The mediating role of documents: information sharing through medical records in healthcare

Abstract

The focus of this paper is on the mediating role of medical records in patient care. Their informative, communicative and constitutive facets are analysed on the basis of a case study in an African University teaching hospital. A practice-oriented approach and the concept of boundary objects were adopted to examine medical records as information artefacts. Data from nonparticipant observations and interviews with physicians were triangulated in a qualitative analysis. Three distinctive practices for information sharing – absorbing by reading, augmenting by documenting and recounting by presenting – were identified as central to the mediating role of medical records in the care of patients. Additionally, three information-sharing functions outside the immediate care of patients were identified: facilitating interactions, controlling hegemonic order and supporting learning. The records were both a useful information resource and a blueprint for sustaining shared practices over time. The medical records appeared as an essential part of patient care and amendments to them resulted in changes in several other work practices. The analysis contributes to research on documents as enacting and sustaining work practices in a workplace.

Introduction

Information sources and their use are a regularly studied topic in the research field of information behaviour. There are numerous studies where information sources used for work, leisure and other areas of private life are mapped and explained (cf. Case & Given 2016), some of which situate them in mundane, rich sites of information and learning (e.g., Wilkinson & Lloyd 2017). The goal has often been to find out how popular and suitable information sources are for delivering the information needed by individuals or groups. More recently, the role of information sources in soliciting what kind of information is appropriate and valid, and what kinds of information interactions are legitimate, has gained growing interest and has resulted in a realization that information sources are not a neutral feature of an environment, but actively contribute to the shaping of information interactions and information landscapes (cf. Byström & Pharo 2019; Haider & Sundin 2019; Isah & Byström 2016; Lloyd 2006). In this light, information sources appear as a central tool in work activities, attached by material and symbolic evidence; often functioning as intermediaries between people in a workplace (Davies & McKenzie 2004). Their seemingly self-evident status as part of their context makes them easily "invisible", commonplace and anonymous, which camouflage their influence in work practices. This article addresses medical records' mediating role(s) on the basis of a case study in an African developing country, where medical records, or "case notes", were studied in the context of a University teaching hospital.

This is a postprint-version of the article published as: Isah, E. and Byström, K. (2020), "The mediating role of documents: information sharing through medical records in healthcare", Journal of Documentation, Vol. ahead-of-print No. ahead-of-print. DOI: https://dx.doi.org/10.1108/JD-11-2019-0227

Medical records in patient care have a long history. Their main purpose is to collect essential details of patients' medical trajectories in their clinical encounters (cf. Huvila et al. 2018; Wilkinson & Lloyd 2017; Åhlfeldt & Huvila 2014; Isah 2012; Mogli 2009; Weed 1969; 1971). These concern disease conditions, diagnoses, test results, treatment plans, subsequent follow-ups and other details assumed to have significance in present and future treatment of the patient. In addition to the obvious value for immediate decisions concerning medical care, they have been considered as means for communication and coordination between caregivers. The medical record is an "intervening document between one practitioner and another and this document is, no doubt, often accorded more credibility than the actual patient" (Pettinari 1988, p.16); it is "woven into the fabric of medical work by providing a structure for ward routines and the smooth flow of work" (Rees 1981, p. 55). The medical record ties, not only the patient to the medical treatment, but also the caregivers to their various responsibilities in the patient's care. Sometimes the medical record is regarded as a kernel of medical narrative (Hunter 1991); "it is not that the records record things but that the very idea of recording … [that] determines in advance how things have to appear" (Raffel 1979, p. 48). This notion of representativeness highlights a perception of "what has taken place" (Berg 1996), thus affirming their usefulness in supporting clinical work (Coiera 1997). Whatever the perspective, it may be concluded that medical record is a significant information artefact that figures prominently in the assemblage of the caregivers' information landscape. In this study, we settle for a general description of medical record as a collection of diverse documented accounts over a patient's medical course and their medical care.

Over the years, medical records have changed both due to technological innovations and societal shifts. Modern technology enables easily transferrable digital format, facilitates the sharing of medical records among healthcare agencies, but also causes integrity issues. Societal development has simultaneously removed the sovereign proprietorship of the records from healthcare agencies in order to be shared with the patients who are allowed to access their own medical records. The policies related to medical records are a timely topic in many countries, and the practices related to the use of medical records are changing (cf. Huvila et al. 2018; Huvila et al. 2016; Huvila et al. 2015). Thus, the use of medical records is studied from several perspectives. In the present study, the primary perspective is that of practicing physicians.

Whilst the basic idea of a medical record appears to be universal, the preconditions differ between developed and developing countries. In developing countries, financial and economic constraints, together with technological and infrastructural inadequacies, hinder initiation of digital systems. Thus, the use of paper-based, manually-managed systems remains standard for patient information. In these contexts, medical records, often referred to as "case notes", are commonly viewed as a retrospective repository of information (Dick & Steen 1991) and the sovereign property of the caregivers. The case notes are seldom, if ever, shared with patients or removed from the healthcare agency where they are originally created. Their content concentrates on notes made by physicians in their meetings with patients during medical

treatment.

We apply ethno methodology to address the relationship between what is represented (the medical care of a patient) and what is a representation of the represented (the case notes). We acknowledge the notion of representation that is not viewed as being the same as its 'original'. Representation *per se* takes on a larger and more complex picture that brings together the presentation and the represented (Berg 1996). In the pursuit of restoring a patient's health, physicians see information as the intermixture of past, on-going and intended actions carried out in clinical settings. This view contests any assumptions that case notes are simply a repository of past documentation and/or completely faithful depictions of medical trajectories. The case notes are a central part of the entire patient care by mediating and coordinating an array of activities (cf. Davies & McKenzie 2004). In this article, we study the ways that they "both mediate and control human activities" (Allen, Karanasios & Slavova 2011, p. 783).

In sum, the present study focuses on the role of manually-managed case notes as mediating artefacts in patient care in an African University teaching hospital. Two decades ago, and still appositely (cf. Wilson, 2015), Davenport and Cronin (1998) called for a detailed investigation of work practices in real settings. They claimed that studying how work practices are carried out in interactions with significant others through text, may explain how work is constituted in a given work context. Such practice-oriented approach emphasizes information-related activities as social practices that take into account interrelated contextual elements in goal-directed work activities (cf. Robbins 2005; Wertsch, Del Rio & Alvarez 1995). Accordingly, we focus on patient care to understand how the case notes are both giving and given meaning in context. In the absence of a clear and concise definition of mediating artefacts as such, we regard them broadly as man-made material, or immaterial, tools that are originally generated or subsequently used in and for diverse goal-directed activities, and furthermore, act as intermediaries in the development of the activities themselves. Our interest is confined to mediating information artefacts, that is, emphasizing information and knowledge as their defining features (cf. Byström & Pharo 2019).

The aim of the present study is to examine the mediating role of case notes in patient care by highlighting their informative, communicative and constitutive facets through two research questions: 1) how practices are enacted and sustained by case notes as information artefacts in patient care; and, 2) what roles are allocated to case notes in the context of the workplace. The intertwined questions are addressed through an analysis of empirical data from a case study in an African University teaching hospital.

Our purpose is to contribute to an understanding of the use of information sources at the workplace. Apart from understanding the practice of medicine in light of the usage of case notes in an African cultural setting, the study provides an opportunity to learn how this practice

appears prior to changes already taken place in the developed world. Thus, it may even facilitate an understanding of the issues faced in the development of medical records as part of emerging healthcare practices. In the next section, we present a selective review of related literature, followed by an account of the theoretical framework and methodology. The qualitative content analysis leads to presentation of results and the article closes with a discussion of the findings in light of previous research and our conclusions.

