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Conceptualising an Approach to Clinical Reasoning in The Education Profession

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Abstract: An increasing number of teaching qualifications are underpinned by the concept of clinical practice (Alter & Coggshall, 2009;McLean Davies et al., 2013) and draw on clinical education research in the health professions. Teaching as a clinical practice profession is an emergent approach in teacher education. Clinical practice is not a wholesale shift in approach; rather it is a change in perspective that has the capacity to create changes in thinking about learning and teaching. The concept of clinical reasoning presented in this paper is offered as a key element in teacher education that requires greater emphasis. By moving away from apprenticeship and craft frameworks of teaching that were prevalent in teacher education (Hoffman-Kipp, Artiles, & Lopez-Torres, 2003), this approach to clinical reasoning can produce teachers who are better able to articulate their reasoning for pedagogical choices drawing on both school-based and research-based evidence so as to improve their own teaching and improve the teaching of others.

Use of Terms

In teacher education programs different terms are used to signify different beliefs and approaches to roles. Terms may not have the same meaning across programs, so for example, a mentor teacher might be responsible to assess as well as guide the pre-service teacher.

In this article the terms in bold are used consistently.

The **pre-service teacher** is a yet to be qualified teacher. Other terms used include student teacher, teacher candidate, associate, novice teacher.

Professional practice is the formal experiences that the pre-service teacher has in school setting/s including teaching students. Other terms include practicum, clinical experience, field experience.

The **mentor teacher** is the school teacher who supervises/ mentors the pre-service teacher in the school setting. Other terms include clinical educator, colleague teacher, supervising teacher.

Student is the school pupil

Introduction

Though teaching is sometimes portrayed as straightforward in such diverse areas as popular literature and film, in reality it is a complicated act (Darling-

Hammond & Bransford, 2005). This misconception can render the professional learning of teachers as a simple task of emulating what successful teachers do. However, as teaching is constantly changing and intrinsically complex, it is difficult to interrogate teaching practices that are intricate and commonly based on tacit judgments. Teaching involves not only knowledge and skills, but also reasoning and thinking (Cochran-Smith & Lytle, 2001; Lampert & Clark, 1990). This makes learning to teach a challenging task. The authors contend that because of these complexities of teaching, the development of clinical reasoning is important. Rather than viewing improvements in teaching as occurring through practice over time, or subscribing to the myth that teachers are born not made, valuing and developing clinical reasoning is an essential component to improved professional practice and is fundamental in the beginning phase of teacher development. Clinical reasoning is aligned to deliberative practice – "purposefully and critically rehearsing certain kinds of performances" (Darling-Hammond & Bransford, 2005, p. 401). However clinical reasoning includes processes of gathering data, and using it collaboratively to make decisions. Clinical reasoning is the cognitive process used by teachers to collect and analyse data to diagnose learning needs in order to undertake an intervention. Subsequent clinical reasoning is employed to evaluate the outcomes of the intervention and to initiate a new cycle of clinical reasoning.

Context

The Master of Teaching is a new two year postgraduate professional degree that was introduced in 2008 in the Melbourne Graduate School of Education (MGSE) and is designed to produce graduates that use analytic skills to best meet the needs of individual learners. It is founded on a clinical practice model in which pre-service teachers are immersed into classrooms in partner schools from the first few weeks of semester where they are supported by a network of school experts ("teaching fellows") and university-based experts ("clinical specialists") who make connections between school field experiences and academic coursework. Together the interlaced responsibilities of staff and the integrated design of the program result in the development of the skills of clinical reasoning in graduates.

In the school's model of clinical education, mentor teachers are positioned as school-based teacher-educators who collaborate with university-based teacher educators. This is achieved through direct liaison with teaching fellows and clinical specialists (Clinical specialists are academic staff members who are situated in schools part time to provide intensive feedback to pre-service teachers and to work with mentor teachers). It is from this that the need for a meaningful conversation based on a clinical reasoning approach has developed.

This article arises from our practice as teacher educators situated in a clinical practice model of teacher education in which more powerful learning in pre-service teachers and unintentionally in mentor teachers' growth is evident when they adopt a clinical reasoning approach based on the principles outlined in this article. As the mentor teachers' actions to develop pre-service teachers in sustained clinical experience is essential, the authors have provided systematic and ongoing instruction about how they might support expertise in optimal ways.

