making sense of qualitative research

Making sense of grounded theory in medical education

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BACKGROUND Grounded theory is a research methodology designed to develop, through collection and analysis of data that is primarily (but not exclusively) qualitative, a well-integrated set of concepts that provide a theoretical explanation of a social phenomenon.

OBJECTIVE This paper aims to provide an introduction to key features of grounded theory methodology within the context of medical education research.

OVERVIEW In this paper we include a discussion of the origins of grounded theory, a description of key methodological processes, a comment on pitfalls encountered commonly in the application of grounded theory research, and a summary of the strengths of grounded theory methodology with illustrations from the medical education domain.

DISCUSSION The significant strengths of grounded theory that have resulted in its enduring prominence in qualitative research include its clearly articulated analytical process and its emphasis on the generation of pragmatic theory that is grounded in the data of experience. When applied properly and thoughtfully, grounded theory can address research questions of significant relevance to the domain of medical education.

INTRODUCTION

The original 1967 description of grounded theory methodology, by Glaser and Strauss,[1] was a pivotal text at the time of its first appearance[2] and continues to be influential today.[3] It has inspired and informed the work of generations of qualitative researchers in the domains of sociology, psychology and education, and more recently has become one of the most widely cited methodological references in the increasing body of qualitative research in the field of medical education.[3] This paper will provide a discussion of the origins of grounded theory, a description of key methodological processes, a comment on pitfalls commonly encountered in the application of grounded theory research and a summary of the strengths of grounded theory methodology with illustrations from the medical education domain.

ORIGINS AND PARADIGMATIC LOCATION OF GROUNDED THEORY

The researchers who originally developed grounded theory methodology are Barney Glaser, a sociologist from Columbia University with expertise in survey methods of sociological research, and Anselm Strauss, a qualitative sociologist from the University of Chicago. Grounded theory methodology reflects both the systematic approach inherent in Glaser's

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Overview

What is already known on this subject

Grounded theory texts are some of the most widely cited qualitative methodological references in the field of medical education.

What this study adds

This paper describes the origins and methods of grounded theory research in the context of the domain of medical education. Commonly encountered pitfalls in the application of grounded theory methods in this domain are articulated.

Suggestions for further research

Grounded theory research is particularly well suited to form the basis of the theory-based, programmatic research that is essential to the advancement of research in medical education.

quantitative background and the Chicago tradition of qualitative field research.[4] *The Discovery of Grounded Theory* arose as a systematic description of the research methodology that Glaser and Strauss developed through their work with terminally ill patients at the University of California San Francisco Medical Center.[1] Glaser and Strauss wrote their initial presentation of the grounded theory method at a time when the dominance of the quantitative experimental research tradition was particularly intense in the social sciences.[2] Thus their intention, in part, in describing the grounded theory method was to provide a systematic approach to the analysis of qualitative data that would live up to the standards of 'rigour' imposed by the quantitative paradigm.[1] Perhaps the main thrust of their work, however, was the turning of the sociological research emphasis away from theory testing to theory generation, and to provide a method for the development of theory that was 'grounded' in, i.e. derived from, a systematic analysis of qualitative or quantitative data.[1]

Interestingly, Glaser's and Strauss' approaches to grounded theory methodology eventually became divergent, and even antagonistic. Strauss went on to collaborate with Juliet Corbin, a nurse researcher, to write *Basics of Qualitative Research: Grounded Theory*

Procedures and Techniques,[5] which provides a series of methodological steps that make concrete the process of employing grounded theory. Strauss and Corbin's theoretical and applied methodology texts[4–7] are quoted widely and have furthered the extent to which grounded theory has been applied in many and varied domains of research,[2] particularly in domains such as medical education research in which the quantitative standards of validity and reliability are pre-eminent. However, Glaser and other critics of the Strauss and Corbin approach claim that it is overly prescriptive[8,9] and that it precludes true emergence of theory by 'forcing' the data to fit with preconceived ideas.[8,10,11] Today, some researchers work exclusively in the vein of either Glaser or Strauss and Corbin, but other grounded theorists draw more broadly on the methodological writings of both of the founders of the method as well as other contemporary grounded theory methodologists.[2,10,12,13]