Literature review

Today, advances in the understanding of information as part of social practices (cf. Cox 2012) have led to the resurgence of interest in intermediaries in information studies, highlighting the role of information artefacts. We define information artefacts as material or conceptual "objects that deal with information and knowledge" despite their original purpose (Byström & Pharo 2019, p. 106). Furthermore, we see the artefacts as subject to human agency through reconfigurations and reconstructions as part of their use (Byström & Pharo 2019), and consider them to function both as intermediaries and as information sources (cf. Allen, Karanasios & Slavova 2011). Thus, information artefacts are closely related to social practices that drive the performance of work activities (e.g. Byström & Lloyd 2012), and enact present actions by bounding them to their historical, institutional and material context (Sundin & Johannisson 2005; Sundin 2008). The information artefacts of the present study, the case notes, have a material and informational omnipresence through time; they have been created and transformed during an activity and "carry within themselves a particular culture – a historical residue of that development" (Kuuti 1996, p. 26).

Information artefacts, like case notes, are thus inseparable from their contexts. McKenzie (2004) suggested that studying the role of documents in a workplace context uncovers the information practices beyond traditional studies on information needs and uses. Her studies in a midwifery clinic setting highlighted the role of documents as temporary boundary objects mediating information across multiple timelines. Star and Griesemer (1989) and Bowker and Star (1999) use the concept of boundary object to explore the role of artefacts in collaborative work engaging multiple contexts simultaneously and incorporating both specific local and broader shared meanings. The information artefacts as boundary objects "both inhabit several communities of practice and satisfy the information requirements of each of them" (Bowker & Star 1999, p. 297). They identified boundary objects as pragmatic tools to bring coherence to information among the diverse groups in workplaces. Wenger (1998, p. 58-59) uses the concept of reification to describe the process of giving form to experiences by producing objects that congeal this experience into "thingness". Thus, the role of information artefacts is particularly relevant in an interactive setting of a workplace due to the meaning and values that people attach to them (Talja & McKenzie 2007).

Research contributions on medical records span time and several academic fields. By the 1960s, Garfinkel asserted that "intricately and sensitively reporting procedures are tied to other routinized practices of the clinic" (Garfinkel 1967, p. 192) and that "bringing record keeping performances under greater and more consistent control, overlooks a central and perhaps unalterable feature of patient records as elements of institutionalized practices" (Garfinkel 1967, p. 197). His work has been followed by a growing body of qualitative studies that emphasize the integral role of medical records in patient care. In their studies on ordered properties and practices related to the paper-based medical records, Heath and Luff (1996, 2000) identify medical records as an integral feature of accomplishing diagnostic and prognostic activities. Fitzpatrick (2000) describes medical records as an evolving and complex set of interrelated documents that are embedded in the social, spatial and organizational milieu of the hospital. To Fitzpatrick, the tangible physical nature of the medical record constitutes an integral part of the practical doings in healthcare where it enables flexible overlaid functionality and conversation. It both visualizes work and supports it with timely responses.

Berg's (1996, p. 499) reappraisal of the constitutive role of medical records in medical work relates it to the practices of reading and writing. He portrayed the medical record as "an artifact that mediates the social relations that act and work through it". He identifies three situational fragments – doctor-patient interaction, organization of the clinic, and reification of patients' medical trajectories – to address the dimensions involved in the practices of reading and writing. Later, Berg and Bowker (1997) studied the medical record as an organizational infrastructure that affords the interplay and coordination of divergent worlds, with focus on how the records, along with practices of reading and writing, are intertwined with the knowledge of patients' bodies. However, they seem to emphasize the medical record, not only as a site where multiple stories about patients and the organization of their treatment meet, but also as instrumental information artefacts in patient care. Berg and Bowker's occupation with the medical record is rooted in the core ideas within science and technology studies (cf. Latour 1996, 1994; Star 1995) through the emphasis on medical records as a part of a network within which the body acquires its specific medical ontology. Hence, they used Latour's (1994) term of "mediation" to underline how the medical record reconciles agency and organizational routines, as well as how it configures patients' bodies accordingly.

In keeping with traditional information-seeking research, Gorman et al. (2000) looked at the role of a variety of information sources that included formal paper and electronic records in clinical decision-making and problem solving. Based on field observations of expert clinicians in critical care units, they found the resident physicians' worksheets to be one type of 'bundles' used in patient care. The bundles were defined as "organized, highly selective collections of information to help solve problems and maintain situational awareness" (Gorman et al. 2000, p. 266). They saw the worksheets as "a widely used means of managing information to support diverse, complex, and often simultaneous tasks" (ibid, p. 266). Thus, a bundle such as the medical record is seen as a selective, multi-granular, context-specific, and task-oriented collection actively created by an expert (Gorman et al. 2000).

In sum, the notion of medical record as mediating artefact appears only fleetingly in the research literature (e.g. Davies & McKenzie 2004), as most of the studies focus on the medical records' informative and communicative roles (e.g., Gorman et al. 2000). The mediating role of medical records becomes central when viewed as a boundary object that inhabits multiple contexts simultaneously and have both local and shared meanings (cf. Star & Griesemer 1989; Bowker & Star 1999). These objects bring coherence to information and activities, by being readily conceived across the workplace but highly structured in the specific context of work. They act as intermediaries in goal-directed activities, for which they form a repository of information (e.g., Ball & Cohen 1992), as well as serving as a knowledge base themselves (Berg & Bowker 1997).

Methods

Since our intention is to explore the mediating role of artefacts, we adopt a practice-theoretical approach to signify actual doings. In our view, practices are socially constructed macro phenomena, and every individual and artefact is seen as a part of one or more practices and, thus, a 'carrier' of it/them (cf. Reckwitz 2002, p. 250). Furthermore, the artefacts are involved in "recurrent, materially bounded and situated actions engaged in by members of the community" (Orlikowski 2002, p. 256). In the healthcare context, the case notes may be viewed as boundary objects "that both inhabit several communities of practice and satisfy the information requirements of each of them" (Bowker & Star 1999, p. 297). Through this lens, we examine relationships and interactions connected to the case notes and their use.

A practice-oriented methodology entails prolonged and sustained contact with the research setting (Bryman & Burgess 1999). We carried out a case study consisting of two periods of data collection carried out by the first author. Altogether, the data collection took six months; the preliminary fieldwork took place from July to September 2008, and the main fieldwork from February to June 2010. We utilized several types of data through triangulation in order to collect rich material (cf. Silverman 2006), as well as to confirm the prominence of observations within the context studied (cf. Stake 2000, p. 443). The first research data was collected, mainly through direct observation of day-to-day clinical activities and meetings. The aim was to identify as many variables of interest as possible. During the second data collection period, we sought to portray the case notes as mediating artefacts (cf. Bliss & Säljö 1999; De Abreu 1999; John-Steiner & Mahn 1996). We were interested in three intertwined key elements: social components, cultural components and present context. This implied that while focussing on the three foci to examine case notes as mediating artefact (cf. Rogoff 1992), we sometimes foreground one component over the other two. The data collection methods consisted of interviews, as well as observations on interactions with physical artefacts and informal interactions surrounding them. The data collection resulted in rich research material, which is only partially used in the present analysis. It has been used also for other work where data collection has been described in greater detail (e.g., Isah & Byström 2016).

The primary participants were a team of physicians. The team serves as an example of a specialty-based unit structure depicting an academic hierarchy of education and responsibility in teaching hospitals. Our goal was to select a team of physicians in a teaching hospital whose

configuration depicted a compilation of different levels of experience within a specialization to highlight different information practices within the group. After identifying such team and gaining access we did not look further. The team members belonged to four cadres: Consultants, Senior Registrars, Registrars, and House Officers. The configuration of the team entails homogeneity depending on the profession and heterogeneity in terms of training, the level of specialization, experience, and exposure. The senior members – Consultants and Senior Registrars – form a relatively stable group and have a key role both in teaching and in maintaining conformity to medical practice and standards. The junior members – Registrars and House Officers – are appointed on short-term training periods as part of their education.

