Experience based learning (ExBL): clinical teaching for the twenty-first century

Tim Dornan
Richard Conn
Helen Monaghan
Grainne Kearney
Hannah Gillespie
Deirdre Bennett
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Institution | Corresponding Address:

Professor Tim Dornan Email: t.dornan@qub.ac.uk
Whitla Medical Building
Queen’s University Belfast
97 Lisburn Rd
Belfast BT9 7BL
UK

The Authors:

Tim Dornan is an internist and endocrinologist who led curriculum reform and pedagogic innovation in Manchester University. He first developed ExBL during a Masters and PhD in medical education at Maastricht University. His interests are qualitative and implementation research, which he has used to examine and improve educational processes. He is Professor of Medical and Interprofessional Education at Queen’s University Belfast and Emeritus Professor, Maastricht University. He has received the ASME Gold Medal and Honorary Fellowship of the Academy of Medical Educators. He led the writing of this guide.

Richard Conn is a trainee paediatrician undertaking a PhD in medical education, investigating how doctors make errors in prescribing for children, from which he has so far published a research article and won an award. He is interested in how students and doctors learn in workplaces and how knowledge about this can be used to promote safer practice. He led the literature review and contributed to writing this guide.

Helen Monaghan graduated in Human Biology in 2016 and is currently a third-year medical student at Queen’s University Belfast. She conducted the literature review and contributed to writing this article.

Grainne P Kearney is a practising General Practitioner, a final year PhD candidate in Medical Education, and a lecturer-elect in medical education at Queen’s University Belfast. She completed a Masters in Clinical Education in 2014. Her academic interests include Institutional Ethnography, critical research into OSCEs, and promoting praxis in medical education. She contributed to reviewing the literature and writing this guide.

Hannah Gillespie studied medicine at Queen’s University Belfast, from where she graduated in 2018. She completed an intercalated BSc in Medical Education, from which she published two research articles in international journals. As a medical student, she received many awards for leadership and innovation. She is now an Academic Foundation Trainee in Northern Ireland, where she is continuing research in medical students’ workplace learning. She contributed to reviewing the literature and writing this guide.

Deirdre Bennett is Head, Medical Education Unit and Director of the 5 Year MB Programme at University College Cork (UCC), Ireland. Her clinical background is in General Practice. She completed a Masters in Teaching and Learning (2010) and a PhD in Medical Education (2015), both at UCC. Her research interests include professional identity formation, clinical learning environments, and regulation of professional competence. She contributed to reviewing the literature and writing this guide.

A related paper will be published in Medical Teacher in October 2019
We dedicate this guide to the memory of the late Professor Karen Mann, who was a living example of the warmth, generosity, and intelligent scholarly guidance that we advocate in the pages that follow.
The need for a pedagogy of clinical workplace learning
Many new doctors report that they are ill-prepared to enter practice and research confirms that their inexperience distresses them and harms patients. This situation persists because, whilst curriculum design, competency-based education, assessment, and simulation have progressed apace, medical education lacks a contemporary, pedagogy to guide students’ workplace learning. This Guide assembles contemporary theory and best evidence into a practical pedagogy for the present age and gives clinicians, students, faculty developers, and curriculum leaders practical guidance.

How the pedagogy developed
A first-generation pedagogic model of Experience-based Learning (ExBL) was developed from empirical research. Then, evidence from 167 articles published between 2000-6 that provided valid information about how medical students learn in workplaces guided a redesign. The third-generation model presented in this Guide was informed by best evidence contained in a further 124 articles published in the years 2007-18, the expert opinion of a panel of 23 education scholars from five continents, an in-depth analysis of our own programmatic research on ExBL, and experiential evidence from a team comprising an academic medical student, junior resident, senior resident, curriculum leader, and consultant. Team members have had clinical experience in primary, secondary, and tertiary care.

ExBL - the model
ExBL results in students being capable - ready to do the job of a doctor. Capability results from real patient learning (RPL), which results from participating in practice within the triad of clinician, patient and student. Clinicians’ supportive behaviour creates the conditions for participation, RPL, and the development of capability. Clinicians: 1) model good practice and engage students into its provision; 2) encourage students to extend their current capability; 3) empower patients to co-participate in students’ learning. Clinicians engage students into the dialogic ‘talk’ of workplaces, help them interact with patients receiving clinical care, and support their reflection on experience. SPaRC summarises ExBL: Support; Participation; Real patient learning; Capability.

Evaluating ExBL
The Manchester Clinical Placement Index (MCPI) is a parsimonious (8-item) mixed methods measure, which evaluates learning environments and the support given to students.

Take Home Messages
- ExBL helps medical students become doctors who are capable of caring for patients safely, effectively, and compassionately
- Students develop professional identities, which include affective, intellectual, and practical capabilities
- Real patient learning makes students capable and shapes their identity
- Real patient learning results from reflection on experiences of participation in practice
- Students participate in practice as members of the triad of student, patient, and clinician
- Students actively observe, rehearse, and/or contribute to real patient care
- Clinicians facilitate ExBL by encouraging students to step outside their comfort zones without striding so far that they are a danger to themselves and others
- Clinicians also empower patients to co-participate actively in students’ learning
- Participation doesn’t just happen: welcoming, well-organised learning environments where clinicians share their expertise help students rise to the challenges of participating in practice
- ‘Clinical teaching for the 21st century’ is not so much about teaching as about helping students become capable doctors by supporting their participation in practice and helping them learn reflectively from experience

Summary
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Implications and future directions
ExBL is widely applicable since it is based on best available theory and evidence and informed by international opinion as well as multiple perspectives within a team of authors. It is clearly specified and flexible enough to be used in any clinical workplace curriculum. We advocate that ExBL be adopted alongside competence-based medical education (CBME) to support students’ learning, within practice, of the all-important capabilities that equip them to practise.

Importance of the topic to international medical education
It is over a century since the Carnegie Foundation commissioned Abraham Flexner to lead efforts to improve medical education in the US and Canada. (Flexner, 1910) His landmark recommendations marked the birth of medical education as we know it today. A formal curriculum was to guide undergraduate medical education, grounding students in biomedical science. After this preparatory phase, students were to learn to practise by participating in practice as apprentices to scientifically-educated doctors. Medical schools around the world adopted this model. (Dornan, 2005)

Whilst the theory-before-practice curriculum design has endured, the practice phase has changed. There are more students and specialties, clinical practice has become more technical, its intensity has increased, and (in many jurisdictions) work hours have been reduced. The net result is a greater number of shorter attachments to busier and more fragmented teams. (Holmboe, Ginsburg and Bernabeo, 2011) One-to-one relationships with single preceptors over long periods are not as widely available to medical students as they were. Meanwhile, the patient safety agenda has made healthcare systems less ready to give students clinical responsibility. This has created the need to find new ways of giving students experience of taking responsibility for patient care before they enter residency.

Education has also changed. There has been a drive to quality-assure competence before students take responsibility for patient care, which has driven a move to competence-based medical education (CBME). (Harden, Crosby and Davis, 1999) This drive culminated in two publications marking the centenary of the Flexner report, which gave CBME the same high status as science-based education had been given a century before. (Cooke, Irby and O’Brien, 2010; Frenk, 2010) Meanwhile, simulation has become a dominant part of the medical education landscape. These developments have partially eclipsed practice-based education.

Training and assessing students is not sufficient to make them capable clinicians because context matters every bit as much as content. (Teunissen et al., 2009) Clinical practice takes place in sometimes rapidly evolving situations in indeterminate contexts, which leads inexperienced clinicians to make errors. (Dornan et al., 2009) As a result, practitioners acquire most of their knowledge ‘on the job’. (Eraut, 2004) There is doubt as to how far simulation can take the place of situated experience (Bligh and Bleakley, 2006) and, even if it could, it would not be feasible for educators to simulate the hundreds or thousands of hours of guided practice with feedback that would turn novices into capable practitioners. (Ericsson, 2004)

There is a growing body of opinion that capability, as opposed to competence, allows people to practise. Advocates for capability have explained that being able to cook spaghetti Bolognese competently for your partner does not assure your ability to feed the same dish to a factory workforce of 50 people. (Neve and Hanks, 2016) Our research consistently shows the aptness of this metaphor. New
Doctors graduate having passed a test of their theoretical knowledge of spaghetti manufacture and OSCE stations testing whether they can boil spaghetti and chop onions. On their first day of work, though, they are expected to feed spaghetti Bolognese to very many hungry people. CBME and ExBL are different but complementary, as Table 1 shows. On-the-job learning has a vital place in vocational education.

Table 1: A comparison between CBME and ExBL

<table>
<thead>
<tr>
<th>Curriculum</th>
<th>Context</th>
<th>Process</th>
<th>Outcome</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBME</td>
<td>Often off-the-job</td>
<td>Training and testing</td>
<td>Competence</td>
<td>Satisfy regulators and enter practice</td>
</tr>
<tr>
<td>ExBL</td>
<td>Always on-the-job</td>
<td>Participation and reflective real patient learning</td>
<td>Capability</td>
<td>Become a practising doctor</td>
</tr>
</tbody>
</table>

Another way of explaining why students need authentic experience is to consider that they learn best by stepping outside their comfort zones in settings that assure their psychological safety. (Michie, van Stralen and West, 2011) Simulation helps students become competent because it allows educators to take them outside their comfort zones whilst simultaneously controlling the level of support that is available. This can only be a step towards becoming capable to practise, though, because simulation keeps both challenge and support firmly under educators’ control. The challenges posed by authentic clinical practice, in contrast, are complex and unpredictable, resulting in a less stable balance between challenge and support. Learners have to be capable of monitoring these unpredictable challenges, identifying their needs for support, and deciding whether and how to obtain this whilst responding to patients’ immediate care needs. Clinicians help students learn within practice by providing an adaptable type of support that responds to learners’ and patients’ unpredictable needs whilst responding to the competing demands of busy clinical environments. This line of argument also explains why high stakes assessments and ExBL don’t mix very well. To make reliable pass-fail judgements, all learners should be subjected to precisely the same degree of challenge with precisely the same degree of support. There is much more at stake for learners in high stakes assessments than in simulation and ExBL, so assessments differ in being inherently psychologically unsafe. This breaches two core conditions for ExBL: the challenges to which students are expected to respond in assessments are inauthentic because using authentic challenges would make assessments unreliable; and students are expected to respond to these inauthentic challenges under unsafe conditions. Because of these contradictions, assessments and ExBL must either be kept apart from one another or both be compromised.

Empirical evidence is unequivocal about the need for students to gain workplace experience. Residents who have had relatively little experience and then assume full responsibility for treating patients make errors, whose causes are directly related to inexperience, and which off-the-job teaching and testing cannot rectify. (Dornan et al., 2009) Students are painfully aware of this, which is why transition points in medical education cause emotional turmoil. (Teunissen and Westerman, 2011) For students to become safe, compassionate, and effective doctors, they have to climb a ladder of participation rather than take full responsibility while still on the bottom rung of it.

ExBL helps students make the most of any contact time with patients and clinicians, from fleeting moments to months or years, and in placements, clerkships, preceptorships, clinical visits, electives, internships and any other curriculum design. In order to revitalise practice-based education, this Guide explains principles and practices developed over the last two decades. (Dornan, 2006; Dornan et al., 2007; Dornan, Scherbier and Boshuizen, 2009; Hill, Giles and Dornan, 2012; Hay et al., 2013; Dornan et al., 2014)
Aims and objectives

This Guide aims to explain how supported workplace experience can help medical students become capable doctors. Its aim is to provide clinicians and other stakeholders in workplace medical education with practical answers to the question: ‘How should I teach medical students when they are placed on my unit, during the procedures I perform, on our ward, or in my consulting room?’ In order to achieve those aims, the objectives are to provide practical guidance about how:

• Medical students can participate in practice
• Members of the clinical workforce and patients can support students’ participation
• Clinicians can help students learn reflectively from real patient experience
• This can result in students having the capability and identity of a safe, effective, and compassionate doctor

ExBL regards identity development as a very important outcome of medical education, on which other scholars agree. (Crueess, Crueess and Steinert, 2019) There are many ways of conceptualising identity. (Monrouxe, 2010) ExBL defines it socioculturally to include what students and doctors do in social contexts as well as who they feel they are. (Wenger, 1998) ExBL regards dialogic talk as a primary medium of identity development. (see (Holland et al., 1998) in Table 2) According to ExBL, the words they speak, the actions they perform, and the impact of these in the lived world of themselves, patients, and fellow professionals constitute clinicians’ professional identity.

According to ExBL, students become doctors in the context of clinical practice. They learn with and from practising clinicians, who simultaneously care for patients, form relationships with and between students and patients, model the identity of safe, effective, and compassionate practitioners and supervise students’ participation in practice. These clinicians are often doctors but may also be members of other health professions.

