The Development of Clinical Thinking in Physicians in Training: The Educator Perspective

CURRENT STATUS: UNDER REVIEW

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DOI:
10.21203/rs.3.rs-21559/v1

SUBJECT AREAS
Educational Philosophy and Theory

KEYWORDS
Physicians in training, clinical thinking, medical education, supervision, medical educator
Abstract

**Background** An important element of effective clinical practice is the way physicians ‘think’ when they encounter a clinical situation, with a significant number of physicians in training challenged by translating their learning into professional practice in the clinical setting. This research explores the perceptions of educators about how physicians in training develop their clinical thinking in clinical settings. It considers what educators and their colleagues did to help, as well as the nature of the ‘context’ in which they worked.

**Method** A qualitative approach was used in this study with in depth interviews carried out with educators as ‘key informants’. Rich data derived from fifteen interview transcripts were analysed thematically in a rigorous and iterative process.

**Results** Three broad and overlapping themes were identified: working in an educationally minded culture; proximity of the educator to the physician in training; and trajectory of the physician in training. The departments in which these educators worked emphasised the importance on the education of physicians in training. All members of the team were responsible for education of the team, and all members, particularly senior nurses, were able to give feedback upon the physicians’ in training progress. Educators described working side by side with their physician in training and frequently being in close proximity to them, which means that the educator was both easily accessible and spent more time with their physicians in training. They described a trajectory of the physicians in training through the placement with close monitoring and informal assessment throughout.

**Conclusion** Recommendations are made as to how physicians in training can be supported to develop their clinical thinking. Educators and managers can analysis their own and department’s practice and select the recommendations relevant to their local circumstances in order to make change. This study adds the educator perspective to a body of literature about the importance of context and supportive learning environments. As such the discussion is applicable to the education of other health professionals.
Background
An important element of effective clinical practice is the way physicians ‘think’ when they encounter a clinical situation. Different concepts have been used to describe the processes involved, including ‘clinical reasoning’ and ‘clinical problem solving’, both of which suggest complex cognitive processes (Faucher, 2011; Young et al, 2019). Others suggest physicians largely engage in ‘problem definition’ rather than ‘problem solving’ (Cristancho et al, 2016), which involves thinking about the problem, not necessarily solving it.

Physicians in training are supported in the development of their clinical thinking by their colleagues through supervision, and there is evidence that much learning results informally and unplanned from interactions with others in the workplace (Eraut 2007). Good supervision includes overseeing training, modelling good practice, observing clinical encounters and to engage in dialogue with the physician in training (Health Education England, 2020). Supervisors may even ask the person they are supervising about their thinking concerning a patient and compare it to their own.

From these perspectives, we believe ‘clinical thinking’ to be the most helpful term to use because it is a broader concept encompassing all these different cognitive processes (Faucher 2011, Fuks, Boudreau and Cassell 2009; Fish and De Cossart, 2008). See Fig. 1. One motive for undertaking the study presented here was that a significant number of physicians in training referred to a Professional Support Unit at a UK postgraduate medical training organisation were described as finding it difficult ‘to think properly’ in the clinical setting.

The ‘context’ in which this happens has been shown to be important. It is now more widely recognised that what was once termed ‘competence’ is not a ‘stable construct’ – that once acquired, competence would be retained always (Regehr, 2006). Rather, the capability of any professional practitioner to practise effectively and appropriately is greatly influenced by the context of their practice (Eraut 2007; Hodges and Lingard 2012; Mylopoulos 2012). The suggestion is that a doctor may appear ‘competent’ in one context but not another – an observation also made by the Professional Support Unit mentioned above, which found that ‘failing’ trainees in one unit were found to ‘thrive’ in another. There are indications that the context in which a doctor trains may determine the effectiveness of
that training. A rigorous internal study of a UK postgraduate medical training organisation (Coles and Mountford, 1999) showed that physicians in training believed they learnt most in clinical units where they felt accepted and involved (a sense of ‘community’), were encouraged to contribute to the units’ work (a sense of ‘collegiality’), and could discuss their thoughts openly and honestly (a sense of ‘criticality’).

