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The Dynamics of Physicians' Learning and Support of Others' Learning

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Abstract: Learning has been defined as a condition for improving the quality of healthcare practice. The focus of this paper is on physicians' learning and their support of others' learning in the context of Swedish healthcare. Data were generated through individual and focus group interviews and analyzed from a socio-material practice theory perspective. During their workday, physicians dynamically alternated between their own learning and their support of others' learning in individual patient processes. Learning and learning support were interconnected with the versatile mobility of physicians across different contexts and their participation in multiple communities of collaboration and through tensions between responsibilities in healthcare. The findings illustrate how learning enactments are framed by the existing "practice architectures." We argue that productive reflection on dimensions of learning enactments in practice can enhance physicians' professional learning and improve professional practice.

The focus of this paper is on physicians' views of their own learning and their support of others' learning in healthcare work. Healthcare around the world is facing great challenges owing to rapid demographic and epidemiological transitions, the rise of new infections, environmental and behavioral threats, patients' social diversity, and increasingly costly and complex healthcare systems (Frenk et al., 2010). Healthcare systems, which are multiprofessional and organized in specialized and differentiated disciplines (Glouberman & Mintzberg, 2001), can be seen as complex adaptive systems (Plsek & Greenhalgh, 2001). In these systems, great demands are put on health professionals because they have to deal with both rapid growth and change in knowledge and technologies. The changing structures and conditions of healthcare systems globally raise important questions regarding the quality of learning that health professionals acquire in their daily work. Collaboration, quality improvement, and patient safety are some areas in which learning among health professionals in different contexts has been emphasized as important for the sustainability of future healthcare (Frenk et al., 2010; World Health Organization [WHO], 2010). Researchers have maintained that learning and knowledge development are essential for achieving continual quality improvements of practice and for linking theory with action (Batalden & Stoltz, 1993). In addition, researchers have argued that outcomes of care, the competence of professionals, and the organization of healthcare systems are interdependent of efforts to improve healthcare (Batalden & Davidoff, 2007; Headrick et al., 2011). Based on their

study of five improvement programs in the United Kingdom, Dixon-Woods, McNicol, and Martin (2012) have concluded that "more explicit acknowledgement of the complexity of the challenges facing those improving quality may help to avert disappointments, maximise learning and accelerate future progress."

Health professionals need to adapt to the needs of patients and populations and their contextual conditions and to work together to improve healthcare. Recent research has proposed that interaction and learning between healthcare professionals, as well as between healthcare professionals and patients, are necessary components for increasing quality in healthcare (Kvarnström, Hedberg, & Cedersund, 2012). Work-based learning is often informal and experiential. However, informal experiential learning based on participation in social practices has often been reported as more efficient than formal learning (Illeris, 2011). When clinical decision making is carried out collaboratively through the participation of patients, it requires rethinking of the general "objective knowledge" so as to fit the particularities of the unique clinic-patient relationship (Trede & Higgs, 2003). The call for a partnership model of health—based on dialogue and learning and the coproduction of health together with health consumers (patients) through the entire healthcare process shifts the focus from a traditional expert-based practice to a coproductive professional practice (Dunston, Lee, Boud, Brodie, & Chiarella, 2009). However, research on how the interaction between health professionals and patients in healthcare practice takes place with regard to knowledge development and learning on both sides remains scarce, and a deeper understanding of professionals' contextualized learning *and* their support of others' learning in daily work is required.

Physicians' learning and their support of others' learning in daily healthcare work