Fig 1 shows the processes that contribute to identity formation. Three types of capability (intellectual, practical, and affective) result from real patient learning.
(RPL), which results from participating in practice (observing, rehearsing, and contributing) within the triad of clinician, patient and student. Clinicians provide organisational, pedagogic, and affective support, which makes it possible for students to participate and, by doing so, step outside their comfort zones without striding so far that they are a danger to themselves and others. Clinicians also support students’ learning by modelling how to practise. Reflection on supported participation results in RPL, capability, and identity. There is positive feedback within ExBL: becoming capable enables participation, which further increases students’ capability. As they become more capable, students become more useful members of practice communities, which encourages practitioners to support them. Many components of the model defy precise definition and reliable measurement but ‘you know a capable and caring doctor when you see one’. (Gillespie et al., 2018)

What is and what is not within the scope of ExBL

**IS IN SCOPE**
- Activities whose conjoint purpose is direct patient care and medical student education

**ARE NOT IN SCOPE**
- High stakes assessments
- Simulation

Theoretical and empirical underpinnings

The pedagogic advice in this Guide has been 20 years in the making. During those years, we have exhaustively reviewed empirical research on several occasions [once in 2018, as described in the Methodology section and twice before.(Dornan, 2016; Dornan et al., 2014] Many eminent theorists have contributed, some personally. We only cite here seminal work, by which we mean work that sowed the seeds of what you are reading. We err on the side of writing a readable narrative and, to that end, summarise the Guide’s theoretical underpinnings in Table 2. We direct those who are primarily interested in the education of residents to our companion publication, which exhaustively reviews empirical evidence about residents’ supervised workplace learning. (Wiese, Kilty and Bennett, 2018)

From complicated to complex

Medical education is complicated because doctors draw on many sources of knowledge and use many skills in practice. It is often assumed that, underneath this, education follows simple rules: Teacher teaches – student learns – teacher tests student’s competence – student passes test – student practises effectively. This simplicity approach to educating doctors is as unlikely to succeed as bringing up a child solely by teaching and testing their competence. Harm caused to patients by inexperienced, newly qualified doctors (Dornan et al., 2009) confirms that the current simplicity approach is not failsafe.

Opinion leaders have advocated that we should acknowledge the complexity of medical education rather than resort to convenient oversimplifications. (Regehr, 2010; Cristancho, Field and Lingard, 2019) We now describe so-called ‘aggregate complexity’, (Cristancho, Field and Lingard, 2019) the branch of complexity science that is relevant to human systems like those in which medical students learn to be doctors, using ExBL as an example. Clinical education is complex because people and how they relate to one another are an essential component of it – and ‘when people get involved, things go wrong’. ExBL concerns itself with the whole, authentic social system of medical students’ education, not just how training can improve performance in experimental conditions. It assumes that, for example, students’ capability to learn is not static but increases as they gain experience. This increased capability will then make clinicians readier to include them in practice. Billett’s theory of relational interdependence (Billett, 2006) (Table 3) supports this position by suggesting that learning influences teaching, not just the reverse. Complexity assumes that any social process is in a two-way relationship with the social environment in which it takes place which, as we explain later, is why medical education has started to pay attention to the effects of learning environments, not just individual training.

“... we should acknowledge the complexity of medical education rather than resort to convenient oversimplifications.”

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ExBL is a complex system in that no one student’s learning, and no one clinician’s educating, are the same as other ones. ExBL acknowledges that hierarchies, people’s different roles, and their workloads influence medical student education. It is a flexible pedagogy, which adapts to individual educators, learners, and patients. The most fundamental theoretical assumption of this Guide is that we can best improve medical education by regarding it as an inherently complex process. Table 2 lists more detailed theories, all of which are compatible with complexity.

### Table 2: Theoretical underpinnings

**Knowles and a humanist approach to educating medical students**

Malcolm Knowles is best known for adult learning theory, or andragogy, which holds that adults learn more autonomously than children. (Knowles, 1975; Knowles, Holton and Swanson, 1998) Andragogy has been criticised because, under certain conditions, children behave more like adults and adults behave more like children. (Norman, 1999) He made an important contribution to this Guide by taking a humanist stance, according to which educators help students learn by forming educative relationships. These relationships are characterised by warmth, mutual respect, good communication, clarity of roles, and trust. The Guide extends Knowles’ concept from dyadic relationships between educators and learners, to triadic ones, where clinicians extend those same values to both patients and students in order to foster clinical humanism. The ExBL concept of support owes much to Knowles.

**Schön and helping medical students become reflective practitioners**

Donald Schön wrote two seminal books about reflective education. (Schon, 1983; Schön, 1987) Like Knowles, his interest was in dyadic relationships between educators and learners, not just in the health professions. He did, however, devote a chapter to ‘Psychotherapy: The Patient as a Universe of One’, which captures how humanistic educators treat both patients and learners as individuals to be understood and respected. Schön’s contributions to this Guide are two-fold. First, he wrote about the ‘The Crisis of Confidence in Professional Knowledge’, (Schon, 1983) which has emboldened us to locate medical education within the ‘swampy lowlands’ of everyday medical practice, rather than the arcane ‘high, hard ground’ of universities. According to Schön, the crisis in confidence results from medical schools teaching competences that ill-equip practitioners to deal with their patients’ realities. Reflective practitioners, according to him, expect every clinical situation to be more or less messy. They respond reflectively in action and, after the event, reflect on situations and what they learned from these. RPL and the reflective development of capability, as presented here, derive from Schön.

**Wenger and developing a practitioner’s identity in a community of practice**

Etienne Wenger contributed personally to ExBL by discussing our ideas and co-authoring two articles. (Mclachlan et al., 2012; Steven et al., 2014) The elegant book he co-published with Jean Lave in 1991 (Lave and Wenger, 1991) coined the oft-used terms ‘communities of practice’ and ‘legitimate peripheral participation’. His more substantial monograph published seven years later (Wenger, 1998) advanced his ideas. He gave ExBL the benefit of his more advanced, but less widely known, ideas in the two publications he co-authored with us. (Mclachlan et al., 2012; Steven et al., 2014) and two others he advised on. (Cantillon et al., 2016; Renting et al., 2017) Wenger’s contribution to ExBL was, first, to help us make best use of social theory and the scholarly tradition that stemmed from Karl Marx and, second, to give us thought-tools to research students’ identity development, in all its social messiness.

**Billett, workplace learning, mutual interdependence, and mimetic learning**

Contemporary educational theorist, Stephen Billett, contributed personally to ExBL as well as through his writings. Billett has researched workplace learning in such diverse fields as hairdressing, coal-mining, and medicine. His first contribution to the Guide is, like Schön’s, to locate professional learning fair and square within ‘the circumstances of practice’. We learn to do any job, according to Billett from; ‘just being’ in workplaces; observing, listening to, and being supported by other workers; ‘just doing’ everyday activities; and observing, listening, and being supported by mentors. (Billett, 2014) Billett’s second contribution is his theory of relational interdependence between learners’ agency (ability to act in the world) and the social world in which they learn. (Billett, 2006) Students minds are not blank slates on which medicine is inscribed. Neither are they, as andragogy might have suggested, (Norman, 1999) free agents who can take independent charge of their learning. Students bring their individuality to learning environments, which are steeped in culture. Learning environments act on students and students act on learning environments. Both act and both change as a result of supported participation. Billett’s third contribution is his theory of mimetic learning. (Billett, 2014) This is an important advance on, for example, the concept of role modelling, which suggests that learners merely imitate the people they learn from and the roles these people fulfill. Mimetic learning, like relational interdependence, frames students as ‘agents’, who actively refashion what they experience into unique, individual identities. In other words, his theory acknowledges the influence of inter-psychological processes, but allows for intra-psychological processes that give students independent agency.
Dorothy Holland’s book, ‘Identity and agency in cultural worlds’, (Holland et al., 1998) contributed to ExBL by providing additional theoretical and methodological tools that complement Wenger’s conceptual tools for researching students’ identity development. Key theorists who informed Holland’s work were Bakhtin, the father of an influential tradition of discourse research, and Bourdieu, whose theories of the dynamics of power in society have strongly influenced the discipline of sociology. The Bakhtinian tradition, and Holland’s work in particular, complement Wenger’s theory that dialogic ‘talk’ plays a central place in education and practice. Wenger’s concept of a community of practice has been criticised [eg (Billett, 2014)] for paying insufficient attention to social influences arising from power inequality. Holland’s ‘Figured Worlds’ theory helped us address this shortcoming by combining Bourdieu’s theories of power with Bakhtin’s theory of language. This explained how the words we use influence students’ identity development and make educational possibilities more available to some students than others. Researchers in mathematics education have used Holland’s theory to examine sexism. (Solomon, 2012) We used it to examine how the exercise of power in ExBL influences medical students’ learning. (Dornan et al., 2015; Bennett et al., 2017)

From individual to social

It is nearly a century since the Russian scholar Vygotsky reconceptualised children’s learning as an essentially social process. The individualistic thinking that he wanted to move away from dominated medical education until the end of the 20th century when Vygotsky’s sociocultural paradigm of thought finally began to gain ground. ExBL is strongly influenced by Billett, Wenger, Holland (see Table 2) and other sociocultural theorists. This conceptual orientation locates learning within interactions between doctors, students, and patients, mediated by the language of medicine and education, and by physical artefacts such as stethoscopes, case notes, clinical guidelines and so on. (Mann, Dornan and Teunissen, 2010) To understand education, we must understand the situated, interpersonal dynamics of practice. (van der Zwet et al., 2014) ExBL is, in those respects, a sociocultural theory.

From teaching to learning

Complexity and sociocultural theories contributed another key assumption of ExBL: that we should shift our attention from teaching to learning. This was explained lucidly by contrasting the ‘acquisition and participation metaphors’. (Sfard, 1998) Teaching is linked with the acquisition metaphor: it is generally assumed that the task of teachers is to help learners acquire knowledge, skills, and attitudes. Learning is linked with the participation metaphor, and to sociocultural theory: according to these ways of thinking, the goal of education is to help students participate in educative activities. ExBL is strongly affiliated with Sfard’s participation metaphor, and also with the additional ‘becoming’ (identity development) metaphor, which is also sociocultural. (Hager and Hodkinson, 2011) None of these metaphors, alone, is sufficient to describe medical education. All are relevant. So, ExBL’s sociocultural emphasis on learning by supported participation and becoming a doctor complements CBME’s emphasis on acquiring competences and being able to demonstrate these in test conditions.

From bedside teaching to clinical learning environment

Clinical bedside teaching, which had an important place in the cultural heritage of medical education, is becoming less common. (Peters and ten Cate, 2014) Commentators express regret about this. (Qureshi, 2014) Whilst it would be regrettable if students’ workplace education was in decline, there are other explanations for a decline in bedside teaching. One is that fewer patients are bedbound and ambulatory care calls for updated (in fact, upright!) forms of clinical education. The other explanation is that medical education is rightly shifting its emphasis from teaching to learning, as explained above.

The presentation of ExBL in this Guide, is strongly informed by a qualitative research study, which used concepts from Communities of Practice Theory to examine how students learn. (Steven et al., 2014) Its conclusion was that a student can be taught without learning anything useful; and a student can learn...
from workplace experience without being directly taught. The experiences that most helped students become capable and develop the identity of a doctor were experiences of supported participation in practice. These brought students’ learning and doctors’ care of patients into close alignment with one another. This Guide suggests many ways of helping students learn within contemporary practice. It moves purposefully away from ‘traditional bedside teaching’, which has too often humiliated students, distressed patients, and focused on arcane subject matter that has little to do with authentic practice.

**From competence to capability and identity**

Some of the most important things doctors do, like being genuinely caring, (Gillespie et al., 2017, Gillespie et al., 2018) defy standardisation, differ between individuals, and continue to evolve throughout a professional lifetime. Capability has been defined as ‘an all-round human quality; an integration of knowledge, skills, personal qualities and understanding used appropriately and effectively’. (Neve and Hanks, 2016) ExBL uses rather general labels for medical students’ capabilities, which represent archetypes of clinical behavior rather than draw precise boundaries around what students are able to do. Students will, as doctors, compile these capabilities into scripts, which are even more individual and allow doctors to perform complex tasks under challenging conditions. (Schmidt, Norman and Boshuizen, 1990)

**From curriculum to pedagogy**

Billett pointed out that curricula of the sort we take for granted nowadays are a relatively modern invention. (Billett, 2014) Medical schools have very sophisticated curricula, which structure students’ experiences, specify subject matter to be learned, and dictate the nature and content of assessments. But, oftentimes, workplace curricula do not specify a pedagogy: how students should learn, and how clinician-educators should help them learn. This Guide fills that gap. Absences from the guide will surprise readers who are accustomed to ‘curriculum thinking’. We do not write about longitudinal clinical clerkships, assessments, hidden curricula, learning organisations, selection for medical school and other important concepts because those are features of curricula rather than features of pedagogy. We follow Osler’s maxim that there should be ‘no teaching without a patient for a text, and the best teaching is that taught by the patient himself.’ (Silverman, Murray and Bryan, 2003) In principle, patients’ healthcare needs dictate the ExBL curriculum. Since placements are often short, however, clinicians need to ensure students have an appropriate range of experiences and/or learn in theory about what they do not directly experience. An earlier publication, in which we describe how curricula can be structured to optimise the depth and breadth of students’ ExBL, complements this Guide. (Dornan et al., 2014)

**Uniprofessional and interprofessional education**

Interprofessionalism is well established in clinical practice and some aspects of postgraduate education. Undergraduate IPE is less well established. This is because tradition and the different status of different health professions militate against IPE in many countries. Under those conditions, it may be most appropriate for students to develop stable uniprofessional identities at undergraduate level before developing interprofessional identities once they enter practice. Since published evidence suggests that undergraduate IPE is best established in the Nordic countries, we cite examples of best practice from there and Germany later in the Guide. (Jakobsen, Larsen and Hansen, 2010; Scheffer et al., 2010; Hallin and Kiessling, 2016)

**Patients’ central place in ExBL**

It is anomalous that, although patients’ illnesses and diseases are the central concern of medical students’ education, real patients have traditionally been given little agency in students’ learning. Rather, doctors sometimes exercise power over patients in bedside teaching. (Rees, Ajaw and Monrouxe, 2013) Bleakley, Bligh, and Browne issued a ‘call to arms’ to address this. (Bleakley and...
Bligh, 2008; Bleakley, Bligh and Browne, 2011) Our research, which examined patients’ readiness to contribute to students’ learning,(Ashley et al., 2009; Mclachlan et al., 2012) found that patients identified with students and their learning needs and were generally willing for students to participate in their care. Patients who were bringing very sensitive issues to consultations might not want students to participate and neither might people whose earlier experiences of medical student teaching had been negative.(Ashley et al., 2009) A minority of patients were willing to take on the role of experts and a majority were willing to be involved provided this did not interfere with their clinical care. ExBL seeks to distribute power equitably so that patients are active participants in students’ learning.