The initial presentation of grounded theory was, in part, a response to the dominant scientific or experimental research paradigm[1] which is located within the major philosophical approach to science known as positivism. Positivism is an approach to the generation of knowledge that is characterized by its search for a singular, apprehendable truth, its reliance on the detached, objective researcher and its upholding of benchmarks of rigour such as validity and reliability.[14] Glaser and Strauss developed their grounded theory method within the evolution of the positivist framework called post-positivism. Post-positivism contends that the whole truth is never fully apprehendable, but is approached progressively through the process of research.[14] The post-positivist paradigm thus lends itself to research questions involving complex social and cultural phenomena, while maintaining the positivist adherence to objectivity and rigour.[3] [Positivism claims the existence of one single reality, one absolute truth. Post-positivism, which holds to the notion of one single reality but claims that it is never fully apprehendable, is one small step away from positivism, towards post-modernism. Post-modernism is at the opposite end of the paradigmatic spectrum from positivism, and it rejects any notion of truth in favour of the concept of multiple, relative, culturally created realities.[15]] The post-positivist location of the initial conception of grounded theory is seen in the authors' emphasis on such concepts as 'accuracy' and the 'informed detachment of the researcher'[4] (p. 226). Glaser, Strauss, their collaborators and many contemporary grounded theory researchers have continued to work in the post-positivist tradition. For example, Strauss and Corbin discuss the fact that 'theory that is derived

from data is more likely to resemble the ''reality'' than… theory that is speculative',[4] (p. 12), and Glaser writes that 'the participant not only tells what is going on, but tells the researcher how to view it correctly – his or her way'[16] (p. 2). This emphasis on the notion of an apprehendable and accurate reality firmly situates the method within the sphere of post-positivism.

Since the time of Glaser and Strauss's early work in the 1960s there has been a proliferation of innovations and advances in the world of qualitative research, with ongoing debates and tensions in the field.[14] The post-positivist approach to grounded theory, with its appeals to rigour and objectivity, fits comfortably within the traditionally positivistic realm of medicine and medical education research.[3] However, innovative researchers, primarily in the social sciences but increasingly in fields such as education and nursing, have sought to develop new theoretical approaches to grounded theory methodology that move beyond post-positivism to involve, for example, the multiple socially constructed realities assumed in a constructivist approach[2] or the emphasis on power structures and the emancipatory intent of critical theory.[17] These new approaches have been used to address issues of key relevance to medical educators, such as the subjective experiences involved in career decisions[18] and the issues of power inherent in interdisciplinary communication.[19]

GROUNDED THEORY METHODS

Grounded theory is a research methodology designed to develop, through collection and analysis of data that are primarily (but not exclusively) qualitative, a well-integrated set of concepts that provide a theoretical explanation of a social phenomenon.[4] The basics of grounded theory methodology explained below are commonly accepted principles that originate in Glaser and Strauss's conceptualisation of the method,[1] and have been described further by Glaser, Strauss, and many other grounded theorists since.

Grounded theory may be an appropriate choice of methodology in situations where the research question involves social interactions or experiences, and where the research aim is to develop a theory or to explain a process, not to test or verify existing theory. Researchers cannot avoid approaching the question with a set of disciplinary interests and background assumptions (sometimes called 'sensitising concepts',[20]), but a priori hypotheses are not developed. Rather, the theory is 'grounded' in (i.e. developed

from) the data as they are collected and analysed. The degree to which grounded theory researchers should (or can) avoid being influenced by previous relevant research is an area of ongoing debate. Opinions range from the position that grounded theorists should acknowledge reflectively the influences of prior relevant work on their analytical perspective[2] to the suggestion that a literature review should not even be performed until the final stages of data analysis.[11]