The observations enabled us to annotate clinical episodes where case notes were utilized. These episodes involved discussions, communications and interactions aided by the case notes. We observed a team comprising of fifteen members *in situ*: during ward rounds, in Consultant's clinics, in the emergency care unit, during morning review sessions, and in clinical meetings. In the semi-structured interviews, the participants were first asked to characterize their demographic details such as educational and professional background, team's membership, unit's aims and goals alongside with the description of their duties. Thereafter the issues of participants' interactions within the team were discussed in more details; the focus was on their information practices. The findings concerning their information practices and learning strategies have been reported in separate works (e.g., Isah & Byström 2016; 2017). The latter part of the interview focused on the case notes, that is, the topic of the present study.

The first author interviewed fifteen (15) physicians working in the same team, as well as an additional ten (10) members of staff from other units/departments who were selected opportunistically by taking advantage of openings that sprung up during the observations. The face-to-face interviews were tape-recorded and transcribed in full. The interview time totalled one thousand four hundred and seven (1407) minutes with an average of ninety-four (94) minutes – one hundred and twenty-eight (128) minutes for the team members and thirteen (13) minutes for the other participants. The study participants were all informed in advance about the study; the patients and their details were carefully left out already during the data collection process, and the hospital's ethical council approved the study.

There are several ways to conduct data analysis in case studies (cf. Yin 1994). We opted for a manual data analysis. We interspersed data collection and analysis by reading through the observation notes to identify themes for further data collection. This made the data analysis a continuously developing process of reconstructing a meaningful whole in an iterative fashion. The analysis was strongly influenced by Strauss' (1987) three kinds of qualitative data coding techniques: open coding, axial coding and selective coding. The complexity of understanding sociocultural and historical components made us adopt a combination of a 'loosely' inductive analysis and a 'tighter confirmatory' deductive analysis. The inductive analysis builds on (re)reading the field notes and interview transcripts, locating themes and assigning initial

codes. The deductive analysis relied on theoretical propositions to aid the clustering of themes into (sub-) categories and around core ideas. Whereas there was no duplicate analysis *per se*, the first author has worked with the original data set in several iterations in separate occasions. She also was responsible for selecting the initial data for the present work, which then was analysed jointly by both authors. During the final analysis the original dataset was browsed once more by the first author to identify additional relevant data.

Empirical findings I – Information sharing in patient care

Data analysis demonstrates three general, but distinctive information practices: to absorb by reading, to augment by documenting and to recount by presenting. Reading and documenting constituted central information practices in any specific instance of patient care. We observed the participants continually flipping through patients' case notes, and (re)documenting their considerations and actions. In this section, we illustrate how case notes are used to share information relating to these three practices in the studied patient care context.

To augment by documenting

Documenting was visibly prominent all through data collection and provides an advantageous place to start to explore the intermediary role of case notes in the team's day-to-day clinical routines: *"every time we see a patient, we are supposed to document; we document both the subjective assessment and objective analysis"* (Registrar). Documenting entailed the actual written recordings made by team members on the case notes. The handwritten case notes were seen as an indispensable working document, without which, patients' health trajectories would be lost. In them, the caregivers were able to

> *"…see the patient's progress, can follow the flow of thoughts of the physicians who earlier documented and followed the peculiarities of this patient's ailment".* (Registrar)

Recordings consisted of details about the patient and the team members' encounters with a patient, such as:

> *"…patient's illness, what had been done so far for the patient, how the patient was responding, whether the team was succeeding, whether there was need to revise the treatment."* (House Officer)

The standard documenting practice entailed a more senior person in the team dictating whilst a junior person documented. Usually, the House Officer who was primarily responsible for the patient did the actual writing. The participants considered this method of documenting efficient, as it allowed documenting to happen simultaneously as the patient was examined and colleagues consulted.

Documenting was believed to result in *"a good summary of the deliberations or discussions about patients so that whatever decisions we take are appropriately reflected"* (Consultant). It provided a compilation of the information gathered and assisted the team *"in reaching our diagnosis, as well as for follow-ups"* (Consultant). Documenting was also an act of corroboration, since any interaction with a patient without appropriately made notes was *"…not valid…is null and void"* (Consultant). It simply *"… was not done. If it is not written, it*

was not said" (House Officer) or even *"if you do not document that means that you never saw the patient"* (House Officer).

However, the documentation was not only to proclaim actions taking place and to support joint conclusions, but also to support the memories of the participants. One participant refers to the number of patients:

> *"I cannot remember all their case histories; I cannot remember all their stories … we write to keep ourselves informed about our patients."* (Senior Registrar)

Furthermore, documentation aids keeping the activity on track:

> *"It helps us to remember where we stopped in case somebody needs to follow up."* (Senior Registrar)
>
> *"We will know where the last person that attended to the patient stopped and what is to follow."* (Registrar)

Documenting gives the case notes a self-perpetuating purpose; they exist to confine all necessary information relating to a patient and their care up until the latest encounter with the caregiver. Any time the patient requires medical attention: *"the team can have recourse to the information already documented by the people who saw him previously"* (Consultant).

> *"It is like I have their minds on the paper, then I evaluate the thought processes of my fellow colleagues, even if the person is not around."* (Registrar)
>
> *"Nobody would start looking for me or trying to reach me or call or do anything to get information from me because the information is right there as documented."* (House Officer)

To absorb by reading

The case notes support and sustain the members' engagement in patient care as *"it is good to look at the past medical history ... by looking at what the different persons involved in managing the patient have done"* in prior clinical situations (Consultant). This is particularly valuable in cases when *"the patient is not cooperating with us"* (Senior Registrar) or when *"the patient is improving clinically"* (Registrar). The case notes thus ensure the continuity of care, and is intricately linked to the practice of reading; what was being shared by documenting is getting shared when others read what was documented. For example, one of the participants explained that what a Consultant documents in the case notes, a House Officer was expected to read and interpret on his own. In this way, the case notes enable participation in patient care through the practices of reading and documenting. Because the medical trajectory entailed a continuum of patient care that ensured continual review and re-evaluation each time the team members either collectively or individually encountered the patient, reading was also compulsory:

> *"…to see what has so far been done for this patient"*. (House Officer)
>
> *"…not just to start writing yourself...but to know where others stopped"*. (House Officer)
>
> *"…you compare the past by looking at what the different persons involved in managing*

the patient have done". (Consultant)

"I see what they have done about this patient and I see... either to agree with him or to disagree with him. It makes you think, it gives you a broader picture. It is like the commerce of people's mind. …somebody comes and makes an impression and you come and make your own impression." (Registrar)

One of the participants expressed that reading a peer's documentation gave him a window into the minds of other team members whilst other participants identified patient safety issues:

"In absence of reading previous documentations about a patient, you will just go there and do what is far from the diagnosis... the patient's medical history, that is to say what is actually wrong with the patient and that can sever patient's life." (House Officer)

"When a patient reacts to certain drugs you document it… Years later someone can flip through and see that the patient once reacted to such drugs even if the patient may have forgotten or the patient is not even in a state to remember." (Senior Registrar)

Reading was a pervasive feature of the team's information practices. The team members intermittently and sequentially turned to, flipped through, and (re)read the case notes during the team's encounters with patients. Furthermore, reading as practice had a relation to the participants social positioning, and particularly to coordinating their activities. The objective of reading stood out as highly pragmatic and highlighted the variations of reading between senior and junior members.

