Practising Knowing At Work: A Case Study In Healthcare

Marie Manidis
University of Technology Sydney - Australia
E-mail: marie.manidis@uts.edu.au

Abstract

In healthcare today, medical knowledge is still largely viewed by the health sector as an 'epistemology of possession'; a perspective which gives primacy to knowledge transfer and communication aspects of care. In my view, this perspective underestimates the complexity of the social, material, situated and collective way that doctors and nurses actually work together – and do knowledge – in order to care for their patients . I illustrate this complexity based on data from a large Australian Research Council (ARC) study by closely examining a case study of how a healthcare team cares for a dying 67-year old patient, Joel in an Emergency Room (ER). Drawing on ethnographic and linguistic ethnographic methodologies and data, 'knowledge' is proposed, not as 'possession', but as an activity, 'a collective and distributed 'doing' situated in time and space, and therefore taking place in [the] work practices [of the ERs nurses and doctors]. Theoretically the paper adopts a 'practice-based' analysis of how team knowledge is done in the ER. In adopting this approach the paper challenges conventional views on knowledge, knowledge transfer and communication in healthcare – and more broadly in other organizational contexts – alerting us to new ways of thinking about how team knowledge is done and how organizational learning might be reconceptualized.

Keywords: Practice. Organizational Theory. Healthcare. Organizational Learning. Knowing.

Manuscript received on September 01, 2015 and approved on November 15, 2015, after one round of double blind review.

Praticando Conhecimento No Trabalho: Um Estudo De Caso Em Serviço de Saúde

Marie Manidis
University of Technology Sydney - Austrália
E-mail: marie.manidis@uts.edu.au

Resumo

Atualmente em serviços de saúde, o conhecimento médico é ainda amplamente visto pelo setor como uma "epistemologia de posse". É uma perspectiva que dá primazia para aspectos de transmissão e comunicação do conhecimento em saúde. Na minha visão, esta perspectiva subestima a complexidade do social, material, situado e coletivo, na forma como médicos e enfermeiros realmente trabalham juntos – e produzem conhecimento- em relação ao cuidado com os pacientes. Eu ilustro esta complexidade baseada em dados de uma ampla pesquisa de um conselho australiano de pesquisa (CAP) que examinou minuciosamente um caso de como uma equipe de saúde cuida de Joel, um paciente terminal com 67 anos de idade, em uma sala de emergência. Baseado em metodologia e dados de etnografia e etnografia linguística, o "conhecimento" é proposto não como "posse", mas como uma atividade. Ou seja, um fazer coletivo e distribuído situado no tempo e espaço, portanto, assumindo lugar nas práticas de trabalho de enfermeiros e médicos das salas de emergência. Teoricamente, o artigo adota uma análise baseada na prática de como equipes de conhecimento se constituem em salas de emergência. Ao adotar esta abordagem, o artigo desafia visões convencionais sobre conhecimento, sua transferência e comunicação em serviços de saúde –e mais amplamente em outros contextos organizacionais- nos alertando para novas formas de pensamento sobre como equipes de conhecimento são constituídas e como a aprendizagem organizacional pode ser repensada.

Palavras-chave: Prática. Teoria Organizacional. Serviço de Saúde. Aprendizagem Organizacional. Conhecimento.

Artigo submetido em 01/09/2015 e aprovado em 15/11/2015, após avaliação double blind review.

1 Introducing

In this paper, I present a healthcare case study examining how a team of nurses and doctors care for a patient and do team knowledge together. In its organization, the paper begins by introducing an overview on current theorizations of knowledge in healthcare, which I foreshadow as inadequate for managing the complexity of modern day healthcare settings. The paper then traces the growing interest in and development of theory on practices, knowledge and learning in organizations under the aegis of practice-based studies (Gherardi, 2008). Then I introduce some recent research on knowledge, learning and knowing in the healthcare sector exploring the disjuncture between practice-based views of knowledge and this research. Next I introduce the methodology and scope of the study, and the key protagonist in my case study, Joel. I present data through two lenses: a micro and macro analysis of Joel's care, tracing his ER consultation and the way team knowledge is enacted socially, materially and temporally. The discussion focuses on the collective doing of knowledge in relation to Joel's care, identifying the doing of team knowledge as praxis. The empirical data of the study contributes to the development of theory and practice in healthcare identifying that when knowledge is viewed as 'knowing' a better understanding of the multimodal complexity of care and *in situ* practice becomes apparent.

2 Understanding healthcare conceptualizations of knowledge

Healthcare conceptualizations of knowledge are strongly perceived as disciplinary, i.e. nurses know nursing knowledge, doctors know medical knowledge, and radiographers know radiography knowledge which they will communicate to each other when working together. This perspective foregrounds two assumptions: firstly, communication is seen as the process that bridges these different knowledges as healthcare teams work and secondly, knowledge is understood as something 'possessed' by the practitioner. While both of these are 'true' in some sense, my *definition* of knowledge is one that goes beyond the face validity of these assumptions. In this paper, based on the empirical data, the animation of and activity around all the information about Joel, the human and material contributions to his care that emerge as his consultation progresses, I redefine knowledge as 'knowing'. Knowing expands the two assumptions above, to account for a more complex, situated, activity-based,

emergent and current understanding of knowledge that aligns with practice-based perspectives (Gherardi, 2006; Schatzki, Cetina & von Savigny, 2001).

In healthcare however, communication is conventionally seen as central to teamwork. Consequently, effective, timely and secure communication practices – and aspects thereof – have dominated conventional approaches to improving team care in Emergency Rooms (ERs). Research has centered on addressing interprofessional and individual communication (Garling,2008; Nugus et al. 2010), improving protocols for handovers – or handoffs (Eggins & Slade, 2012) and using new technologies to communicate knowledge or transfer information about patients. In addition, as disciplinary knowledge is seen as 'possessed' by practitioners, knowledge is viewed as a resource that can be transferred and managed when practitioners work collectively as a team in a linear order of care. Yet healthcare studies have shown repeatedly that in handoff processes (of healthcare more generally) and in ERs in particular, patient knowledge is precariously transferred between practitioners (Cohen & Hilligoss, 2010; Singer & Dean, 2006).