How ExBL was developed

Having described its theoretical origins, Fig 2 and the text after it describe how we ensured that our pedagogic guidance is evidence-based.

Secondary research

Two systematic reviews identified good quality published research evidence from any part of the world, any curriculum design, any context of care, and any specialty. The first review included evidence from 2000-2006.(Dornan et al., 2014) The second review, presented here for the first time and summarised in Appendix 1, covered 2007-2018 inclusive. Taking the two reviews together, 292 articles contributed evidence that was robust enough to inform our pedagogy.

Programmatic primary research

A second source of information was our own programmatic empirical research. We developed the ExBL model from a detailed qualitative investigation, which we published in 2007.(Dornan et al., 2007) We then published seven research articles, which elaborated the conditions, processes, and outcomes of medical students’ workplace learning.

Experiential evidence

Clinicians have valuable knowledge about education that is never published. This review is informed by two sources of experiential knowledge. One source
Experience based learning (ExBL): clinical teaching for the twenty-first century

is the authors’ knowledge of workplace education. We are medical students, residents, and faculty from several clinical specialties, of variable levels of seniority, for whom medical students’ workplace learning is ‘bread and butter’. All of us have trained in (or at least experienced) education, education research, and medical practice. We used our experiential knowledge to respond reflexively to other sources of evidence, whilst maintaining a critical dialogue between ourselves to minimize ‘groupthink’. To avoid our own opinions unduly biasing the pedagogy and to give the Guide a truly international reach, we drew on a second source of experiential evidence: twenty-three experienced medical educators from 18 countries in Europe, North and South America, Africa, the Middle-East, Japan, Australia and New Zealand advised. First, they suggested search terms that were most likely to identify articles relevant to their contexts. Second, they give critical feedback on a draft of the Guide to ensure it maintained international relevance.

**Types of support that promote students’ workplace learning**

**Fig 3**

| Curriculum Planning Resourcing | Placement Arranging Orientating | Individual Formal: (Timetabled) Supervising Training Informal: (In the moment) Modelling Conversing Questioning Explaining Inspiring |

**Support**

Support is the ExBL term describing the set of conditions that help students step out of their comfort zones and co-participate with patients and clinicians in placements, clerkships, preceptorships, clinical visits, electives, internships and so on. The pedagogic and affective conditions are similar, whether learning encounters last fleeting moments, months, or years (though attaching smaller numbers of students for longer periods of time to supportive learning environments, when possible, has major benefits). The conditions are termed organisational, pedagogic, and affective support. Relating well to students and helping them learn by talking with them underpin all three types of support. Fig 3 depicts the support component of SPaRC and Table 3 gives additional detail.

**Organisational support**

The qualities of the facilities provided to students and the organisation of placements and clinical activities influence students’ learning. Organisational support operates at every level, from the highest level of curriculum design to the minutest organisational detail of students’ education. Organisational support brings students, patients, and clinicians together so that clinical practice and
education proceed alongside one another to the greatest benefit of all three parties. Leadership, which fosters three-way interactions between clinicians, patients, and students is the most important component of organisational support. Although organisational support is in the background of every good educational encounter, we say less about it than about pedagogic and affective support because this Guide is more concerned with the foreground of ExBL. Organisational support was discussed in detail in an earlier publication, (Dornan et al., 2014a) the findings of which we revisit in the Implications section.

**Pedagogic support**
This term describes clinicians’ purposeful support of one or more students’ learning. This may be formal pedagogic support; for example, a classroom event before a participatory experience to strengthen students’ learning, or a training event to prepare students to care for real patients. Formal pedagogic support in workplaces typically comprises instructing students how to perform a task, observing them, and giving them feedback. Informal pedagogic support attracts less attention than formal support but is the type of education that makes the greatest contribution to clinicians’ professional development. It has been said that students ‘learn from talk, to talk.’(Lave and Wenger, 1991) Talk is the medium of informal pedagogic support. Clinicians explain, ask questions, listen, converse about practice, and think out loud to help students think along with them. A vital form of pedagogic support is the informal talk that helps students, reflectively, turn experiences of participation into real patient learning and capability.

**Affective support**
Clinicians having positive attitudes towards educational and clinical practice and relating positively to students at group and individual level provide essential support. The term ‘affective’ should need little explanation, we suggest, because it is what we give our partners, siblings, and children, patients under our care, colleagues, friends, and sometimes also strangers as part of our daily lives. Affective support is hard to define but easy to recognise. It means being approachable and friendly whilst also providing pedagogic support. Affective support is most easily observed in personal interactions between students and clinicians, but its presence is a distinguishing feature of the best leaders at placement and curriculum level too.

**How organisational, pedagogic, and affective support come together**
Organisational support brings clinicians, students, and patients together in pursuit of clinical education. Once together, clinicians provide affective and pedagogic support by briefing and debriefing students, instructing, observing, and giving feedback during consultations, ward rounds, and other patient care activities. They engage students into the talk of practice and broker their relationships with patients. They encourage students to advance beyond their existing capabilities. Patients, who are often kindly disposed and willing to support students’ learning, then become an additional source of support. Clinicians’ willingness and ability to form the relationships that energise educational triads help students gain the real patient experience they need to transition from student to doctor. Support is not mollycoddling students. Neither is it an optional extra. It enables students to rise to the challenges of practice. Helping them do this can change students from a burden to a source of practical and affective support to busy doctors. Being able to support students is a key educational skill.

**Workplace climates**
Students are very sensitive to the social climates of workplaces, which are an important source of support. The behaviour of individuals and workplace climates feed on one another. Educators commonly blame students for behaving in demotivated and uncommunicative ways. Their frustration, whilst understandable, is not helpful. You can’t change students, but you can change the climate of your workplace. Having a relentlessly positive attitude towards students and their learning can turn apparently demotivated and uncommunicative learners into animated ones. If it doesn’t, the next step is to
ask students how you could help them be more motivated and communicative. If you are genuinely too busy to have students with you, politely explain that to them. It is striking, though, that unmotivated clinician-educators are always too busy to support students’ education while motivated ones are never too busy to do this. Are you really too busy?

### Table 3: Types of support

<table>
<thead>
<tr>
<th>LEVEL</th>
<th>EXAMPLES</th>
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<tbody>
<tr>
<td><strong>CURRICULUM</strong></td>
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</table>
| Organisational: planning | • Blueprinting intended learning outcomes and educational methods  
• Sequencing placements appropriately and optimising continuity of experience  
• Providing access to an appropriate breadth and depth of experience  
• Ensuring opportunities to participate in practice |
| Organisational: resourcing | • Providing facilities and staff  
• Balancing numbers of students to numbers of staff and patients to optimise experience |
| **PLACEMENT** |          |
| Organisational: being a leader | • Prioritising education and making students part of the team  
• Planning and conducting clinical work to optimise students’ participation  
• Making clinical staff accessible to students  
• Structuring students’ learning activities  
• Ensuring learning resources are provided and students have places to sit and leave their bags and coats  
• Arranging individual and group learning activities to support students’ ExBL |
| Pedagogic and affective: being a warm person who shares their expertise | Welcoming students and orientating them to:  
• Intended learning outcomes and ways of achieving these  
• Faculty available to support their learning  
• Activities in the clinical unit that provide learning opportunities  
• Ways of learning from those activities  
• Sources of personal and pedagogic support and guidance |
| **INDIVIDUAL** |          |
| Formal (timetabled) pedagogic and affective support | • Training students: instructing, observing, and giving feedback  
• Supervising, preceptoring, mentoring  
• Briefing students for specific educational activities and debriefing them |
| Informal (in the moment) pedagogic and affective support | • Modelling the attributes of a good doctor; being clinically skilled, respectful, and well-mannered  
• Drawing students into clinical activities and conversations  
• Giving students tasks, observing, and debriefing them  
• Facilitating students’ interactions with patients  
• Demonstrating positive attitudes towards education and clinical practice, and to students, patients, their families, and fellow staff  
• Encouraging students to be self-aware and ensuring they participate actively |
Table 4: Support - best practice from around the world

MAKING THE MOST OF BRIEF EDUCATIONAL ENCOUNTERS

It is easy for students to be relegated to the status of passive observer in out-patient clinics.

Small differences in doctors’ behaviour overcome this.

Doctors in England promoted participation by identifying students’ level of knowledge and learning needs, orientating them to patients’ diseases before consultations began, helping them contextualise their existing knowledge to patients they saw, providing a scaffolding for new learning, and establishing how ready students were to take on a more active role. Arranging the furniture in out-patient consulting rooms to optimise participation increased students’ confidence, comfort, and level of interaction with patients. Being able to make eye contact with patient and doctor helped a student ask questions; sitting in a corner inhibited this. (Ashley et al., 2009)

There are obstacles to students’ participation in inpatient practice, which can also be overcome in small ways.

Participation in practice in a Swedish academic hospital was inhibited by students not having access to electronic patient records. Short placements fragmented students’ learning, prevented them forming relationships with staff and, as a result, inhibited them from rehearsing and contributing to patient care. Doctors helped students participate in practice more actively by involving them in discussions with about about patients, and actively involving them in the delivery of patient care. (Hägg-Martinell et al., 2017)

Even fleeting clinical encounters present educational opportunities to committed educators.

US internists who prioritised teaching, found ‘teaching moments’ in their encounters with sick patients and families. (Smith and Knowles, 2011) Likewise, US hospital residents seized teaching moments ‘on the fly’, during which they modelled how to practice well under pressure, verbalised their clinical reasoning, and brokered students’ participation in practice. (Karani et al., 2014)

HELPING STUDENTS LEARN WITHIN CLERKSHIPS

Parallel consulting

Students in Australian surgical clinics contributed to clinical care by seeing patients independently and then presenting them to supervisors. (Azher et al., 2013)

Pre-prescribing

Scottish students wrote up medication orders, which supervising doctors activated by countersigning them. Placement supervisors met students regularly to discuss issues that arose. This helped students think about patients as a whole, reasons for prescribing, and drug interactions that might occur; it motivated students to refresh their knowledge of disease. Students described pride and a sense of ownership of patient care. (Smith et al., 2013)

Structured learning

Faculty in a US family medicine clerkship developed a ‘one-minute learner tool’ to structure discussion of students’ goals and expectations for clinical teaching sessions. This oriented students to their roles, defined what was expected of them, and integrated them into clinical settings. (Hoffman and Cohen-Osher, 2016)

Peer support

Australian educators facilitated peer-assisted learning by tasking students to see patients in pairs and observe and give feedback to one another; later, supervisors debriefed the pairs and gave feedback. (Tai et al., 2017)

Phased entry to practice

During 6-week clerkships, Norwegian general practitioners took a phased, individualised approach in order to involve senior students in practice. They explored students’ expectations and capabilities. They invited students to observe them modelling family practice. Once mutual trust existed, they closely observed students practising and gave sensitive feedback. Finally, they encouraged students to consult independently under supervision, which assured good care and learning. (Gran et al., 2016)

Affective and pedagogic support

Clinical supervisors in a Swedish University Hospital made students aware of their potential contributions to healthcare productivity and included them in practice communities. They introduced students to staff and patients as future colleagues and engaged them in joint problem-solving and team learning. They provided emotional support, acknowledged students’ anxiety and uncertainty, and maintained a constant dialogue that made it easy to ask questions. A student was not an ‘anonymous tourist’ but a person with a name, one of the gang, with a sense of belonging. (Strand et al., 2015)

Canadian physicians who were prepared to trust students made teaching a ‘core’ component of patient care, facilitated ad hoc conversations and collaborations, and encouraged students to ask questions. This helped students participate and become experienced. (Steinert, Basi and Nugus, 2017)
Participation
There are three types of participation:
- Observing: being present at and learning from practice without being hands-on involved
- Rehearsing: performing tasks of practice for educational purposes rather than ‘for real’
- Contributing: taking responsibility for (co-)performing tasks of practice

The triad of student, patient, and clinician is a vital educational context for several reasons. The clinicians who supervise students, the patients those clinicians treat, how the clinicians treat those patients, and students’ experiences of learning and practising within the triad lay the foundation for students’ capabilities and identities as practitioners. And this learning triad emulates the triad of patient, clinician, and fellow professional in which healthcare is practised.

Observing, rehearsing, and contributing are rungs on a ladder that leads to independent practice. Students’ ascent of the ladder is anything but linear. Becoming more capable is a step upwards, but clinical situations vary enormously, and sometimes very fast, in the demands they make. The dimensions of support presented in the previous section help students ascend the ladder. But support also means recognising when the demands of a clinical situation make it more educational for a student to step down a rung or two. Because participation changes dynamically, skilled supervisors support students by maintaining a level of participation that gives them the most educative amount of challenge.

