic, work-related, and other cultures (for example, Nicholson and Sahay 2001; Parker 2000). Others emphasize its homogeneity trend broadly enclosed within an organization's boundaries (for example, Robey and Azevedo 1994). This study acknowledges those who adopt the view of organization culture lacking coherence, while emphasizing that forces for harmony exist in any organization so that coordinated actions and collaboration in the organization's activities can take place. Although the organizational culture battle has been contested to a certain degree, particularly in IS research, there is still much to learn from studying organizational cultures. A situated action perspective, very broadly defined, constitutes a promising vehicle for such research.

3   CONTEXT, SETTING, AND METHODS

The study was directed by an ethnographic methodological approach (Aunger 1995; Hardon et al. 2001; Honigmann 1976) with the use of ethnographic interviews, participant observation, review of documents, informal talks, and discussion during the training and analysis of the information flows within the HIS in Tanzania. Ethnographic research methods provided details through the health workers' own words and descriptions of health facility situations, events, interactions, and observable behaviors for understanding how health workers' practices and everyday actions are influenced by the context of their specific situation. I was directly engageded in the health facilities and thus played the role of participant observer. I am a member of the Tanzanian HISP team, and have thus played a central role in collaboration with health workers at all levels in the national health care system. The empirical material presented in this paper was collected during the periods from January to July 2005, and from February to April 2006.

In-depth semi-structured interviews were conducted with 32 members of the health sector in Kibaha and Bagamoyo districts. The interviewees were the people in charge of the health facility, the district information officers (DIOs), members of the council health management team (CHMT), the regional information officer and the HIS people at the Ministry of Health (MoH). Each interview was approximately one hour long and conducted in the local language, Kiswahili. Each interview started by introducing the

purpose of the interview along with reassurances about confidentiality and the right of the interviewee to decline to answer any question to which s/he would prefer not to respond. After each interview, the interviewees were asked to provide a list of potential additional interviewees as well as to provide any documents of use to the study. Each interview was noted in a summary form and the summaries were extended immediately at the end of the day of each interview. The interviews took place within the health facility surroundings, mostly in health workers' offices as they needed to continue their daily health care activities.

Participant observation and informal talks were used to gather an impression of the health facilities surroundings and to understand health workers' working practices in depth and detail. Approximately 20 to 30 hours a week were spent doing the observations in different health facilities while documenting the observations in field notes. These observations involved a wide context of the health workers environments and thus allowed me to see and interpret the health care activities through intensive interaction, for example, by participating in day-to-day activities such as registering children for vaccination and weighing.

The documents reviewed include health performance reports at health facilities and the district level, the district plan reports and HIS implementation plan, the MTUHA guidelines manual and data documentation. I also analyzed the patients' records from various recording tools at the health facilities and district levels.

3.1   The Health Information System in Tanzania

Tanzania has achieved considerable expansion of health services since its independence in 1961. The health sector reforms initiated in 1993 have made some progress in improving health care services and resources throughout the country. However, there are problems with limited capacities for generating reliable data, analysis, storage, retrieval, dissemination, and use. As a consequence, decision-making in the health care system is not generally evidence-based.[2]

The current routine HIS in Tanzania is known by the acronym MTUHA (Mfumo wa Taarifa za Uendeshaji wa Huduma za Afya), covering both governmental, private, and nongovernmental organization (NGO) health facilities (MoH 1993). MTUHA's administration and reporting organization hierarchy has four levels: health facility level, district level, regional level, and national level (see Figure 1). The information within MTUHA is based on data collected at the health facility. The district level, being the main operation unit within the organization hierarchy, is responsible for planning, managing, and supervising all health facilities and health care programs within MTUHA.

---

[2]"WHO Country Cooperation Strategy: United Republic of Tanzania, 2002-2005" World Health Organizational Regional Office for Africa, Brazzaville (http://www.who.int/countries/en/cooperation_strategy_tza_en.pdf).

3.1.1 MTUHA Organizational Context and Working Practices

At the **health facility**, which is the origin of most routine health data for MTUHA, health workers collect data routinely on outpatients, inpatients, and maternal and child health (MCH). However, additional data in the health facility is obtained through working with the surrounding community through village health workers[3] (VHW), traditional birth attendants[4] (TBA), and community based distributors[5] (CBD) for contraceptives and school visits. The data collection and processing in health facilities consists of a set of MTUHA paper forms, register books (12 in number), tally sheets and different forms from donor funded programs such as tuberculosis, malaria, and immunization, mostly written in a mix of the Kiswahili and English languages. Reports are then prepared on weekly, quarterly, and yearly bases and sent to the district medical officer (DMO) (for details, see Lungo 2003; Mukama 2003; Rubona 2001). Data handling involves a group of health workers from different sections of the health facility who have been given responsibility for MTUHA. The group consists of the MCH coordinator, the OPD coordinator, etc., depending on the number of sections (services) available at the particular health facility.