In seeking to manage knowledge as a resource, possessed by practitioners, the care trajectory is understood as a linear, rational process whose problems of efficiency can be fixed by applying an engineering approach to processes (specifically, Toyota Lean Production principles (Ng et al., 2010)). As a consequence, health administrators and policymakers in Australia and elsewhere favor achieving production line efficiency in the ER in the spirit of Chaston's (2011) assumption that economics and efficiency will result in service effectiveness. Thus, ER efficiency strategies in recent research studies focus on reducing both length of stay (LOS) and on minimizing duplicated processes (AIHW, 2013).

In adopting a practice-based perspective of work, I define knowledge, not as 'possessed' by practitioners but as an outcome that emerges through a collective social and material doing – as 'knowing'. This view of knowledge allows me to gain a deeper theoretical understanding of what is happening at patients' bedsides as well as how practitioners collectively work to 'know' about and care for their patients. In not seeing knowledge as linear, pre-packaged and securely transferred (in effective and timely communication, although this helps) – I understand knowledge as 'knowing' that is messy and emergent. This conceptualization of knowledge has until now largely by-passed the healthcare sector (Nicolini et al. 2008) even though significant theorizations on practice and knowledge became of interest almost two decades ago (Gherardi, 2006; Schatzki, 2001).

2.1 Understanding key practice-based concepts

In order to understand a practice-based approach and its usefulness in examining organizational work, it is necessary to examine its terminology as well as the diversity of perspectives on what this 'turn' (Schatzki, 2001) to practice has entailed.

> [Practice] needs to be understood as a 'loose, but nevertheless definable movement of thought that is unified around the idea that the field of practices is the place to investigate such phenomena as agency, knowledge, language, ethics, power and science' (Schatzki, 2001, pp. 13-4).

Schatzki first identified that there was not a 'unified practice approach' to practice (Schatzki, 2001), although theorists shared similar interests in their object(s) of study as outlined above. This diversity was elaborated on by Reckwitz (2002), a student of sociology, philosophy and political science, who listed several practice theorists, such as Bourdieu, Giddens, Foucault, Garfinkel, Latour, Taylor and Schatzki. Reckwitz also made a point of distinguishing the singular word 'practice' from its plural 'practices'. He pointed out that the former 'represents merely an emphatic term to describe the whole of human action (in contrast to 'theory' and mere thinking)' (Reckwitz, 2002). In other words, 'practice' in the singular mostly refers to the everyday meaning of the word, whereas 'practice' or 'practices' as theorized within a practice-based approach were, and still are, understood in diverse ways (Gherardi In press; Reckwitz, 2002).

In a 2008 chapter, Gherardi illustrated how knowledge and practice had become the centerpiece of study for theorists from different theoretical genealogies including Actor Network Theory (ANT) and Cultural History Activity Theory (CHAT) to name a few (Gherardi, 2008). Gherardi also identified that although these different theorists adopted different perspectives, they shared a focus on investigating doings, sayings, seeings, social relations and material aspects of practice and how these related to situated knowing (Gherardi In press; Kemmis et al., 2014).

Knowledge and practice were therefore inextricably linked and had been of interest to organizational theorists for some time. Organizational theory itself was catapulted into prominence as workplaces moved from manufacturing to more technological and innovative forms of production in the middle of the 20th century. Around this time Drucker (1959) first identified workers as 'knowledge workers'. These events stimulated an interest in *knowledge* as an organizational resource, and organizations focused on the fact that their competitive and sustainability edge was increasingly based on what workers knew rather than from what

workers did or made. Organizational theorists became interested in the evident links between transferring knowledge, managing and producing knowledge. Theorists (and companies) were interested in how individual workers and then the organizations themselves learned (Lave & Wenger, 1991) as the focus was on competing with other organizations and striving for a competitive edge in innovation.

With this renewed focus on knowledge, team knowledge and competitive learning, it was felt that 'organizational learning' as a process (in other words the transfer of knowledge between individuals) 'could be managed like any other organizational process' (Gherardi, 2009). However it soon became clear that theorists and organizations struggled within this paradigm in which knowledge itself was understood as a 'possession'. In 1996, with the shift towards seeing 'organizations as organizing' (e.g. Clegg & Hardy, 1996, p. 4), theorists began to think of knowledge as 'knowing'. This shift allowed knowledge to be understood as an activity, 'a collective and distributed 'doing' [ ] situated in time and space, and therefore [ ] taking place in work practices' (Gherardi, 2009). According to Gherardi, this shift heralded 'the practice turn in this area of social studies, anticipating the celebrated book by Schatzki et al. (2001)' (ibid.): a turn in which work practices, knowing and organizing became of central interest to researchers and theorists. More recently practice theorizations have been adopted by workplace learning and educationalists whose analyses have made significant inroads into understanding practice, knowledge and professional work (Green, 2009; Hager, Lee & Reich, 2012; Kemmis et al., 2014).

In the chapter mentioned above, Gherardi (2008) contributed a valuable historical overview of how understandings of 'knowledge' had shifted in practice-based studies, defining these in three ways. Firstly, based on the work of Lave & Wenger (1991), Gherardi identified that knowledge was conceptualized as *contained* within a community. Secondly, she identified that Cook & Brown's (1999) work set up knowledge as *mutually constituted* between 'knowledge [as] possession, [and] knowing [as] relation' (Cook & Brown, 1999). The latter described how a knower interacts with the world. Cook & Brown (1999) described this relationship between possessed knowledge and knowing as a 'generative dance'. Finally, Gherardi proposed that knowledge, or what she termed 'knowing' could be thought of as *equivalent* to doing, to practising.

Both Gherardi and Schatzki elaborate on their understandings of practice. Gherardi describes knowing as a social process, a process made up of people, materiality, and aesthetics as well as ethical and emotive components (2008). Knowledge or 'knowing' for

her, also incorporates sensory dimensions including feeling, seeing, hearing and sensing: knowing is therefore embodied and affective (Strati, 2003).

Approaching the notion of 'practice' from a philosophical perspective, Schatzki proposes that practices have 'two basic components: actions and structure' (Schatzki 2006). A participant's actions are structured as 'manifolds of action' (Schatzki, 2006) and these have underpinning knowledges underpinning what people do and say. In Schatzki's view,

> [t]he structure, or organization as I prefer to say, of a practice embraces four principal phenomena: (1) understandings of (complexes of know-hows regarding) the actions constituting the practice; (2) rules, or protocols [by which Schatzki means] explicit directives, admonishments, or instructions that participants in the practice observe or disregard; (3) a teleological-affective structuring, which encompasses a range of ends, project, actions, maybe emotions, and end-project-action combinations (teleological orderings) that are acceptable for or enjoined to pursue and realize; and (4) general understandings, for example, general understandings about the nature of work [that practitioners use or draw on in action] (Schatzki, 2006).