There is wide international variation in students’ level of participation and the stage of their education at which they climb up a rung. At one extreme, students in some countries become part of the workforce long before qualifying. Students in other countries qualify without ever having taken clinical responsibility. This is partly determined by tradition and partly also by the wealth or poverty of the country where students are educated. In under-resourced health economies, students’ contributions to patient care may be sorely needed. In wealthier ones, the greater number of staff may leave few tasks for students to perform. There is also wide variation in the education provided to bridge the transition between classroom and practice-based learning. Well-designed curricula help students socialise into clinical learning environments before they become active participants. Clinicians support students at this stage by helping them learn how to interact and how to use language that does not baffle or frighten lay people.

Participating is the component of ExBL that builds up students’ repertoires of experiences. It is not a sole end in itself. It has an important counterpart: the...
reflective learning that turns participation into real patient learning, practical and affective capability, and identity. ExBL is a complex process where supported participation increases capability and students’ increasing capability makes it easier for them to participate and clinicians to support their participation. The reverse can also occur.

**Observing**
Observing is a rung on the ladder, which students must climb but where they should not linger too long. It gives a first exposure to practice, allows students to experience situations where they are not yet ready to perform (like interviewing a suicidal patient), and allows them to experience situations that are too complex for any student to contribute (like relieving pericardial tamponade, or performing microscopic surgery). Being hands-off does not necessarily mean being inactive. Astute observers are inquisitive and take in every detail of what goes on between patient, doctor, family, other staff and so on. By observing actively, a student can participate discretely in, for example, a delicate situation or intimate examination. Observing makes other important contributions to ExBL. It gives students breadth of experience and allows them to build up a repertoire of visual prototypes and patterns; the facies of acromegaly, and appearance of arthritic hands, for example. And it allows them to learn the craft of medicine mimitically.

ExBL goes wrong when students are relegated to the role of passive observers, which happens when doctors ignore students and, as a result, patients and other staff ignore them too. This makes students feel useless, feeds the imposter syndrome from which novices suffer, and demotivates them. Skilled educators prevent this by providing the types of support listed in Table 3. If nothing else, they activate students by engaging them in good-humoured talk, ideally involving patients too. The talk of workplace education can be made more educational by following some of the suggestions in Table 11. ‘Cognitive apprenticeship’ is an important educational technique. This sounds deceptively like traditional apprenticeship but means something rather different because it is an intellectual rather than a practical exercise. It means that a clinician-educator provides a conceptual structure by explaining and thinking aloud, which helps a student organise what they see and hear. Inviting students to think out loud, asking them open questions, and probing their thoughts and feelings stimulates reflection.

**Rehearsing**
Rehearsing is going through the motions of being a doctor, in context, without taking responsibility or contributing to a patient’s care. Taking a history from a patient who has already been seen by a doctor, performing a physical examination purely for practice, or practising the palpation of a patient’s enlarged liver are typical examples. Rehearsing makes the important contribution of allowing students to assume the identity and roles of a doctor in authentic but psychologically safe ways. Rehearsing deepens students’ learning, which complements the breadth of learning that comes from observing. It is a rung above observing, allowing students to perform doctors’ tasks and find out how easy or hard they are. The disadvantage of observing is that students may be painfully aware they are imposing on sick people for their own learning and contributing nothing. This can be very demotivating, particularly if students rehearse under the supervision of doctors who are insensitive to students’ and patients’ embarrassment or discomfort.

**Contributing**
The next rung on the ladder of participation is making some hands-on contribution to patient care, no matter how small. This must, of course, be safe so it must be supervised by clinicians who take responsibility for students’ actions and support their learning. Students’ level of involvement is influenced by their capability and the nature of patients’ problems. Students’ contributions may be large (doing a diagnostic workup) or small (requesting an investigation) and may be whole tasks (conducting a complete consultation) or part of them.
(performing cardio-pulmonary resuscitation during the management of cardiac arrests). The best learning is when students are involved at the highest level their capability allows and make as complete a contribution as possible.

The boundary between rehearsing and contributing can be difficult to define. A student thoroughly reviewing the laboratory results of a patient and obtaining best evidence about the patient’s disease can, unintentionally, turn what started out as a rehearsal into a useful contribution. Savvy educators harness the enthusiasm and time students can invest in individual patients by encouraging them to get involved. This confers the double benefit of improving patient care whilst legitimising students’ participation. A high level of involvement is not, of course, always possible, but inviting students to do small tasks makes them ‘cogs’ in the community of practice, which is much preferable to being ignored. Done skilfully, delegating some part of a patient’s care can make the difference between a student participating or not participating.

**The dynamic relationship between observing, rehearsing, and contributing**

Imagine an out-patient clinic where the doctor swaps chairs with a relatively junior student and invites them to conduct the next consultation. After some opening pleasantries, the student asks more focused questions about the patient’s well-being. The patient weeps, to which the student responds kindly. Before long, the patient starts expressing suicidal thoughts. The situation has changed from a potentially straightforward one to a complex one. The supervising doctor has been observing closely. Because the chairs were arranged in a triangle, the doctor is able to take over the consultation discreetly, leaving the student in the doctor’s chair. This rescues, but does not sideline, the student. When the emotional temperature cools a little, the doctor swaps chairs with the student, checking with the patient that it is still acceptable for the student to be present. After the patient leaves, the doctor asks the student to say how they feel, then invites comments on what happened. The doctor then makes a positive comment about the student’s behaviour, makes a specific suggestion for how the student might respond differently on a future occasion, makes some observations about the situation, and then gives some general advice about how to manage such situations. This example illustrates the dynamic nature of clinical workplace learning and the need for clinician-educators to respond flexibly in order to build students’ capability and identity within triadic relationships. The student switched from contributing to observing. If the situation had de-escalated quickly, it might even have been possible for the doctor to re-engage the student and help the patient regain composure and control by asking the student to rehearse some aspect of physical examination. This sounds time-consuming. Skilled clinician-educators, though, use students’ attentive communication with patients to buy themselves time to disengage, seek information, make essential phone calls and so on. Adapting students’ level of participation in unpredictable, rapidly changing clinical situations models the very essence of clinical practice. Even when emotions are escalating, attentive clinician-educators keep the situation as psychologically safe as possible for student and patient.

Involving students in practice comes more naturally to some clinicians than others. ExBL calls on them to strike an optimum balance between the freedom they give students to perform tasks, the difficulty of the tasks they allow students to perform, and the degree of support they provide. The ideal balance is to leave students in no doubt that they are legitimate, their learning is important, and that both they and patients will be safe whilst giving students slightly harder tasks, and slightly more freedom to perform the tasks, than the student might expect.
### Table 5: Types of participation

<table>
<thead>
<tr>
<th>Points for a clinician to consider when supervising a student’s ExBL</th>
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<tbody>
<tr>
<td><strong>What experience that is relevant to students’ learning needs is available?</strong></td>
<td><strong>Making it possible for students to be present</strong></td>
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<tr>
<td><strong>What is students’ (likely) capability?</strong></td>
<td><strong>Brokering students’ interactions with patients and other clinicians</strong></td>
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<tr>
<td><strong>How can students participate at the highest level (observing, rehearsing, or contributing)?</strong></td>
<td><strong>Promoting peer observation so two students learn simultaneously</strong></td>
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<tr>
<td><strong>What needs to be done before, during, and after experiences to optimise students’ learning?</strong></td>
<td><strong>Engaging students into the talk of practice</strong></td>
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<tr>
<td><strong>Observing</strong></td>
<td><strong>Advising students what to observe, when, and how</strong></td>
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<td></td>
<td><strong>Using clinical understanding to scaffold students’ learning by thinking aloud</strong></td>
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<td></td>
<td><strong>Stimulating reflection</strong></td>
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<td></td>
<td><strong>Questioning</strong></td>
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<td></td>
<td><strong>Modelling</strong></td>
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<td></td>
<td><strong>Inviting students to comment critically on your practice</strong></td>
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<tr>
<td><strong>Rehearsing</strong></td>
<td><strong>Giving students a pre-specified practice-relevant task to perform</strong></td>
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<td></td>
<td><strong>Instructing them</strong></td>
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<td></td>
<td><strong>Observing their performance</strong></td>
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<td><strong>Giving constructive feedback</strong></td>
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<td></td>
<td><strong>Suggesting other ways of rehearsing the task and transferring it into authentic practice</strong></td>
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<tr>
<td><strong>Contributing</strong></td>
<td><strong>Affirming students’ legitimacy and right to contribute to patient care</strong></td>
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<tr>
<td></td>
<td><strong>Finding opportunities for students, during practice, to (for example) assist in the operating theatre, present a provisional management plan for a patient, or deliver preventive healthcare.</strong></td>
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<td></td>
<td><strong>Some curricula create roles that students may not perform once qualified but provide opportunities for them to contribute whilst still students</strong></td>
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<tr>
<td></td>
<td>• Acting as a patient advocate</td>
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<td></td>
<td>• Providing free, preventive healthcare to underserved populations</td>
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Table 6: Participation - best practice from around the world

SUPERVISORS HELPING STUDENTS PROGRESS FROM OBSERVING TO CONTRIBUTING
Supervisors in the Netherlands scaffolded students’ learning by creating opportunities for them to observe tasks, then rehearse, then contribute to patient care. (Stalmeijer et al., 2009)

Excellent US clinician-educators helped students function at the highest level their capability allowed by setting expectations based on students’ level of experience, adapting to their level of experience, breaking down complex cases into manageable parts, and remaining present to support students’ participation. (Chen et al., 2015)

English doctors maximised patients’ and students’ co-participation and realised their mutual sense of responsibility by helping students attending out-patient clinics observe, rehearse and/or contribute. This motivated and satisfied students, made them more confident to assert their learning needs, increased their capability to learn in workplaces, and afforded them legitimacy. (Ashley et al., 2009)

WELL SUPPORTED OBSERVATION MAKING IMPORTANT CONTRIBUTIONS TO STUDENTS’ CAPABILITY
Students observing practice in England learned the language of medicine, which made them more legitimate. Hearing doctors admit they didn’t know what to do and intended to ask for help taught students that doctors are fallible. (Steven et al., 2014)

Observing attending physicians giving patients bad news allowed third year students in the US to learn ‘how important it is for us to truly connect and show [patients and families] we care’. (Cripe et al., 2017)

An English student observing a patient’s death after cardiac arrest reflected on conflicting emotions; the excitement of the medical drama, and sadness about the patient’s death. Another student reported that interviewing a patient, and then observing a doctor continue the consultation in an empathic way made them see that ‘practitioners are very fortunate’. (Dornan et al., 2015)

CLINICIANS MAKING REHEARSAL MORE EFFECTIVE BY SUPPORTING IT
Junior clerkship students in Australia would have valued being attached to someone whose responsibility was to help them approach and learn from patients. (Barrett, Trumble and McColl, 2017)

Having rehearsed clinical interviewing with real patients, an English student said ‘Oh, yeah, I feel I could be a doctor’. (Steven et al., 2014)

CURRICULA OFFERING A WIDE VARIETY OF WAYS OF CONTRIBUTING
Doctors in England who recruited patients, briefed students, and allowed them to contribute to clinical decisions provided a powerful entrée to practice and source of legitimacy. (Steven et al., 2014)

Sometimes, students’ contribution is a small part of an authentic task
Writing medication orders for real patients helped Scottish medical students think about patients as a whole, reasons for prescribing, and drug interactions that might occur; this motivated students to refresh their knowledge of disease. (Smith et al., 2013)

Surgeons in Kenya took students to the operating theatre, explained what they were doing, showed students how to suture, and allowed them to do some suturing during the operation, which increased students’ practical capability and confidence. (Kibore et al., 2014)

Sometimes, it is making an independent contribution to a whole team task
Being on a shift rota and staying with a patient during labour as part of a care team helped students in Ireland consolidate their knowledge of (for example) gestational diabetes, improved their communication skills, and conferred legitimacy. (Cotter et al., 2016)

Senior students in Wales adopted genuinely useful roles within teams by clerking patients, writing medication orders for doctors to sign, reviewing test results, suggesting management decisions, performing administrative tasks, and undertaking practical procedures. This helped them recognise the limits of their competence and increased their confidence to start to work as doctors. (Jones et al., 2016)

Sometimes, it is more complete
Australian students consulted independently and then discussed patients’ management with family doctors. Their supervisors made this possible by promoting a strong teaching culture in their practices. It helped students feel like doctors, motivated them to study, and linked theory with practice. (Thomson et al., 2014)
Students in the US consulted with patients in clinic, wrote care plans, and reviewed lab results, which helped them feel included and alleviated concerns about being a drain on clinicians' resources. (Golden et al., 2018)

Conducting authentic therapeutic consultations, supervised by doctors who gave constructive feedback, helped Dutch students learn to develop implementable therapeutic plans for real patients. (van Unen et al., 2012)

Volunteer US students were trained in motivational interviewing and peer mentoring. Under the supervision of physicians, pharmacists and diabetes educators, they discussed patients' glycaemic control weekly by phone and adjusted patients' long acting insulin doses based on a protocol. Students were also paired with patients whose diabetes was uncontrolled to give individualised advice and explore barriers to compliance. Participants learned about barriers to clinical compliance, and ways to address these barriers. They received positive affirmation from patients directly or from the patients' clinical results. (Johnson et al., 2017)

**CURRICULUM DESIGNS OFFERING COMPREHENSIVE OPPORTUNITIES TO CONTRIBUTE**

**Interprofessional training wards**

In Germany, (Scheffer et al., 2010) Denmark, (Jakobsen, Larsen and Hansen, 2010) and Sweden, (Hallin and Kiessling, 2016a) medical students, together with students of other professions, were given primary responsibility for the care of hospitalised patients in dedicated training wards. Qualified health professionals, who supervised them, identified students’ educational goals, helped them make clinical decisions, evaluated progress, and gave regular feedback. Students in these settings ran ward rounds, made decisions, performed clinical tasks, and presenting patients at interprofessional meetings. They developed practical capability and identified as (future) professionals.