At **the district level**, reports from the health facilities are aggregated into an overall district quarterly report and sent to the office of the regional medical officer (RMO) together with a copy of each health facility's annual report. One copy of the district quarterly report is also sent directly to the primary health care (PHC) secretariat, which is a section in the local government authority responsible for managing health centers, dispensaries, and village health posts. Since the beginning of MTUHA, the preparation of an overall district report was done manually through the use of the district processing file[6] (DPF) and involves a group of health workers who work together as a team. The team is composed of different coordinators for different health care service sections. In November 2004, the MoH implemented MTUHA data processing software[7] in all district health offices, which resembles the DPF in format.

At the **regional and national** levels**,** data processing is done with the help of a MTUHA computer software package. The regional level is responsible for sending quarterly reports to the national level on a floppy disk, based on further aggregation of the health data from the regional districts. Information on floppy disks from all regions is processed by the HIS unit staff at the MoH using a similar software package as the one installed at the regional level.

The overall information flows within the MTUHA system are summarized in Figure 1.

---

[3]People in the community responsible for reporting all activities going on in the community, such as, all newborn deaths.

[4]People in the community responsible for deliveries and reporting to the health facility on neonatal tetanus cases, registered children, children weighing and children behind their immunization schedule.

[5]People in the community responsible for distributing contraceptives to the community members and reporting to the health facility

[6]A manual database consisting of a collection of forms with specifications on what should be processed into a district quarterly report.

[7] Note: In this paper, the terms *software* and *database* are used interchangeably.
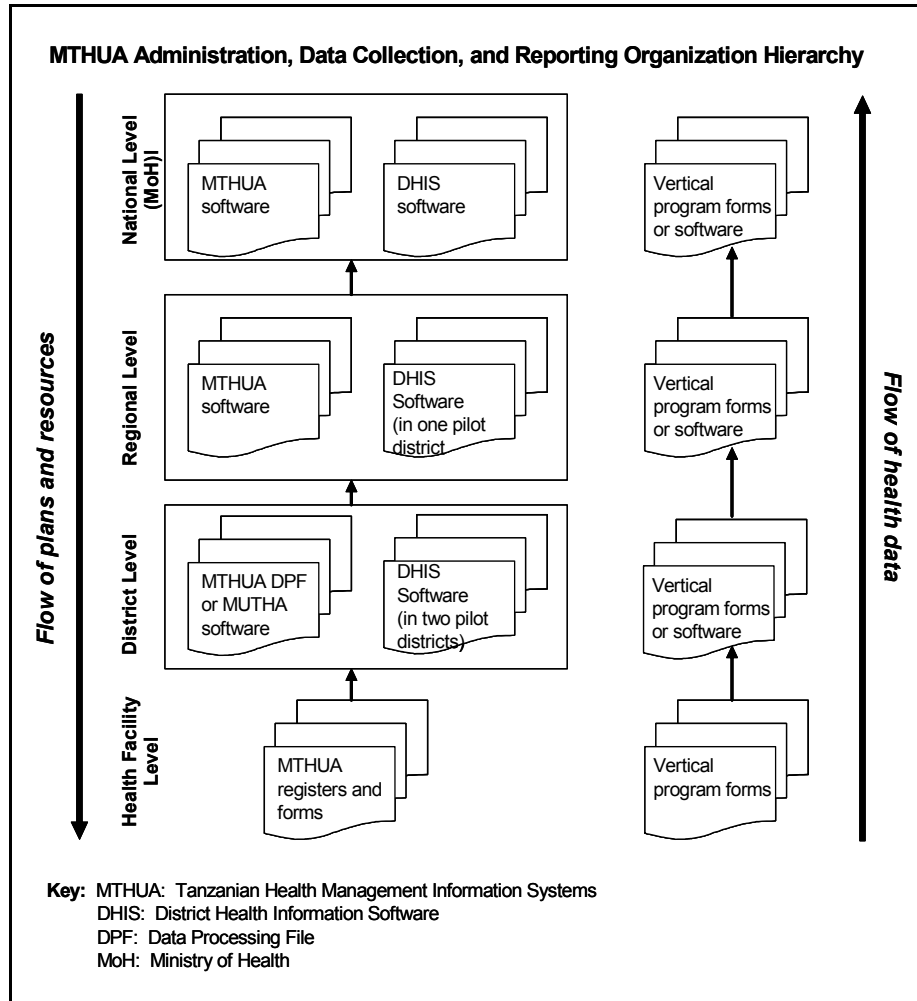
MTHUA Administration, Data Collection, and Reporting Organization Hierarchy