Study design in grounded theory employs an iterative approach. An iterative study design involves cycles of simultaneous data collection and analysis, in which the results of the ongoing data analysis inform the subsequent data collection. Through preliminary analysis of data collected early in the study process, decisions are made about how to go about the next phase of data collection. The preliminary analysis may reveal theoretical questions that require clarification or aspects of emerging themes that require further exploration. These analytical considerations might then inform decisions, for example, to alter an interview schedule, to recruit participants who might offer a contrasting perspective or to collect data in an additional setting. Analysis of the subsequent phase of data collection will lead to further adaptations of the data collection process, in an ongoing iterative cycle, until the study is complete. Through this iterative process, grounded theorists continually refine, expand and challenge their emerging theory. The iterative process is central to grounded theory methodology, and by enabling the research process to identify and expand on all potentially relevant information as soon as it is perceived it is considered to be a major source of the effectiveness of grounded theory research.[21]

Data collection in grounded theory is not limited to specific modalities. Although interviews and field observations are traditionally the most common sources of data for grounded theory studies, data may originate from such varied sources as focus groups, policy documents, reflective journals or even quantitative surveys. The objective of data collection in grounded theory is to obtain an appropriately broad range of perspectives and experience relevant to the research question. Many grounded theory studies will employ more than one data source or involve more than one study population, in order that the insights gained from different perspectives will add to the richness of the understanding of the phenomenon under study (a process called triangulation[1]). For example, the data set in a study of problem-based learning groups might include transcripts of inter-

views with tutors and students, fieldnotes from observations of groups in action and relevant evaluation forms.

The sampling process in grounded theory research proceeds on theoretical grounds. Theoretical sampling means that the study sample is not set prior to starting data collection, but rather that participants or other data sources are selected purposefully as the analysis progresses for their ability to provide data that would confirm, challenge or expand an emerging theory. Further sampling is undertaken not for the purpose of representation of a population but in order to develop further emerging analytical considerations. For example, a study investigating the practices of clinical teachers might intentionally seek out participants who were both junior and senior faculty members, or might observe teachers during both busy and quieter months of the year, or might include participants from medical and surgical specialties, as questions arising from the analysis would dictate. Sampling in a grounded theory study continues until saturation is achieved. Saturation is the point at which the ongoing analysis of new data is not producing any new insights relevant to the emergent theory.

The central principle of data analysis in grounded theory research is the principle of constant comparison. As incidents or issues of interest are noted in the data, they are compared against other examples for similarities and differences. Through the constant comparison process, emerging theoretical constructs are continually being refined through comparisons with 'fresh' examples from ongoing data collection, which produces the richness that is typical of grounded theory analysis. Initially, incidents or issues with similarities are grouped together into themes or categories, which are named according to meaning in a process called open coding. The constant comparison of themes is employed to rename, reorganise or redefine thematic categories in an ongoing process of refinement. Once major themes are identified, a second level coding process called axial coding explores and defines the connections between categories. As ongoing comparison of instances, themes and categories ensues, the process of memo-writing is utilised to formulate and develop emergent theory at progressive levels of abstraction. Memos are written to define the properties and characteristics of themes and categories, to elaborate processes and patterns identified within the categories and to formulate emergent theoretical constructs. The analysis process is complete when theoretical formulations produce an understanding or explanation of the social phenomenon under study or, in other words, a theory that, through the constant comparison process used in its development, is grounded in the data.