While Gherardi and Schatzki both acknowledge that knowledge(s) underpin(s) action, they differ in their understandings on how materiality and humans interconnect. While each recognizes that practices and materiality are closely interwoven, in Gherardi's view, materiality and human activity are symmetrically engaged (Gherardi In press). For Gherardi human actions and activities are not dominant in relation to materiality: they form a mutual and reciprocal ecology. However, for Schatzki, while acknowledging that materiality is an integral part of action, activities or practices (2010; 2002), for him there is an asymmetry between human activity and materiality, a perspective in which human agency can hold sway. In Nicolini's words, 'Schatzki affirms that only humans carry out practices' (2012). The different perspectives situate Schatzki as a residual humanist and Gherardi as a post humanist in practice theory terms (Gherardi In press).

Why is this difference in their approaches relevant? A Schatzkian perspective offers insight into the organization of the ER (consultation). Assembled predominantly by medical practitioners the consultation is *intentionally* designed to privilege medical knowledge over other kinds of knowledge (Manidis, 2013). Decision-making about the patient is the prerogative of the doctor, nurses have prescribed (and limited) tasks and activities and the potential of material agency (and its contribution to knowing) are underestimated. In this paradigm, the design of the ER consultation affords a lesser role to other disciplinary

'knowers', to material 'agency' and to the *activity* that contributes to knowing about the patient.

On the other hand, a Gherardian perspective offers insight into how knowledge is mediated as much by the mobile beds, the deteriorating health of Joel and equipment for example, as by the nurses' and doctors' actions. Her perspective affords an understanding of how Joel's nurses and doctors and material agency are 'constitutively enmeshed in practice' (Pickering 1993), and how care and knowing emerge temporally. Thus the ecological model of Gherardi and the intentionality model of Schatzki offer different insights into the analysis.

2.2 Connecting practice-based approaches and healthcare

How do these theoretical strands – on knowledge, learning and knowing – connect with my study? I found in my review of literature and the ER sites in which I conducted my research, that care processes and hospitals in general, 'continue to focus on improving the institutional management of codified patient knowledge' (Manidis, 2013). Although there are some studies in the field which *do* take into account broader location factors including space, clinical pressures, time and elaborated understandings of information use and information seeking and how these impact on team knowledge (Ayatollahi; Bath & Goodacre, 2013; Coiera et al., 2002; Eisenberg et al., 2005; Iedema et al., 2008; Nugus, 2007; Nugus & Braithwaite, 2009; Nugus; Bridges & Braithwaite ; Welch et al,. 2013; Woloshynowych et al., 2007), these are outliers. Some more recent studies have started to address complexities of interacting and knowing in practice *in situ* in ERs taking account of knowledge as an emergent phenomenon of practice (Manidis & Scheeres, 2012; Nugus et al., 2010; Redfern; Brown & Vincent, 2009). These include a focus on handoff protocols and electronic patient record keeping systems.

Predominantly, however, ongoing efforts are aimed at increasing the frequency of information transfer and also the capture of information to do with patients and care processes. On the one hand, these efforts are aimed at addressing individual skills; on the other hand, they suggest that knowledge is capable of being captured securely. The belief is that it is care design or training that can ensure the rapid and reliable transfer of information in the ER. While these efforts are a key component of safe and good care, they 'perpetuate an understanding of knowledge as a cognitive, fixed or stable entity *(I will have the same*

understanding of this as everyone else; this information will never get lost)' (Manidis ,20135). In my view, this perspective underestimates the complexity of the social, material, situated and collective way that doctors and nurses actually work together – and do knowledge – in order to care for their patients (Manidis, 2013).

Below, I show how I analyzed team knowledge using a practice-based analysis in the 'timespace' (Schatzki, 2009) of the ER at two levels: a macro and a micro level. The macro level examines how nurses' and doctors' network their knowledge and work collectively as a team. The micro level examines how nurses and doctors work at patients' bedsides to 'know' about their illnesses/injuries. This level focuses on artifacts, space, time, people and clinical materialities (medical records, deteriorating bodies) and how these impact on individual, and by implication, team knowledge.

3 The study

The study data is taken from an Australian study across five ERs, initiated in response to concerns about acute healthcare services following the death of a young teenage woman in a Sydney metropolitan ER in November 2005. The study sought to investigate how communication (particularly clinician-patient communication) might be made more 'effective'. Effective communication was defined as clinician-patient talk that was interpersonally sensitive to patients as well as clinically accurate.

Over four years, researchers worked through a data collection schedule, taking approximately six months to complete day/night, quiet/busy sessions in each hospital. The research team conducted 1095 hours of non-participant ethnographic observations, audio-recorded 82 ER consultations (from triage to disposition) and interviewed 150 ER clinicians including nurses, doctors, paramedics, cleaners, communication clerks and orderlies etc.

My narrative traces the care trajectory of one of the recorded patients, 'Joel', using ethnographic (Kornblauch, 2005) and linguistic ethnographic (LE) (Rampton; Maybin & Roberts, 2014) methods and analyses. LE emphasizes ethnographic features, enabling a focus on the processes of how interactions unfold in the ER (i.e. the repetitions, the iterative questioning about allergies, pain etc., the number of times doctors and nurses interact with patients, where they interact with patients etc.) as well as the products of their interaction (the content of their conversations). Analyses examine how multiple visits to patients' bedsides are organized sequentially in progressing nurses' and doctors' knowledge and the

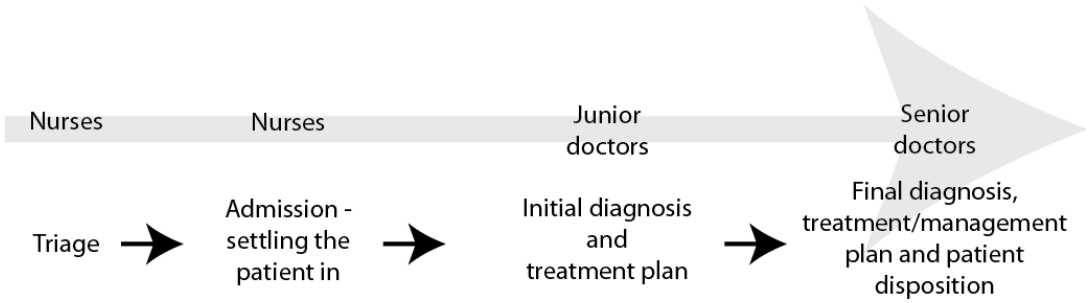
patient's care. Examining how team knowledge is enacted at Joel's bedside, the paper draws on practice theory – or practice-based understandings of working, learning and knowing (Gherardi, 2006; Schatzki, 2006).