Figure 1. MTHUA Administration and Reporting Organization Hierarchy

3.1.2 HISP in Tanzania

In collaboration with the HIS unit at the MoH, HISP started piloting its activities in two health districts of Bagamoyo and Kibaha in the Coast region in July 2002. The activities included implementation of the DHIS software and training on computer and DHIS use, as well as conducting research on data collection, information flow, and use. (See Lungo 2005; Lungo and Nhampossa 2004; Kimaro and Nhampossa 2004;. For more details about HISP, see the proceedings of the IFIP WG 9.4 Working Conference on Enhancing Human Resource Development through ICT in Abuja, Nigeria, May 26-29, 2005.) At the time this paper was written, HISP was still conducting pilot studies of its activities in the Coast region.

4   SITUATEDNESS OF WORK PRACTICES AND ORGANIZATION CULTURE: CHALLENGES

This section presents the situatedness of work practices and organizational culture within the health care organization in Tanzania, focusing on the tensions around health workers' working practices due to situational, individual, and organizational factors of work including the interaction between multiple organizational contexts. While linking the work practices throughout the health care organization structure, the descriptions were categorized into three main groups: government health facilities, private health facilties, and district-level health facilities. Separation of the government and private health facilities is based on the difference in relations with other governmental organizations.

For the purpose of the present section, the elements of the health care system in Tanzania as an activity system are identified as follows:

- The health workers (doctors, nurses, and health managers) are the *subjects* who work together in transforming a shared object to an outcome.
- The primary and shared *object* of the health care workers is to attend patients coming to the health facility and the secondary object is the management of the health facility. At the same time, the functioning of the information system is a requirement due to demands from above and the need for information.
- The shared *outcomes* of these three objects are the improvement of health care services and the health situation of the population.
- In order to fulfil the health care organization's information needs, health workers attempt to control the functioning of an IS with the help of *tools* (register books, paper forms, pen, calculators, etc.).
- Activities are guided with certain *rules and division of labor* (each level is required to report at the end of each week (for weekly reports), after each three months (for quarterly reports), and yearly. One typical action of this activity is expressed at the health facility where health workers attend patients and collect routine data, which is often followed by another important action of preparing reports, which is often followed by sending them to the district level.
- Furthermore, there is a *community of practitioners* consisting of the coverage population, patients attending the health facility, and donor agencies.

4.1   Government Health Facility

4.1.1 Tensions between Primary, Secondary, and IS Work Practices and Resources

Health workers at the facility level are facing tensions between their primary work practices (patient care activities), secondary work practices (management of the health facility), and information systems work practices (data collection, report preparation and reporting). One health worker expressed this in the following way:

> *There are a lot of registers to fill in and many patients waiting…for example, a child crying, a pregnant mother waiting while tired—this makes the work difficult and complicated.* (Health Worker at Health Facility A)

This tension is partly due to lack of resources and skills for data collection, report preparation, reporting and storage, which was expressed by the health facility worker who said,

> *We need a calculator to help us in calculating the totals, especially on vaccination reports which are too many—you can't calculate them with your head.* (Health Worker at Health Facility B)

> *We had a calculator that we were given at the beginning of MTUHA, which is not working any more. We just use a mobile phone.* (Health Worker at Health Facility C)

> *We borrow a calculator from a teacher at the nearby school.* (Health Worker at Health Facility D)

> *We use our money for local transport when taking the reports to the district because if we wait they will say that we are lazy.* (Health Worker at Health Facility E)

The storage of data at the health facility depends on individual health workers' arrangement: some keep data on shelves, where it is being eaten by ants, and others keep data in boxes, where rats eat the papers. Consequently, the variation in storage makes access to data very difficult. In expressing the lack of proper arrangements for data storage, one health worker said,

> *We need somewhere to keep the register books and paper forms for easy access when we need the information.* (Health Worker at Health Facility F).

In addition to a lack of material resources, the lack of human resources and skills among health workers also causes tensions between the primary, secondary, and IS work processes. For example, in some of the health facilities visited there was only one health worker, so we had to stop the interview so that she could attend the patients to avoid long queues.