To illustrate the progressively abstract process of coding and theory development, we refer to our recently completed study of the problematically termed 'difficult patient' in paediatric medical education.[22] Data collection involved observation and audio recording of morning rounds on a paediatric in-patient teaching team. Open coding of field notes and transcripts sorted instances of difficulty into categories based on the immediate source of the difficulty. For example, situations in which the team had difficulty finding an effective treatment were coded under 'management dilemmas', and situations where patients were thought to be exaggerating their symptoms were coded under 'patient behaviour'. The process of axial coding resulted in the refinement and regrouping of categories into 4 over-arching themes related to difficulty, including 'clinical factors' (which included the 'management dilemmas' category and others, such as 'diagnostic ambiguity'), 'patient factors' (which included the 'patient behaviour' category and others), as well as 'parent factors' and 'systems factors'. The identification of multiple sources of difficulty resulted in a critique of the 'difficult patient' concept, as the experience of difficulty was not related solely to patient factors, but to multidimensional case-specific factors. As the constant comparison process continued through ongoing memo-writing, it became apparent that each potential source of difficulty did not always result in the experience of difficulty for the teaching team. Ultimately, a theory of difficulty was developed with the emergent concept of 'irresolvability' as a central issue.[22]

COMMON PITFALLS IN GROUNDED THEORY RESEARCH

The widespread use of grounded theory in qualitative medical education research produces an opportunity to characterise recurrent shortcomings in the application of this method in the domain. Our review of the published literature combined with our experience reviewing manuscripts, conference abstract submissions and grant proposals, suggests 3 common pitfalls that researchers embarking in the field should endeavour to avoid. In describing these pitfalls, our aim is to assist new researchers, not to attack those whose work exhibits the following issues. Towards that end, we provide representative examples derived

from recurrent instances in the literature while refraining from direct citation.

Doing grounded theory *analysis* but not grounded theory *research*

As we have discussed, the popularity of grounded theory research may be due in part to the presence of key texts (e.g. Strauss and Corbin,[4]) that outline a process for operationalising qualitative analysis, lending a welcome concreteness and standardisation to the mystical process of moving from transcripts to themes. However, the analytical process is only one component of the grounded theory approach: other key aspects are iterative data collection and analysis and theoretical sampling to saturation. A common pitfall evident in the medical education literature is the claim that a research project is grounded theory *in toto*, when only the process of data analysis evinces grounded theory principles. For instance, if a 'grounded theory study' of attending physicians' strategies for responding to trainee errors involved 30 interviews collected as a batch and analysed subsequently using open and axial coding, then it would have used a grounded theory approach to data analysis, but not to data collection. For the data collection to be true to the grounded theory tradition, interviews and analysis must occur simultaneously in order for sampling to evolve in response to emergent themes. This is not to say that grounded theory must be all or nothing. There may be instances in which a data set cannot be collected alongside preliminary analysis (e.g. the data already exist, as in the case of second-year students' reflective essays on end-of-life care collected during the academic year but not analysed, for ethical reasons, until after course grades are submitted). In such instances it is important to specify, along with an outline of the reasoning process, which aspects of the grounded theory approach were incorporated into the study (constant comparative analysis with open and axial coding and memo-writing for generation of interpretive theories) and which were not (theoretical sampling to saturation and iterative collection and analysis cycles to shape data collection to pursue emerging themes).

Applying predetermined themes rather than seeking emergent ones

Throughout its history, grounded theory has experienced a tension between what Glaser called 'emergence vs. forcing'.[11] How does the researcher balance the search for emergent themes with the application of existing theoretical knowledge or concepts? Many

researchers grapple admirably with this tension, particularly in constructivist grounded theory which has moved beyond the positivist admonition to come to the data with a clear mind and no preconceptions. For instance, a series of grounded theory projects exploring how medical trainees conceptualise health and illness in their early clinical training could explain a dual analytical process: the application of preselected themes that had emerged in earlier projects in the series and the attention to emergent themes that were not accounted for in the coding framework produced from analysis of preceding data sets. This dual process would allow the authors to maintain their exploration of emergent issues while building a theoretical explanation of the phenomenon that could span the various clinical settings represented in the individual projects. The pitfall avoided by this approach is the abandoning of emergent theme analysis altogether, in the interests of 'proving' or 'applying' a pre-existing theoretical structure. Grounded theory research that takes existing categories, for instance, from a validated survey of residents' attitudes towards evaluation, and uses those categories to 'code' focus group transcripts in which residents discuss issues related to evaluation, abandons the central premise of the method − the building of powerful explanatory theories from the data on upwards.

