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Learning clinical skills during bedside teaching encounters in general practice

A video-observational study with insights from activity theory

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Abstract

Purpose – This paper aims to explore how opportunities for learning clinical skills are negotiated within bedside teaching encounters (BTEs). Bedside teaching, within the medical workplace, is considered essential for helping students develop their clinical skills.

Design/methodology/approach – An audio and/or video observational study examining seven general practice BTEs was undertaken. Additionally, audio-recorded, semi-structured interviews were conducted with participants. All data were transcribed. Data analysis comprised Framework Analysis informed by Engeström's Cultural Historical Activity Theory.

Findings – BTEs can be seen to offer many learning opportunities for clinical skills. Learning opportunities are negotiated by the participants in each BTE, with patients, doctors and students playing different roles within and across the BTEs. Tensions emerged within and between nodes and across two activity systems.

Research limitations/implications – Negotiation of clinical skills learning opportunities involved shifts in the use of artefacts, roles and rules of participation, which were tacit, dynamic and changing. That learning is constituted in the activity implies that students and teachers cannot be fully prepared for BTEs due to their emergent properties. Engaging doctors, students and patients in reflecting on tensions experienced and the factors that influence judgements in BTEs may be a useful first step in helping them better manage the roles and responsibilities therein.

Originality/value – The paper makes an original contribution to the literature by highlighting the tensions inherent in BTEs and how the negotiation of roles and division of labour whilst juggling two interacting activity systems create or inhibit opportunities for clinical skills learning. This has significant implications for how BTEs are conceptualised.

Keywords Professional education, Higher education, Field research, Learning, Education, Workplace learning

Paper type Research paper

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Introduction

Bedside teaching encounters (BTEs) are any teaching in the company of the patient and involve the triad of patient, doctor and student (Rees and Monrouxe, 2008). They are highly valued by students and tutors for the learning of clinical skills (Celenza and Rogers, 2006). Yet there are reports of inconsistent quantity and quality of BTEs as well as missed teaching opportunities both of and within BTEs (Nair *et al.*, 1997, 1998; Williams *et al.*, 2008; Crumlish *et al.*, 2009; Qureshi and Maxwell, 2012). This study explored how learning opportunities for clinical skills are negotiated in general practice BTEs using observation and interviews framed within activity theory.

BTE research

Several studies have utilised surveys (Nair *et al.*, 1997; Celenza and Rogers, 2006; Crumlish *et al.*, 2009; Qureshi *et al.*, 2013) and/or interviews to explore different stakeholders' perceptions of BTEs, e.g. values, barriers and future improvements (Nair *et al.*, 1998; Ramani *et al.*, 2003; Williams *et al.*, 2008; Wenrich *et al.*, 2011; Gonzalo *et al.*, 2014). Of those studies specifically exploring interactions among participants within BTEs, one utilised interviews (McLachlan *et al.*, 2012), four employed observation (Weissman *et al.*, 2006; Rees and Monrouxe, 2008, 2010; Monrouxe *et al.*, 2009; Bristowe and Patrick, 2012) and two used video observation with audio interviews (Rees *et al.*, 2013; Elsey *et al.*, 2014; Rizan *et al.*, 2014).

A phenomenological study of patient experiences ($n = 10$) of BTEs in ambulatory settings identified that patients on the whole were ambivalent about their experiences. Patients reported that they were objects or "guinea pigs" of student learning, with only coincidental social interaction between the patient and student occurring (McLachlan *et al.*, 2012). The study identified that patients adopt primarily passive roles during student – doctor interactions. Conversely, Weissman *et al.* (2006) identified that students simply watched doctor – patient interactions, learning humanism and professional values "almost exclusively" by role modelling without explicit signposting from tutors. Using audio recording and discourse analysis of consultations in a plastic surgery hand clinic, Bristowe and Patrick (2012) also found that students adopted an observational role unless invited to do otherwise. Data suggested doctors' distraction and loss of focus when students were present, indicating the challenge of managing the competing demands of patient care and student education.