3.1 The case study patient

Joel is a 67 year-old palliative care patient with metastasized cancer in his leg, originating from kidney cancer. As Joel arrives at the ER at 11.29am, like every other patient in the study, he becomes a part of the organizational momentum of care that unfolds relentlessly and repetitively. Jill, Joel's wife, a former nurse accompanies him to the ER. As reported by one paramedic, Jill has *an abundant [sic] of information* about him, as she has been carefully recording a detailed history of Joel's entire, very serious illness for a number of years.

The primary goal (and hence activity) of Joel's ER clinicians is 'to know (about)' him, i.e. to *diagnose* (from the Greek *dia* (through) and *gnosis* (experience knowledge)). To manage this, his ER consultation is institutionalized sequentially into disciplinary stages. First, if he is not in need of immediate resuscitation Joel will be (1)triaged by a nurse and given a triage category based on five levels of acuity and urgency (Australasian College of Emergency Medicine 1993). Then he should go through the remaining three principal stages of care/treatment: (2)settling/admission (nurse); (3)initial history taking and examination (doctor); and (4)diagnosis/treatment/ management (plan) and disposition (doctor) (based on McGregor et al., 2010) as depicted in Figure 1 below.

Figure 1 - The stages of care in the ER



Fonte: Manidis, 2013; Manidis, 2015.

Despite this intended linear staging, Joel's doctors and nurses *in practice* visit his bedside on 39 separate occasions – disrupting the disciplinary and clinical stages. Doctor

Surita (D1) completes 12 visits (six alone) and the nurses 27 (22 alone). Joel leaves the ER at 18.31pm and is admitted to the hospital.

3.2 Working: a macro perspective

Table 1 is a summative view of how nurses and doctors persistently '(re)discover, (re)inquire, or (re)confirm details' (Manidis; Iedema & Scheeres, 2012) directly from Joel rather than rely on what others have told them or what they have established for themselves earlier. The data show that even where there is time and opportunity to talk to colleagues, team knowledge sharing between nurses and doctors is not simple or unproblematic. Individual team members participate recursively to ensure the team 'knows', but team knowledge is not linear, fixed or cumulative.

Table 1 reveals that what clinicians are told in handoffs (even in discussions with Joel) is forgotten, confused, ignored, (mis)understood and utilized idiosyncratically. From my transcript data it is clear that on many occasions Joel's clinicians do not know what they are 'meant' to know, on other occasions it is not clear whether they are just rechecking. While the overarching stages of care, Figure 1, are adhered to, the neat transfer of knowledge about Joel in and across the disciplinary stages is not what transpires in practice.

Table 1 - Non-linearity of knowing at the bedside

Working/knowing at the bedside	Joel
Attending clinicians	Total care involving 6 clinicians and others, 6 roles
Length of ER consultation	7 hours 2 minutes
Visits to the bedside by different clinicians	39 visits
	12 visits by D1 (6 alone)
	27 visits by nurses (22 alone)
Multiple activities and actions at the bedside	History taken by D1, checked by N3 and more fully by N6
	Notes required 4 times
	Allergies checked 4 times; temperature taken, blood pressure checked; assisted with going to the toilet
Spatial relocations	Joel is moved 3 times
Clinical procedures conducted	ECG, X-ray, 2 bloods
Knowing as activity	D1 treats Joel for pain; but staff confuse his pain/mobility 8 times
Information is forgotten	Information forgotten numerous times (Joel's medications; his allergies; the primary site of his cancer)
Information is confused	Information confused by several clinicians on different occasions (Joel's name; his pain and his mobility; whether he's on Flucloxacillin; when he was first diagnosed; what his dosages are)

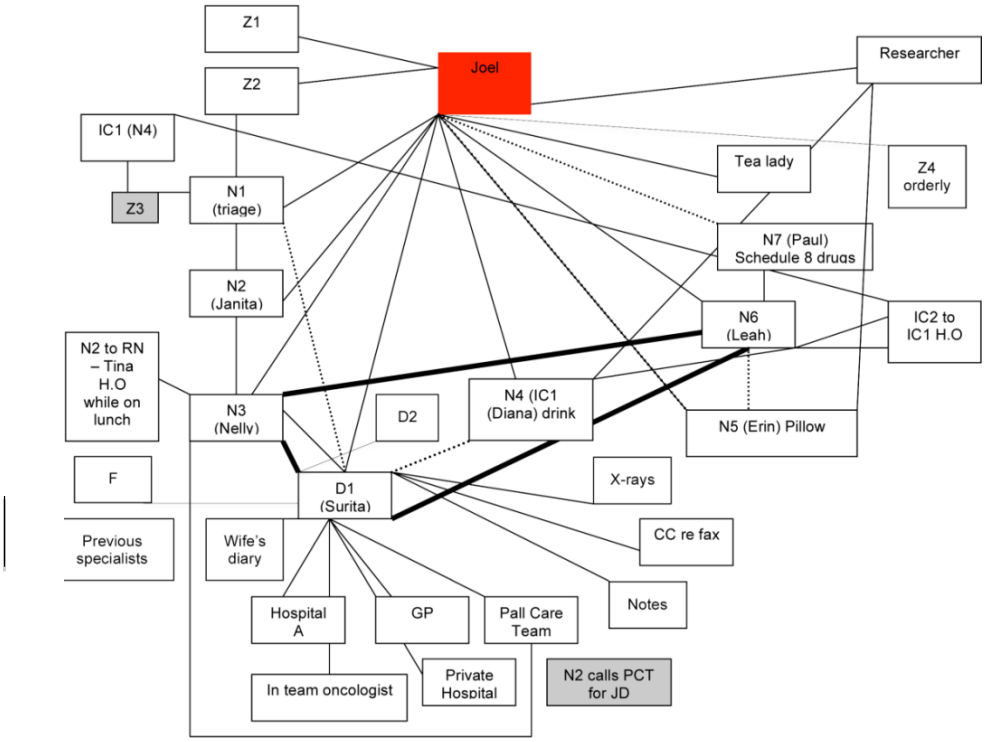
Working/knowing at the bedside	Joel
Patient details are confused	Name mistaken 11 times

Fonte: Manidis, 2013.