Analysis interruptus − describing themes, not developing theory

The art of grounded theory is building the theory. Perhaps because the path from describing themes to developing theory requires serendipitous connections and the crafting of a 'so what' story that explains why the themes matter in the bigger picture − for these reasons and others, much grounded theory research never makes it to theory. The literature abounds with detailed descriptions of thematic categories accompanied by illustrative and entertaining excerpts, but no theory. Authors count the instances that inhabit thematic categories, and some even count the number of categories, with sometimes alarming results enumerating thousands of 'substantive codes'. These techniques may help to characterise the results and they may serve a rhetorical purpose of persuading an audience accustomed to numerical characterisations of the scope and depth of the results, but they do not in themselves explain what is going on, and why.

Grounded theory research involves a process of inductive analysis leading towards increasing abstraction, articulation of relationships between

themes and argument about why key relationships exist and what they mean. This is the 'discussion' section of a grounded theory paper – after the results have described and illustrated the themes themselves, the discussion works through a higher-level interpretive process, drawing on other research findings and theoretical constructs towards an explanatory model or theory. Progressing to theory has particular salience in medical education research, where the dominant paradigm of experimental research with its generalisable conclusions informs a scientific value system that privileges research with the ability to speak broadly, to have relevance beyond its immediate context. This is not to say that qualitative research that provides rich description of situated experience is not worthwhile – not only does it have enormous worth, but that worth is becoming increasingly recognised in the medical education domain. Our point is that researchers engaged in grounded theory need to follow through and produce the theory, because therein lies the greatest potential for contribution to the community's understanding of the study setting and its ongoing exploration of similar phenomena in other settings.

STRENGTHS OF GROUNDED THEORY AND IMPACT ON MEDICAL EDUCATION RESEARCH

Many of the key principles of grounded theory methodology described above have areas of overlap with other qualitative approaches. Some important ethnography texts, for example, emphasise the importance of theory generation,[23] and general qualitative methods texts contain the concepts of saturation[24] and theoretical sampling.[25] Grounded theory as a whole, however, remains a distinct and influential qualitative methodology.[3] The significant strengths of grounded theory that have resulted in its enduring prominence in the field of qualitative research include its clearly articulated analytical process, and its emphasis on the generation of pragmatic theory that is grounded in the data of experience. Each of these strengths has implications for medical education research.

The clear articulation of the grounded theory process has significant appeal to researchers working in a scholarly community that applies the positivist standards of rigour, reliability and validity in evaluating research. The choice of grounded theory as an approach to a medical education research project,

then, has important practical and rhetorical advantages. The advantages of the clearly articulated method also include the facilitation of mixed methods research, which is increasingly important in the medical education domain. Qualitative analysis of data generated from interviews or field observations is being combined more frequently with statistical analysis of data from sources such as standardised clinical evaluations[26] or questionnaires[27] as researchers grapple with complex educational problems. The process of developing a grounded theory was designed initially to incorporate data from a variety of sources, including quantitative data sets,[1] and the well-defined analytical process allows quantitative and qualitative researchers to participate together in grounded theory projects with relative comfort due to the established analytical framework. [Some methodologists argue that qualitative and quantitative techniques cannot be combined feasibly because the disparate assumptions and values inherent in the 2 methods are incompatible.[14,28] Proponents of mixed methodologies claim that with a careful exploration and description of the paradigmatic implications of the methods employed in a study, qualitative and quantitative methods can be combined without violating basic paradigmatic assumptions.[28]]

The emphasis on pragmatic theory generation inherent in grounded theory research also has implications for medical education research. Recently, medical education researchers have called for an increase in programmatic research[29] and in research that is based on relevant theory.[30] In our opinion, grounded theory research is uniquely suited to form the basis of research programmes that arise from theory grounded in the medical education experience, and then build toward implementation of practical educational innovations. Consider, for example, how Ginsburg's research programme that developed a behavioural theory of professionalism[31–34] has informed innovations in professionalism evaluation,[35] and how Lingard's work building a theory of interprofessional communication[36–40] has led to the development of a communication checklist intervention to promote patient safety.[41]