Recent studies have focused on an individual’s cognitive processing (Mason et al, 2019). Our study aimed to explore the development of clinical thinking in physicians in training with an emphasis on the importance of context. Other research in this area has sought to capture the medical trainees’ viewpoint in this regard (e.g. Paes, Leat and Steward 2018; McBee 2018). However, the focus of our work was on gaining the educator perspective, since they, as noted above, are largely responsible for, and well placed to understand and comment on, the development of clinical thinking in physicians in training.

The research explored the perceptions of educators about how physicians in training developed their clinical thinking in clinical settings and what they, their colleagues, did, as well as the nature of the context in which they worked, to help develop clinical thinking of physicians in training. General recommendations are made as to how medical educators and their managers can support physicians in training.

Methods

Research Design

A qualitative approach was used in this study with in-depth interviews employed as a data collection technique. This enabled detailed descriptions from the educators involved in the situations being researched and exploration of the complexity of connections in practice (Golby and Parrot, 1999). Fifteen semi-structured interviews were conducted with interviews lasting around 45 minutes each.

Participants

The rationale for the selection of research participants was to interview those medical clinicians in departments with a local reputation for providing supportive learning environments as well as positive feedback from physicians in training themselves, as reported in the General Medical Council national
training survey. The educators in the sample also had a minimum of three years’ experience in their educator roles making them valuable ‘key informants’ (Marshall 1996).

Ethical considerations

In carrying out the research the British Education Research Association’s (BERA) Ethical Guidelines for Educational Research were adhered to (BERA 2011). Informed written consent was gained from participants, including the right to confidentiality and to withdraw without explanation. The interviews were digitally recorded and once transcribed, all the data was anonymised, and the recordings deleted. Ethical approval was granted by the Research and Knowledge Exchange Ethics Committee at University of Winchester.

Data analysis

Data was analysed between interviews and interviews continued until codes found through analysis were ‘saturated’. Thus the process of data analysis was inductive with the themes derived from the data (Braun and Clark, 2006). The software package NVivo supported this process by helping to manage the content from the interviews. The thematic approach saw codes initially independently identified by the authors (CC, AM, RL). The results of the coding were then compared and discussed by all the authors (CC, AM, RL, RML and MM) until there was convergence (Saldana, 2016). Coding was followed by the creation and development of themes - ‘interpretations of the issues under investigation’ (Green et al 2007: page number). Codes and themes are illustrated by quotations from interview participants (P).

Results

The coded interviews were categorised into three broad and overlapping themes. These themes include working in an educationally minded culture; proximity of the educator to the physician in training; and trajectory of the physician in training. Table one lists these themes and includes selected quotes which further explain their meaning.

Educationally Minded culture

The departments in which these educators worked put a great importance on education of physicians in training. All members of the team were responsible for education of the team, and all members,
particularly senior nurses, were able to give feedback upon the physicians’ in training progress: ‘we have that relationship with the senior nurses, that they will bring up any concerns. We'll say, 'How's Sharon getting on? She was having a few difficulties a few weeks ago, is that getting any better?' and they will give very honest feedback that's so helpful...’ (P5). Physicians’ in training progress was discussed regularly at formal departmental meetings, ‘We discuss each trainee in turn. If the clinical supervisor for that trainee is there, they'd take that and do the feedback to the trainee... On a regular basis all the consultants, not just individual clinical supervisors, are just discussing how each trainee is doing.’ (P8). Physicians in training were also discussed informally: ‘all the consultants, we're all on one corridor, and all of us with open doors, and we do regularly discuss trainees. Educators described that education was not only for the benefit of the trainee, but that it was also essential for patient safety: ‘That's really important for education but most importantly, that's important for patient safety’ (P9).