**Longitudinal clinical placements**

US students in prolonged clinical attachments took on doctor-like roles and contributed directly to patients’ care. This was helped by supervisors who behaved respectfully towards them, endorsed their legitimacy, and encouraged them to be independent. (Hauer et al., 2012)

**Student-run clinics**

US students, supervised by family physicians, internists, and paediatricians ran an integrated, patient centred, multi-disciplinary clinic. They made clinical decisions, followed patients up by phone between appointments, and helped patients navigate hospital appointments. This increased students’ self confidence in teaching self-care, providing continuity of care, and managing care for high-risk patients. Students valued having continuing relationships with patients. (Henschen et al., 2013)

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**Real patient learning**

RPL is the reflective process by which students find meaning in clinical encounters. This is central to ExBL. It links prior learning to memorable patients. It restructures, consolidates, reinforces, and contextualises students’ existing capabilities. As a result, students understand the scope and complexity of disease and link theory with practice. The more experience and RPL students have the better because this builds up the repertoires of mental images and schemas on which doctors rely. RPL is best described by giving examples, which Table 7 does.

RPL thrives on support to students’ reflective learning. With due regard to a patient’s sensitivities, a clinician may motivate a student to reflect even while the patient is still in the consulting room. Clinicians may also support reflection by debriefing students after patients have left or by facilitating discussion within groups of students, perhaps also involving residents. Attentive clinicians encourage students to put their thoughts and feelings into words. Doing so turns partially formed impressions, questions, anxieties, and positive emotions into more concrete and explicit thoughts and feelings, on which students can continue to reflect as they build up their repertoire of capabilities. Clinician-educators also help students handle negative emotions caused by, for example, observing a patient being told they will die. In our research, compassionate clinicians helped students address difficult emotions as part of their identity development. (Dornan et al., 2015)
Table 7: Topics for reflective debriefing on supported participation

<table>
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<tr>
<th>Experiences of:</th>
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<tbody>
<tr>
<td><strong>Activities and events</strong></td>
</tr>
<tr>
<td>Interactions with patients, their families, and health professionals; caring and clinical management; illness, disease, death</td>
</tr>
<tr>
<td><strong>People</strong></td>
</tr>
<tr>
<td>Patients as whole people, not just diseases; patients’ and their families’ reactions to disease; relationships with patients and staff</td>
</tr>
<tr>
<td><strong>The temporal dimension of medicine</strong></td>
</tr>
<tr>
<td>How diseases progress and/or respond to treatment, how diagnoses unfold, and how doctors revise investigation and management plans over time</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Students’ states of mind:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeling involved in practice; being trusted, confided in, responsible, useful; identifying with patients and professionals; the rewards and challenges of caring for patients</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Consolidating and applying to real life:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intellectual, practical, and affective capability</td>
</tr>
<tr>
<td>The language of practice</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Self-reflective topics:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oneself; one’s reactions to others; one’s professional identity; one’s practical and affective capabilities; one’s aspirations</td>
</tr>
</tbody>
</table>
Table 8: Promoting reflective RPL - best practice from around the world

**ExBL IN LONGITUDINAL CURRICULUM DESIGNS**

**Longitudinal integrated clinical clerkships**

A South African student on a longitudinal rural placement said: ‘It is excellent. You sit in outpatients or casualty, if you are not working in the wards, and the patients come ... each with their own complaints and problems, and it teaches you really how to think of somebody as a whole. Not as a woman with a uterus and a baby in it, but she also has a heart and lungs and a gastrointestinal tract and everything else can also be sick. I think it is more of a holistic approach instead of a systems-based one.’ (Voss et al., 2015)

A Canadian study showed how contributing to the care of individual patients over time encouraged students to reflect on management decisions. Meeting patients’ expectations and responding to their trust fostered students’ sense of responsibility. Being assigned challenging patients (for example, perpetrators of child abuse) showed students that it can sometimes be hard to feel empathy and maintain non-judgemental attitudes. (Asgarova, Mackenzie and Bates, 2017)

Being part of a clinical team in a South African rural setting, where they contributed to patient care, showed students it was more important to have a systematic approach to patients than to ‘know everything in the whole wide world’. (Van Schalkwyk et al., 2014)

**Longitudinal mentoring**

Clinician-educators supporting Canadian student groups’ reflective learning longitudinally over time created a ‘safe’ (non-hierarchical) space for guided critical reflection and identity formation. (Boudreau, Macdonald and Steinert, 2014)

A US peer continuity scheme, facilitated by faculty, promoted reflective RPL following a range of participatory experiences; peers learned from each other about patient cases and updated one another about patients’ progress. (Chou and Teherani, 2017)

**ExBL DURING THE PRE-CLERKSHIP PHASE OF CURRICULA**

Dutch pre-clerkship students, who debriefed reflectively in facilitated small groups on their experiences of working as assistant nurses in elderly care homes, described how they had thought back over, or discussed with others, situations that aroused strong emotions. (Helmich et al., 2011)

Interviewing, examining, and presenting patients encouraged US students to tease out, piece together, integrate, and construct interpretations of patients’ illnesses; realising they could be of value to patients increased students’ motivation to learn. (Dyrbye, Harris and Rohren, 2007)

**LEARNING BY PROVIDING COMMUNITY SERVICE**

Volunteer doctors in Singapore, who reflectively debriefed students on their experiences of supporting underserved patients, helped students develop practical capabilities to practise in the community, improved their understanding of ethical issues and critical thinking, and influenced students’ future career choices. (Liang En, Koh and Lim, 2011)

**INTERPROFESSIONAL CLINICAL TEACHING WARDS**

Group reflection helped medical, nursing, and other healthcare students recognise how their experiences of providing real patient care on a Swedish interprofessional training ward were positively influencing their self-confidence, self-knowledge, and belief in their ability to be good professionals in the future. (Hallin and Kiessling, 2016a)

**SOCIAL SUPPORT IN CLERKSHIPS**

Feeling recognized and part of the health care team helped US students figure out what to do during clerkships, how to do it, where to be, and why things were done the way they were; this made them more confident to interact with patients and professionals and helped them learn time management. (Han, Roberts and Korte, 2015)

Residents helping Dutch students set goals and asking them questions helped students learn reflectively from RPL. Longer attachment to individual supervisors during rotation-based clerkships, and being known personally by supervisors, increased Dutch students’ readiness to learn from feedback. (Berkhout et al., 2015; Berkhout et al., 2017)
Capability

Supported participation and RPL result in students knowing, being skilled, and feeling. Formal terms for these attributes are intellectual capability, practical capability, and affective capability. The term capability highlights that there is no endpoint; doctors continue to learn intellectually, practically, and affectively throughout their careers. Subtypes of knowing, being skilled, and feeling, are shown in Table 9 and discussed below. These defy precise classification because they are complex, individual, different on different occasions, and overlapping. Nevertheless, having labels for them helps educate students. Because the subtypes have fuzzy boundaries, the labels we use and examples we quote are archetypes rather than definitions that precisely distinguish one (sub-) type of capability from another.

A striking finding of the evidence is that ‘experience’ is an important outcome of supported participation and RPL. It has been suggested in recent years that passing tests of competence is a more important arbiter of career progression than having spent a specific amount of time learning the job. It is true that being experienced without being competent would not be satisfactory but being competent without being experienced is not satisfactory either. Another striking finding of the evidence is that emotions are a very common outcome of ExBL. Knowing and being skilled, this suggests, are not very useful if students do not have the identity of a doctor-to-be, a positive mood, motivation and confidence, positive emotions towards patients and fellow professionals, and professional attitudes and values.

Intellectual capability: knowing

Unlike the type of knowledge that is tested in exams, the knowing that results from participation and real patient learning is an integrated understanding of how to become and be a doctor, the contexts in which doctors practise medicine, and how practice is organised. The subtypes of intellectual capacity are applied knowledge and reasoning skills. (Table 9)

Practical capability: being skilled

Practical capability is a set of observable behaviours. One subtype is clinical skills - behaviours that directly affect patients. The other subtype is self-management skills - behaviours that help students and doctors organise their work and learning. (Table 9)

Affective capability: feeling

Many different aspects of one’s state of mind contribute to being a good doctor. These aspects are closely linked to values and emotions and include thoughts about oneself, one’s duties, and other people. Like knowing, but unlike being skilled, affective capability is not primarily an observable behaviour, though it influences behaviour. The subtypes are mood (eg satisfaction, reward, anxiety, anger), confidence and motivation, identity (eg feeling you are becoming a doctor, that you belong in clinical settings, and that you have the right to care for patients), attitudes and values (eg being idealistic, respectful, collaborative, and having a sense of responsibility), and affects towards others (eg empathy, compassion); see Table 9. Our earlier publication contains a more detailed description of affective capability and factors that influence this. (Dornan et al., 2014)

Promoting capability - helping students put learning into words

Helping students learn clinical skills is perhaps the least controversial component of the ExBL pedagogy. Capabilities that are not directly observable (applied knowledge, reasoning skills, self-management skills, and the whole range of affective capabilities) can’t really be taught. Students learn non-observable capabilities by reflecting on experience. Clinicians help students do this by encouraging them to put their thought processes into words, asking probing questions, and offering well-judged nuggets of information and advice: cognitive apprenticeship. (Stalmeijer, 2015)
Perhaps the greatest blind spot in medical education is supporting students’ development of affective capability. (Shapiro, 2011) Clinician-educators must be sensitive and self-aware if they are to draw students into conversations about their mood, motivation, confidence, attitudes and values, emotions towards other people, and identity. These are the most important conversations that students never have with their clinical supervisors. Table 7 suggests topics that could be raised in such conversations.

Table 9 presents the ExBL capability framework. Table 10 gives detailed examples from around the world. This shows that capabilities resulting from ExBL are many and varied, and often complex and contextualised. It shows how observing, rehearsing, and contributing help students develop different capabilities. It shows how different curriculum designs, specialties, and practice contexts, as well as individual clinicians’ behaviours, influence students’ learning. It gives motivated clinicians a menu of possibilities.