4.1.2 Demands from above and Health Facility's Needs:
Creation of New Tools and Use of Old Tools

There are health facilities that provide more services than the data elements described in MTUHA forms and they are required to report on those services. In striving to fulfill the demands from above and the health facility's needs, health workers have to create new forms for data collection. For example, a table for registering medicines indicates only those which are being provided in drug kits (that is, for health centers and dispensaries), but the hospitals receive more medicines than those described in MTUHA forms.

Some use the old form, which was being used before MTUHA for collecting data on the MCH program. In expressing how this form (named MCH3) helps the health facility to collect the extra data required, one health facility worker said,

There was a form before MTUHA called MCH3 which they stopped distributing but found that the data in there are needed. We are asked to report on these data elements so we had to continue using MCH3 in order to be able to report to the district offices. (Health Worker at Health Facility B)

On the other hand, the DIO expressed this view of the MCH3 form:

Before MTUHA there was a form called MCH3. Health workers at the facility level find it easier to use than the current collection of registers books. (DIO).

4.2   Private Health Facilities: The Difference in Relations and Their Impact on Reporting Practices

All health facilities (government and private) in Tanzania are required to collect data using MTUHA data collection tools. Health workers in private health facilities collect the data they need for their daily management activities in a separate register book (designed by a particular private health facility) and do not necessarily follow the needs of MTUHA since they think data from MTUHA doesn't help them much as they don't get feedback from higher levels.

If I report to the DMO that my buildings are not well what will they do… they don't come to repair. So we also have to prepare our own registers [for management activities] especially on medicines consumption. (Private Health Facility in Charge)

On the other hand, private health facilities reported fewer numbers of patients than were actually attended. This is because they pay taxes to the Tanzanian Revenue Authority (TRA) according to the number of patients they are attending. The district health worker expressed this by describing her experience with private health facilities:

One day we were at one of the private health facilities and when we asked the in-charge how many patients he attends he said 3 per day, but while we were there we saw more than 10 patients coming. Then we asked him why have we seen more that 10 patients. He told us that he is doing that [reporting less] to avoid paying higher taxes to TRA because he is a retired person and the dispensary is his main source of income.

The above relational and operational differences between the private and government health facilities results in data interferring with business.

4.3   District Level

4.3.1 Demands from Above: Creation of New Local Tools for Data Collection

When it really comes down to the details of responding to their bosses' demands, the health workers effectively abandon the work processes and fall back on whatever

embodied skills are available to them. When MTUHA started, it was declared that all the vertical programs would be using data colleted through MTUHA forms at the health facility level. After some time of operating different sections and departments such as the MCH department from the MoH started to demand data from the district level that are currently not collected through MTUHA forms (these are data that were previously collected before MTUHA, that is, before integrating the vertical programs). As a way of responding to the higher levels' needs, the district information officer (DIO) in collaboration with the district MCH in charge developed forms separate from MTUHA with the required data elements, which they distribute to all the health facilities in their specific district.

> *As the days went on, we are asked for other information that are not in MTUHA forms, which caused us to design our own forms and add more columns in MTUHA registers so that we could get the data the region coordinator is asking for.* (District MCH in Charge)

On the other hand, this adds more workload to health workers at the facility level who are busy attending patients with poor resources and infrastructure.

Health workers at the district level have to use data collection and processing tools from the MoH regardless of their limitations.

> *I have to use the MTUHA software regardless of its limitations because it is the order from the MoH.* (DIO)

However, the extra paper forms that the district level has designed for collecting information that is not in MTUHA paper forms and register books which the district receives from the health facilities has no place in the MTUHA database. In expressing the limitations of the MTUHA software, the DIO said,

> *In collaboration with the MCH coordinator we have designed paper forms, called* mapungufu ya MTUHA[8] *for collecting additional data on MCH activities that are missing in MTUHA register books used at the health facilities. These [additional data in the* mapungufu ya MTUHA *paper form] have no place in the MTUHA software and we can't modify the database.* (DIO)

4.3.2 Demands from above and District's Needs: Creation of New Local Tools for Data Analysis

There are some reports that are needed by the higher levels or for the district's activities, for example, a report on the top 10 diseases in the particular district. Currently it is very difficult to prepare such reports mainly due to deficiencies in the reporting. The quarterly reports, which the district level receives from the health facilities, have no diseases reports; the health facilities only report on diseases yearly, which means in the middle of the year you can't know the top 10 diseases for the district unless you go to the individual health facilities to collect data. In addition to the limitations on reporting the frequency

---

[8]*Mapungufu ya MTUHA* is a Swahili statement meaning "the lacks of MTUHA."

of diseases, there are no tool(s) to help the district health workers in sorting out the top 10 diseases from all the health facilities in a particular district. Each time the health workers at the district have to prepare a top 10 diseases report, they use a very big sheet of paper (joined papers which are pinned together), which they have given a Kiswahili name *mkeka* due to its size (big) resembling a local tool called *mkeka* used when sitting on the floor. On this sheet of paper, they list all of the health facilities in the district and the reported diseases. Then they count how many time the disease has appeared at each of the health facilities. When describing the process, the DIO said,

> *We have designed our own form called 'mkeka' to be able to find the top 10 diseases.* (DIO)

There are times when the district health workers have to use the previous year's diseases reports because of the difficulties in getting the current report.