We identified differences on what the participants looked for or paid attention to in the case notes. The senior members were expected to take time to consider previous documentation to distinguish salient points in the case notes. One of the senior members explained that before treating a patient *"you read through the patient's history; you go back and move forward; you stop, ask questions, and even begin again"* (Senior Registrar). Furthermore, this had an educational effect by allowing the senior members to find out whether there were discrepancies between what they had expected their junior colleagues to do and what was actually done: *"... are there errors in their documentation"* so that *"they can be corrected"* (Senior Registrar). Thus, the senior members saw reading as an instrument to supervise the treatment and to ensure accurate procedures:

"I want to know whether the instructions in the case notes have been carried out in the way they should have been." (Senior Registrar)

The junior members had partially the same reasons to flip through the case notes. They too obtained insights of the patient's history in order to solve the problem, to keep track of the patient's health trajectory and to find out whether *"the patient had been taking his drugs regularly, whether the nurses have been charting his temperature, vital signs, temperature, respiratory, breathing pattern, the blood pressure, etc."* (House Officer). For them, it was useful to read about previous diagnoses and investigations, what treatment had been proffered and what drug complications had arisen. Reading through case notes entailed looking at the

progression so far between the time the patient was first seen and the present time:

> *"You look through how the patient is taking his drugs and the vital signs. Are the drugs having an effect? You look through... is the patient gaining weight? Is the patient doing well? You can assess the progress of the patient... the patient's blood pressure, PCV… are we doing well or are we doing badly? The patient's subjective feeling, does the patient feel he is getting better? …so, these are things you look through and then see where you are in the time scale.*" (House Officer)

> *"I am also looking at the alternate diagnosis, and I want to know the reason why there is more than one diagnosis for the patient."* (House Officer)

In addition, reading had obvious learning implications for both the senior and junior members of the team at the individual and collective levels. At the individual level, one of the Registrars recounted the benefits he derived from reading:

> *"I have benefited a lot by flipping and reading through various documentations on our patients. I have gotten some knowledge about the patients' clinical problems and some knowledge of the patients' history. It has helped me in continuing patients' management and even for my own professional development."* (Registrar)

On the collective level, another Registrar noted the benefits of reading to the team members:

> *"...we gain from reading the case notes…it helps us to update ourselves about the patient condition and that collectively helps the team to become better."* (Registrar)

The team members saw the case notes as a template for learning. One of the House Officers, for example, explained that the best way to learn about congestive heart failure or chronic kidney disease was to read through the case notes of patients. The case notes made for a central point of reference:

> *"You cannot remember everything you saw in the patient before, because you meet a patient today, and you see him in the next six months. So it is a way of going back to what you did before and reminding yourself about the patient and knowing where to go next. The next time you see this patient, you do not need to be asking all the questions all over again. They are already in the case notes; you can now make reference to your write-up. It also helps you to remember the cases you have managed very well and treated very well and see what you did for those people, and you can apply the same experience to other people."* (Registrar)

Reading also acknowledged the activities of members of the wider community, particularly those of nurses. The case notes were the exclusive domain and prerogative of the physicians and it was supplemented with different addenda such as the nursing process chart and drug chart.

> *"Unless I investigate the nurses' process chart for example, I am not able to tell what the pattern of the patient's temperature yesterday was like, and what the fluid intake-output was like."* (Consultant)

> *"… even if I had written a prescription in the case note, the only way to be assured that the patient was administered the drug by the nurses is to go to the drug chart, and see what were given, how much of it was given, and when it was given."* (Consultant)

To recount by presenting

The practices of documenting and reading as part of encounters with a patient are complemented by a practice of presentation. This third type of sharing takes case notes away from the patient's bedside. Case presentations are narrative re-enactments of medical encounters with patients. They enable team members to evaluate whether the patient treatment is conducted appropriately, as well as to ensure that the established protocols for information gathering (i.e. clerkship) were followed appropriately. During the case presentations, one or more team members re-interpret the patients' medical treatment trajectory from the case notes to a wider audience. The presentations are given *"... in a format that is acceptable and meaningful ... in our own medical language"* (Registrar) and focus on the patient's health profile *"so everybody gets to be aware ... you do not just gather information and keep it to yourself"* (House Officer). Through the presentations *"the team members will get to know more about patients"* (House Officer) and become aware of *"what we are doing for the patient or what we have done for the patient"* (Registrar). The case presentations were usually interactive in nature and provided a forum for feedback and evaluation concerning the patient cases and the presentations themselves:

> *"I would look out to see that the fellow who is presenting the case has a message to deliver, he presents it with all confidence, good flow, proper delivery of the case, and then gives an adequate review of that case and delivers a message so that at the end of the day, there is a take home message from the case that was presented."* (Consultant)
>
> *"... the diagnosis he made, is it actually the right diagnosis looking at the history and examination he has done? The plan that he has instituted, is that actually the right plan? You want to know why he has instituted the plan. Does he know the reason why he is instituting the plan?"* (House Officer)

Similar to the practices of documenting and writing, the practice of presenting was related to the participants' social positioning in the medical hierarchy. For the junior members, the case presentations allowed training of their competence to work with patient data. They aimed for clarity and facts in their presentations: *"...the presentation has to be clear... looking for conciseness, simplicity"* (House Officer)*; "the presentation has to be easy to understand"* (House Officer) and *"... you get to listen; you get to hear, you know, see how this person was thinking and why the person made certain diagnosis"* (Registrar). Some of the junior participants saw the case presentations as a way of learning by enabling them to gain insights from their senior colleagues: *"we are learning and tapping from their wealth of experience"* (House Officer). During the case presentations their senior colleagues *"analyse what you have done, and in so doing they help you in getting a better history of the patient"* (Registrar) and *"will tell you that this is how to do this thing"* (House Officer). They often got feedback in the form of criticism:

> *"They criticize your history and tell you what they think after hearing your case presentation."* (House Officer)
>
> *"They tell you that what you did was not the right thing to do at that particular time."* (House Officer)
>
> *"They even criticize the drugs you prescribed, probably because you were unaware*

that there is a better alternative to what you prescribed for the patient." (House Officer)

"You did not do this well, right now go back there, do this for the patient, do that for the patient." (House Officer)

The senior members viewed the case presentations much in the same way, but from a different perspective. The case presentations provided an opportunity to get first-hand information, *"hear straight from the horse's mouth"* (Senior Registrar), and more importantly secure appropriate treatment for patients by filling *"in those gaps and correct errors that have been made … suggesting the way forward"* (Senior Registrar). The case presentations also provided an opportunity to analyse and criticise the steps taken by the presenter:

"We probe in, we want to see how grounded our younger ones are and the knowledge they have … how well they have developed in the training." (Senior Registrar)

"Listen to all the processes to see if it is in line with already known format." (Consultant)

"How did he move on from point A to point B to point C in making a diagnosis? Is it logical? Then also your examination, does it go with the known form; the known pattern of the disease which I think the patient has, then when you make a diagnosis, is it in a proper formulation?… And then the treatment is it in line with what is the acceptable treatment for that condition or not?" (Senior Registrar)

Thus, to absorb by reading, to augment by documenting, and to recount by presenting were fundamental in enacting and sustaining case notes. Furthermore, reading, documentation and presenting enable information sharing, both concerning a particular patient, as well as concerning work practices in general in-patient care. One caregiver documents in order to share information (mainly with other colleagues, but also with oneself at a later stage), another reads to take part in what others (or oneself at an earlier stage) have documented, whilst another delivers an oral presentation to colleagues (to share information, but also demonstrate their own skills to highlight the essentials).

Empirical findings II – broader functions of information sharing

As demonstrated above, the case notes are multi-purposeful; they served as a repository of information and knowledge, and supported and mediated a plethora of the medical team's work activities in patient care. In addition, the case notes served functions that were not directly related to the care of patients, but still concerned information sharing regarding the care. For example, Registrars took the case notes to morning review to inform other units/departments about the patients in treatment, indicating that the case notes were not only a resource for the medical team, but also a *"record linkage"* (Consultant) to the wider community. The Consultants and Senior Registrars acted as experts who shared detailed knowledge within their respective specialties. One of the senior members claimed that he used the case notes for auditing at different levels. Another claimed that the case notes constituted a good source of information for residents preparing for their examinations. Thus, beyond the

immediate care of patients, case notes served to facilitate several other roles. We identified the following ones: facilitating interactions within the workplace in general, controlling hegemonic order throughout the workplace, and supporting learning at the workplace. These are discussed below.