### Table 9: Types of capability

<table>
<thead>
<tr>
<th>Type of capability</th>
<th>Subtype</th>
<th>Topics</th>
</tr>
</thead>
</table>
| Practical (Being skilled) | Clinical skills | Some examples:  
• Communication, relationship, and collaboration skills  
• Physical examination skills  
• Procedure skills  
• Skills of organising and navigating practice |
| | Self-management | Being able to organise one’s own learning, including transitions between learning contexts  
Being able to organise one’s work |
| Intellectual (Knowing) | Practical knowledge | Reasoning |
| | Mood | Positive moods: Feeling ...  
• Happy  
• Honoured  
• Inspired  
• Proud  
• Reassured  
• Rewarded  
• Safe  
• Satisfied |
| | Motivation and confidence | Feeling:  
Accomplished  
Confident  
Motivated  
Self-efficacious  
Reassured  
Rewarded  
Safe  
Satisfied  
Frustrated  
Sad  
Stressed  
Vulnerable |
| | Other-directed emotions | Feeling:  
Empathic  
Compassionate  
Recognising/responding to fear, dislike and other negative other-directed emotions |
| | Attitudes and values | Being:  
Caring  
Collaborative  
Non-judgemental  
Recognising: Boundaries Limits  
Respectful  
Responsible  
Self-aware  
Demonstrating: Personal values Positive attitudes |
| | Identity | Feeling that you  
Have the right to care for patients  
Belong in clinical settings  
Are becoming a doctor |
<table>
<thead>
<tr>
<th>Affective</th>
<th>Observing</th>
<th>Rehearsing</th>
<th>Contributing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outcome</strong></td>
<td><strong>Experience</strong></td>
<td><strong>Outcome</strong></td>
<td><strong>Experience</strong></td>
</tr>
<tr>
<td>Satisfaction&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Actively observing outpatient consultations</td>
<td>Satisfaction, but also sadness, powerlessness, vulnerability, fear&lt;sup&gt;5,6&lt;/sup&gt;</td>
<td>Talking to patients about illness</td>
</tr>
<tr>
<td>Elevation&lt;sup&gt;2&lt;/sup&gt;</td>
<td>Observing doctors being compassionate</td>
<td>Talking to patients about illness</td>
<td>Reward&lt;sup&gt;14&lt;/sup&gt;</td>
</tr>
<tr>
<td>Excitement and sadness&lt;sup&gt;3&lt;/sup&gt;</td>
<td>Observing an unsuccessful resuscitation attempt</td>
<td>Pride&lt;sup&gt;27&lt;/sup&gt;</td>
<td>Pre-prescribing</td>
</tr>
<tr>
<td>Reduced anxiety; reassurance&lt;sup&gt;4,5&lt;/sup&gt;</td>
<td>Shadowing residents; seeing they need to look up information</td>
<td>Ability to handle own emotions&lt;sup&gt;24&lt;/sup&gt;</td>
<td>Providing care in nursing homes</td>
</tr>
<tr>
<td><strong>Method</strong></td>
<td><strong>Observing</strong></td>
<td><strong>Experience</strong></td>
<td><strong>Contributing</strong></td>
</tr>
<tr>
<td>Confidence to assert learning&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Actively observing outpatient consultations</td>
<td>Confidence to approach patients&lt;sup&gt;6,12,25&lt;/sup&gt;</td>
<td>Talking to patients about illness and interviewing/examining/presenting</td>
</tr>
<tr>
<td>Confidence and preparedness&lt;sup&gt;6&lt;/sup&gt;</td>
<td>Observing residents during a transition to practice attachment</td>
<td>Confidence&lt;sup&gt;26&lt;/sup&gt;</td>
<td>Practicing clinical skills</td>
</tr>
<tr>
<td>Motivation&lt;sup&gt;14&lt;/sup&gt;</td>
<td>Observing a specialty that interested a student; being asked questions and being able to ask them</td>
<td>Motivation&lt;sup&gt;11,13,24,41,42&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Compassion&lt;sup&gt;17&lt;/sup&gt;</td>
<td>Observing doctors being compassionate</td>
<td>Tenderness and respect&lt;sup&gt;21&lt;/sup&gt;</td>
<td>Interviewing patients</td>
</tr>
<tr>
<td>Collaborativeness&lt;sup&gt;1,3&lt;/sup&gt;</td>
<td>Observing doctors being collaborative; being welcomed into operating theatres</td>
<td>Responsibility&lt;sup&gt;25&lt;/sup&gt;</td>
<td>Suggesting management plans</td>
</tr>
<tr>
<td>Fallibility&lt;sup&gt;2&lt;/sup&gt;</td>
<td>Observing doctors admitting they don't know</td>
<td>Acknowledging own limitations; self-awareness&lt;sup&gt;26&lt;/sup&gt;</td>
<td>Interviewing/examining/presenting patients</td>
</tr>
<tr>
<td>Respect&lt;sup&gt;8&lt;/sup&gt;</td>
<td>Being welcomed into operating theatres</td>
<td>Holistic attitude&lt;sup&gt;28,29,30&lt;/sup&gt;</td>
<td>Talking about illness; seeing palliative care patients serially; writing reports on home visits to elderly people</td>
</tr>
<tr>
<td>Awareness of own identity development&lt;sup&gt;6&lt;/sup&gt;</td>
<td>Being debriefed on traumatic experiences</td>
<td>Awareness of own identity development&lt;sup&gt;3,12&lt;/sup&gt;</td>
<td>Interviewing/examining/presenting patients</td>
</tr>
<tr>
<td><strong>Identity</strong></td>
<td><strong>Awareness of a doctor’s practice</strong></td>
<td><strong>Observing practice that is interesting</strong></td>
<td><strong>Legitimacy</strong>&lt;sup&gt;3,23&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Observing</strong></td>
<td><strong>Experience</strong></td>
<td><strong>Contributing</strong></td>
<td></td>
</tr>
<tr>
<td>Legitimacy&lt;sup&gt;3&lt;/sup&gt;</td>
<td>Actively observing doctors’ work</td>
<td>Legitimacy&lt;sup&gt;23&lt;/sup&gt;</td>
<td>Talking to patients about illness; interviewing/examining/presenting patients</td>
</tr>
<tr>
<td>Membership&lt;sup&gt;3&lt;/sup&gt;</td>
<td>Being asked questions and being able to ask them</td>
<td>Membership&lt;sup&gt;3&lt;/sup&gt;</td>
<td>interviewing/examining/presenting patients</td>
</tr>
</tbody>
</table>
Table 10. Becoming capable: best practice around the world... Cont’d

<table>
<thead>
<tr>
<th>Intellectual Knowledge</th>
<th>Observing</th>
<th>Rehearsing</th>
<th>Contributing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness of knowledge gaps; linking theory to practice; understanding unfamiliar subject matter; contextualising information</td>
<td>Observing practice, including surgery; being able to ask questions about what they had observed</td>
<td>Theory linked to practice; linking theory to practice; Awareness of knowledge gaps</td>
<td>Adjusting patients’ insulin doses; pre-prescribing</td>
</tr>
<tr>
<td>Understanding patient’s whole story</td>
<td>Physicians briefing students about patients’ histories and viewing patients’ charts</td>
<td>Understanding personal preferences</td>
<td></td>
</tr>
<tr>
<td>Understanding of holistic practices</td>
<td>Being paired with patients; visiting them at home and attending clinics with them</td>
<td>Seeing palliative care patients repeatedly</td>
<td>Providing care in nursing homes; providing care on teaching ward</td>
</tr>
<tr>
<td>Decision-making skills</td>
<td>Observing interactions and hearing doctors’ spoken thoughts</td>
<td>Diagnostic and planning skills</td>
<td>Consulting in clinics</td>
</tr>
<tr>
<td>Critical thinking</td>
<td>Hearing doctors dictate chart entries and talk with other professionals</td>
<td>Relationship-building skills</td>
<td>Adjusting patients’ insulin doses; informing and emotionally supporting patients; providing care in nursing homes; taking responsibility</td>
</tr>
<tr>
<td>Ability to detect abnormal findings</td>
<td>Interviewing/examining/presenting patients</td>
<td>Intimate examination skills; putting nervous patients at ease; making a therapeutic plan; suturing</td>
<td>Consulting; assisting surgery</td>
</tr>
<tr>
<td>Time management and workplace learning skills</td>
<td>Observing practice</td>
<td>Relationship-building skills; taking openly about disease; consultation style</td>
<td>Navigating professional environments; ability to dictate notes; making team-based management decisions</td>
</tr>
<tr>
<td>Self-management skills</td>
<td>Observing other students being taught</td>
<td>Practising patient-related tasks, including Interviewing/examining/presenting patients</td>
<td>Performing simple procedures; running ward rounds; providing care on teaching ward</td>
</tr>
<tr>
<td>Reflective skills</td>
<td>Observing doctor-patient relationships</td>
<td>Managing learning environment</td>
<td>Performing simple procedures</td>
</tr>
</tbody>
</table>

Practical guidance

**Fig 4. Patients’ and students’ contributions to ExBL.**

<table>
<thead>
<tr>
<th>Support</th>
<th>Participation</th>
<th>Real patient learning</th>
<th>Capability</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Curriculum development</strong></td>
<td>‘On the day’</td>
<td>During and after the experience</td>
<td></td>
</tr>
<tr>
<td>Advising leaders which capabilities students should develop and how to develop these.</td>
<td>Reciprocating support by rising to the challenges of participating</td>
<td>Reflecting on their real patient learning and further developing capabilities</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supporting students’ participation</td>
<td>Stimulating reflection</td>
<td></td>
</tr>
<tr>
<td><strong>Preparing</strong></td>
<td>Experiencing</td>
<td>Reflecting</td>
<td>Performing</td>
</tr>
</tbody>
</table>

**SPaRC**

**Implications for patients and students**

Patients’ main contribution is to co-participate with students during clinical encounters. Students’ main contributions are to build relationships with clinicians, participate actively in practice, learn reflectively, and develop their capabilities as a result of this. Progressive curricula may involve lay people and students in curriculum development, inviting them to help leaders decide what capabilities students should develop and how they should do so.

**Implications for clinicians**

The answer to a clinician’s question: ‘How should I teach medical students when they are placed on my unit, during the procedures I perform, on our ward, or in my consulting room?’

Is:

Support students’ participation in clinical practice; help them step outside their comfort zone, learn reflectively from doing so; and become more capable.

Your most important contribution may be informal and apparently small such as welcoming students and orientating them to your practice.

The subject matter of students’ RPL is closely related to practice rather than arcane knowledge or ruses to pass OSCEs. Stay within the ‘messiness’ of real practice, where ‘right answers’ are often conspicuously absent and courses of action are chosen collaboratively between patients and those who care for them. Fig 5 lays this out this advice along the timeline of a short encounter between a clinician and a student and Table 11 specifies many different ways of putting it into practice.
How clinician-educators can help students learn from supported participation in practice

<table>
<thead>
<tr>
<th>Beforehand</th>
<th>On the day</th>
<th>Afterwards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Help students socialise into practice; advise how to structure experience and learn from it</td>
<td>Relate to students</td>
<td>Encourage reflective learning by debriefing; help students verbalise thoughts/feelings, and identify capabilities; plan new learning</td>
</tr>
<tr>
<td>Train students in skills that will help them participate (e.g. simulation)</td>
<td>Brief them</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Obtain patients’ consent</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Model practice</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Empower/manage co-participation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Train</td>
<td></td>
</tr>
</tbody>
</table>

Where possible, support reflective learning within the triad

**Prepare**
- Check student’s capability
- Check patient’s problem
- Ask patient’s consent
- Brief student
- Set up how student will

**Observe**
- Rehearse
- and/or Contribute

**Prepare**

**Ensure and model**
- Exemplary patient care

**Empower**
- Student and patient to co-participate

**Support reflection**
- Help student verbalise RPL
- Help student identify, and reinforce, new capability and identity
- Help student identify learning goals and ways of achieving these

<table>
<thead>
<tr>
<th>Preparing</th>
<th>Experiencing</th>
<th>Reflecting</th>
</tr>
</thead>
</table>
### Table 11: Supporting participatory learning

#### Relating to students
- Get to know students, acknowledge them as individuals, make them feel invited and valued, and don’t allow them to feel uninvolved, in the way, or a burden.
- Reduce hierarchical distance between clinician, student, and patient.
- Use relationships with students to create a comfortable and relaxed climate for patients.
- Use language that students understand and causes them minimal discomfort.
- Be generous with time: listen, explain, question, make suggestions, chat.
- Observe students. Are they happy, sad, or anxious? Ask how they are feeling. Don’t be afraid to say how you are feeling. Model emotional awareness and openness.
- Relate intellectually as well as socially: think out loud; scaffold students’ understanding of what they are experiencing.
- Treat students as junior colleagues; inspire them with your enthusiasm and love of education.

#### Briefing students
- Find out their capability (often they will understate it) so you can meet their learning needs.
- Help them choose learning goals and ways of achieving these.
- Tell them what to expect of you and what you expect of them.
- Orientate them before participation begins.

#### Practising within the educational triad
- Obtain patients’ consent for a student to be present and ensure the student knows you have done so.
- Handle sensitive consultations carefully so you involve students (if patients are willing) to patients’ benefit rather than harm.
- Be open, willing, friendly, kind, and helpful towards patients.
- Model the attributes of a good doctor; be clinically skilled, respectful and well mannered; demonstrate positive attitudes towards patients’ families and fellow staff.
- Empower students and patients to co-participate by, for example, giving a student a task and asking a patient to join you in giving constructive feedback.
- Use physical examination as an opportunity for students to come close to patients and overcome inhibitions.
- Ask students to present patients’ problems, propose and justify different explanations for and approaches to these, and choose between them; think out loud about your own approach.
- Seize ‘teachable moments’.

#### Managing the dynamics of observing, rehearsing, and contributing within the educational triad

##### Some general rules
- Tailor your education to students’ capability and patients’ problems.
- Observing provides breadth; rehearsing provides depth; contributing confers legitimacy.
- Use rehearsal for students to learn how to participate.
- Whenever possible, turn observing to rehearsing, and rehearsing into contributing; involve students at the highest level their capability allows, given the situation at hand.
- Respond flexibly to changes in clinical situations so students participate, throughout, at the appropriate level.

##### Managing interactions
- Broker students’ interactions with patients and other clinicians.
- Judge which rung of the ladder of participation gives the appropriate degree of challenge and negotiate this with patient and student.
- Match the challenge with the appropriate support.
- Encourage students to participate in pairs so they learn simultaneously and support each other’s learning.

##### Observing
- Use observation to give students a breadth of learning.
- Encourage students to observe situations they are not yet ready to perform or are too complex for any students to rehearse or contribute.
- Consider giving students written guidance about what to observe, when, and how.
- Make it possible for the student to be present and comfortable about being there.
- Activate observation by engaging students in talk; scaffolding their learning, inviting them to think out loud, asking them questions, and probing their thoughts and feelings to stimulate.
- Arrange the furniture so everyone can make eye contact and feel included.
- Ensure conversations are triadic, in which both patients and students speak and know they are listened to.
- Detail students to observe how you, residents, and other professionals practise and report on this.
- Promote active participation by, for example, asking a patient to follow up a patient’s investigations and discuss their results with you.

##### Rehearsing and contributing
- Empower student and patient to co-participate by, for example, giving the student a task and asking the patient to join you in giving constructive feedback. The student may:
  - Carry out part or all of a patient interview and/or physical examination.
  - Conduct complete outpatient consultations or review inpatients then present the patient and the provisional management plan.
- Provide opportunities for students to assist in operating theatres.
- Provide opportunities for students to summarise previous records and/or investigations of complex patients.
- Find opportunities for students to perform procedures they have learned.
- Detail students to assemble information, organise aspects of care, and communicate with patients and professionals on your behalf.
- Manage time pressures by, for example, using students’ attentive communication with patients to buy yourself time to disengage, seek information, and make essential phone calls.
- Detail students to assemble information, organise aspects of care, and communicate on your behalf.
Table 11: Supporting participatory learning ... Cont’d

Debriefing students (See tables 7 & 8 for ways of encouraging reflection)

- With due regard to patients’ sensitivities, stimulate students to reflect while participating in practice
- Support students’ reflective learning by helping them verbalise RPL
- Help student identify (and reinforce) new capability and identity
- Encourage students to put their thoughts and feelings into words so they turn partially formed impressions, questions, anxieties, and positive emotions into concrete and explicit thoughts and feelings on which they can continue to reflect
- Ask students to interpret patients’ problems, propose and justify different approaches, and choose between them
- Invite students to comment critically on your practice
- Summarise your conversation and reinforce take-home messages
- Advise students how to structure future experience and learn from it; suggest alternative ways of rehearsing tasks and transfer capability into authentic practice
- Ask students about their study habits; suggest alternatives

Implications for placement leaders

Leadership is key to the success of clinical placements. Leaders provide organisational, pedagogic, and affective support, but may do so at arm’s length rather than at the individual level

Key questions for placement leaders to answer are:
- What opportunities to participate can this placement offer?
- What capabilities can students develop from those opportunities?
- How can we support students’ participation and development of those capabilities?