If viewed from the perspective of the conventional handoff literatures, these data reinforce the well-documented failures of communication noted above. On the other hand if viewed from the perspective of organizational knowledge literatures – these data confirm that individual knowledge is fluid and fragile yet team knowledge is sustained collectively across the team through praxis – intelligible actions and activities that make up the practices of the ER – through recursive activities of care and knowledge renewal. This understanding shifts the focus from clinicians communicating *fixed* knowledge to one in which they continually *reconstitute their knowing* in practice.

These bedside data blur safety and unsafety (Jerak-Zuiderent, 2012) yet doctors' and nurses' understand the *process* of reconstituting their knowing as care progresses and in so doing, network their own and the team's knowledge, at a macro level. Figure 2 below represents a virtual network of the social, clinical, artefactual and material connections involved in Joel's care. Lines link Joel to each person he interacts with and to any objects (e.g. Joel's wife's diary, X-rays, blood samples etc.) that contribute to knowing.

Figure 2 - Knowledge networks for Joel's four-hour consultation



Fonte: Manidis, 2013; Manidis, 2015.

In Figure 2, darker lines represent a closer connection between people (more interactions); a dotted line signifies a textual connection. For example, Doctor Surita (D1) might only see an X-ray result and not speak directly to the radiographer. A letter from a General Practitioner (GP) or the medical and nursing notes may connect the nurses and doctors to each other; or they may be connected through objects (X-rays, urine samples, etc.).

Although Figure 2 charts a complicated network of people, things and objects, what is significant about the network is the activity that occurs across it. Firstly, this activity is contingent as clinicians do not always meet in structured ways. The lines connecting to Joel also indicate the sequence of clinicians who interact with Joel; which they do iteratively. Knowledge about Joel is 'fragmented' (Bruni; Gherardi & Parolin, 2007). Bruni *et al.* prefer the term 'fragmented' over 'distributed' as this term 'shifts away from 'knowing-as-cognition' (seen as a mental activity) to knowing-as-a-situated-accomplishment that is something that people do together' (2007). Knowledge is also multimodal – it is verbal and written, it involves and is located in objects (e.g. ECGs, new notes, previous notes, X-rays,

blood and urine samples and results). Clinicians locate and read Joel's previous notes, X-rays, ask history-taking questions, carry out physical examinations, do observations, do ECGs, collect blood samples, speak to others and review the results and medications Joel has brought with him.

Care is distributed between several clinicians organized into disciplinary divisions of labor reflecting differing statuses, tasks and expertise. Joel's consultation involves the already-mentioned doctor, Doctor Surita (D1); several paramedics (Z1, Z2); six nurses (N1 – N6); the researcher; tea ladies, in-charge nurses (IC1, IC2); Nurse Paul who assists with Schedule 8 drugs; the Communication Clerk (CC); Hospital A records (from Joel's previous admission); Joel's palliative care team (PCT); Joel's GP; the in-team oncologist; the Private Hospital where Joel has been treated before, and so on. Doctor Surita (D1) is a central figure connected to a total of three nurses (particularly Nurses 2, 3 and 5) although other nurses, Nurses 1, 6 and 7 are also involved in Joel's care. Doctor Surita (D1) draws on knowledge from the palliative care team, Joel's extensive medical history, previous X-rays and notes including those from previous specialists and Joel's very knowledgeable wife (Jill) who presents a detailed four-year diary of his illness. Key decisions remain with Doctor Surita (D1).

At a macro level, the knowledge networks provide an abstracted view of the ER model of care compared with the micro level happenings at Joel's bedside. In practice, not all the clinicians who connect to Joel connect to each other; as such Joel remains a central source of knowing for nurses' and doctors' work. Doctor Surita (D1) must also discuss Joel with a senior doctor (D2) before a diagnosis can be given. Doctor Surita (D1) does not necessarily need to discuss his diagnosis/treatment plan with the nurses and Jill, but the potential to do so is always there.

Figure 2 shows how from the macro perspective of Joel's case, Doctor Surita (D1) and Joel are central to the network of activity. Doctor Surita (D1) slowly builds a medical case that leads to a decision, after approximately seven hours in the ER, to admit Joel to the hospital. Doctor Surita (D1) relates to people and objects – all of which help to construct Joel's case and diagnosis.

3.3 Working: a micro perspective of how nurses and doctors work

The micro level analysis of Joel's consultation draws on Gherardi's metaphor of the 'texture of practice' (2006) where working practices are enacted and interconnected with objects, people, sayings and doings and impacted on by spatial and material arrangements in the ER. This texture is illustrated through a Practice/LE matrix, using a coding frame shown in Table 2 below.

Table 2 - The Practice/LE matrix

	Who or what is involved in (re)producing knowledge in the consultation	Aspect of practice 'represented'
	Nurse(s) interacting with/treating Joel	People, sayings and doings
	Doctor(s) interacting with/treating Joel	As above
	Joel initiating interaction	As above
	Joel and Jill (wife) interacting with each other	As above
	Senior doctor(s) interacting with/treating Joel	As above
	Researcher(s) interacting with Joel	As above
	Interaction between two clinicians overheard by Joel	Sayings (interaction/language)
	Interaction between two clinicians discussing procedures, equipment etc.	Sayings (interaction/language and objects)
	Patient being relocated, e.g. to a new bed, to or from the ambulance bay, to or from radiography	Material arrangements (space)
	A disturbance that impacts on the consultation, i.e. a noise, interruption, bedside X-ray machine	Contextual elements including noise, objects, etc.

Fonte: Manidis, 2013.

This matrix is a combination of the transcribed audio-recorded consultations and ethnographic field notes. Together they create a diagrammatic representation of Joel's overall ER consultation.

As part of ongoing activity, each new action and/or each new interlocutor engaging with Joel has been coded. Joel's relocations in the ER, each noise disturbance or interruption (by tea ladies, for example) is coded and labelled as an 'encounter'. Each encounter, particularly each nurse's and doctor's saying and/or doing (action), is one of a succession of episodic 'event[s]' (Schatzki 2011), making up knowing.