However, not all BTE studies identify students as passive. Rees and Monrouxe (2008, 2010) found that students adopted an active, participatory role within BTEs. Indeed, all individuals within the learning triad were shown to play multiple roles including actor, director, audience and non-person[1] within and across hospital BTEs with language (e.g. directives) and paralanguage (e.g. pronoun use, laughter) serving to include/exclude individuals (Monrouxe *et al.*, 2009). In a further study, using video-observational data, we examined how power is negotiated among BTE participants through language, paralanguage and non-verbal communication and materials such as physical positioning and control of artefacts (Rees *et al.*, 2013). Elsey *et al.* (2014) utilised a video ethnographic approach to consider how *trust* is achieved and co-constructed during BTE interactions. They found that during the activity of students-as-registrars (i.e. taking a full history and examining the patient, then presenting this to the senior doctor), *trust* emerged interactionally with patients able to make difficult disclosures of new, potentially embarrassing information (e.g.

falling over). Finally, Rizan *et al.* (2014) considered the types of interactional structures utilised in embedded feedback sequences during general practice BTEs. What is missing from these studies is the use of video-observation for visibilising how clinical skills' learning emerges.

Cultural historical activity theory

Studies described above have identified that doctors, students and patients enact multiple roles within BTEs, implying the need to juggle various responsibilities within complex, interacting and often competing activity systems (i.e. patient care and student education). These two activity systems have their own (often contradictory) divisions of labour, material environments, social rules, routines, policies and practices. Cultural Historical Activity Theory (CHAT) is useful here, as it considers how identities are constructed through work-based practices and how the management of identity relates to historically determined roles and rules (Engeström, 2001). Social practices are primary objects of inquiry in CHAT, thereby moving beyond researching individuals to researching practices in context (Arnseth, 2008). Adopting the BTE as a unit of analysis (comprising both student education and patient care activity systems) enabled in-depth exploration of interactions among the triad.

CHAT belongs to a group of theories labelled as "sociomaterial", which bring to the foreground the social and material world in which the individual is entangled (Fenwick *et al.*, 2011). Third-generation CHAT enables two or more interacting activity systems to be modelled to understand dialogues, multiple perspectives and networks of interacting activity systems (Engeström, 2001). The concept of expansive learning accounts for knowledge co-production rather than re-production and occurs through shifts in the organisation of work or alterations in the rules that govern behaviours (Engeström, 2001).

According to Engeström's (2001) model, the subjects of an activity system are the individual or sub-group engaged in an activity. The object of an activity in CHAT is not unitary or easily defined, but more akin to "an assembly of material entities embedded in economic and social relationships" (Miettinen, 2005, p. 58). The object is the motive of the collective activity system (e.g. caring for patients) upon which the subject brings to bear various tools and which produces action. Action is a relatively discrete segment of behaviour oriented towards a goal (e.g. eliciting a history). When repeated with little variation over time, they become automatic operations or routines (e.g. auscultation may become routine; Engeström 1995). Tools or cultural artefacts mediate the subjects' actions upon the object. There are primary artefacts, those directly used in the production of activity (e.g. medication script, computer or stethoscope) and secondary-level artefacts that define modes of action and are representations of that tool (e.g. prescribing; Engeström 1990). Interactions within an activity system are oriented towards producing some outcome. Community encompasses the wider network to which the subjects may belong (e.g. the profession of medicine or specialty to which the student aspires to). Division of labour shapes the way the subjects act within the activity system, with individuals taking on different roles (e.g. within BTEs teacher, doctor etc.). Activity systems always have rules, explicit and tacit, which are dynamic and shape the interactions of subject and tool with the object (Russell, 2001). Tensions and contradictions may emerge within and between any of these elements and are the motive for change and development (Engeström and Miettinen, 1999).

For the purposes of this research, we used Ringsted's (2010, p. 11) definition of clinical skills as: "more than technical skills, including the interplay between knowledge, procedural skills, and systems aspects of learning and professional development". From this definition, we can see that clinical skills may encompass actions and routines and their associated artefacts depending on the social and material assemblages and activity.

We found only two studies using CHAT in medical education research. Wearn *et al.* (2008) identified how tensions and contradictions between a professional activity (learning clinical skills) and a social activity (building friendships) caused anxiety among students during peer physical examination. de Feijter *et al.* (2011) identified contradictions arising between student engagement in the activity system of learning to be a doctor by conducting procedures and that of providing patient care but putting patients at risk. However, neither of these studies used observational data. Therefore, using video in the current study is original and can help in visibilising the human – material interactions, as demonstrated in our paper on power with non-verbal communication and the control of artefacts (Rees *et al.*, 2013).

Research questions

The specific research questions were:

RQ1. What learning opportunities for clinical skills emerge within interacting activity systems in BTEs?

RQ2. How are these learning opportunities negotiated within BTEs?

Research approach

We conducted a qualitative video-observational study with audio-recorded debrief interviews. The philosophical basis of socially constructed multiple realities rather than an objective single truth underpinned this research (Crotty, 1998).