Table 12 lists a set of answer to those questions.

Table 12: Making placements supportive

<table>
<thead>
<tr>
<th>Provide leadership</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engender a supportive climate that prioritises education and values students</td>
</tr>
<tr>
<td>Provide pedagogic expertise that optimises students’ ExBL</td>
</tr>
<tr>
<td>Ensure students have space and learning resources (books, elearning etc)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Organise students’ education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrate students into your clinical team so they can participate in its activities</td>
</tr>
<tr>
<td>Arrange individual and group learning activities to support students’ ExBL, for example:</td>
</tr>
<tr>
<td>Group briefing and debriefing</td>
</tr>
<tr>
<td>Skills training</td>
</tr>
<tr>
<td>Seminars and tutorials</td>
</tr>
<tr>
<td>X-ray meetings and case conferences</td>
</tr>
<tr>
<td>Identify activities that provide participatory opportunities; particularly ones that allow students to contribute</td>
</tr>
<tr>
<td>Organise clinical schedules so they optimise learning opportunities</td>
</tr>
<tr>
<td>Ensure clinical staff are accessible to students; for example, list contact details</td>
</tr>
<tr>
<td>Plan for students to socialise into your practice, including its language</td>
</tr>
<tr>
<td>Schedule students’ activities and ensure this is communicated</td>
</tr>
<tr>
<td>Arrange for students to attend clinical activities in numbers that optimise participation</td>
</tr>
<tr>
<td>Ensure students have ample, supported 1:1 interactions with patients</td>
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<tr>
<td>Attach students to clinicians with appropriate attitudes and skills</td>
</tr>
<tr>
<td>Encourage students to present patients on ward rounds or clinical conferences, attend operations or other procedures, and participate as fully as is feasible</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Welcome students and orientate them to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical activities and the learning opportunities these provide</td>
</tr>
<tr>
<td>People who will support their learning, and their roles</td>
</tr>
<tr>
<td>Intended learning outcomes and ways of achieving these</td>
</tr>
<tr>
<td>Sources of personal and pedagogic support and guidance (supervision and mentoring)</td>
</tr>
</tbody>
</table>

Implications for curriculum leaders

Key questions for curriculum leaders are:
- What capabilities do you want students to develop?
- How can you plan and resource students’ ExBL to ensure they develop these capabilities?

The general principles of support at curriculum level were summarised in Tables 3 & 4 and elaborated upon in an earlier publication. Finer details vary greatly between curricula so we simply re-emphasise important implications here. Just as patients, students, clinicians, and placement leads must
be committed to humane values and clinical excellence, curriculum leaders should provide affective and pedagogic leadership to all stakeholders. The brunt of organisational leadership, and of resourcing students’ education falls on curriculum leaders, including a responsibility to:

- Blueprint intended learning outcomes and educational methods, so students, clinicians, and placement leaders are clear about the goals of the curriculum
- Identify, and provide access to an appropriate breadth and depth of experiences
- Balance the numbers of students sent to individual placements to the numbers of staff and patients to optimise participation
- Ensure that students’ experiences are logically sequenced so they develop requisite capabilities incrementally
- Train clinicians
- Ensure the requisite facilities and learning resources are available
- Evaluate and quality-improve students’ learning

**Implications for faculty developers**

This Guide has been written with faculty developers in mind. Space precludes a lengthy discussion of the faculty development implications of ExBL, though we hope it will provide a rich resource. We list, here, some guiding principles that, we suggest, would make faculty development most effective:

- Help clinician-educators learn to educate, rather than teach them to teach
- Help clinician-educators learn educational practice, first and foremost, rather than facts
- Use theory discretely to explain principles and practice; don’t blind clinicians with education science
- Align educational practice with clinical practice; don’t divorce them
- Be pragmatic and simple, but not simplistic
- Make faculty development practical and experiential using, for example, role play
- If you help clinicians develop part-task skills (for example debriefing), encourage them to think how they will implement these within their everyday practice
- Involve all members of the ExBL triad if at all possible:
  - Students make essential contributions to faculty development
  - Involve real patients because they are key stakeholders;
- Help students and faculty learn educational skills together
- Respect participants’ clinical realities and be adaptable to these

**Problems and pitfalls**

We have written this Guide in optimistic language but are under no illusions about the difficulty of achieving what we have advocated. Not all clinicians and leaders have positive attitudes towards students and their education. Even if they do, they may lack the capability to make ExBL work as we have described. They may find it hard to reconcile their responsibilities to students and patients simultaneously and, as a result, give patient care a higher priority than education. Not all clinical practice goes smoothly, which can make it even harder to balance clinical duties with educational duties in today’s hard-pressed health services. Students may find it difficult to adapt to new learning environments, particularly when they rotate between different ones. They may have difficulty taking responsibility for their own learning, fail to engage, or be overtly resistant. Not all patients are willing for students to participate in their care, which may be more of a problem in private than public healthcare.

There are two antidotes to these problems and pitfalls: a relentlessly positive attitude (because positive attitudes make success more likely and negative attitudes make failure more likely); and continuous curriculum quality improvement. Rather than regarding a curriculum as actually, or even potentially, perfect, we suggest that staff, students, and patients should aim for a ‘best fit’ to local circumstances and resources. Curricula can always be improved and should, therefore, be evaluated; the next section provided an audit tool to do this.
Evaluating ExBL

The section entitled ‘From complicated to complex’, earlier, explained that an important theoretical underpinning of ExBL is complexity science. ExBL does not assume that relationships between support and participation, participation and RPL, and RPL and capability are simple. Human beings have free will, after all, and are at liberty to respond in different ways from the ones you intend. But creating favourable conditions makes it more likely that favoured outcomes will occur. The main benefit of thinking this way is it predicts that even small changes in the conditions under which students are educated can make big differences to their learning. It was this type of thinking that led the medical education community to become interested in learning environments. A well-designed learning environment, so the reasoning goes, helps students find energy within themselves to learn. Meeting an inspirational clinician, for example, can release so much energy in a student that a brief educational encounter changes their whole career. Or, regrettably, being humiliated by a clinician can lead to a student leaving medicine.

It may seem that the best way of evaluating ExBL would be to examine students’ exam results. It has been eloquently argued, however, that the ‘law of unintended consequences’ makes this an invalid measure. Here’s why. Students on poor clinical placements have nothing better to do than read books, which helps them score well in exams but not necessarily become capable doctors. (ten Cate, 2001) Good placements help students become capable doctors and, hopefully, motivate them to read books as well. Exams test book-reading and skills, not the broader attributes that make students capable doctors. So, we evaluate learning environments on the basis that placing students in appropriate ones will energise their intrinsic motivation and capability, whilst simultaneously providing them with rich opportunities from which to learn.

There are various ways of evaluating learning environments. (Soemantri, Herrera and Riquelme, 2010), all of which ask students to rate a number of items on numerical scales. One evaluation instrument was developed specifically to evaluate ExBL. Named the Manchester Clinical Placement Index (MCPI – Table 13), this was derived from precisely the same theoretical and empirical underpinnings as ExBL itself. (Dornan et al., 2012) It is short, having just eight items; and it asks students to give written comments, telling evaluators why learning environments are more or less good and how to improve them. MCPI was developed in a programme where students spent large amounts of time in community-located, primary care placements as well as hospital placements and is therefore valid for use in both community and hospital settings.

Research has shown that the MCPI has at least as good reliability as an alternative, widely used scale, (Kelly et al., 2015) which asks students to rate six times as many items and risks causing evaluation fatigue. MCPI’s 8 items provide two subscale measures as well as an aggregate measure. One subscale measures the quality of the learning environment itself (leadership of the placement, reception to it, supportiveness of the staff, and quality of facilities and resources). The other subscale, termed ‘training’, measures the quality of support given to students’ rehearsing and contributing (instruction, observation, and feedback). We suggest that MCPI is a logical first choice for readers of this Guide wishing to evaluate ExBL.
**Table 13: Manchester Clinical Placement Index (MCPI)**

**Leadership**
There is leadership if one or more senior doctors (specialist, family practitioner, resident) take responsibility for your education

Please rate your agreement

(0 = strongly disagree; 3 = neither agree nor disagree; 6 = strongly agree) with this statement:

- **There was leadership of this placement**
- Please add comments to either or both of the next two boxes:
  - Strengths of leadership were ...
  - Weaknesses or ways leadership could be improved ...

**Reception/induction**
An appropriate reception is a welcome that includes an explanation of how the placement can contribute to your real patient learning

Please rate your agreement

(0 = strongly disagree; 3 = neither agree nor disagree; 6 = strongly agree) with this statement:

- **There was an appropriate reception to this placement**
- Please add comments to either or both of the next two boxes:
  - Strengths of the reception were...
  - Weaknesses or ways the reception could be improved ...

**People**
The support to your real patient learning from people (like doctors, secretaries, receptionists, nurses, and others) you met on the placement

Please rate your agreement

(0 = strongly disagree; 3 = neither agree nor disagree; 6 = strongly agree) with this statement:

- **I was supported by the people I met on this placement**
- Please add comments to either or both of the next two boxes:
  - Strengths of any/all of the people listed above were ...
  - Weaknesses of any/all of the people listed above or ways they could contribute more ...

**Instruction**
Clinical teaching may include instruction in how to perform clinical skills (like history taking, examination, practical procedures etc.) on real patients

Please rate your agreement

(0 = strongly disagree; 3 = neither agree nor disagree; 6 = strongly agree) with this statement:

- **I was instructed in how to perform clinical skills on real patients**
- Please add comments to either or both of the next two boxes:
  - Strengths of instruction were ...
  - Weaknesses or ways instruction could be improved ...

**Observation**
Clinical teaching may include teachers observing you perform clinical tasks on real patients

Please rate your agreement

(0 = strongly disagree; 3 = neither agree nor disagree; 6 = strongly agree) with this statement:

- **I was observed performing clinical tasks on real patients**
- Please add comments to either or both of the next two boxes:
  - Strengths of observation were ...
  - Weaknesses or ways observation could be improved ...
Table 13: Manchester Clinical Placement Index (MCPI) ... Cont’d

Feedback
Clinical teaching may include teachers giving you feedback on how you performed clinical tasks on real patients
Please rate your agreement
(0 = strongly disagree; 3 = neither agree nor disagree; 6 = strongly agree) with this statement:
I received feedback on how I performed clinical tasks on real patients
Please add comments to either or both of the next two boxes:
Strengths of feedback were ...
Weaknesses or ways feedback could be improved ...

Facilities
Your learning environment may include such things as space for students (to write notes, read, and be taught) and resources (books, computers or other materials) that support your real patient learning
Please rate your agreement
(0 = strongly disagree; 3 = neither agree nor disagree; 6 = strongly agree) with this statement:
This placement provided appropriate facilities
Please add comments to either or both of the next two boxes:
Strengths of the facilities were ...
Weaknesses or ways the facilities could be improved ...

Organisation of the placement
An appropriately organized placement is one whose teaching and learning activities are organized in a way that supports your real patient learning
Please rate your agreement
(0 = strongly disagree; 3 = neither agree nor disagree; 6 = strongly agree) with this statement:
This placement was appropriately organized
Please add comments to either or both of the next two boxes:
Strengths of organization were ...
Weaknesses or ways organisation could be improved ...

MCPI Scoring guide
Learning environment is calculated as a percentage according to the formula:
(Leadership + Reception + People + Facilities + Organisation) x 100/30%
Training is calculated as a percentage according to the formula:
(Instruction + Observation + Feedback) x 100/18%
Reliable measurements can be made by averaging the ratings of over 10 respondents. Free text responses can be used to explain numerical differences and identify strengths and weaknesses for quality improvement purposes.

ExBL into the future
ExBL arose from research, has guided research, and will continue to evolve as a result of research. We offer it to researchers, as well as educators, with the suggestion that it might be used in these ways:
• As a programme theory
  o For realist primary research, realist evidence synthesis, and other forms of qualitative evidence synthesis (Hannes, Macailtis and Hannes, 2012)
  o For design-based research,(Anderson and Shattuck, 2012) and for interventions guided by implementation science (Damschroder et al., 2009)
  o To guide educational interventions informed by behaviour change theory. (Michie et al., 2011)
  o To provide constructs for the development of evaluation instruments, of which the MCPI (Dornan et al., 2012; Kelly et al., 2015) is just one example
• To guide qualitative research
  o To provide sensitising insights for constructivist grounded theory (Ng, Lingard and Kennedy, 2013)
  o To provide an interpretive framework for framework analysis (Gale et al., 2013)
  o As an adjunct to thematic analysis (Braun and Clarke, 2006)

ExBL was developed in the context of medical student education, with the assumption that learners’ opportunities to contribute directly to practice are limited. We have not evaluated its applicability to residency education, nor to professions other than medicine. It was, however, designed to be a transferable theory and it is very likely it could be valuable to students of other health professions and at other stages of training. Exploring its transfer would be of interest. Even within medical student education, it would be useful to examine the strengths and limitations of ExBL within different medical undergraduate curriculum designs, at different stages in curricula, and in countries with different curriculum structures. The transferability of ExBL from the relatively similar educational cultures of Europe, North America, Australia and New Zealand to different educational cultures merits exploration.