Research on teaching *or* learning in medical work is already extensive; however, it has often focused on a single role, such as the role of physicians as tutors, the role of resident doctors, and the role of medical students, rather than on contextualized combinations of teaching *and* learning. Even though physicians' experiences as tutors are stimulating, research has showed that they are also associated with "multitasking difficulties," an excessive workload, and a need for managerial support from the clinic (von Below, Rödjer, Wahlqvist, & Billhult, 2011). Kilminster (2010) has addressed the complexity of supervision in practice and pointed to the tension that can exist between giving trainees' opportunities for practice and protecting patients when it comes to providing care for them. The "supervisee" can also become a "supervisor" when dealing with less experienced colleagues, other professionals, or students at different times during the same day. According to Mukhopadhyay, Smith, and Cresswell (2011), when resident doctors received specific training based on models of self-directed lifelong learning, it resulted in satisfying individual development and practice performance. However, the practicing resident doctors described learning barriers ranging from competing demands in daily work and patient care to difficulties concerning goal generation and planning. The interplay between physicians' own learning and their support of others' learning in daily work (i.e., pedagogical processes embedded in work) seems to be an almost unexplored field, even though learning is seen as necessary for physicians' knowledge development and for the quality of healthcare in general.

A 2009 study by Hult, Lindblad Fridh, Lindh Falk, and Thörne, drawing on interview data from physicians, occupational therapists, and nurses, found that pedagogical processes in professionals' daily work with patients and their next of kin frequently varied in quality and had nonspecific or nonexistent learning objectives. Based on an analysis of the verbs that informants used when they described their workdays, a model of pedagogical processes in healthcare was developed, using

the concepts read, guide, and provide learning support. Professionals judge the learning needs of patients and next of kin by reading the current situation in which they exist, rather than planning for learning in advance. The professionals then guide how they should support this learning rather than setting clear goals. When they provide the actual learning support, it is normally embedded in healthcare work that has goals other than teaching and learning. The medical, nursing, or rehabilitation aspects of the associated work were readily discussed and analyzed with colleagues and patients, whereas pedagogical aspects were often left mainly in the hands of individual professionals. A tentative conclusion is that in daily healthcare work, learning and support of others' learning occur constantly, although these processes are seldom articulated and not sufficiently theorized (Hult et al., 2009).

Tracing materiality in connection with social processes in medical practice

To demonstrate that learning and learning support are highly contextualized phenomena in medical practice, we framed our study theoretically from a perspective acknowledging that human social actions and interactions are inextricably intertwined with their contextual and material conditions. Traditionally, aspects of materiality, such as tools, technologies, texts, actions, and objects, as well as bodies, have been taken for granted as background factors in learning. Fenwick, Edwards, and Sawchuk (2011) have argued that materiality in learning is entangled in its meaning and that materiality is embedded in certain social relationships and human intentions. Socio-material approaches to research view actions and bodies, including human ones, as parts of assemblages with things in particular contexts. They continuously act upon each other and can either enable or obscure practice and learning (Fenwick et al., 2011). Schatzki (2002) has argued that activities, humans, and objects are interconnected and that they become organized through the materially mediated networks of activity informed by meaning. According to Kemmis (2009), professional practice comprises "sayings," "doings," "set-ups," and "relatings." Sayings include the use of particular words, ideas, utterances, and thoughts in and about a practice that exists in cultural-discursive arrangements. The physicians' actual activities, which are supported with special equipment in physical places where the work is typically located, are the doings and the set-ups of practice in Kemmis's terminology of material-economic arrangements. Medical practice materiality also includes patients' bodies, the use of different equipment for examinations, and the use of information technology (IT) in the search for, the documentation of, and the spread of knowledge. The participants' relatings describe which roles they take, how they collaborate and socially interact, and the approaches to solidarity and power that exist in distinct social-organizational arrangements.

Kemmis (2009) has argued that people's sayings, doings, and relatings are always linked or bundled together with material features. In each professional practice, these bundles are arranged in characteristic ways that create what Kemmis (2009, 2012) has described as a "practice architecture" that constructs, enables, or constrains work and learning. Through the formation of unique practice architectures in each professional practice, the practice architectures prefigure actions performed within each practice and how the whole practice is carried out. At the same time, each practice architecture can be changed and developed by the practitioners involved.

In this paper, we outline how socio-material arrangements both shape and are shaped by health professionals, with a particular focus on how physicians describe learning enactments in their daily work—that is, how they go about learning and support of others' learning rather than their cognitive conceptions of learning. The

aim of the study is to enhance understanding of how learning is enacted in physicians' daily practice. More specifically, we seek to answer the following research question: How do physicians describe enactments of learning and their support of the learning of others in their daily work?