Facilitating interactions

The case notes served as an intermediary because they occupied a position that cut across the boundaries of the team, other units/departments, patients, as well as time. One of the senior members explained that

> *"… if the relevant parties do not have the existing documentation of what has been happening, they may lose entirely the patient's profile or what the sequence of the history is all about"* (Consultant).

Some of the participants reasoned that if a patient being managed by the team had to be re-evaluated and managed for some other pathological conditions in other units/departments, it is through the case notes *"as the template"* (Registrar) that they are able to understand what has already been done for the patient. Indeed, the members of other units/departments simply assumed that the case notes would be "*detailed enough"* (Senior Registrar) even for their purposes.

The case notes showed some commonality of purpose in the context of patient care. The most recurring motives for using the case notes were to resume past activities: e.g., *"to see what had been done for the patient"* (House Officer) and *"to read what we discussed during our previous encounters with the patient"* (Senior Registrar); as well as to confirm consensus: e.g., *"to verify what was said regarding the patient status"* (House Officer) and that *"the disease that was diagnosed was collectively agreed upon"* (Registrar). The information in the case notes was reconsidered continually, amplified with test results, interpreted by several participating instances, summarized after each encounter, and made available at any time.

> *"Any member of my unit could walk up there to look at the case notes … I do not have to be there … He does not need to see me face-to-face but looking at the case note will tell him what has been done."* (House Officer)

It was evident that the case notes served as a coordinating mechanism between the participating actors. There was no indication of confusion in the way they were accessed. Though the case notes served multiple units/departments, control of the case notes depended on the participating actor's involvement with the patient. Some were directly involved with patients, such as the specialist physicians from other units/departments, nurses, and physiotherapists; others were not directly involved, such as the accounting staff and laboratory technicians. Although the contents and the presentation were the same for all actors, the interpretations and meanings changed according to their relation to the patient. Through their perspectives, the contents of the case notes were incorporated to fit into a diverse range of activities in the hospital.

> *"During physiotherapy sessions, I assess the case notes by looking at the patient's medical history and therapeutic interventions to relate to the patient's level of cooperation in physiotherapy."* (Physiotherapist)

Even with this kind of flexibility in perspective, the case notes did not lose their significance. Instead, the case notes were integrated and assigned a different significance in the interactions for which they become a part. For example, one of the specialist physicians explained that the case notes served as a mechanism through which he integrated his own neurological specialist input. This way, the members of other units and departments maintained direct relationships with the team members:

> *"They make their own notes, and their opinions well stated … We do not have to go and ask them whether they have seen the patient."* (House Officer)
>
> *"… from there, we can make our own impressions and interpretation of their findings pertinent to the patient's condition."* (House Officer)

This flexibility in the use of case notes had major implications in supporting information sharing. The entries in the case notes were largely standardized, which enabled information to be shared regardless of the sameness or differences of the participating actors. The case notes comprised the patient care decisions about actions to be undertaken, how they were to be carried out, and who was responsible for carrying them out. Thus, the case notes fed into the organization of the entire hospital. The case notes were exhaustive; they started with the few entries from when the patient was first attended to, and grew larger with entries relating to frequent updating during subsequent visits or stays at the hospital. The multiple data types, such as numbers, text, pictures, annotations, and abbreviations, were all represented so that they made sense in their different contexts, reflecting the expertise and limitations of the respective participating actors. Thus, the data in the case notes were complex but comprehensible for both team members and members of the wider hospital community, to the degree deemed necessary for their work activities.

Controlling hegemonic order

A heavy instance of power relations surfaced in the study. Power relations refer to the unequal influence of participating actors and affected the way the case notes were accessed and utilized. The issue of power relations was prevalent as the case notes underscored the hierarchical relationships in the entire teaching hospital. We found that the medical hierarchy governed how the differences were reconciled and whose views prevailed. Whenever there were two mutually exclusive entries, the aspect of power surfaced. The consultants with their highest degree of seniority were the absolute authorities concerning the entries in the case notes. They were the most knowledgeable members and their statements in the case notes became instantly a reference for the other team members.

The case notes reflect the hegemonic order and chains of delegations and authority that depict the physicians as representatives of the entire heterogeneous assembly in the teaching hospital

setting. It was on these handwritten loose-leaf papers that the authority and sphere of dispensation of 'who is who' in the teaching hospital was portrayed. They affirmed the asymmetrical relationship among team members, as well as between the team members and members of other units/departments, such as specialists, nurses and administrators. The team members were central actors and decision makers in treating their patients, while the role of others was often reduced to the execution and administration of the treatment plans. Accordingly, they merely extracted information from the case notes for their own work activities. For example, even though the nurses were custodians of the physical case notes when patients were in hospital, they were not allowed to make entries in them: "*We do not make any entry in the case notes… We have our charts that we use*" (Nurse). However, they were expected to read the case notes to carry out the tasks and administration specified in the management plans. The only exception was the specialist physicians from other units who were granted much of the same authority as the team members. They were able to enter information without restrictions. A specialist physician from another unit explains: *"I have to make my own documentation and instructions on what to do"* (Specialist). However, one of the consultants said that the treating team has ownership of the case notes because of the

> *"... confidentiality clause concerning my interactions with my patients. So, I do not think my patients' case notes should be released without getting my consent"* (Consultant).

Supporting workplace learning

The case notes were a useful learning resource that was neither fixed nor arbitrary, and participants experienced them to enhance *"faster learning than when discussing with the patient"* (Registrar). Consequently, the senior members used the case notes to teach the junior members. The possibility to trace back and move forward in the case notes enhanced, relating single specifics to patients. One participant explained that reading through the case notes was the best way to understand congestive heart failure or chronic kidney disease. Another claimed that the assemblage of extensive history taking, physical examinations, investigative results, and the patient's treatment management, far outweighed what he had learnt from textbooks. We observed that junior members were habitually picking up and reading through case notes as they clerked in pairs at the bedsides of patients in the ward. We also observed how they discussed amongst themselves the content of the case notes. The junior members claimed that the case notes both enhanced their proficiency in clerkship and improved their skills and expertise. Because the case notes reflected different perspectives on the patient and their ailment, they tended to perpetuate the practice of the unit beyond the circumstances that shaped them in the first place.

In medicine, it is necessary to know both the basic principles and practical approach in patient care. Sometimes the case notes helped the junior members to confirm whether their history taking conformed to the standards of medical practice. On other occasions, the case notes helped them to learn more about different kinds of unfamiliar drugs, for what they were useful, what side effects they have, and how they were used: *"I will be able to say that this particular line of treatment is very useful in the management of this kind of case"* (House Officer). The

case notes were enabling them to consolidate their factual and procedural knowledge base as physicians. Accordingly, the detailed entries in the case notes by experienced team members were seen as a useful learning instrument:

> *"I will just go to the case notes and find out what other questions my lecturers have asked, so that could aid me to know the kind of question to ask the patient"* (House Officer).

Case notes were also seen as the blueprint for sustaining the shared practices, whilst reducing dysfunctional practices. One of the senior members explained that a physician treating a patient with problematical medical conditions such as kidney transplants or chronic pyelonephritis needed to understand potential complexities in managing such a patient. Before referring the matter to senior colleagues, the proper thing to do was to look at the case notes. To buttress the senior member's explanation, one of the junior members noted that: *"... it enabled me to have oversight of a pattern of management regarding different ailments"* (House Officer). Moreover, the case notes highlighted areas for possible additional inquiry. Sometimes these helped to bridge information gaps, other times they resulted in controversies. One challenge the team members faced was the need to reconcile differences in entries in the case notes. The participants believed that reconciling differences and resolving controversies helped them in their continual development: *"the usefulness of the case notes in identifying pitfalls and peculiarities of the interventions go a long way in enhancing learning"* (Registrar).