In summary, grounded theory is a research methodology that, through iterative cycles of data collection and constant comparative analysis for emergent themes, develops theoretical explanations of social phenomena that are grounded in practical experience. While there are common pitfalls to be avoided, when applied properly and thoughtfully grounded

theory can address research questions of significant relevance to the domain of medical education.

REFERENCES

1 Glaser B, Strauss A. *The Discovery of Grounded Theory: Strategies for Qualitative Research.* Chicago: Aldine Publications Co. 1967.

2 Charmaz K. Grounded theory: objectivist and constructivist methods. In: Denzin N, Lincoln Y, eds. *Handbook of Qualitative Research*, 2nd edn. Thousand Oaks: Sage 2000;509–35.

3 Harris I. What does 'The Discovery of Grounded Theory' have to say to medical education? *Adv Health Sci Educ* 2003;**8**:49–61.

4 Strauss A, Corbin J. *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*, 2nd edn. Thousand Oaks: Sage Publications 1998.

5 Strauss A, Corbin J. *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*, 1st edn. Thousand Oaks: Sage Publications 1990.

6 Strauss A, Corbin J. *Grounded Theory in Practice.* Thousand Oaks: Sage Publications 1997.

7 Strauss A, Corbin J. Grounded theory methodology: an overview. In: Denzin N, Lincoln Y, eds. *Handbook of Qualitative Research*, 1st edn. Thousand Oaks: Sage Publications 1994;273–85.

8 Melia K. Rediscovering Glaser. *Qual Health Res* 1996;**6**(3):368–78.

9 Robrecht L. Grounded theory: evolving methods. *Qual Health Res* 1995;**5**(2):169–77.

10 Rennie D. Grounded theory methodology as methodical hermeneutics. Reconciling realism and relativism. *Theory Psychol* 2000;**10**(4):481–502.

11 Glaser B. *Emergence vs Forcing: Basics of Grounded Theory Analysis.* Mill Valley, CA: Sociology Press 1992.

12 Wuest J. Feminist grounded theory: an exploration of the congruency and tensions between two traditions in knowledge discovery. *Qual Health Res* 1995;**5**(1):125–37.

13 Hall W, Callery P. Enhancing the rigor of grounded theory. Incorporating reflexivity and relationality. *Qual Health Res* 2001;**11**(2):257–72.

14 Lincoln Y, Guba EG. Paradigmatic controversies contradictions and emerging confluences. In: Denzin N, Lincoln Y, eds. *Handbook of Qualitative Research*, 2nd edn. Thousand Oaks: Sage Publications 2000, 163–188.

15 Vidich A, Lyman S. Qualitative methods. Their history in sociology and anthropology. In: Denzin N, Lincoln Y, eds. *Handbook of Qualitative Research*, 2nd edn. Thousand Oaks: Sage Publications 2000, 37–83.

16 Glaser B. Constructivist Grounded Theory?. *Forum: Qualitative Social Research* 2002;**3**(3):Online Journal: www.qualitative-research.net/fqs.

17 Kushner K, Morrow R. Grounded theory, feminist theory, critical theory: toward theoretical triangulation. *Adv Nurs Sci* 2003;**26**(1):30–43.

18 Burack JH, Irby DM, Carline JD, Ambrozy DM, Ellsbury KE, Stritter FT. A study of medical students' specialty-choice pathways: trying on possible selves. *Acad Med* 1997;**72**(6):534–41.

19 Pearson J. An exploration of the empowerment of nursing students in a clinical context. *Nurs Praxis NZ* 1998;**13**(3):45–55.