Methods

Context and participants

A letter describing the study and inviting participation in our research was sent to the heads of eight different departments within a county health authority in the south of Sweden. All but one department head sent us the names of potential informants. The department head who declined to provide us with the names of potential informants claimed not to believe in qualitative research. A letter describing the research project was duly sent to the potential informants. All of them accepted and provided their consent. The informants comprised seven physicians, between 32 and 63 years of age, who were working within seven different medical specialities. Three were resident doctors (all females), and four were senior consultants (one female and three males). The informants were strategically sampled (Carter, Ritchie, & Sainsbury, 2009) so as to maximize variation in gender and age, as well as education, clinical and leadership experience, professional speciality, and context of healthcare (i.e., hospital or primary healthcare). This survey as well as the original study did not require ethical approval because their purpose and content were deemed to be for the purposes of a service evaluation. The recommendations of the Swedish Research Ethics Committee were followed.

Data collection

Data were gathered through individual interviews and a focus group interview. Two physicians were interviewed on four occasions, the last of these by telephone, for approximately 60 minutes on each occasion over a 12-month period (Table 1). The interview questions were open-ended and focused on the physicians' description of the current workday. In addition to the individual interviews, a focus group interview was also conducted. The data were collected by Karin Thörne, a physician by profession. The focus group comprised five physicians and lasted approximately 90 minutes. The topic for the focus group interview was pedagogical processes and learning in the participants' daily work. The informants were presented with the key concepts from the preceding individual interviews. These were discussed further to validate the concepts generated from the individual interviews. Follow-up interviews were conducted approximately 12 months later with the same physicians who had participated in the individual interviews. A detailed description of the interview procedures that were followed is provided in Hult et al. (2009). All interviews were tape-recorded, subsequently transcribed verbatim, and analyzed with NVivo.

Analysis

The analytical procedure applied was multilayered. Our interest lay not only in how physicians' views on learning and their support of the learning of others in healthcare practice varied but also in how these learning enactments were interconnected with social and material aspects.

The primary analysis of the eight individual interviews was inductive, focusing on the interviews as whole entities so as to bring about familiarity with the data. The second step entailed identifying the meaning units that referred to learning enactments. Next the meaning units were compared so as to find agreements and variations and were further grouped into themes. The focus group interview was then carefully read, inductively identifying meaning units that were compared and combined with the themes from the individual interviews. The themes were further organized into a set of categories.

The third step involved further analyzing the categories by a theory-driven analysis in an "iterative reflexive" process (Srivastava & Hopwood, 2009) in which a theoretical perspective was adopted (Kemmis, 2009). Employing this theory-driven analysis made it possible to trace how physicians' learning and their support of others' learning were embedded in cultural-discursive, material-economic, and social-organizational arrangements. Across the identified categories, a second-order interpretive analysis was performed, through which different patterns of sayings, doings, set-ups, and relatings emerged. The entire process of analysis was conducted by Karin Thörne and was supported by discussions with the co-authors so as to ensure the consistency of the process and the coherence of the findings.

Findings

The physicians' work and enactments of learning and their support of others' learning involved a variety of other professionals, patients, and next of kin, who were linked to one another and to material aspects in various ways. In the physicians' descriptions, learning enactments were located in several physical settings (i.e., examination rooms, operating theaters, ward offices, meeting rooms). Physicians did not talk explicitly about the material arrangements of different rooms and equipment, which indicated that they took these arrangements for granted. Four categories of enactments of learning and learning support in medical practice were discerned in the physicians' accounts in relation to (a) individual patient processes, (b) versatile mobility across contexts, (c) multiple communities of collaboration, and (d) tensions between professional responsibilities. These categories are described in detail in the following sections titled "Engaging in Individual Patient Processes," "Creating Versatile Mobility Across Contexts," "Participating in Multiple Communities of Collaboration," and "Giving and Taking Professional Responsibilities."