**Proximity of educator to physicians in training**

Educators described working side by side with their physician in training and frequently being in close proximity to them, which means that the educator was both easily accessible and spent more time with their physicians in training. For example, several of the emergency medicine educators described being on ‘the shop floor’, spending most of their time working alongside their physicians in training; ‘on the shop floor, you [the physicians in training] can ask a consultant for advice...the most senior doctor’ (P2). This closeness also helps foster a sense of collegiality, the physicians in training being viewed as a colleague, through repeated formal and non-formal interactions, building rapport and a safe learning environment, ‘I think it's having that flat hierarchy, having that community collegiality that helps make things easier.’ (P5).

This physical closeness also allowed the physician in training to regularly witness the educator at work meaning the physician in training can model their own actions on that of their educator. The educators also described verbalising their thought processes in front of the physician in training,
giving clarity to the educators’ thought processes, ‘so they see us doing that [clerking patients] and modelling a way of working’ (P12). As part of this educators described being open and honest with physicians in training about gaps in their own knowledge and how they dealt with that situation ‘if there is a problem as I don't know what to do with X or Y, I say, 'Look, this is quite clearly a haematological problem. I really don't quite know what we should do with this. I know that the consultant haematologist is doing a ward round downstairs, let's see them.’ (P9). Physicians in training are also regularly encouraged to verbalise their thought processes ‘What's much better is to be able to see - almost see their thought process because you are watching them, seeing, talking to a patient, examining them, coming out, talking to nurses, ordering investigations, sitting, thinking, Googling headache or whatever’ (P7).

**Trajectory of the Physicians in Training**

Many of the educators placed great importance on the process of induction at the start of the physician in training’s placement in the department. The induction should be well organised and should allow the physicians in training to meet the rest of the team and understand their role within the team ‘they have an induction programme, so they know before they arrive who they're going to be with and when....That induction typically goes on for about two-and-a-half weeks, so they can get a feel of all the different people at the surgery, what their different roles are, and get to know people a little bit better and how the surgery works before they’re thrown in at the deep end. During that induction, they may see patients, but very supervised...’ (P4). This induction period also allows the educator to make multiple informal assessments regarding the physician’s in training strengths and weaknesses and make a judgement regarding how much support they will require in different circumstances.

Educators described the trajectory of the physicians in training through the placement with close monitoring and informal assessment throughout. Based on these observations and assessments they are gradually allowed to develop independence in their practice. Many educators described the
process of building trust in the physicians in training and allowing them to work more autonomously, ‘I can trust them. When they're coming to me and they're talking about my patients, I have a feeling of comfort and I'm not nervous.’ (P14).

As part of the induction, and the physician’s in training development during the placement, educators described tailoring their placement for the physicians in training, identifying their abilities in different areas and adjusting the clinical experience accordingly. In some placements physicians in training were more closely supervised for longer periods if it was felt that not doing so would risk them being in a situation where they were out of their depth, even though this may impact on the service capacity of the department. 'We say 'We'd like you to continue after two weeks talking to a consultant for every patient’...for some trainees, because we don't have consultants overnight, we actually stop them working after midnight' (P10).

Built into this progression during their placement was the sense that the educator was able to begin to trust the physicians in training, allowing them to take more responsibility whilst at times letting them make mistakes, ‘even if I don't necessarily agree with it, as long as I'm happy that it's safe, I'll say, 'Okay, let's try that, and I'll see the patient tomorrow, and we'll see if it's worked, see if it's helping.’ (P11).

Discussion
This study has sought to highlight the techniques and behaviours of well-regarded educators and departments in providing the optimal context for physicians in training to develop their clinical thinking abilities. The study reveals several ways educators and departments create an educationally minded culture, work in close proximity to physicians in training and also allow physicians in training to progress along a trajectory during their placement, to foster the development of clinical thinking. These themes have been identified, and a general framework of actions has been provided with specific examples which may optimise the development of clinical thinking (table 1). These findings extend the current medical education literature by adding the educator perspective on context and
supportive learning environments, and are likely to be applicable to other areas of professional education.