20 Blumer H. *Symbolic Interactionism: Perspective and Method.* Englewood Cliffs, NJ: Prentice Hall 1968.

21 Corbin J, Strauss A. Grounded theory research: procedures, canons, and evaluative criteria. *Qual Sociol* 1990;**13**(1):3–21.

22 Kennedy T, Rosenfield J, Leslie K, Lingard L. 'He's bugging the heck out of me…'. A qualitative study of the 'difficult patient' in pediatric medical education. *Paediatr Child Health* 2004;**9**(Suppl. A):40A.

23 Hammersley M, Atkinson P. What is ethnography? *Ethnography: Principles in Practice*, 2nd edn. London: Routledge 1995.

24 Morse JM. The significance of saturation. *Qual Health Res* 1995;**5**:147–9.

25 Kuzel AJ. Sampling in qualitative inquiry. In: Crabtree BF, Miller WL, eds. *Doing Qualitative Research*, 2nd edn. Newbury Park, CA: Sage 1999, 33–45.

26 Kennedy T, Regehr G, Rosenfield J, Roberts SW, Lingard L. Exploring the gap between knowledge and behavior: a qualitative study of clinician action following an educational intervention. *Acad Med* 2004;**79**(5):386–93.

27 Espin S, Regehr G, Levinson W, Baker GR, Lingard L. Error or 'act of God?': a study of patients' and operating room team members' perceptions of error definition, reporting and disclosure. *Surgery* 2006;**139**:6–14.

28 Morgan D. Practical strategies for combining qualitative and quantitative methods: applications to health research. *Qual Health Res* 1998;**8**(3):362–76.

29 Regehr G. Trends in medical education research. *Acad Med* 2004;**79**(10):939–47.

30 Prideaux D, Bligh J. Research in medical education: asking the right questions. *Med Educ* 2002;**36**(12):1114–15.

31 Ginsburg S, Regehr G, Lingard L. The disavowed curriculum: understanding student's reasoning in professionally challenging situations. *J Gen Intern Med* 2003;**18**(12):1015–22.

32 Ginsburg S, Regehr G, Lingard L. To be and not to be: the paradox of the emerging professional stance. *Med Educ* 2003;**37**(4):350–7.

33 Ginsburg S, Regehr G, Stern D, Lingard L. The anatomy of the professional lapse: bridging the gap between traditional frameworks and students' perceptions. *Acad Med* 2002;**77**(6):516–22.

34 Ginsburg S, Regehr G, Hatala R *et al.* Context, conflict, and resolution: a new conceptual framework for evaluating professionalism. *Acad Med* 2000;**75**(10 Suppl.): S6–S11.

35 Ginsburg S, Regehr G, Lingard L. Basing the evaluation of professionalism on observable behaviors: a cautionary tale. *Acad Med* 2004;**79**(10 Suppl.):S1–S4.

36 Hawryluck LA, Espin SL, Garwood KC, Evans CA, Lingard LA. Pulling together and pushing apart: tides of tension in the ICU team. *Acad Med* 2002;**77**(10 Suppl.):S73–6.

37 Lingard L, Espin S, Whyte S *et al.* Communication failures in the operating room: an observational classification of recurrent types and effects. *Qual Safety Health Care* 2004;**13**(5):330–4.

38 Lingard L, Garwood S, Poenaru D. Tensions influencing operating room team function: does institutional context make a difference? *Med Educ* 2004;**38**(7): 691–9.

39 Lingard L, Reznick R, DeVito I, Espin S. Forming professional identities on the health care team: discursive constructions of the 'other' in the operating room. *Med Educ* 2002;**36**(8):728–34.

40 Lingard L, Reznick R, Espin S, Regehr G, DeVito I. Team communications in the operating room: talk patterns, sites of tension, and implications for novices. *Acad Med* 2002;**77**(3):232–7.

41 Lingard L, Espin S, Rubin B *et al.* Getting teams to talk: development and pilot implementation of a checklist to promote safer operating room communication. *Qual Safety Health Care* 2005;**14**:340–6.