Engaging in individual patient processes

For all physicians, the main aim of the individual patient processes (all actions and collaborations with or for an individual patient) was to practice good medical care. Their intentional strategies displayed in sayings, doings, and relatings of learning and support of others' learning were therefore both varied and limited. The physicians' accounts of planning, decision making, treating, and supporting in individual patient processes showed, however, that learning and learning support of patients, next of kin, and other professionals were enacted, even though not explicitly articulated.

Throughout each patient case, the physicians always had the opportunity to learn about each patient, making use of material arrangements of the room and equipment as well as their own bodies (auditory, visual, and tactile doings) in a translation of general medical knowledge into meeting the particular needs of individual patients. The individual interviews showed that physicians created assumptions about patients' preparedness to handle situations concerning their illness, their attitudes, and their emotional responses. However, few physicians gave concrete examples of how these assumptions were confirmed by the patients. One physician's description of what happened during patient and next of kin consultation gives an example of the kind of assumptions made: "I think she (the patient) also sat and listened. . . . It was perhaps just as well, . . . she could hear what she wanted to hear" (Physician B, Interview 3).

Variation existed in how the physicians' support of patients' and next of kin's learning were enacted, but mostly the physicians provided information. Some physicians said that other types of professionals had more time with patients and were more skilled in patient education. In the patient processes, the social interaction was clearly emphasized through the physicians' relatings to other professional groups; these relatings varied from the simple transfer of information to the sharing of norms across professions, or to interprofessional collaboration where different professions contribute their specific perspectives. These different relatings enact different forms of learning for all informants. One informant made the following comment:

> I also think that when new colleagues arrive with new knowledge, it is an excellent opportunity for me, and not [the] least [of which for] the medical students… It is here I can learn an awful lot. (Physician D, focus group)

All the physicians interviewed for this study emphasized collegial support in patient processes as important learning situations. Tutorial doings by more experienced physicians were integrated in patient processes with a range of different supportive approaches. All physicians stated that tutorial work supported their own learning, which implies that their own learning and their support of others' learning were integrated.

Creating versatile mobility across contexts

The physicians' conceptual understanding, skills, and values in their daily healthcare practice were dependent on physical and virtual (through IT) movement patterns and variations in working groups and tasks, thus creating versatile mobility across various healthcare contexts. In all individual interviews, the physicians described how they continually used mobility, as illustrated in the following quotations that summarize aspects of a physician's workday:

> The day began in the conference room with the department physicians listening to the "report by the on-call physician" about patients. Went to the intensive care ward to "distribute the work over the day" in a group of two senior consultants, a resident doctor, and an intern. Obtained the first impression of the patient and "listened to what the nurses had to say" followed by writing a "report" at the office. Went to the radiology department for the "x-ray rounds and looked at examined patients from yesterday." Back in the ward for assessments and treatments of patients and support of residents' work. A person rang up, wanting to plan a lecture about "two large studies to be presented in the US." Went to the conference room, "reported to the eleven-thirty conference [all physicians] what we had in the way of [patients], and then, L referred to a scary pa-

tient case that they have had in X-town." "I went and spoke to a patient who has just come back from the X University Hospital, with whom we have started respiratory training [i.e., a patient who has mechanical support to breathe and now has to learn to breathe independently], and spoke to relatives, his wife and his daughter." Finally, before the interview, "I reported to G, who was on call" that night. (Physician A, Interview 3)

This quotation shows how the physician moved between different tasks, working groups, and various physical and virtual rooms, with the aim of assessing and treating patients. This versatile mobility involved activities such as transferring the responsibility of patients to other colleagues and preparing for and performing explicit activities aimed at learning (e.g., seminars with other physicians). In the description of this working day, materiality emerges in the different tasks carried out with different equipment and in the different working groups in physical or virtual rooms arranged specifically for different purposes. All these activities can be seen as enactments of learning or support of others' learning, bundled together with different materialities. The specific enactments of learning are further described in the following sections titled "Learning Through Mobility Between Working Groups," "Learning Through Mobility Between Tasks," and "Learning Through Mobility Across Physical and Virtual Contexts."