Sampling and recruitment

Third-year medical students from two medical schools in Australia who were about to start their general practice rotation were invited to participate. We decided to observe general practice BTEs because previous research had not explored this setting, and this is where most of student learning in the workplace occurs in the earlier years of medical curricula. For students who consented, their general practitioner (GP) supervisor was then invited. Once students and their supervisors had both consented, a day for data collection was arranged. The practice managers informed patients attending the practice on that day about the research in advance. Patients were recruited to participate in the study by the researchers (RA or ADL – see acknowledgements) in the waiting room of the practice prior to their consultation. Multiple levels of consent included video- or audio-only, and all participants were asked again for consent following the consultation. Ethical approval was obtained from both medical school ethics research committees.

Data collection

Consultations were either video- or audio-recorded with the researcher in the room using a small hand-held video-recorder with wide-angle lens. Five BTEs were video-recorded and two were audio-recorded at the patients' requests. Wherever possible, RA or ADL

conducted debrief semi-structured interviews with each of the participants (doctor, student and patient) separately. Questions explored participants' perceptions of the roles played during the BTE consultation, what was learned, use of language, interactions and involvement in the BTEs. The researchers were not involved in patient care or medical school curricula so were not in a position of power relative to the participants. ADL was a medical student at the time of data collection and RA a medical education academic and researcher. CER and LVM are academic medical educators with experience in social science research.

Data analysis

Audio of the consultations and interviews were transcribed to the level of discourse analysis by a professional transcription service, removing identifying features. RA and CER reviewed the transcripts against the audio/video to ensure accuracy. Data analysis was informed by a systematic framework approach (Ritchie and Spencer, 1994) where a section of the data (transcripts, video and audio for BTEs1-3) was analysed by the three authors and a preliminary coding framework negotiated. This framework was then used to code the remaining observation and interview data (RA and CER). The videos were used to enable coding of visual attributes such as positioning and use of artefacts onto the transcripts in Atlas.ti Version 6.2 (Scientific Software Development GmbH, Berlin, Germany).

Third-generation CHAT formed the theoretical lens through which we interpreted the data and so was included in our coding framework, for example, with codes emphasising roles played (director, actor, observer, non-person), actions (including receiving a history, physical examination, giving advice) and artefacts. The researcher constructs the activity system "as if looking at it from above" while also analysing the data based on the experiences and interpretations of the various members through which the activity is constructed (Engeström and Miettinen, 1999, p. 10). Analysis involved moving dialectically between the systemic perspective and views of the participants, thereby expanding our understanding of the activity under investigation (Engeström and Miettinen, 1999). In keeping with this, each BTE and its related debrief interviews were analysed and modelled using third-generation CHAT with similarities and differences explored across the BTEs.

Results

Seven BTEs were recorded in total with 193 minutes of BTEs and 100 minutes of interview data. Two of the seven BTEs (BTEs 4 and 6) were audiotaped only at the request of the patient. Four doctors, two students and eight patients participated across the seven BTEs. BTEs ranged in length from 16 to 80 minutes (average = 28 minutes). Fourteen debrief interviews were conducted ranging from 3 to 20 minutes (average = 7 minutes). The patient from BTE2 and the senior GP from BTE7 were not interviewed due to time constraints.

Opportunities for learning clinical skills

Many clinical skills (encompassing artefacts, actions and routines) were observed within the BTEs. Table I presents the length of recording for BTEs, participant demographics (gender and age), primary reason for attending the consultation and clinical skills demonstrated by the doctor and observed by the students and those also performed by the student.