> *Sometimes the community leaders call us to go to their community and report the diseases situation in our district but because the data is only being reported at the end of the year….sometimes we repeat the previous year's report because we don't have a tool to give us information on quarterly basis.* (District Health Worker)

5   DISCUSSION

Fundamental to the activity theory approach is that human capacities develop in collaboration with others, and people act upon their immediate surroundings (Engerström 1987). The idea of actors acting according to what is happening around them is the embodiment of situated action. The discussion on the situatedness of work practices and organization culture is based on two main arguments from activity theory: the relations between the organization and the overall object of its activities are mediated by its division of labor, and the relations between individuals and the organization of which they are a part are mediated by rules and procedures (Engerström 1999b). In this discussion, organization culture is perceived as expressed through the way the organization is structured, how work is done, the aims of the organization, and how management and staff interact within the organization and with those outside (for example, with the donor requirements through vertical programs and private health facilities with the TRA).

Health workers' work practices are physically situated within the environment and within the organization culture. The ethnographic data from this study indicates that situatedness is expressed through the *tensions* between primary health care work practices, secondary health care work practices, and IS demands, as well as the difference in relations between private and government health facilities. The local and situated construction of the HIS is archived by the interplay of the health care worker (at the health facility level, at the district level, at the regional level, and at the MoH), the tools (register books, paper forms, pen, calculator, etc.) and the infrastructure (the shelves for register books, the folders to keep paper forms, and transport for taking reports to the higher level).

5.1   The Division of Labor, Rules, and Procedures: Tensions in Work Practices

In providing health care and collecting health care data, several health care workers need to engage in the processes and take action within it (Korpela et al. 2004). Work in health care organizations can be described as distributed work among health workers as well as between the health care organizational hierarchies. HIS activities are mainly organized by managers at higher levels for the grassroots levels, for example, the CHMT organizing HIS activities for the health facilities. Distribution of work happens within a specific level, for example, the DMO distributing work between the district health workers. In practice, then, differently distributed tasks lead to different patterns of work practices, cause tensions for health workers, and limits other activities. In health facilities, for example, health workers have to perform mainly patient care, administrative, and secretarial tasks, which mainly involves paper work. At the district level, the DMO does mainly managerial activities while the DIO is supposed to deal with information issues (collecting reports from the health facilities and preparing the district reports). However, the distribution of work tasks includes problems such as some DMOs delegating emergence report preparation tasks and roles to DIOs, requiring the DIO to adjust his routine work practices, while some other DMOs do similar minor routine tasks themselves. This implies that the DIO assists the DMO in paper work or even attending patients in places where the district offices are located within the district hospital. Consequently, it is often the social connections and practical requirements that lead to a certain division of tasks and roles which might not be seen on any organizational charts or plans (Barley 1986), but has been noticed in the health care districts in this study.

On one hand, Tanzanian HIS is still relatively hierarchical with more emphasis on data collection and reporting at the health facility level. According to Markus (1983), organizational tensions and conflicts of authority are well known problems in hierarchical organizations. On the other hand, organizational hierarchy can create conflict trenches between DMOs and DIOs, higher levels and grassroots levels because of the politics related to distribution of work, resources, and power. Social factors can be the final battlefield where individuals use whatever skills and tools they have to fit situational factors. For example, health workers at the grassroots level designing their own data collection forms to fulfil the higher level's requirements, which in turn adds more workload, borrowing a calculator from a nearby school teacher so that they can prepare reports, using their money for transport to take the reports to avoid being seen as lazy.

When considering the contested, temporal, and evolving attributes of organizational culture (Avison and Myers 1995; Westrup et al. 2002), where there is room for development is in the area of how IS affects or mediates organizational culture and vise versa. To innovate IS in organizations requires a very careful exploration of the situatedness of the particular organizational culture in an organization. Equally, exploring organizational culture raises the issue of the environment in which organizations are found. The ethnographic data from this study show that as the days go on, there is a demand for extra data from the higher levels than what are being collected through a standardized IS tool (MTUHA in this particular case). Consequently, work practices and organization culture are subject to development and change over a period of time because of the learning going on within the organization. This change is normally incremental and evolutionary and is affected by both external and internal

environmental factors. The importance is in understanding these factors and determining how they (factors) have had an impact on the development of the present work practices and organization culture.