Learning through mobility between working groups
The physicians' movements between different working groups meant that they participated in several contexts and in activities taking place in different physical spaces. It also meant moving between different work content and different relational arrangements. In this section, we show how this versatility in socio-material arrangements prefigured different enactments of learning and learning support. One physician described her situation as follows:

> You are part of several contexts . . . the junior physician group and the ward when you are there, and the endocrine team and the diabetes team. . . . I want it like that; it's good to be part of many contexts. (Physician B, Interview 3)

In an interview, this physician compared aspects of the two teams in which she worked. She explained how the members of one team arranged multiprofessional meetings with patients and relatives, whereas the members of the other team (a dietician, a doctor, a nurse, and a psychologist) individually met the same patient, without knowing of the others' involvement. She highlighted the benefits for both patients and professionals in changing work arrangements in the second team. This physician's knowledge about different team practices had emerged only as a result of her embodied mobility between the two models of participation and collaboration in the teams.

Learning through mobility between tasks
The informants' accounts allowed us to trace the patterns of mobility between tasks during the physicians' workdays. Enactments of learning and learning support emerged in actions involving equipment and physical set-ups for all these tasks. The tasks included moving between board meetings, educational tasks, "quality improvement" work, medical duties at other departments and nursing homes, and collegial training in practical skills. In the following interview excerpt, a resident doctor describes how she and a less experienced resident seized the opportunity to develop their medical skills:

> We were given placentas so that we could practice inserting a catheter into the umbilical cord. I think it is good I was there and showed from the start how to lay out the instruments, which catheters to use, how it all works, and how one makes incisions using different techniques. (Physician B, Interview1)

Combining physicians' doings involving the materials of instruments and objects with instructions and joint collaboration helped the physicians become skilled. Moving between and contrasting material tasks thereby reinforced the fulfilment of the physicians' own identified learning needs.

Learning through mobility across physical and virtual contexts
Several participants moved both inside and outside their county of employment, physically and in virtual arrangements (via telephone calls and IT applications), giving and receiving support on medical judgments and standards. In the following interview excerpt, one physician belonging to a "consultant speciality" describes how she developed knowledge in her consultations with other physicians during her regular visits to departments of different disciplines:

> One has many contacts with other specialists. . . . In this way, one perhaps learns partially about some surgical method one has to understand, why you did as you did. And I think that involves a lot of communication. . . It's fun. (Physician I, focus group)

This consulting physician simultaneously supported the host surgeon and obtained a deeper understanding of how her decisions correlated with the surgeon's interventions in the patient processes. She accomplished this task and learned through observations of doings and set-ups and sayings, such as clinical reasoning, which also enabled support of her counterparts' learning in departments involving other disciplines.

To summarize, we found that physicians' versatile mobility across contexts created a variety of learning enactments in the physicians' daily practices. The mobility allowed learning through contrasting working groups, tasks, and physical and virtual set-ups.

Participating in multiple communities of collaboration

Through mobility, physicians with different levels of experience participated in several communities in which they shared their knowledge of specific patients. They did this by talking about and comparing their doings, and, in this manner, they built relationships. As a result, the communities shared, developed, and pooled collective professional knowledge regarding intentions and capabilities of the available healthcare system so as to safeguard the patients' care. Collegial support of learning was undertaken in various material settings, in procedures with patients during rounds, informally in corridors and lunchrooms, over the telephone, and in regular collegial meetings.

Several physicians participated in cross-disciplinary communities of collaboration, as illustrated in the following interview excerpt describing how pediatricians and gynecologists came together in a regular meeting to discuss the potential perinatal delivery scenarios concerning mothers with at-risk pregnancies: "[A] prenatal meeting [is held] every Wednesday when we meet the gynecologists. . . . It is quite exciting; it is then that one hears what is currently happening in the department, which premature births, illnesses, or dysfunctions are expected" (Physician B,Interview1). This excerpt illustrates how structural needs for the future care of a medical problem, such as heart failure, could be described and subject to discussion in a common learning process.