Consult	Length, mins	Participants involved (age)	Primary reason for consultation	Clinical skills observed and contributed to by the student
BTE 1	16	MD1 (44), FS1 (19), FP1 (59)	Obtain referral to a specialist and getting blood test results	*Observed*: Establishing purpose of visit, eliciting history, interpreting blood tests, measuring BP, examination of eye condition, providing information and advice, providing referral letter *Contributed to*: Discussion of patient's condition following BTE
BTE 2	18	MD1 (44), FS1 (19), FP2 (60)	Anxiety and reflux	*Observed*: Establishing purpose of visit, eliciting history, interpreting and explaining endoscopy report, measuring pulse and BP, auscultation, providing information and advice, prescribing medication *Contributed to*: Discussion of patient's condition following BTE
BTE 3	26	MD1 (44), FS1 (19), FP3 (36)	FP3 tiredness and baby colic (1 month)	*Observed*: Establishing purpose of visit, eliciting history, examining baby's abdomen, providing information, reassurance and advice *Contributed to*: Examining baby's skin, discussion of patient's condition following BTE
BTE 4	19	FD1 (51), FS2 (25), FP4 (4), FP5 (37)	FP5 depression management and cough/sore throat for FP4	*Observed*: Establishing purpose of the visit, eliciting history and measuring weight and BP for FP5, giving information and advice, interpreting blood test results and referral for repeat blood test for FP5 *Contributed to*: Physical examination of FP4 (observation, palpation, ear and throat examination, chest auscultation), discussion of patients' conditions during and following BTE
BTE 5	17	FD1 (51), FS2 (25), FP6 (37)	Baby eczema (3 months)	*Observed*: Establishing purpose of visit, eliciting history, reassurance and advice, explanation of management plan *Contributed to*: Skin examination, identifying antibiotic that FP6 was taking (MIMS and on computer), hand washing, clearing of examination area, discussion of patient's condition following BTE
BTE 6	17	FD1 (51), FS2 (25), FP7 (35)	Acute eye and throat infection	*Observed*: Establishing purpose of visit, explaining management plan and medication choice, prescribing medication *Contributed to*: Eliciting history, physical examination of FP7 (temperature, auscultation, palpation, throat and ear examination), decision-making of management plan, discussion of patient's condition following BTE
BTE 7	80	FD2 (32), FD3 (53), FS2 (25), FP8 (84)	75+ assessment	*Observed:* measuring BP, explanation of management plan *Contributed to*: Eliciting history, physical examination (height, weight, pulse), medication review, decision-making of management plan, providing advice and reassurance, referral letter, discussion of patient's condition during and following BTE
Total	193			

Notes: MD = male doctor; FD = female doctor; FS = female student; FP = female patient

Table I.
Breakdown of BTEs (length, reason for consultation and clinical skills) and participant demographics (gender and age)

Negotiating learning opportunities

Across all BTEs, participants played different roles including director, actor, audience and non-person. Learning opportunities were co-constructed within the overlapping activity systems (patient care and student education), through constant negotiation of roles, rules of participation and the division of labour. In particular, a marked difference was seen in the levels of involvement, artefact use and roles played by the two students in and across the BTEs. To highlight some of these qualitative differences in how learning opportunities were negotiated, we describe two excerpts and analyse them using CHAT.

Dyadic interaction

Excerpt 1 context. BTE1 included one male GP (MD1), 1 female patient (FP1) and 1 female medical student (FS1) (Table II). The patient presented to general practice to obtain her blood test results, have her blood pressure checked and to obtain a referral to a specialist. The patient was seated next to the doctor with the student seated on the periphery of the room along with the researcher. The doctor was speaking aloud to the patient his interpretations of the blood test results, which we pick up in turn 1 (below). The communication is seen to be dyadic throughout where the doctor is reading from the computer screen the results and making eye contact with the patient only until in turn 9 he faced the student to ask her a medical question, establishing her role as medical student. Once satisfied with her response, he turned back to the patient and continued with the consultation (turn 11).

The doctor appeared to be the only participant to legitimately engage in both activity systems here. He acted as the mediator switching between both systems to achieve different outcomes. When he spoke to the student, it was in a teaching role, and the patient would take an observer or non-person role (occasionally interrupting to resist this exclusion). The opposite was the case when the doctor was taking care of the patient with the student typically adopting an observer or non-person role. There was very little interaction between

1	MD1	Your cholesterol back is four
2	FP1	Oh good (.)
3	MD1	Now which is very good (.) I'm very happy with it
4	FP1	That's good
5	MD1	And your (.) thyroid (.) er (.) is okay within er (.) normal range too
6	FP1	Yeah
7	MD1	And your haemoglobin A1C which is for (.) diabetes is six point six
8	FP1	So it's still up
9	MD1	errrrrrrrr it's kind of very good ((doctor now turns his attention to FS1 to ask her a question)) FS1 (0.5) what number is good (.) for haemoglobin A1C?
10	FS1	Um less than ten
11	MD1	Yeah (.) ((doctor returns his attention back to the patient)) so- so you're doing very well
12	FP1	Oh okay
13	MD1	Although if you compare it with before six point one, six point four, six point five and six point six (.) is- the trend's going up

Table II.
Excerpt 1 "What number is good for haemoglobin A1C?"