5.2   When the Work Practice Is Disturbed

When the health care worker is asked for reports which s/he can't prepare with MTUHA tools, s/he creates other tools, for example, the use of *mkeka* at the district level to prepare the top 10 disease report, and the creation of new forms for collecting data requested by the higher levels. This is a disturbance, a deviation from the standard work practices of the IS. The situation continues to be a disturbance to the health worker, especially because similar events are repeated every day during routine data collection, each quarter during report preparation and reporting. The health workers do not stick to the routine MTUHA work practices and, therefore, they handle the disturbances. In handling the disturbance or the difficult as Engeström (1987 1999b) puts it, health workers change their activities and simultaneously change their skills. The health worker focuses on the disturbances and begins to search for tools to help in achieving the desired outcome (a required report, in this case the top 10 disease report, extra data on the MCH activities). In other cases, such as when the MoH or region level asks the district level about a certain report that is not collected and reported using MTUHA tools, the DIO does not conduct their reflective actions of how to report alone. They involve the district in-charges of particular health care programs (for example, involving the district MCH in-charge in this case) and health facility workers in the reflection actions, thus expanding the social scope and interactive basis of the actions. This usually results in the development of a new form for collecting and reporting the required information. The result in turn causes more tensions for the health workers.

The HIS innovation uptake in this case seems to be problematic as well because neither the organization nor the professional training within the health care system and within particular districts includes health workers training on HIS as a natural part of the normal work activity. Health care professionals rarely have detailed and profound knowledge about possibilities and restrictions of IS. Some health care workers may not be at all familiar with the importance of health data collection and use and this has already caused problems. "Knowledge and responsibilities are not always visible in the organizational structures but in the more or less hidden social networks" (Laine 2003, p. 5). It is also important to determine actual experiences from people within the organization in their adapting to the internal and external environments, for example, the private health facilities report fewer patients because they want to avoid paying higher taxes to the TRA.

6   CONCLUSIONS

In this article, we have examined the situatedness of work practices and organizational culture. Arguably this paper has addressed central themes in IS innovation uptake in both low income countries and developed countries. The situatedness of work practices and organization culture is expressed through the tensions between the shared objects (primary work practices, secondary work practices, and IS requirements) and the inter-

action between multiple organizational contexts within and outside the health care organization as an activity system. The identification and understanding of these tensions offers a step forward in current IS research in the HIS field. The division of labor, rules, and concrete procedures of the HIS are constructed historically and collectively, in collaboration between health care workers and their artifacts. The local and situated construction of the HIS also happens collectively. Coordination of activities requires commitment from individual health workers and health workers need to work across and around gaps in existing health care systems. The organization culture should not be seen as an obstacle to IS innovation uptake, but an aspect that is intimately linked to what we call the social, political, and economic aspects of people's lives and their relations with the organizations of which they are part. Unlike Egeström's approach to activity theory in developmental work research, which binds the individual, collective, and technological aspects of work together, this paper emphasizes the situatedness of work practices, focusing on the influence of the organizational context to actors' everyday work practices and actions. I consider this emphasis as the main theoretical contribution of the paper.

References

Aunger, R. "On Ethnography: Story Telling or Science?," *Current Anthropology* (36:1), 1995, pp. 97-130.

Avison, D. E., and Myers, M. D. "Information Systems and Anthropology: An Anthropological Perspective on IT in Organizational Culture," *Information Technology and People* (8:3), 1995, pp. 43-56.

Bardram, J. E. "Plans as Situated Action: An Activity Theory Approach to Workflow Systems," in *Proceedings of the ECSCW97 European Conference on Computer Supported Cooperative Work*, Boston: Kluwer Academic Publishers, 1997, pp. 17-32.

Barley, S. R. "Technology as an Occasion for Structuring Evidence from Observations of CT Scanners and the Social Order of Radiology Departments," *Administrative Science Quarterly* (31:1), 1986, pp. 79-108.

Blackler, F., Crump, N., and McDonald, S. "Organizing Processes in Complex Activity Networks," *Organization* (7:2), 2000, pp. 277-300.

Braa, J., and Herdberg, C. "The Struggle for District-Based Health Information Systems in South Africa," *The Information Society* (18:2), 2002, pp. 113-127.

Braa, J., Monteiro, E., and Sahay, S. "Networks of Action: Sustainable Health Information Systems across Developing Countries," *MIS Quarterly* (28:3), September 2004, pp. 337-362.