The communities also provided strategies for team performance as a source of learning. In the following interview excerpt, an individual attending a multiprofessional team meeting reveals how therapeutic work in a patient's case could involve a spectrum of different competences:

> Going back to the team, mirroring the process, we have now done this six times and how can we think around this in the future and you also get others' reflections on what you are doing and what you can learn from it. (Physician G, focus group)

Based on different aspects of professional knowledge domains, the team mentioned in the preceding interview excerpt created a set-up where common reasoning opened up the opportunity to transform knowledge and guided informed actions. Physicians together with other professions could thus develop different kinds of knowledge through their sayings, doings, and relatings. In the following interview excerpt, one informant talks about how the interprofessional teamwork has integrated chronic patients' active involvement in the teams:

> Today, patients are active team members from the outset, included in the planning. . . . We use our experience and knowledge to help . . . and we listen for what it is this unique patient wants and what is the focus. . . . My view of what may be the most important thing to do perhaps is secondary to what these special patients prioritize. (Physician R, focus group)

This interview excerpt illustrates how enactments of learning and support of others' learning in this particular community of collaboration are intertwined and how they exist mutually between professionals and patients.

The data indicate that all the physicians practiced in multiple communities, each one in different material settings and differently arranged. These were sources of learning and support of others' learning. The communities comprised disciplinary or transdisciplinary groups of physicians or interprofessional teams, or teams that involved patients.

Giving and taking professional responsibilities

All participants emphasized the importance of giving and taking responsibility as a way in which to improve their knowledge. The responsibilities borne by these physicians were embedded in medical procedures, decision making, updating of medical standards, and improvements in the quality of healthcare. All their doings could thereby contribute to a physician's own learning and support of others' learning. In physicians' decision making concerning patients, elements of uncertainty are constantly present. It became evident from the resident doctors' descriptions and from the senior consultants' descriptions of their tutoring of the resident doctors that making decisions independently not only was important for learning but also involved uncertainty and stress.

One physician said that when he and a resident doctor planned for the current workday, the resident would report her preoperative assessment of the patients who were ready for surgery that day. When it was time for the actual surgery to be performed, they decided that the resident doctor would perform the surgery on one patient. In the following interview excerpt, the more experienced physician discusses the level of supervision the resident doctor needed: "But with that she said, 'No, I do not want help. I want to start this myself.' And I said, 'OK, you do that.' . . . [I know] that if she has a problem or something she wonders about, then she will ask" (Physician A, Interview 2). When the resident doctor met the patient,

the senior consultant had rearranged his schedule to be available to help her if needed. This interview excerpt shows that responsibilities were taken and given—in that the resident doctor took the responsibility for part of the medical practice and the more experienced physician trusted her to carry it out. At the same time, the more experienced physician assumed the overall responsibility—in that he rearranged his schedule, thereby creating a situation of support of others' learning. This example demonstrates further how the more experienced physician created a situation of learning support for the resident doctor who, during her continuing practical work with the patient, had asked for support in handling a troublesome situation. The more experienced physician managed the situation by taking over the practical work, providing a description of what he was doing, and asking the younger resident doctor about the previous events as well as her view of what would be best to do next in the case. After that, the younger physician proceeded with the intervention in the patient by herself. Here, the physicians' relational collaboration and tension between responsibilities were bundled with sayings, doings, and a specific material set-up, a practice architecture that produced learning and support of learning.

Six of the informants said that they carried out their work with the aim of improving the performance of the healthcare they provided. To improve medical routines at their hospital, a group of physicians made plans to hold a consensus seminar in which physicians from several disciplines and experts from other countries would be invited to participate (Physician A Interview 1). This illustrates how physicians also take responsibility for sharing and developing their professional knowledge base collectively.

In medical practice, different kinds of responsibilities influenced the physicians' doings, sayings, and relatings, thereby creating tensions within a source of learning. We categorize these tensions as follows: (a) tensions between giving and taking responsibility involving professionals in diverse tasks; (b) tensions that emerge from the responsibility of carrying out decisions, independently or with support; and (c) tensions between doings so as to update medical standards and to improve healthcare as well as to take part and use the results from such doings.