Notes: Transcription notation: [words in square brackets] = overtalking speech; (single brackets) = probably word spoken; (…) = inaudible speech; (.) = micropause; (1.5) = pause to nearest half second; ((double brackets)) = further information

the student and the patient beyond pleasantries at the beginning and the end of the consultation. The doctor would ask the student mainly knowledge-focussed questions. Only 4 of the 24 turns in BTE 1 were student – patient interactions with none in BTEs 2 and 3. The range of relative contribution to talk across BTEs 1-3 was: doctor (45-49 per cent), patients (43-50 per cent) and student (0-8 per cent). The student did not control any primary artefacts (e.g. stethoscope, BP monitor) or invoke any associated (secondary) representations throughout these three BTEs. This approach was typical of three of the BTEs we observed (BTE1-3) where the student was not seen to engage meaningfully in the actions or activity of patient care despite the GP interrupting this activity to ask her questions on multiple occasions.

Division of labour

Although it appeared that the doctor constructed the passive role for the student during patient care activity in the video observation, the debrief interviews provided insight to a more complex co-construction of roles. As can be seen in Table III quote 1, FS1

Quote no.	Quote
1	FS1: Yeah (.) I think (.) like the first day that I was here (.) um the doctor let me see patients on their own first (0.5) before um I-I saw them (.) with him
	FR1: Uh-mm
	FS1: But I find it (.) more useful this way [observing patient-doctor interactions]
	FR1: Oh do you?
	FS1: Yeah
	FR1: Okay (.) why- (.) why is that?
	FS1: Well because when I took histories (.) I did exams on the patients um (1.0) he wasn't really watching like (.) he'd be doing his- (.) seeing his other patients (.) and I wasn't really sure if I was doing it right (.) whereas this way I get to (.) see more consultations (FS1 debrief interview)
2	MD1: No I- (.) the first one (.) eh (0.5) the problem with this teaching because you don't know how- usually (.) what I usually do (0.5) I usually put the patients (.) like the- the students take history and examination by (.) themself
	FR1: Oh okay
	MD1: But she [the student] doesn't feel comfortable with that
	FR1: Yeah she (.) mentioned that yeah
	MD1: (. . .) But- but I-I think that still (.) it would be boring for them [students] if they keep sitting at the back (.) listening to us (MD1 debrief interview)
3	MD1: The examinations (0.5) you don't do examinations every time because you've seen them [patient] before (.) you've checked them (.) so you don't examine (.) every time
	FR1: Yes
	MD1: But I think the only thing the students will learn from the history that we [GPs] take (.) is how focused we are and how quickly (.) we look at their demands and (.) and- and try to (.) ah sort out their- their- their- (0.5) what they requested (MD1 debrief interview)
4	FS1: Like most of the other (1.0) interviews that I sit in with (.) they [patients] don't really talk to me much but (.) I-I guess the doctor talks to me and he just asks me questions about the (0.5) condition (FS1 debrief interview)

Notes: FR1 refers to the female researcher ADL; transcription notation as before

Table III. Dyadic interactions: quotes from participant debrief interviews for BTE 1

negotiated this observational role during patient care interactions. Although she had been given the opportunity to see patients independently she found this challenging, leading to a disruption in the doctor's educational activity and tension between his conception of a good educational experience for the student and her desire to be an observer (Table III, quote 2). This disruption and resultant co-construction of the observational role by the student created other tensions for the GP in relation to actions and artefacts that would vary depending on the activity system being undertaken. For example, he was dubious of the value of his focused history taking (typical of the patient care activity system) for the student's learning, where a comprehensive and systematic history is expected within the educational activity system (Table III, quote 3). The student was conscious of her passive role and was aware of the limited opportunity of communication and learning from and with the patient (Table III, quote 4).

Collaborative and triadic interactions

Learning opportunities were negotiated in BTEs 4-7 with greater use of collaborative interactions and closer alignment between (the objectives of) both activity systems. The student adopted both passive and active roles and was seen to interact with the patients more freely and involving greater control of various primary and secondary artefacts and involvement in different activities. The range of relative contribution to talk across BTEs 4-7 was: doctor (10-49 per cent), patients (37-45 per cent) and student (7-38 per cent).

Excerpt 2 context. BTE 6 included 1 female GP (FD1), 1 female medical student (FS2), 1 female patient (FP7) and her mother (Table IV). Prior to this excerpt, FD1 asked the patient about her red eyes: "how long have you had that?" establishing the acute nature of her condition. FD1 then says to the patient:

> [Actually] (.) how about I just stop you and get ((names student)) (.) ((addresses FS2)) why don't you ask her some questions about this and (.) see what your assessment is (.) okay?

Thereby disrupting one routine and redefining the rules of participation and division of labour, creating an opportunity for the student to participate in actions within the patient care activity system. FS2 introduced herself again, sought consent and started by eliciting the patient history (part of the ritualised introductions taught in medical school). The excerpt in Table IV is from the physical examination that the student was carrying out.