Bratteteig, T., and Gregory, J. "Human Action in Context: A Discussion of Theories for Understanding Use of IT," in T. Käkölä (ed.), *Proceedings of the 22nd Information Systems Research Seminar in Scandinavia (IRIS 22): "Enterprise Architectures for Virtual Organizations,"* Jyväskylä: University of Jyväskylä, Computer Science and Information Systems Reports, Technical Report TR-21, 1999, pp. 161-182.

Cabrera, A, Cabrera, E. F., and Barajas, S. "The Key Role of Organizational Culture in a Multi-System View of Technology-Driven Change," *International Journal of Information Management* (21:3), 2001, pp. 245-261.

Doerry, E. "Evaluating Distributed Environments Based on Communicative Efficacy," in *Conference Companion on Human Factors in Computing Systems, CHI'95*, Denver, CO, 1995, pp. 47-48 (available online at http://www1.acm.org/sigchi/chi95/proceedings/doctoral/ed_bdy.htm).

Dubé, L., and Robey, D. "Software Stories: Three Cultural Perspectives on the Organizational Practices of Software Development," *Accounting, Management and Information Technologies* (9:4), 1999, pp. 223-259.

Engeström, Y. "Activity Theory and Individual and Social Transformation," in Y. Engeström, R. Miettinen, and R. Punamäki (eds.), *Perspectives on Activity Theory*, Cambridge, UK: Cambridge University Press, 1999a, pp. 19-38.

Engeström, Y. "Communication, Discourse and Activity," *Communication Review* (3:1-2), 1999b, pp. 165-185.

Engeström, Y. "Expansive Visibility of Work: An Activity-Theoretical Perspective," *Computer Supported Cooperative Work* (8), 1999c, pp. 63-93.

Engeström, Y. *Learning by Expanding: An Activity Theoretical Approach to Developmental Research*, Helsinki: Orienta Konsultit, 1987.

Engeström, Y., Miettinen, R., and Punamäki, R-L. (eds.). *Perspectives on Activity Theory.*, Cambridge, UK: Cambridge University Press, 1999.

Giddens, A. *The Constitution of Society*, Cambridge, UK: Polity Press, 1984.

Grudin, J. "The Organizational Contexts of Development and Use," *Computing Surveys* (28:1), 1996, pp. 169-171.

Hardon, A., Boonmongkon, P., Streefland, P., Tan, M., Hongvivatana, T., Geest, S. V. D., Staa. A. V., Varkevisser, C., Chowdhury, M., Bhuiya, A., Sringeryuang, L., Dongen, E. V., and Gerrits, T. *Applied Health Research Manual: Anthropology of Health and Care*, Amsterdam: Het Spinhuis Publishers, 2001.

Honigmann, J. J. "The Personal Approach in Cultural Anthropological Research," *Current Anthropology* (17:2), 1976, pp. 243-261.

Iivari, N. "The Role of Organizational Culture in Organizational Change: Idenfying a Realistic Position for Prospective IS Research," in D. Bartmann, F. Rajola, J. Kallinikos, D. Avison, R. Winter, P. Ein-Dor, J. Becker, J. Bodendorf, and C. Weihardt (eds.), *Proceedings of the 13ᵗʰ European Conference on Information Systems*, Regensburg, Germany, 2005.

Kapetlinin, V. "Human Computer Interaction in Context: The Activity Theory Perspective," in *Proceedings of the East-West Conference on Human Computer Interaction*, Moscow: ICSTI, 1992, pp. 7-13.

Kapetelinin, V., and Nardi, B. A. *Acting with Technology; Activity Theory and Interaction Design*, Cambridge, MA: MIT Press, 2006.

King, W. R. "Strategic Issues in Groupware," *Information Systems Management* (13:2), 1996, pp. 73-75.

Kimaro, H. C., and Nhampossa, J. L. "The Challenges of Sustainability of Health Information Systems in Developing Countries: Comparative Case Studies of Mozambique and Tanzania," in T. Leino, T. Saarinen, and S. Klein (eds.), *Proceedings of the 12ᵗʰ European Conference on Information Systems: The European IS Profession in the Global Networking Environment*, Turku, Finland, 2004.

Korpela, M., Mursu, A., Soriyan, A., Eorola, A., and Häkkinen, H. "Information Systems Research and Development by Activity Analysis and Development: Dead Horse or the Next Wave?," in B. Kaplan, D. P. Truex II, D. Wastell, A. T. Wood-Harper, and J. I. DeGross (eds.), *Information Systems Research: Relevant Theory and Informed Practice, Proceedings of the IFIP TC8WG8.2 International Conference*, Boston: Kluwer Academic Publishers, 2004, pp. 453-471.