The case notes have many obvious implications for learning, and were, in principle, a tool for collective learning. They *"put the team on a strong footing in knowing what is wrong with this patient ... so that you know where to start from"* (House Officer). Some of the participants reasoned that one of the attributes of a good physician was the realization that nobody knows everything. Therefore, every cadre was expected to provide input in the case notes as *"we get to know more because what I was thinking may not be conclusive and what somebody else had added as his own opinion becomes an addition to mine"* (House Officer).

The three information practices related to the medical records were on going, visible, and pervasive in the study. Sharing by documentation was the first major information practice undertaken by the team members as they focused their attention on the patients. It depicted the actual writing in the case notes. Sharing by reading refers to the activity of taking in the patient's documented medical history. This involves following up the patient's health trajectory and to identifying and relating diverse medical phenomena to each other. Sharing by presenting consisted of narrative re-enactments of the documented encounters with patients, including significant medical specifics. Presenting occurred simultaneously alongside other cognates of the information practices related to the medical record. These three practices supported and played a central role in other, non-patient related mediating activities, including: facilitating interactions, controlling hegemonic order and supporting learning.

Discussion

It is evident that medical records, such as the case notes of the present study, are an essential part of practices within healthcare, playing a key role in enacting and sustaining the work through their multi-functionality; they are informative, communicative and task-oriented, they form a data cache for residual memory and they function as mediating artefacts across boundaries of time and local contexts. The case notes have both convergent and divergent functions in patient care; they allow the participating actors to synchronize and carry out their actions in a meaningful way (i.e. diagnoses, therapeutic management, monitoring and follow-up activities, and discharge). They are situated within the cultural-historical medical context and are understood primarily within the framework of patient care but also, more generally, within healthcare.

The material, physical form was a major aspect of the case notes. Their material representation in the form of written text on multiple loose-leaf papers can be seen to serve several purposes within the work activity. They were constantly and visibly in use; as a record presenting a patient history and treatment status; as a "textbook" of symptoms, diagnoses and treatments; as a reference text of medical plans and procedures; and, as the official documentation with administrative and legal consequences. The case notes provided the entry point to the patient's profile and were multi-granular in format containing information on various levels, from the patient's biographical data to the numerous detailed entries by caregivers. The entries were chronologically arranged, indicating successive, continuous, and iterative interactions and events, reflecting a series of well-defined and sequential narrative structures. The case notes were designed to facilitate multi-authorship; whilst the structure was fixed, it simultaneously permitted unlimited possibilities to add documentation about diagnosis, investigations and therapeutic interventions in full detail. The structure defined fixed categories that both indicated what to collect and where to insert the items in the case notes. Thus, the case notes were viewed as comprehensive material reports of all information obtained at any given point of time. This function as a repository makes them an eminent carrier of information providing access to information about a patient over time and over several sub-areas. The treating physicians create them as part of patient care; they document their everyday actions and decisions pertaining to the patient, accumulating a structured medical history for a specific patient. They are used to validate the diagnosing and provide justification for choices in patient care. Our findings revealed that case notes support both material and immaterial representations, which feeds back into present and future practice.

In our study, the case notes appear as a prerequisite for engaging in patient care. They were omnipresent; consulted both when attending to the patient but also independently. Practices of documenting, reading and presenting enact and sustain the case notes as a necessary mediating artefact in the work activities and, as a result, the case notes have evolved into a co-produced social practice. The case notes may even be described as an extreme mediating artefact; they are modified in interactions with a patient and are used to keep track of and to control the activities undertaken by the caregivers. Due to the centrality of case notes for patient care; our use of the concept of mediating artefact is both broader and deeper than conceived by Engeström (1987). The case notes embody the social practices involved in patient care. They were primarily seen as an artefact-in-progress that evolved over the patient's health trajectory.

However, they do not only co-evolve with the team's work activity, but they enable a configuration of reification, the "thingness" that is enclosed in the activities undertaken (cf. Wenger 1998).

The case notes are thus both meaning-producing and practice-regenerating. In addition to the informational details, the case notes convey tacit knowledge of patient care; by guiding and directing processes and procedures in connection to one patient, they simultaneously fortify the ways of practicing patient care. The case notes have been bestowed a physical presence and representational life of their own. From a practice-oriented perspective, learning is seen as a continuous activity through mundane everyday undertakings such as documenting, reading and presenting related to the case notes. Such undertakings entailed both adopting and gaining mastery of the artefact (cf. Wells 1999, p. 155). Aside from facilitating, and by so doing, fortifying many day-to-day functions in patient care, the case notes have also established themselves for the purposes of deliberate learning; they embody a template for clerkship and facilitate newcomers in integrating and perpetuating practice.

Case notes also function as a bridge that overcomes boundaries between units/departments in the teaching hospital. They link the medical engagements with a patient to the wider community and allow specialists carrying out their involvement to access information about the patient and their condition. They also enable access to information for activities other than medical ones in the hospital, e.g., for administrative purposes such as registration and the administration of drugs. The case notes represent the patient *per se* in several practices; their structure and content support interactions and collaborations in practices of different parts of the wider community (cf. Engeström 1987; Berg & Bowker 1997; Cox 2012; Davies & McKenzie 2004). The case notes are both solid and flexible enough to accommodate different interpretations and diverse types of connections across boundaries. The case notes thus enhance coordination between participating actors and provide coherence in information that span through the other units/departments within the teaching hospital (cf. Davies & McKenzie 2004). Thus, the case notes are true boundary objects (cf. Star & Griesemer 1989) where different perspectives converge and different purposes align. The case notes form a "nexus of perspectives" (Wenger 1998, p. 108), a meeting point for arriving at consensus between the participating actors. In this way, coherence is attained within a medley of activities linked to the care of a patient.

We argue that the case notes are crucial in determining the relationships among team members, between the team and the different units/departments and are robust enough to maintain a common identity across the wider community in mutual engagements (Wenger 1998, p. 76). According to Wenger, mutual engagements do not entail homogeneity, but they create relationships and diversity between people through the process of doing things together. Berg and Bowker (1997) assert how medical records are especially effective in producing a human body and hospital hierarchies, as well as how the selective memory displayed in them form a clinical point of view. Our findings clearly affirm that case notes are both about factual statements regarding a patient's medical status, but also about mundane proclamations about

the social practices taking place in medical settings.

Viewing the case notes as mediating artefacts revealed issues less visible in social practices such as power. When addressed, the power relationships are viewed as internal contradictions leading to a change. The role and influence of power in determining or influencing the use of a mediating artefact is largely ignored in wider communities, a shortcoming that practice-theoretical approach bridges in our study. The power relationships were palpable in our empirical material, even if we were not initially looking for them, but appeared not to be conflicting or tense, rather the case notes as mediating artefacts augmented into a passive, even affirmative acceptance of power structures. Nevertheless, the power relationships in our study appeared to possess a "social, meaningful enacted essence" (Prus 1999, p. 272) suggesting a hegemonic order in the teaching hospital. Hegemony was demonstrated predominantly through the influence that the senior members had over junior members regarding the use of case notes and even had implications for the wider community's relationships to case notes by defining who was required, or authorized, to fill in information in the case notes, who had access to read them, and in the case of disagreements, whose standpoint prevailed.