In turn 1, we see FS2 examining the patient's throat and articulating her findings out loud at times using medical jargon. This performativity within the education system is in tension with the patient care activity system as the patient may be unable to understand the jargon meant for the doctor teacher. The student moves on to examine the patient's other ear and with the signs of "red" and "bulging" (turn 3), the doctor interrupts with a statement to review the patient's ear for herself. FD1 confirms the findings with the student and explains her reasoning to the patient and student in terms of the antibiotics; both the patient and student are involved in this triadic interaction as indicated by their responses (turns 11 and 13, respectively) and her eye contact with them both. The doctor actively includes the student in the decision-making about the antibiotic (use of "we" in turns 14 and 18) and the reasons for choosing an alternative to the one the student suggests (turns 14-18).

1	FS2	If you can open wide (2.5) ((speaks softly)) that's what I thought (.) so she looks a little dry (.) there's (.) like (.) pus at the back and a bit red (0.5) ((directs speech to FD1)) did you want to look as well (1.0) ((directs speech to FP7)) are you okay there?
2	FP7	Yeah ((unclear))
3	FS2	(1.0) Just (.) go (straight on) (3.0) okay (14.5) >I'm just going to look in your< less sore ear first if that's okay (10.5) it looks a bit like its bulging (3.5) (I'll be really gentle) (2.0) that's it (12.0) red (.) but not (. . .)
4	FD1	(. . .) Let me have a look (.) excuse me (19.5) mmm (1.0) ((directs speech to FS2)) yeah it actually is quite red I think (.) and I think >it probably is< a bit (bulging) actually
5	FS2	That one?
6	FD1	[Yeah (.) yes]
7	FS2	[Oh (.) okay] [(I'll have a look)]
8	FD1	[I think it probably is] very dull [isn't it (. . .)]
9	FS2	It is dull
10	FD1	(. . .) ((spoken in a very low voice and then returns speech to normal volume)) so that's interesting (2.0) alright (1.5) ((directs speech to FP1)) look ((names person)) (.) it's really hard to know (.) with these thing (.) um (.) you know (.) sometimes things start off as (.) as um (.) viruses (.) and then sometimes the bacteria gets in on top of it (0.5) we do see a lot of sort of unusual infections at this time of the year (.) seeing so many people with the eye problem (.) that you've got
11	FP7	Oh really?
12	FD1	So (.) um (.) it's all going together (.) I actually probably would suggest that we use an antibiotic (.) um (.) because (.) she's got a lot of (hay) fever
13	FS2	Yep
14	FD1	She's got (.) clearly got a bacterial infection in her eye and I'm concerned about the ear as well (.) um (.) I feel less concerned about the chest (.) but I think that it would be appropriate to use an antibiotic (0.5) okay (.) um (.) ((directs speech to FS2)) so what should we choose?
15	FS2	Um (.) just make sure there's no allergies and probably Amoxicillin as well
16	FD1	Yeah (.) I think so too (.) in fact I'd probably (would) go with Augmentin because (. . .)
17		of the combination of everything that we've got going here

Notes: Transcription notation as before; > < indicates the talk between these symbols is speeded up relative to the surrounding talk

Table IV.
Excerpt 2 "Let me have a look"

Division of labour

In this excerpt, like the previous, tensions emerge as a result of the interacting and overlapping activity systems. Learning opportunities are again co-constructed by the participants with greater opportunities for the student to engage directly with the patient. This occurs through a shift in the division of labour and control of artefacts, creating new rules of participation for the student when the doctor asks her to take over the history and physical examination of the patient. In this case, the student's involvement is in a legitimate action and associated artefacts of a physical examination. The two interacting activity systems are negotiated into closer alignment between the goals of the systems and the roles played by the student as boundary-crosser. This closer alignment in goals between both activity systems

seen in BTEs 4-7 was also noted by some of the patients in their debrief interviews (Table V, quote 1).