Liane, S. "Social Networks and Organizational Structures During the Implementation Process of an Electronic Patient Record System," in *The 2003 European Computer Supported Cooperative Work Conference (ECSCW'03) Workshop on Social Networks*, Helsinki, Finland, 2003.

Leontjev, A. *Activity, Consciousness, and Personality*, Englewood Cliffs NJ: Prentice-Hall, 1978

Lungo, J. H. "Data Flows in Health Information Systems: An Action Research Study of Reporting Routine Health Delivery Services and Implementation of Computer Databases on Health Information Systems," M.Sc. Thesis, Department of Informatics, University of Oslo, Oslo, Norway, 2003.

Lungo, J. H. "The Potential of District Health Information Software in Tanzania," in A. Bada and O. Adelakun (eds.), *Social Implications of Computers in Developing Countries: Enhancing Human Resource Development through ICT*, Abuja, Nigeria. 2005, pp. 518-529

Lungo, J. H., and Nhampossa, J. L. "The Impacts of Legacy Information Systems in Reporting Routine Health Delivery Services: Case Studies from Mozambique and Tanzania," paper presented at the Eighth International Conference on Systems Science in Health Care, University of Geneva, Geneva, Switzerland, 2004.

Markus, M. L. "Power, Politics, and MIS Implementation," *Communications of the ACM* (26:6), 1983, pp. 430-444.

Mukama, F. K. "A Study of Health Information Systems at Local Levels in Tanzania and Mozambique," M.Sc.Thesis, Department of Informatics, University of Oslo, Oslo, Norway, 2003 (available online at www.ub.uib.no/elpub/NORAD/2003/uio/thesis02.pdf).

Mullins, J. L. *Management and Organizational Behavior* (6th ed.), Upper Saddle River, NJ: Prentice-Hall, 2002.

Nardi, B. A. *Context and Consciousness: Activity Theory and Human–Computer Interaction*, Cambridge, MA: MIT Press, 1995.

Nardi , B. A. "Studying Context: A Comparison of Activity Theory, Situated Action Models and Distributed Cognition," in *Proceedings of the East-West Conference on Human Computer Interaction*, Moscow: ICSTI, 1992, pp. 352-359.

Newman, M., and Sabherwal, R. "Determinants of Commitment to Information Systems Development: A Longitudinal Investigation," *MIS Quarterly* (20:1), March 1996, pp. 23-54.

Nicholson, B., and Sahay, S. "Some Political and Cultural Issues in the Globalization of Software Development: Case Experience from Britain and India," *Information and Organization* (11:1), 2001, pp. 25-44.

Orlikowski, W. J. "The Duality of Technology: Rethinking the Concept of Technology in Organizations," *Organization Science* (3:3), 1992, pp. 398-427.

Parker, M. *Organizational Culture and Identity*, London: Sage Publications, 2000.

Robey, D., and Azevedo, A. "Cultural Analysis of the Organizational Consequences of Information Technology," *Accounting, Management & Information Technology* (4:1), 1994, pp. 23-37.

Rubona, J. "Routine Health Information Systems that Operate in Tanzania," in *The RHINO Workshop on Issues and Innovation in Routine Health Information in Developing Countries*, The Bolger Center, Potomac, MD, March 14-16, 2001. Arlington, VA: Measure Evaluation, JSI Research and Training Institute, 2001, pp. 183-193.

Suchman, L. A. *Plans as Situated Actions: The Problem of Human–Machine Communication*, Cambridge, UK: Cambridge Press, 1987.

Vygotskij, L. S. *Mind and Society*, Cambridge, MA: Harvard University Press, 1978.

Walsham, G. *Interpreting Information Systems in Organizations*, Chichester, UK: Wiley, 1993.

Westrup, C., Liu, E., El-Sayed, H., and Al-Jaghoub, S. "Taking Culture Seriously: ICTs, Cultures and Development," in S. Krishna and S. Madon (eds.), *Information & Communication Techonologies and Development: New Opportunities, Perspectives and Challenges, Proceedings of the Seventh International Working Conference of IFIP WG 9.4*, Bangalore, India, May 28-31, 2002.

About the Author

Faraja Igira is currently a Ph.D. student at the University of Oslo, Norway, interested in studying information systems and cultural aspects. She holds a Master's in Informatics from the University of Oslo. Her current research is on organizational issues in the development and implementation of health information systems in low-income countries. Faraja can be reached by e-mail at farajam@ifi.uio.no.