The power relationships were neither accidental nor marginal but were intricately intertwined in the social practices inherent in patient care, including the case notes. Our impression of power relationships in the empirical material stems with the view of Lave and Wenger (1991, p. 42) where an appreciation of the "hegemony over resources" is incorporated within "unequal relations of power", later reaffirmed by Wenger-Trayner and Wenger-Trayner (2015) who operationalized it in terms of "accountability" and "knowledgeability" as a result of legitimization within and between communities of practise. Thus, the power relationships either facilitated or impeded the access to the mediating artefact and, in doing so, also regulated who was responsible for what.

Conclusion

This article contributes to the research field of information behaviour from a practice-theoretical perspective. It has focused on the role of case notes as mediating artefacts in patient care. We have demonstrated how case notes are not just a source of information, but an essential, enacting part of the work itself. In this article, we have taken the analysis beyond the dichotomy between representations and mediating (cf. Berg & Bowker 1997), to investigate how information practices themselves are enacted and, in turn, how they enact other work practices. Our findings have illustrated that the case notes effectuate shared understanding and agreement that is much deeper than just providing access to documented information.

The analysis of artefacts as mediating cultural means and boundary objects brings a set of defining features in focus, which have bearing beyond the present study. The medical record as an information artefact has the following characteristics: (1) it is context-specific, in as much as it has defined meaning only within the work context of where it is enacted, constructed and used; (2) it is not neutral means but constitutes an integral part of the work; (3) it is a

pragmatic tool that enables practical actions and doings in collaborative work activities; and thus, (4) it has transformative influence in the relationships between physicians, as well as between physicians and patients during patient care. It also serves (5) the purpose of coordinating work, and (6) brings coherence in the communication between dispersed work groups. To master the use of the artefact is "to learn to participate in the practices in which it plays a functioning mediating role" (Wells 1999, p. 136). To sum up, the above features make the medical record a reified repository that gives form to interactions and encounters in healthcare in a standardized, accepted format, traversing sites.

In this article, we have viewed case notes through a practice-theoretical lens. Out of this perspective we can conclude: 1) that the case notes occupy a central niche in patient care, in line with previous research (e.g., Engeström 1987; Berg & Bowker 1997); 2) that the information source is only one of the roles of case notes; and, 3) that the case notes provide a forum for meaning-making and negotiations for, and amongst, all participating actors (cf. Davies & McKenzie 2004). The entries have bearing on the practices of the entire hospital. In addition, the physical format of the case notes, visibly demonstrate their omnipresence, which is likely to strengthen their significance in the work (cf. Fitzpatrick 2000). Our orientation towards conceptualisations within practice studies has been consciously broad in order to capture the informative, communicative and constitutive facets of medical records as mediating artefacts that we set out to investigate in an empirical setting. Consequently, the theoretical deliberations have had an analytical role in relation to our findings. For theoretical deliberations on relevant, intertwined scholarly discourses we refer to Huvila, Anderson, Janson, McKenzie and Worrall (2017).

The digitalization of medical records alters the preconditions for the significance of medical records. Both the records themselves, and their use, appear to become a less visible part of the activity (cf. Hertzum, 2019). Our results offer a rich understanding of the practices related to medical records prior a change of format. By relating new findings of the use and role of digital records may then reveal what is lost and gained in the practices. For example, what does it mean for learning purposes that corporeal and social information are distanced from the recorded information when the record is not as significantly transparent in meetings with patients? Does the new structure allow fuelling of collective decision-making, or are details and connections more difficult to identify? Are the records losing content or changing its nature as patients themselves are granted access on their own? Addressing what these and other changes mean concerning the medical records' role in mediating work practices, and for work practices in general, is an interesting research topic in settings where digital records have been taken into use.

In conclusion, the case notes in the present study, exemplify an extreme type of mediating artefact; it is imperative and crucial for – if not all then nearly all – engagements in patient care. They are far from an informational by-product of work; instead they make a main assemblage of local knowledge enabling the work.

References

De Abreu, G. (1999). Learning mathematics in and outside school: Two views on Situated Learning. In J. Bliss, R. Säljö & P. Light (Eds.), *Learning Sites: Social and Technological Resources for learning* (pp. 17-31). Amsterdam: Pergamon.

Allen, D., Karanasios, S., & Slavova, M. (2011). Working with Activity Theory: Context, Technology, and Information Behaviour. *Journal of the American Society for Information Science and Technology 62*(4), 776-788.

Åhlfeldt, R. & Huvila, I. (2014). Patient safety and patient privacy when reading their medical records. In K. Saranto, M. Castren, T. Kuusela, S. Hyrynsalmi, & S. Ojala (ed.). Safe and Secure Cities, Heidelberg: Springer, 230-239.

Ball, M. J., & Collen, M. F. (Eds.) (1992). *Aspects of the Computer-Based Patient Record*. New York: Springer.

Berg, M. (1996). Practices of reading and writing: The constitutive role of the patient record in medical work. *Sociology of Health and Illness, 18*(4), 499-524.

Berg, M., & Bowker, G. (1997). The multiple bodies of the medical record: Toward sociology of an artifact. *The Sociological Quarterly, 38*(3), 513-537.

Bliss, J., & Säljö, R. (1999). The Human-technological dialectic In J. Bliss, R. Säljö & P. Light (Eds.), *Learning Sites: Social and Technological Resources for Learning* (pp. 1-12). Oxford: Pergamon.

Bowker, G. C., & Star, S. L. (1999). *Sorting things Out: Classification and its Consequences. Part 11 and 111* Cambridge, MA: MIT Press.

Bryman, A., & Burgess, R. G. (1999). Qualitative research methodology- A review. In A. Bryman & R. G. Burgess (Eds.), *Qualitative research* (Vol. 1, pp. p.ix-xlvi). London: Sage Publication.

Byström, K., & Lloyd, A. (2012). Practice theory and work task performance: How are they related and how can they contribute to a study of information practices. *Proceedings of the American Society for Information Science and Technology*, *49*(1), 1-5.

Byström, K., & Pharo, N. (2019). Information artefacts. In Byström, K., Heinström, J. & Ruthven, I. (Eds), *Information at Work - Information management in the workplace.* London, UK: Facet Publishing, 103-126.

Case, D. O. & Given, L. M. (2016). *Looking for information: a Survey of research on information seeking, needs, and behaviour,* 4th ed. Bingley, England: Emerald.

Coiera, E. (1997). *Guide to Medical Informatics, the Internet and Telemedicine*. London: Chapman and Hall Medical.

Cox, A.M. (2012). An exploration of the practice approach and its place in information science. *Journal of Information Science, 38(2),* 176-188. doi:10.1177/0165551511435881

Davenport, E., & Cronin, B. (Fall 1998). Text at work: Some thoughts on "Just for you" service in the context of domain expertise. *Journal of Education for Library and Information Science, 39*(4), 264-274.

Davies, E., & McKenzie, P. J. (2004). Preparing for Opening Night: Temporal Boundary Objects in Textually-Mediated Professional Practice. Information Research: An International Electronic Journal, 10(1), n1.

Dick, R. S., & Steen, E. B. (Eds.) (1991). *The Computer-Based Patient Record: An Essential Technology for Health Care*. Washington, D.C.: National Academy Press.

Engeström, Y. (1987). *Learning by Expanding: An Activity-theoretical Approach*. Helsinki: Orienta-Konsultit.

Fitzpatrick, G. (2000). *Understanding the Paper Health Record in Practice: Implications for EHRs.* Paper presented at the CD-ROM Proceedings of the Health Informatics Conference (HIC), Adelaide, Australia. n.p. Available at: http://www.dstc.edu.au/Research/Projects/EWP/HIC_20_fitzpatrick_dist.pdf.

Garfinkel, H. (1967). Studies in Ethnomethodology. Englewood Cliffs, N.J: Prentice-Hall.

Gorman, P., Ash, J., Lavelle, M., Lyman, J., Delcambre, L., Maier, D., Bowers, S. (2000). Bundles in the wild: Managing information to solve problems and maintain situation awareness. *Library Trends, 49*(2), 266-289.