The matrix codings for Joel's entire consultation, shown in Figure 3 below, identify different interlocutors, whether it is doctors and nurses interacting about procedural work

or about Joel himself and whether they are addressing Joel directly or are overheard speaking in his presence. The matrix codings also illustrate when Joel speaks.

When nurses and doctors (re)introduce themselves or return to question Joel after an absence, a new encounter is shown. As speakers concentrate at different times in the consultation – for example Joel says very little in the beginning of his consultation compared to halfway through his time in the ER – the different, disciplinary, conversational, clinical, spatial and social practice dimensions and patterns of the consultation become evident.

Figure 3 - Joel's consultation

Fonte: Manidis, 2013.

3.4 Read in landscape layout, from left, top to bottom in successive rows.

Legend: Disturbances are pink; Doctor Surita's interaction are gold (D1); different nurses are numbered (N3) and are pale yellow; relocations in the ER are red; pale green represents two clinicians interacting about their work, their procedures or a piece of equipment; bright green represents two clinicians interacting about Joel in earshot. The researchers are pink (R), Joel's initiations are purple (P) and the blue squares (F) are Jill's interactions. These encounters reflect who is interacting with Joel; who is interacting about him in earshot; when disturbances or noise drown out understanding; when Joel is moved etc. The squares represent the aural, physical, interactional complexity of doing knowledge.

3.5 The macro and micro perspectives: working and knowing

As was outlined earlier, care in the ER is imagined to occur in structured, linear stages, see Figure 1. Although nurses' and doctors' working practices are structured by the intended disciplinary stages of the consultation, the above analyses reveal how, *in practice,* individual and collective knowledge and knowing are non-linear and iterative.

4 Discussion

The data reflect that people, language and material aspects of work such as equipment, handoff reports, medical records, telephone or pager conversations, talk, patients' notes, whiteboards, written notes, time, objects, space and codified patient information – as dimensions of practice – impact on how team knowledge emerges, is worked with and communicated. Care must be analyzed as multimodal (Heath; Luff & Svensson, 2007) and textured (Gherardi, 2006), and care understood from this perspective highlights the non-linearity and emergent nature of team knowledge defined by three things: the working arrangements of the ER consultation based on a 'possession' view of knowledge, the materiality of the ER and the passage of time.

Firstly, the consultation is organized in stages where care is distributed between many people. This arrangement fragments what is known about Joel's illness or where the team is up to in caring for him at any point in time, creating a scattered trail of distributed information. For example, there are details about Joel's care in the notes that the doctor has

misplaced or left at the workstation; there are details Nurse Leah (N6) has momentarily in her head before she writes down the results; and there are details in the triage nurse's chart in the triage room or in the X-ray, delayed at the previous hospital.

In the current paradigm of ER care, Joel's treatment details and his care status, and what to do with these, i.e. the individual, disciplinary and collective knowledge of doctors and nurses caring for Joel, is understood as a cognitive 'possession' of either the individual nurse, or doctor or team or as a fixed detail in Joel's notes or on the computer. This is summed up by the words of one ER Director:

> It's a team sort of approach to knowledge, gathering knowledge, sharing and also knowledge communicating. The real information sits with the primary doctor and nurse until the patient leaves ER and then it becomes the chart and it becomes the health record (Interview with ER Director: 27111007) (Manidis, 2013).

Conventionally, the key to understanding the overall quality and safety of care for Joel is that mutual understanding and timely knowledge transfer is secured at the level of the individual nurse or doctor. The model of ER care for Joel then relies on the strength and security of knowledge-transfer between his clinicians either through handoffs or through his patient notes, and relies on optimal networking between clinicians. Knowledge is seen as a contained, fixed 'virtue' (Yamauchi 2006) with a focus on the reliability of the message system between individual communicators, their teamwork and handoff protocols. This places a reliance on memory, on concentration, on synchronous, positive collegiate relations and on mutual understandings of particular forms of information/evidence/knowledge.

However, the network diagram, Figure 2, and the non-linearity of what is known, Table 1, show that connections are, in Lazer & Friedman's words, 'random' (2007) and fixed knowledge is indeterminate. There are further discontinuities in knowledge when shifts change, when handoffs take place, when people take breaks, when Joel's notes are misplaced or delayed, or when his nurses and doctors are interrupted or called away by other emergencies. Because the network links are fragile, Joel's nurses and the junior doctor rely heavily on Joel to refresh what they need to know sometimes in preference to the notes, handoffs and each other.

Secondly, many objects and people in the material arrangements of Joel's ER are mobile and dispersed. Joel's nurses and doctors must locate not only Joel's notes and medical records, but also beds, stickers, carers and other clinicians when they need them. Joel himself is moved several times during his ER stay. The empirical data confirm that this

mobility poses challenges for knowing (and for interacting with others (McIlvenny;, Broth & Haddington, 2009)). Because of this mobility, nurses and doctors must (re)connect to and interact with each other and objects in the space of the ER. The space away from the bedside is where Doctor Surita (D1) speaks to his more senior doctors; Nurse Leah (N6) too must find Doctor Surita (D1) away from the bedside – this mobility impacts on her interactions with Joel, as she has to leave him and must then return and restart the conversation. Nurse Leah (N6) must also secure the Schedule 8 drugs in a locked cabinet – this takes her away from Joel's bedside and she too needs to reconnect with him when she returns. In short, mobility of people and objects contributes to the non-linearity of knowing.

Finally, time plays a key role in the non-linearity of knowing in Joel's consultation. During the long hours that Joel is in the ER, it is evident that urgent and acute care and knowing are interconnected. Over time people forget, confuse and misplace details, even Joel himself.

In summary, as his nurses and doctors work, at the macro and micro levels, spatial, temporal, material and interactional issues impact on the ways that care is experienced by Joel and enacted by his clinicians (Manidis & Scheeres, 2012; Woloshynowych et al., 2007). Team knowledge is rendered non-linear and contingent. This finding challenges conventional handoff research, which situates team knowledge in the linear, fixed (and non-problematic) transfer of Joel's patient and situational information. Instead, the study's empirical data reveal that ER healthcare knowledge is (re)produced and (re)constituted collectively by members of the clinical team as they work with objects, people, space, time and interactions that are woven together through multimodal praxis.