The potential means by which educators and departments can introduce changes within their own practice and working environments have been compiled into a table of recommendations (table 2). Educators may wish to select applicable recommendations for their own circumstances in order to make change. Modifications in workplace culture and working practices are most likely to be successful if locally driven, as opposed to being imposed by an external organisation.

Well regarded departments were identified by feedback provided by physicians in training; however not all educators approached agreed to participate. This is acknowledged by the authors as a limitation of the study as those that did not take part may have given different accounts to those that are represented here.

**Conclusion**
Based on our findings there are several areas which could benefit from further research. To our knowledge this is the first study to examine this topic from the educator’s perspective, further studies across wider specialities could help to confirm our findings. Several themes have been identified as enhancing the development of clinical thinking in the study; what has not been shown is how these could best be applied to help departments where these factors are not occurring. The findings suggest that allied health professionals played a role in assisting physicians in training develop clinical thinking skills, and it would be of interest to study the interplay of how different healthcare professionals assist each other’s development of clinical thinking, which more accurately represents the multi professional healthcare working environment. There is a lack of evidence linking positive fostering of development of clinical thinking and patient safety and patient outcomes. If such a link was shown this would give further weight to the importance of this topic.

**Abbreviations**
British Education Research Association (BERA)
Participant (P)
Declarations

**Ethics approval and consent to participate**

Ethical approval was received from the University of Winchester Ethics Committee.

**Consent for publication**

Not applicable.

**Availability of data and materials**

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

**Competing interests**

The authors declare that they have no competing interests.

**Funding**

The study was funded by Health Education England (Wessex). This body was not involved in the design or execution of the research.

**Authors’ Contributions**

CC, RML, MM and RL, designed the research. RL carried out the interviews. AM, RL and CC undertook the initial coding and analysis. All authors discussed the results of the coding. RL and AM led on the drafting of the manuscript. CC and RML contributed significantly to revising of manuscript. All authors read and approved the final manuscript.

**Acknowledgements**

The authors thank all the research participants. They also wish to thank Professor John Sandars for his comments on an initial draft of the manuscript.

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### Tables

#### Table 1: Summary of findings

| Themes | Actions | Methods |
|--------|---------|---------|
| **An educationally minded culture** | Regular discussion of physicians in training | Discuss physician meetings. Have between senior education and patient safety dependent. Phv supported for lo |
| | All team members are responsible for education | | |
| | Patient safety | | |
| **Proximity of educator to physicians in training** | Working side by side | | |
| | Working within t in training. Freq interactions fos | | |
Observation

Verbalisation of educator thought processes

Verbalisation of the physician in training’s thought processes

collegiality. Safe name terms.

Allowing the physician to clerk and interact with the patient.

Thinking about their own thought processes and being open about their need for advice or information.

Ask physicians in training to verbalise their thought processes.

Ask for the physician’s opinion.

Table 2: Recommendations for Educators and Departments
Recommendations

Edcuators
- Be prepared for induction period to be labour intensive
- Be accessible and make sure trainees know how to contact you each day
- Display fallibility
- Exploit opportunities to work side by side with trainee
- Verbalise thought processes
- Tailor trainee experience throughout a placement
- Be aware of trainees’ development through informal assessment of progress

Departments
- Offer structured and ongoing induction
- Organise rotas so that the same staff work together and get to know the trainee
- Place consultant educators’ offices close to one another
- Prioritise education - all staff have a responsibility for education, with trainees discussed regularly and informally
- Have a flat hierarchy
- Regularly discuss at departmental meetings trainees’ progress and identify those in difficulty

Figures
Figure 1

An Integrative Model of Clinical Thinking (Faucher, 2011)