Heath, C., & Luff, P. (1996, Nov. 16-20). *Documents and professional practice: 'bad' organisational reasons for 'good' clinical records.* Paper presented at the 1996 ACM Conference on Computer Supported Cooperative Work, Boston, M.A.

Heath, C., & Luff, P. (2000). *Technology in Action*. Cambridge: Cambridge University Press.

Haider, J. & Sundin, O. (2019). *Invisible search and online search engines: the ubiquity of search in everyday life*. New York: Routledge.

Hertzum, Morten (2019). *How is professional information seeking shaped by workplace procedures? A study of healthcare clinicians.* Information Processing & Management, 56(3) 627-636.

Hunter, K. M. (1991). *Doctors' stories: the narrative structure of medical knowledge*. Princeton, NJ: Princeton University Press.

Huvila, I., Anderson, T. D., Jansen, E. H., McKenzie, P., & Worrall, A. (2017). Boundary objects in information science. *Journal of the Association for Information Science and Technology, 68*(8), 1807-1822.

Huvila, I., Cajander, A. Daniels, M., Åuvila, I., (2015). Patients' perceptions of their medical

records from different subject positions. *Journal of the Association for Information Science and Technology, 66.*

Huvila, I. Enwaild, H., Eriksso-Backa, K., Hirvonen, N., Nguyen, H., Scandurra, I. (2018). Anticipating ageing: Older adults reading their medical records. *Information Processing & Management, 54(3), 394-407.*

Huvila, I., Daniel, M., Cajender, A, Ahlfeldt, R., (2016). Patients reading medical records: differences in experiences and attitudes between regular and inexperienced readers. *Information Research,* 21(1). Available at (http://www.information.net/ir/121/paper706.html

Isah, E. E. (2012). *Physicians' information practices: A case study of a medical team at a teaching hospital.* Borås, Sweden: Valfrid. (Ph.D dissertation).

Isah, E. E., & Byström, K. (2016). Physicians' learning at work through everyday access to information. *Journal of the Association for Information Science and Technology, 67(2)* 318-332.

Isah, E.E. & Byström, K. (2017). Enacting workplace information practices: the diverse roles of physicians in a health care team. In *Proceedings of the Ninth International Conference on Conceptions of Library and Information Science, Uppsala, Sweden, June 27-29, 2016 Information Research, 22(1),* CoLIS paper 1650. Retrieved from http://InformationR.net/ir/22-1/colis/colis1650.html

John-Steiner, V., & Mahn, H. (1996). Sociocultural approaches to learning and development: a Vygotskian framework. *Educational Psychologist, 3*(3/4), 191-206.

Kuuti, K. (1996). Activity theory as a potential framework for human-computer interaction research. In 1996 (Ed.), *Context and consciousness: Activity theory and human- computer interaction* (pp.17-44). Cambridge: MIT Press.

Latour, B. (1994). On Technical Mediation: Philosophy, Sociology, Genealogy. *Common Knowledge, 3,* 29-64.

Latour, B. (1996). *Aramis, or the Love of Technology*. Cambridge, MA: Harvard University Press.

Lave, J. & Wenger, E (1991). *Situated learning: Legitimate peripheral participation* (Learning in doing: social cognitive and computational perspectives). Cambridge: Cambridge University Press.

Lloyd, A. (2006). Information literacy landscapes. *Journal of Documentation,* 62(5), 570-583.

Mckenzie, P. J. (2004). Positioning theory and the negotiation of information needs in a clinical midwifery setting. Journal of American Society for Information Science, 55(8), 685-694.

Mogli, G.D. (2009). Medical records role in healthcare delivery in 21st century. *Acta Inform Med.* 17(4) 209-212

Orlikowski, W. (2002). Knowing in practice: enacting a collective capacity in distributed organizing *Organization Science, 13*(3), 249-273.

Pettinari, C. J. (1988). *Task, Talk and Text in the Operating Room: A Study in Medical Discourse*. Norwood, NJ: Abex.

Prus, R. (1999). *Beyond the power mystique: Power as intersubjective accomplishment*. Albany, NY: State University of New York Press.

Reckwitz, A. (2002). Toward a theory of social practices: A development in culturalist theorizing. *European Journal of Social Theory, 5*(2), 243-263.

Rees, C. (1981). Records and hospital routine. In P. Atkinson & C. Heath (Eds.), *Medical Work: Realities and Routines*. Farnborough: Gower.

Raffel, S. (1979). *Matters of Fact: A Sociological Inquiry*. London: Routledge and Kegan Paul.

Robbins, J. (2005). Contexts, collaboration, and cultural tools: a sociocultural perspective on researching children's thinking *Contemporary Issues in Early Childhood, 6*(2), 140-149.

Rogoff, B. (1992). Three ways to relate a person and culture: Thoughts sparked by Valsiner's review of Apprenticeship in Thinking. *Human Development, 35*, 316-320.

Silverman, D. (2006). *Interpreting Qualitative Data* (3rd ed. ed.). London: Sage.

Stake, R. E. (2000). Case studies. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of Qualitative Research* (2nd ed., pp. 435-454). Thousand Oaks: Sage Publications.

Star, S. (1995). *Ecologies of Knowledge: Work and Politics in Science and Technology*. Albany: State University of New York Press.

Star, S. L., & Griesemer, J. R. (1989). "Institutional ecology, 'translations' and boundary objects: amateurs and professional in Berkeley's musuem of vertebrate zoology". *Social Studies of Science, 19*(3), 387-420.

Strauss, A. (1987). *Qualitative Analysis for Social Scientists*. New York: Cambridge University Press.

Sundin, O. (2008). *Information practices in professional life*. Paper presented at the Keynote at the Annual Symposium at Research Center for Knowledge Community, University of Tsukuba Japan, the 19th of February.

Sundin, O., & Johannisson, J. (2005). Pragmatism, neo-pragmatism and sociocultural theory: Communicative participation as a perspective in LIS. *Journal of Documentation, 61*(1), 23-43.

Talja, S., & Mckenzie, P. J. (2007). "Editors' introduction: Special issue on discursive approaches to information seeking in context". *The Library Quarterly, 77*(2), 97-108.

Weed, L.L. (1969). The importance of Medical Record. *Canadian Family Physician*. 15(12), 23-25.

Weed, L. (1971). *Medical Records, Medical Education and Patient Care*. Cleveland: The Press of Case Western Reserve.

Wells, G. (1999). *Dialogic inquiry: towards a sociocultural practice and theory of education*. Cambridge: Cambridge University Press.

Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity*. Cambridge: Cambridge University Press.

Wenger-Trayner, E. & Wenger- Trayner, B. (2015). Learning in a Landscape of Practice: a framework. In Wenger-Trayner, E., Fenton-O' Greevy, M., Hutchinson, S., Kubiak, C., & Wenger-Trayner, B., (Eds.). *Learning in Landscape of Practice: Boundaries, Identity, and Knowledgeability in Practice-based learning* (pp.13-30). Abingdon: Routledge.

Wertsch, J. V., Del Rio, P., & Alvarez, A. (1995). Sociocultural studies: History, action, and mediation. In J. V. Wertsch, P. Del Rio & A. Alvarez (Eds.), *Sociocultural Studies of Mind* (pp. 1-34). New York: Cambridge University Press.

Wilkinson, J. & Lloyd, A. (2017). The role of everyday spaces for learning by refugee youth. In R. M. Elmesky, C.C. Yeakey & O.O. Marcucci. *The Power of Resistance: culture, ideology and social reproduction in global contexts.* Emerald Press, 383-408.

Wilson, T.D. (2015). Editorial. Information Research, 20(1), editorial E201. Retrieved from http://informationr.net/ir/20-1/editor201.html

Yin, R. K. (2003). *Case Study Research: Design and Methods* (3rd ed. Vol. 5). London: Sage Publications.