4.1 Working practices – connecting through praxis

In practice through individual, collective and iterative sayings and doings that draw on objects, people, space and time through praxis, individual knowledge(s) makes up the activity of team knowledge. Multimodal praxis is visible at the macro level, through the knowledge networks, illustrated at Figure 2. Knowing and practising with Joel comprise, for example, what Joel and Joel's wife do and say, what the palliative care team have done and said, what the X-rays show, what the previous notes say and what the interactions between Doctor Surita (D1) and Joel reveal. The knowledge and work of the specialists, the senior doctors and Jill complement Doctor Surita's (D1) and Joel's knowledges. During Joel's visit,

Joel's wife invokes his previous doctors, his previous ER visits, his earlier test results and so on. These all weave together to create interconnected threads, or lines of knowing in this activity 'system of fragmented knowledge' (Bruni; Gherardi & Parolin, 2007).

At the micro level, the encounter squares, illustrated at Figure 3, depict the summative activities of the clinicians. While streamlined handoff protocols, constructive interprofessional communication and length of stay (LOS) efficiency measures are paramount, it is the 'texture of practice' (Gherardi, 2006) involving duplication, re-checking and iteration – that binds knowledge. This is the *modus operandi* of how knowledge is done as activity, not viewed as a 'possession'.

5 Concluding comments

My findings have presented an alternative view to the way team knowledge and care efficiencies are conventionally understood in healthcare settings. In challenging the conventional views of the way that clinicians are meant to communicate with each other, my findings offer a new way of understanding information transfer in the ER. They give us deeper insight into ways that knowing is done and how organizational learning works in this context. Learning and knowing occur through participating in practices, and those who accomplish work and know-in-practice (Gherardi, 2006) in a work setting draw on the complex web of material objects, relationships and activities. Knowledge is an outcome produced and (re)produced in that community.

Team knowledge in the ER is presented as 'a fluid' undertaking – an activity collectively and individually sustained (Schatzki, 1996) and one in which material and social aspects of ER work play a pivotal role. By illustrating that care processes and clinical interactions are necessarily circular, iterative and complex, each involving repetitive questioning and recurrent checking, I note that duplicating and recycling knowledge is a critical rather than a superfluous part of safe ER care and effective team work. This has implications for how I understand communicating team knowledge and improving efficiency processes in the ER, and beyond.

Beyond the ER, a practice-based analysis of the ER consultation has shifted the focus away from individuals to practices, and in so doing, has allowed a more complex understanding of working and knowing. By illustrating through the data how nurses and doctors (re)constitute their knowing in practice, the paper has contributed a deeper

understanding of how knowing (about the patient) emerges during a consultation, how the 'timespace' of the ER works, and how the social relationships, the privileging of disciplinary knowledges and the materiality of the ER are not just background to what is done there, but are central to work and knowing as nurses and doctors care for their patients.

Viewing team knowing as (re)produced through the flow of praxis (Schatzki, 1996) collectively and individually sustained, provides a deeper insight into knowing and not knowing (Yamauchi, 2006) in ER practice. This perspective adds to extant research by disrupting the knowledge-transfer paradigm, proposing a new locus of research in ERs beyond handoffs into the space of 'posttransfer activities' (Singer & Dean, 2006) – the ongoing activity after and beyond communication. The findings from the study also apply more broadly in other organizational contexts – alerting us to new ways of thinking about how team knowledge is done and how organizational learning might be reconceptualized.

References

Australasian College of Emergency Medicine 1993. *Australasian Triage Scale*, April 2008.

Australian Institute of Health and Welfare. *Australian hospital statistics*: National emergency access and elective surgery targets *2012*, Health Services Series, 48, 2013.

Ayatollahi, H.; Bath, P. A.; Goodacre, S. Information needs of clinicians and non-clinicians in the Emergency Department: a qualitative study. *Health Information and Libraries Journal*, 30, 2013.

Bruni, A.; Gherardi, S.; Parolin, L. L. Knowing in a system of fragmented knowledge. *Mind, Culture, and Activity*, 14, 2007.

Chaston, I. *Public Sector Management:* Mission Impossible?. Palgrave: Basingstoke, 2011.

Clegg, S.; Hardy, C. Organizations, organization and organizing. In: Clegg, S.; Hardy, C.; Nord, W. (Ed.), *Handbook of Organization Studies*. London: Sage, 1996.

Cohen, M. D.; Hilligoss, P. B. The published literature on handoffs in hospitals: deficiencies identified in an extensive review. *Quality and Safety in Health Care*, 19, 2010.

Coiera, E. W. et al. Communication loads on clinical staff in the emergency department. *Medical Journal of Australia*, 176, 2002.

Cook, J.; Brown, S. Bridging epistemologies: The generative dance between organizational knowledge and organizational knowing. *Organization Science*, 10, 1999.

Drucker, P. *The Landmarks of Tomorrow*. New York: Harper,1959.

Eggins, S.; Slade, D. Clinical handover as an interactive event: Informational and interactional communication strategies in effective shift-change handovers. *Communication & Medicine*, 9, 2012,.

Eisenberg, E. M. et al. Communication in Emergency Medicine: Implications for Patient Safety. *Communication Monographs*, 72, 2005.

Garling, P. *Final Report of the Special Commission of Inquiry*: Acute Care in NSW Public Hospitals*, 2008*. http://www.lawlink.nsw.gov.au/lawlink/Special_Projects/ll_splprojects.nsf/pages/acsi_index.

Gherardi, S. *Organizational Knowledge*: The Texture of Workplace Learning. London: Blackwell, 2006.

Gherardi, S. Situated Knowledge and Situated Action: What do Practice-Based Studies Promise?. In: Barry, D.; Hansen, H. (Eds). *The SAGE Handbook of New Approaches in Management and Organization*. Los Angeles: Sage, 2008.

Gherardi, S. Knowing and learning in practice-based studies: an introduction. *Learning Organization*, 16, 2009.

Gherardi, S. To start practice theorizing anew: the contribution of the concepts of agencement and formativeness', *Organization*, September, 2015. DOI: 10.1177/1350508415605174.

Gherardi, S.; Strati, A. *Learning and Knowing in Practice-Based Studies*. Cheltenham: Edward Elgar Publishing Limited, 2012.

Green, B. (Ed.) *Understanding and Researching Professional Practice*. Rotterdam: Sense, 2009.