The collaborative perspective is maintained through the use of the pronoun "we" (turns 12 and 14) to indicate shared decision-making with the student and through switching eye contact between the student and patient. The articulation of clinical reasoning (an artefact within the student education activity system) by FD1 (turns 10-14) and shared decision-making (turn 4 and turns 14-18) mediates the student's development of her own mental algorithms. For example, the student can make direct links between symptoms elicited and signs she has seen in her examination and her reasoning. Although the student provides a choice for an antibiotic that is softly corrected by the doctor she does explain to the student the alternative choice after the consultation is over. In this example, the student can build on her illness scripts surrounding differentiating viral and bacterial infections, indications for antibiotics, medication choices and dosages based on contributing to patient care. The shift in participation or social rules to generate learning opportunities necessitated a different division of labour, based on moment-to-moment situated judgements by the participants and considering multiple factors, such as student capability and the nature of the patient's problem. In the debrief interview, FD1 explained how she made decisions about the division of labour during the encounter (Table V, quote 2). She goes on to state that this often added another "layer of complexity" to the consultation and that these judgements were difficult to make. These situated judgements can make it difficult for the student who also needs to be flexible and adaptable to the emergent situation despite

Quote no.	Quote
1	FP7: I think it goes both ways, for her [the student] to be able to help me [and] I was helping by explaining what the problems are FR2: How did she help you? FP7: I think she was trying to understand what the problem for the patient is and trying to see what the most suitable prescription that she can provide
2	FD1: Well I have to get a sense first of what (. . .) the student's level is and how much I trust that what she sees in the ear would be the same as what I saw in the ear, for example (. . .) So it's good to involve them but also you have to make a judgment about a particular patient (. . .) You just have to make a judgment based on what's going on
3	FD1: It really depends on whether or not I've sort of given her permission to do that
4	FD1: I trust her judgment and I think she's very attuned to the difficulty of the situation for the patient as well as for me
5	FS2: Well she [the patient] needed to be auscultated to see if she had a wheeze (. . .) But I don't know I just thought I'd just do a bit extra
6	FS2: Usually I like to wait for some sort of cue that that's what they [the doctor] want. And if they want you to do a specific part of the examination only, then it's a little bit nice to know what is expected. "Cause sometimes you'll go okay well I should do the whole exam "cause that's what should be done". But really they only want you to look at the throat. So it's good when you can have a bit of non-verbal or explicit communication to know

Table V.
Triadic interactions: quotes from participant debrief interviews for BTE 6

Notes: FR2 refers to the female researcher AA; transcription notation as before

not necessarily having a bigger picture grip of how the consultation may unfold and the history that may exist between the GP and the patient. Although FD1 perceives herself as the gatekeeper of the learning opportunities (Table V, quote 3), this is negotiated through trust and previous experiences between the GP and the student (Table V, quote 4). The student is complicit in this co-construction and can be seen to resist the GP as the gatekeeper, for example, in this quote (Table V, quote 5). The student discussed her own anxieties in responding to the shifting rules of the BTE, explaining here the tension between conducting a systematic and comprehensive physical examination (as may be expected in the activity of student education) versus a focused physical examination for patient care (Table V, quote 6).

Discussion

BTEs can be seen to offer many learning opportunities for clinical skills (with some missed opportunities seen across all BTEs). Learning opportunities are negotiated and co-constructed by the participants in each BTE, with patients, doctors and students playing different roles within and across the BTEs. We saw tensions emerge within and between nodes and across the two activity systems. Even seemingly similar actions such as eliciting a history or conducting a physical examination take on different meanings depending on the activity system in which they are conducted. The complexities and tensions identified in this study may go some way to explaining the findings of Bristowe and Patrick (2012) where more patient questions went unanswered in consultations in which students were present. This may be a result of the doctor – student focussing on the student education activity system at the expense of the patient care activity system.

In three of our BTEs (1-3), we saw primarily observational learning opportunities and pointed discrete knowledge questions with minimal opportunities for the student to adopt a (neophyte) doctor role and meaningfully engage in the activity of patient care. In these BTEs, the adoption of patient-centred care and student-centred learning are in contradiction to each other, setting up a tension where the GP is aiming to role model patient-centred care, yet inadvertently objectifies the patient in trying to educate the student. This may explain why well-meaning and knowledgeable clinical teachers continue to promulgate actions which could lead to patients feeling excluded from doctor – student interactions; as found by McLachlan *et al.* (2012) and Monrouxe *et al.* (2009).

The dyadic co-construction of roles and division of labour diminishes the opportunity for students to build a relationship with the patient and to participate in the practice of medicine. If learners are not able to construct their identity through expanding involvement with a learning community focussed on the common object of patient care, they risk feeling disenfranchised, able only to learn discrete knowledge and skills for their own personal motives (Russell, 2001).