ExBL, like medical curricula, will never be a perfect fit to every context but has been through three stages of development and is designed to evolve as a result of the improvement efforts of the workplace education community, to whom we commend it.
References


CRIPPE LD, HEDRICK DG, RAND KL, BURNS D, BANNO D, COTTINGHAM A (2017). Medical Students’ Professionalism Narratives Reveal That Experiences With Death, Dying, or Palliative Care Are More Positive Than Other Experiences During Their Internal Medicine Clerkship. The American Journal of Hospice & Palliative Care, 34(1) : 79–84.


JAKOBSEN F, LARSEN K, HANSEN TB (2010) This is the closest I have come to being compared to a doctor: views of medical students on clinical clerkship in an Interprofessional Training Unit. Medical Teacher, 32(9):399-406.


Appendix 1: Resume of literature review covering 2007-2018 inclusive

Review questions
• How did students participate and how did support enable them to do so?
• How did support help students turn participation, reflectively, into RPL?
• How did support help students turn RPL, reflectively, into capability?

Evidence gathering
Stakeholder consultation
We emailed the international panel of medical educators these questions:
• Please describe the level of undergraduate student involvement in clinical practice in the medical school/country where you work.
• Examples of curriculum structures include clerkships, longitudinal integrated clerkships, assistantships and so on. Please supplement this list with as many other terms as you can think of.
• Examples of pedagogies include clinical teaching, apprenticeship, experience-based learning, and so on. Please supplement this list with as many other terms you as you can think of.
• Are there any examples of good practice in your country or medical school that we might not know of and which might inform our Guide?

We tabulated their responses in a spreadsheet, imported these into NVivo (QSR, Australia), reviewed them as a group, coded terms, and categorized them into a themed set of descriptors of conditions, processes, and outcomes of medical students’ workplace learning.

Search strategy
Helped by a subject specialist librarian, we converted the descriptors into search terms, which we refined iteratively in the Medline database. We then extended the search to Embase, Scopus and Web of Science for the years 2017-18. Using four databases identified so many articles, so few of which were relevant, that we restricted the search for the years 2007-2017 to Ovid MEDLINE. Appendix 1 shows key features of the search strategy, using the ‘STARLITE’ checklist. (Booth, 2006) The final search syntax is shown in Appendix 2.

Article selection
The aspect of ExBL which had been least well described in earlier publications, and which we thought most needed detailed analysis, was how educators helped students participate in practice. We decided to focus the review on what we had described (Tim Dornan et al., 2014a) as ‘pedagogic and affective support at the individual interactional level’. The unit of analysis was one or more medical students learning within the triad of clinician, patient, and student. We applied a set of inclusion and exclusion criteria and progressively refined them to optimise sensitivity and specificity for informative data. The final set is shown in Appendix 3. The process of whittling the results of the search down to an informative set of full-text articles is summarised in Appendix 4 following the PRISMA convention.

As in earlier research, (Yardley and Dornan, 2011; Dornan et al., 2014) we evaluated the quality of research using a simple grading scheme devised by the Best Evidence Medical Education (BEME) collaboration. Because we were seeking practical relevance, we used these rubrics to grade quality: Grade 3 - The evidence is strong enough for me to forward to a colleague, suggesting they pilot it. Grade 5 - The evidence is strong enough for me to present at a curriculum committee and recommend implementing it in our curriculum. Grade 4 - The evidence lies somewhere between 3 and 5. Articles graded less than 3 were not included. Throughout the process of article selection, the authors worked collaboratively, resolving disagreements by consensus.
Progressive refinement of ExBL
ExBL continues to evolve. The model published in 2014 was a refined version of the 2007 model. This Guide further refines it, resulting from inclusion of new evidence and reconsideration by the authors of how ExBL can best be used as a pedagogic tool. To be specific, we have repositioned RPL as a reflective, intermediate process rather than an outcome, and replaced the word outcome with capability to emphasise that learning to be a doctor is a continuing process rather than one with a fixed endpoint. This decision, which resulted from selecting and analysing data, guided the way we extracted, data, which we now explain.

Data analysis
Using a simple analytic guide, we extracted information about support, participation, real patient learning, and capability from each article, identified causal links between these, and entered data into a spreadsheet. At this point, the authors split into three pairs to analyse the contents of the spreadsheet, examining the fit of the data to the existing ExBL model, with particular attention to findings that challenged or could improve the model. We identified informative case studies to include in the Guide. The spreadsheet containing this information provided content for the sections of the Guide that follow.

<table>
<thead>
<tr>
<th>Element</th>
<th>Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>Sampling strategy Comprehensive</td>
</tr>
<tr>
<td>T</td>
<td>Type of studies Any study design contributing to understanding of how medical students learn from real patients</td>
</tr>
<tr>
<td>A</td>
<td>Approaches Electronic database searching informed by international stakeholder consultation; articles suggested by stakeholders; articles identified opportunistically</td>
</tr>
<tr>
<td>R</td>
<td>Range of years Ovid MEDLINE: 2007 – May 2018 (period subsequent to development of ExBL model) Other databases: beginning of 2017 – May 2018</td>
</tr>
<tr>
<td>L</td>
<td>Limits English language articles</td>
</tr>
<tr>
<td>I</td>
<td>Inclusions and exclusions See Table 6</td>
</tr>
<tr>
<td>T</td>
<td>Terms used See Table 4: Medline Search Terms</td>
</tr>
<tr>
<td>E</td>
<td>Terms used Ovid MEDLINE; EMBASE; Scopus; Web of Science</td>
</tr>
</tbody>
</table>
Medline search terms

Database(s): Ovid MEDLINE(R) ALL 1946 to May 30, 2018
Search Strategy:

# Searches
1. students, medical/ or students, premedical/ or students, public health/  
2. "workplace learning".ti,ab.  
3. "real patient learning".ti,ab.  
4. [firm or firms].ti,ab.  
5. placement*.ti,ab.  
6. rotation*.ti,ab.  
7. attachment*.ti,ab  
8. "community based education".ti,ab.  
9. Clinical Clerkship/  
10. elective*.ti,ab.  
11. exp Preceptorship/  
12. "pre-intern".mp  
13. "pre-internship".mp  
14. Problem-Based Learning/  
15. [(experien* or contextual or situated) adj5 learning*].ti,ab.  
16. exp Models, Educational/  
17. apprenticeship*.ti,ab.  
18. "supervised patient care".ti,ab.  
19. [case* adj5 (consult* or present* or discuss*)].ti,ab.  
20. "task based learning".ti,ab.  
21. [clinical adj5 (supervision* or guidance*)].ti,ab.  
22. "one minute preceptorship".ti,ab.  
23. feedback*.ti,ab.  
24. shadow*.ti,ab.  
25. "guided observation".ti,ab.  
26. (learning adj5 peer*).ti,ab.  
27. [(bedside* or clinical*) adj5 (teach* or demonstrat*)].ti,ab.  
28. SNAPPS.ti,ab.  
29. "clinical discussion".ti,ab.  
30. "case based learning".ti,ab.  
31. ["whole task*" or "part task*" or instruct*].ti,ab.  
32. or/2-31  
33. 1 and 32

Inclusion and exclusion criteria

Inclusion criteria

Articles which described medical students’ learning in practice, within the triad of student, doctor/clinician-educator, and patient  
Conference abstracts, if sufficiently detailed to contribute

Exclusion criteria

Articles involving doctors after graduation/licensing  
Articles involving simulated patients or simulated settings  
Articles which did not involve learning from real patients, whether physically or ‘vicariously’ present  
Articles primarily focused on summative assessment  
Other branches of HPE; interprofessional education unless there was specific contributory information about medical students’ learning  
Articles focusing on curriculum which did not contribute information about supporting medical students’ learning at a pedagogic level  
BEME score less than three on quality grading  
Non-English language  
Full text not available
Search steps, summarised according to the PRISMA convention

**Identification**

- Records identified through database searching (n = 6623)
  - Duplicates removed (n = 1052)

**Screening**

- Records after duplicates removed (n = 5771)
  - Records excluded (n = 4925)
    - Assessment-focused (n=209)
    - Curriculum-focused (n=162)
    - Did not contribute to research question (n=2893)
    - Not real patient learning (n=675)
    - Postgrad/discipline other than medicine (n=87)
    - Simulation (n=336)
    - Interprofessional education (n=111)
    - Specialty focused (n=52)

- Records screened ('first pass') (n = 5771)
  - Records excluded (n = 659)
    - Assessment-focused (n=36)
    - Curriculum-focused (n=70)
    - Did not contribute to research question (n=342)
    - Not real patient learning (n=115)
    - Postgrad/discipline other than medicine (n=17)
    - Simulation (n=37)
    - Interprofessional education (n=12)
    - Specialty focused (n=12)
    - Not English language (n=19)
    - Further duplicates (n=4)

- Records screened ('second pass') (n = 846)

**Eligibility**

- Full text articles retrieved and assessed for eligibility ('third pass') (n = 183)
  - Records excluded (n = 70)
    - Curriculum-focused (n=6)
    - Did not contribute to research question (n=16)
    - Early clinical contact (n=6)
    - Not real patient learning (n=22)
    - Postgrad/discipline other than medicine (n=3)
    - Simulation (n=4)
    - Full text article unavailable (n=2)
    - Insufficient quality grading (n=12)

**Included**

- Studies included from database searching (n = 113)
  - Studies included from other sources (n = 11)
    - Opportunistic (n=8)
    - Stakeholders (n=3)
Apprenticeship: The 7-year attachment to a single ‘Master’, which taught medieval workers their craft and allowed them to enter a guild. This term has become less applicable to medicine as educational relationships in developed countries have involved more and more students and masters, interacting for shorter periods of time. The emphasis of apprenticeship, moreover, was primarily on performing tasks. Recognising a shift of emphasis from performing tasks to developing professional identity, Lave and Wenger reconceptualised apprenticeship as Legitimate Peripheral Participation in Communities of Practice. (Lave and Wenger, 1991) For those reasons, and because the patient safety agenda in some countries prevents semi-trained workers providing patient care, ExBL does not use the term apprenticeship. The term may be appropriate, though, in health economies that rely on students to provide patient care.

Assessment: Reliably measuring what a person can do in test conditions. In N American usage, the word evaluation is sometimes used interchangeably, but not here.

Capability: Practical capability: Being capable of performing doctors’ tasks, including learning in/from practice. Intellectual capability: Having practically useful knowledge and being able to apply this. Affective capability: Having emotions, attitudes and values that make a doctor capable.

Clinician: A portmanteau term referring to practitioners, often but not always doctors, who provide education within practice.

Competence-based medical education (CBME): Acquiring, and being able to demonstrate in test conditions, components of medical proficiency.

Evaluation: Making a judgement of how valuable something is to somebody; in this case, the supported participation that learning environments provide.

Experience-based Learning (ExBL): Gaining real patient experience as a result of supported participation in practice within the triad of doctor, patient, and student, which results in a student developing the capabilities of a doctor.

Experience: Authentic (real as opposed to simulated) human contact in a clinical context that enhances learning of health, illness and/or disease and the role of health professionals. The patient may be present by proxy [eg a student may discuss their X-ray with a doctor] but they must be real, not simulated. Provided the student is in direct personal contact with the patient and is learning within a supportive practice community, the doctor may be present by proxy.

Interprofessional education: Learning with and from students or members of other professions. Medical students most often learn with a peer group of fellow medics although many curricula provide educational experiences with students of other professions. Our ‘Best practice from round the world’ table 6 gives an example of this.

Outcome: Measurable stages along a student’s learning trajectory; not final destinations.

Participation: Students’ experiences as members of the triad of student, patient, and doctor:
Observing: Being present at and learning from practice without hands-on involvement.
Performing: Using one’s capabilities and identity to behave like a doctor.
Participating: Sharing responsibility for a patient’s care by (co-)performing tasks of practice.
Preparing: Supporting students organisationally, affectively, and/or pedagogically to ready them for participation and real patient learning.

Professional (Professional) identity: Becoming or having become a doctor.

Real patient learning (RPL): Students’ reflective learning from co-participation with real patients.

Reflecting: Stepping back, metaphorically, from workplace learning; exploring experience emotionally as well as intellectually; seeking meaning and planning actions.

SPaRc: Support, Participation, Real patient learning, and Capability.

Support: Support is a necessary pre-condition for ExBL; this comprises:
Organisational support: Provision of appropriately resourced facilities and organised experiences, including leadership of placements and students’ reception and induction to these.
Pedagogic support: Intentional support of students’ learning, which may be formal or informal, as explained later. ExBL uses the term pedagogic support rather than ‘teaching’ because the latter implies transmission from educator to student rather than activating a student’s learning.
Affective support: The display of positive attitudes and values and warm behaviours by clinicians and other people in students’ learning environments.

Talk: The dialogic means by which clinicians practise and clinician-educators support students’ learning.

Trajectory: The longitudinal process by which students become capable doctors.