Hager, P.; Lee, A.; Reich, A. *Practice, Learning and Change*: practice-theory perspectives on professional learning. Dordrecht Netherlands: Springer, 2012.

Heath, C.; Luff, P.; Svensson, M. S. Video and qualitative research: analysing medical practice and interaction. *Medical Education*, 41, 2007.

Iedema, R.; et al. *Emergency Department Co-Design Evaluation Stage 1*: Final Report to Health Services Performance Improvement Branch. Sydney: Centre for Health Communication, University of Technology, 2008.

Jerak-Zuiderent, S. Certain uncertainties: Modes of patient safety in healthcare. *Social Science and Medicine*, 42, 2012.

Kemmis, S. et al. *Changing Practices, Changing Education*. Singapore Springer, 2014.

Knoblauch, H. Focused ethnography. *Forum*: *Qualitative Social Research*, 6, 2005.

Lave, J.; Wenger, E. *Situated Learning*: Legitimate Peripheral Participation. Cambridge: Cambridge University Press, 1991.

Lazer, D.; Friedman, A. The Network Structure of Exploration and Exploitation. *Administrative Science Quarterly*, 52, 2007.

Manidis, M. *Practising Knowing in Emergency Departments*: Tracing the disciplinary and institutional complexities of working, learning and knowing in modern emergency departments. PhD thesis (Doctor of Philosophy in Education). Sydney: Faculty of Arts and Social Sciences /University of Technology Sydney, 2013.

Manidis, M. Communicating in emergency care. In: Iedema, R.; Piper, D.; Manidis, M. (Ed.). *Communicating quality and safety in health care*. Melbourne: Cambridge University Press, 2015.

Manidis, M.; Iedema, R.; Scheeres, H. Information Transfer in ERs. *Focus on Patient Safety*, 15, 2012.

Manidis, M.; Scheeres, H. Towards understanding workplace learning through theorising practice: at work in hospital emergency departments. In: Hager, P.; Lee, A.; Reich, A. (Eds). *Practice, Learning and Change*: practice-theory perspectives on professional learning, Dordrecht: Springer, 2012.

McGregor, J. et al. *Communicating in The Emergency Department*: Report for Hornsby Ku-Ring-Gai Hospital. Sydney: University of Technology Sydney, 2010.

McIlvenny, P.; Broth, M.; Haddington, P. Communicating place, space and mobility. *Journal of Pragmatics*, 41, 2009.

Ng, D.; Vali, G.; Thomas, S.; Schmidt, N. Applying the Lean principles of the Toyota Production System to reduce wait times in the emergency department. *Canadian Journal of Emergency Medicine*, 12, 2010.

Nicolini, D. *Practice Theory, Work, & Organization*: An Introduction. Oxford: Oxford University Press, 2012.

Nicolini, D. I. et al. Managing knowledge in the healthcare sector: A review. *International Journal of Management Reviews*, 10, 2008.

Nugus, P. *The organisational world of emergency clinicians*. PhD Thesis (Doctor of Philosophy). Sidney: University of New South Wales, 2007.

Nugus, P.; Braithwaite, J. The dynamic interaction of quality and efficiency in the emergency department: Squaring the circle?. *Social Science and Medicine*, 70, 2010. DOI:10.1016/j.socscimed.2009.11.001.

Nugus, P.; Bridges, J.; Braithwaite, J. Selling Patients. *British Medical Journal*, 339, 2009,.

Nugus, P. et al. How and where clinicians exercise power: Interprofessional relations in health care. *Social Science and Medicine*, 71, 2010.

Pickering, A. The Mangle of Practice: Agency and Emergence in the Sociology of Science. *The American Journal of Sociology*, 99, 1993.

Rampton, B.; Maybin, J.; Roberts, C. Methodological foundations in linguistic ethnography. In: Snell, J.; Shaw, S.; Copland, F. (Eds). *Linguistic Ethnography*: Interdisciplinary Explorations. U.K.: Palgrave Advance Series, 2014.

Reckwitz, A. Toward a Theory of Social Practices: A Development in Culturalist Theorizing. *European Journal of Social Theory*, 5, 2002.

Redfern, E.; Brown, R.; Vincent, C. Identifying vulnerabilities in communication in the emergency department. *Emergency Medicine Journal*, 26, 2009.

Savolainen, R. Epistemic work and knowing in practice as conceptualizations of information use. *Information Research*, 14, 2009, '

Schatzki, T. Materiality and Social Life. *Nature and Culture*, 5, 2010.

Schatzki, T. R. *Social practices*: A Wittgensteinian approach to human activity and the social. Cambridge: Cambridge University Press, 1996.

Schatzki, T. R. Introduction: Practice Theory. In: Schatzki, T. R.; Cetina, K. K.; von Savigny, E. (Eds). *The Practice Turn in Contemporary Theory*. London: Routledge, 2001.

Schatzki, T. R. *The site of the social*: a philosophical account of the constitution of social life and change. Pennsylvania: Pennsylvania State University Press, 2002.

Schatzki, T. R. On organizations as they happen. *Organization Studies*, 27, 2006.

Schatzki, T. R. Timespace and the Organization of Social Life. In: Shove, E.; Trentmann, F.; Wilk, R. (Eds). *Time, Consumption and Everyday Life*: Practice, Matieriality and Culture. Oxford: Berg, 2009.

Schatzki, T. R. Lecture on practices: incorporating paper "The Edge of Change"'. 2011.

Schatzki, T. R.; Cetina, K. K.; von Savigny, E. *The practice turn in contemporary theory*. London: Routledge, 2001.

Singer, J. I.; Dean, J. Emergency physician intershift handovers: an analysis of our transitional care. *Pediatric Emergency Care*, 22, 2006.

Strati, A. Knowing in practice: aesthetic understanding and tacit knowledge. In: Nicolini, D; Gherardi, S.; Yanow, D. (Eds). *Knowing in Organizations:* A Practice-Based Approach. Armonk: Routledge, 2003.

Welch, S.J. et al. Strategies for Improving Communication in the Emergency Department: Mediums and Messages in a Noisy Environment. *The Joint Commission Journal on Quality and Patient Safety*, 39, 2013.

Woloshynowych, M. et al. Communication Patterns in a UK Emergency Department. *Annals of Emergency Medicine*, 50, 2007.

Yamauchi, Y. Knowing and not knowing in work practice: three ethnographic studies. Los Angeles, California: University of California, 2006.