In BTEs 4-7, however, we saw negotiated opportunities for the student to actively contribute to the activity system of patient care; an example of what Miettinen (2005) refers to as co-evolution of an object of activity. Fenwick *et al.* (2011) noted that learning often emerges at the boundaries of overlapping activity systems where objects are shared yet have distinct effects. The patient as shared "object" is not intended to objectify the patient as something acted on by the subject (although this may actually occur), but the term is interpreted as the "purpose or aim of the activity" – or motive

(Bakhurst, 2009). We also saw tensions for the second student who aimed to act in a patient-centred way during her physical examination of the patient, but inevitably used medical jargon in her performativity of the exam to the doctor teacher. Spafford *et al.* (2009) discussed the internal conflict such tensions cause to optometry students who viewed their clinical educator (and assessor) as the "real audience" rather than the patient when delivering bad news to patients during BTEs.

As identified in this study, negotiation of clinical skills learning opportunities involved shifts in the use of artefacts, roles and rules of participation, which were tacit, dynamic and changing. This can be difficult for doctors, students and patients to manage. It is reminiscent of what Engeström (2000, p. 972) refers to as knotworking:

> […] rapidly pulsating, distributed and partially improvised orchestration of collaborative performance between otherwise loosely connected actors and activity systems. A movement of tying, untying and retying together seemingly separate threads of activity.

This has significant implications for how we conceptualise BTEs, rather than contained/bounded and stable contexts where students transfer knowledge and skills learned in classrooms to the workplace under the supervision of a Master, to a more dynamic and overlapping set of activity systems from which learning emerges through the creation of opportunities for boundary crossing. This notion of improvisation in managing BTEs is implied by FD1 when she says: "every general practice encounter really is a one-off" (FD1 debrief interview).

Strengths and challenges of the research

This is the first study to use video-observation to analyse learning opportunities for clinical skills in BTEs in general practice settings. The lens of CHAT, focussing on the activity systems and the relations between elements including within and between nodes and across activity systems, in BTEs is also unique. This multi-site study involved students and tutors affiliated with two different medical schools in Australia. The sample size of the study, although relatively small, was adequate for the purposes of in-depth analysis, yielding rich data (Morse, 2000). To minimise patients' waiting time, the researchers conducted the interviews with patients immediately following the BTEs rather than recording the student – tutor discussions that always occurred following the BTE. This dilemma may be addressed in future research by maintaining a static camera in the consultation room while the researcher conducts the interview with the patient. Although some authors have critiqued the theoretical status of CHAT, as it lacks predictive power (Bakhurst, 2009; Martin and Peim, 2009), this does not discredit the utility of the model for analysing practices, in particular, for exploring the conditions of interacting activity systems. CHAT remains relevant as a methodological approach for tackling many of the theoretical and methodological questions that cut across the social sciences today (Bearman and Ajjawi, 2013; Fenwick, 2014).

Implications of the current research

Findings from this study highlight some of the tensions inherent in BTEs and how the negotiation of rules, roles and division of labour whilst juggling the two interacting activity systems create or inhibit opportunities for clinical skills learning. That learning is constituted in the activity implies that students and teachers cannot be fully prepared for a BTE due to its emergent properties. This aligns well with research and sociocultural perspectives that preparedness is an empty concept because practice,

performance and learning are interlinked and inseparable (Kilminster *et al.*, 2011). Education should enable students to engage with high levels of indeterminacy and complexity, framing learning as an emergent property of a dynamic, unstable system (Bleakley and Bligh, 2008). These findings therefore negate the use of simple guidelines (Gonzalo *et al.*, 2014) and heuristics, e.g. the one-minute preceptor[2] (Neher *et al.*, 1992) or MiPLAN[3] (Stickrath *et al.*, 2013) as adequate for clinical teacher training.

Privileging the student – patient relationship may be one way of developing a close alignment between the activity systems within BTEs. Bleakley and Bligh (2008) argued that medical education needs to refocus on the student – patient relationship such that students might learn with, from and about patients in a manner that turns their attention away from the dominant focus of technical knowledge and the doctor – educator as role model and instructor. Engaging doctors, students and patients in reflecting on tensions they experience and the factors that influence judgements in BTEs may be a useful first step in helping them recognise the complexities and better manage the roles and responsibilities therein.

Further research with a larger sample and greater diversity (e.g. tertiary settings, different specialties, gender etc.) may elucidate conditions under which boundary crossing may be facilitated. In particular, future research may focus on the opportunities for patients to meaningfully cross into the activity system of student education.

Notes

1. Non-person is defined "as someone who isn't there" metaphorically speaking (Goffman, 1990, pp. 150-151); i.e., is physically present but is ignored (Monrouxe *et al.*, 2009).
2. One-minute preceptor: based on five microskills for effective clinical teaching (Neher *et al.*, 1992).
3. MiPLAN: is a three-part model for learner-centred bedside teaching (Stickrath *et al.*, 2013).

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