Analytical summary of the findings

In summary, the physicians' professional practice, together with patients, their next of kin, other professionals, and other generations of physicians, creates opportunities for comprehensive knowledge development that are embedded in the arrangements of sayings, doings, set-ups, and relatings. The patterns of these practices are often taken for granted and not articulated. The physicians dynamically alternate between their own learning and their support of others' learning, in and around the individual patient processes. Learning and learning support are triggered through the physicians' comparisons during their versatile mobility across healthcare contexts, which emerge between various working groups, in different tasks, and in several physical and virtual contexts. Learning and learning support occur through participation in multiple communities of collaboration in which distinct relational, discursive, and material arrangements generate different kinds of learning. Tensions between different responsibilities in and around patient processes are also important sources for learning through physicians' collaboration. Our findings indicate that the medical practice architectures vary between different medical disciplines, thereby displaying the dynamics and complexity of physicians' opportunities and constraints for learning and support of others' learning in healthcare. The complexity can be described as webs of extra-individual dimensions that are bundled uniquely into distinctive practice architectures in each participating medical discipline.

Discussion

The rapid growth in knowledge and technology, the pressure associated with needed improvements, and the escalating workload for professionals in complex healthcare systems with limited resources are indications of the importance of making appropriate and explicit arrangements for physicians' learning and their support of the learning of others in daily healthcare practice. The use of Kemmis's (2009) socio-material conceptual framework of practice architecture to understand more clearly physicians' learning and their support of others' learning in complex healthcare practices enabled us to uncover a dynamic web of learning enactments.

Repeated analyses of accounts of the current workday situation for a group of physicians through personal narratives, in combination with analyses of conversations in a multidisciplinary focus group, provided us with valuable multifaceted data. They allowed us to see that learning enactments in physicians' professional practice were multidimensional and integrated with patients' care.

Individual patient processes are therefore central to physicians' learning of practical medicine, with the practical application of general medical knowledge occurring through different material arrangements and particularization through sayings, doings, and relatings. The findings also demonstrate that physicians' interdependence and learning with other professionals in patient processes are important and can be leveraged in several ways. In their 2010 study, Frenk et al. emphasized the importance of interdependence and learning in healthcare and pointed to information gathering as well as the formation and transformation of knowledge as different approaches that lead to different outcomes. They also argued that the education of professionals has contributed to dysfunctions in healthcare systems owing to rigid curricula, professional silos, static pedagogy, and insufficient adaptation to local contexts. Frenk et al. claimed that systems of healthcare and health professional education have to face these difficulties interdependently by rethinking the design and flexibility of educational programs within common healthcare and educational systems. We argue that a practice theory perspective contributes a broader perspective on healthcare processes, allowing the discernment of how different doings are bundled together with distinct set-ups and material arrangements, leading to various sets of sayings and relatings between professions that not only drive one's own learning but also support the learning of others. The most frequent relating is the conveying of data and knowledge when transferring information between the parties. In shared set-ups, professionals can negotiate ways in which to conduct themselves, as well as form, shape, and develop common norms and attitudes mutually. Learning is fostered in patient processes where arrangements enable different professions to explore jointly topics based on the breadth of knowledge they represent. Dunston et al. (2009) have developed a partnership model in which health consumers and professionals collaborate in producing healthcare services. Coproduction is a way of remaking healthcare by changing relationships, practices, and cultures. There is an important potential for strengthening learning and the performance of healthcare through identifying which kinds of learning and knowing are to be produced in each practice. Our findings show that discursive, material, and social arrangements in patient processes prefigure what learning can be achieved by both patients and professionals. We suggest further improvement work in healthcare contexts to foster such development, supported by participatory research conducted in collaboration between healthcare and universities.

Beckett and Hager (2000) have argued that one of the most important factors affecting the quality of workplace learning is the dependence on a variety of learning opportunities. Our findings are in line with Beckett and Hager's argument, indicating that physicians' professional learning is closely connected to their versatile

mobility across working groups, tasks, and physical and virtual contexts. According to Kemmis (2009, 2012), material arrangements prefigure what kind of practice is performed. We argue that material arrangements can make different learning features possible, and that if learning features are made explicitly, this can motivate rearrangements, which not only stimulate but are also appropriate for the desired knowledge development.

In his 2012 study, Reich argued that the use of technologies such as electronic medical records may increasingly constrain physicians' clinical practices, erode their diagnostic sensibility, and reduce their appreciation of the social and emotional aspects of care. Our study shows that the physicians contributed their experience to extensive numbers of patient processes in a tradition of secrecy, which was essential for patient safety and the quality of care provided. Generations of physicians in and between disciplines have supportively built relationships, compared behaviour, and discursively established links between their perceptions of patients, thereby demonstrating that social functions are essential for physicians' informal learning. Learning and patient safety could be hampered by the implementation of IT systems and related guidelines stating that physicians' access to data is limited to the patient with whom they explicitly work. Therefore, the importance of socio-materiality—that is, the interplay between information technologies and social aspects of knowledge development in patient processes—needs to be made explicit so as to secure and enhance the quality of healthcare provided.

The physicians' mobility across multiple communities of collaboration meant in practice that they were in transition involving participation in a number of different professional communities with diverse socio-material arrangements, compositions of members, and learning enactments. Spilg, Siebert, and Martin (2012), building on the work of Lave and Wenger (1991), have stated that resident doctors, who are involved in social learning, develop professional identity, socialize, and gradually move more to the center of the community through a process of participating in groups over time. Our findings illustrate how the physicians' mobility across different communities was imbued with identification and socialization processes, which could be used for productive reflections to enhance the physicians' professional learning. According to Boud (2010), productive reflections need to be contextualized within work and to connect learning and work so as to be collectively and organizationally oriented rather than individually oriented. We suggest that productive reflection is situated and enacted within the flows of practice in the professional communities of physicians, each one characterized by its specific arrangements of set-ups and doings. These patterns of arrangements are collectively shared and make up the practice architecture that characterizes the communities.

Our findings show that learning can be enabled or constrained by relational tensions owing to professional responsibilities, decision making (either independently or with support), the giving and receiving of responsibility, and doings to update medical standards and improve healthcare as opposed to receiving and using their results. Park, Woodrow, Reznick, Beales, and MacRae (2007) have identified patient care and education, as well as self-(imposed) and collegial relationships, as major responsibilities in the daily work of surgical resident doctors and faculty members, thus emphasizing their complex structure and collective character. From the perspective of junior physicians' performance at various levels of responsibility, Kilminster, Zukas, Quinton, and Roberts (2010) have argued that junior physicians' transitions through healthcare can be referred to as critical intense learning periods (CILPs), in which the role of the workplace and those with whom they work have a decisive impact. In our study, we found that relational tensions between the physicians' professional responsible doings illustrate the connections between learning and support of others' learning and that they can be seen as important features of CILPs.

This qualitative study is based on a limited number of informants and should be seen as an explorative study. Therefore, the possibility of generalizing the findings is limited.

Conclusions

In this study, we show that physicians' learning and their support of others' learning dynamically alternate and are related to the following: (a) engagement in individual patient processes (b) physicians' versatile mobility across contexts, (c) participation in multiple communities of collaboration, and (d) relational tensions between responsibilities. The findings that emerge through a socio-material theoretical perspective on practice provide more detailed knowledge about health professionals' pedagogical processes, previously described as processes of reading, guiding, and learning support (Hult et al., 2009).

The findings provide a contextualized understanding of how the practice architectures framing physicians' learning and learning support in healthcare practice are constituted. Therefore, we suggest that making the enactments of professional responsibilities more explicit has potential for use in pedagogical work so as to enhance learning in medical practice. We argue that through productive reflection in healthcare practices on dimensions of learning enactments, it may be possible to enhance physicians' professional learning and support of others' learning and to improve the professional practice of healthcare.

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