The authors argue that the articulation of clinical reasoning deprivatises pedagogical decision-making, and that this provides a fertile site for theory and practice to be connected. In so doing it affords opportunities to "call into question

parts of the institutional culture that have slowly become invisible, camouflaging practices that result from the culture of privatization" (Bell & Nugent, 2006, p. 3). In deprivatising pedagogy, teachers make explicit their pedagogical choices by articulating what they did or plan to do and importantly on what basis they decide on a course of action. In this act of articulating their reasoning there is a process of learning in which knowledge is not professed, but rather knowledge is made.

The notion of deprivatisation is compatible with the visible thinking movement which has been taken up in different ways by scholars including Hattie, Ritchhart and Perkins. In the context of student learning in schools, when learners articulate their thinking through speech or writing, they deepen their cognition (Ritchhart and Perkins, 2008). Consequently, schools and universities must support cultures of thinking for teachers where deliberations about teaching and learning are grounded in observations of student work (Ritchhart & Perkins, 2008). The key notion is that by making thinking visible the learners—in this case pre-service teachers—can better develop and critically assess their own thinking and employ such processes in the future (Hattie, 2009). These ideas are valuable for our purposes as they support an argument to incorporate clinical reasoning in teacher education to make thinking visible. For teachers, the practice of visibility provides a compelling reason for using evidence to interrogate their practice rather than simply making inferences.

This article conceptualises an approach to promote clinical reasoning based on four fundamentals of respectful and reciprocal dialogue, iterative use of data and evidence, probing personal assumptions and theories and articulating reasoning (visible thinking). Conversation prompts are provided that are designed to stimulate thinking, as thinking is fuelled by asking and answering questions (Golding, 2011). These conversation prompts which the authors provide as one element of a mentor-teacher education program are used in school-based conversations with pre-service teachers. They are offered as a practical means to support the process of clinical reasoning.

Making the Tacit More Explicit

Our approach is situated within a view that professionals need to make the tacit visible. Polanyi describes *tacit knowledge* as "that we know more than we can tell" (1967, p. 4). Eraut takes a more nuanced view that knowledge is never fully explicit or implicit (2000). As the nature of the teaching profession is that much of the work is done in isolation, away from peers, the tacit knowledge that is developed may never be enunciated or interrogated. In school education, opportunities to make such knowledge explicit, in a social context, are limited. Critical and reciprocal dialogue enables this tacit knowledge to be made public and shared. What then do professionals do with what has been brought forth? Within clinical practice, this is a form of data gathering. This provides the evidence base for clinical reasoning. As teachers think critically about their practice and expose and explore what was once tacit, the deepening of professional conversations can lead to enhanced outcomes that the participants can transfer beyond the mentor mentee relationship.

Tracing the Reorientation Towards Clinical Practice

Teaching as a clinical practice profession is an emerging approach in teacher education. Recently, in the United States, The National Council for Accreditation of

Teacher Education (NCATE) has been instrumental in building clinical frameworks for pre-service training (Alter & Coggshall, 2009). NCATE advocates an approach in which clinical practice is intertwined with academic courses. Traditionally clinical practice has been seen as the preserve of the medical profession. Yet, increasingly, literature from medical education has offered other perspectives for teacher educators interested in clinical practice. As well there is a strong tradition of Professional Development Schools (PDS) in the United States in which the school is likened to a teaching hospital where pre-service teachers become residents who are guided by expert teachers.

In both education and medicine, the view of clinical practitioners' work draws on highly complex bodies of theoretical and practical knowledge, using *evidence* developed by observing, questioning and collecting data from each patient or student to make judgements about how to deliver high quality outcomes. Clinical practice does not diminish the importance of a holistic view of the child. In the context of schooling, it is the whole child that is the focus: the desired outcomes are high quality learning for each student with full regard to the elements that contribute to each young person's well being.

Some of the language used in clinical practice can be an uncomfortable fit for the teaching profession when it draws on medical discourse using terms such as diagnosis and intervention that, for some, appear unrelated to teaching. Yet clinical practice is not a wholesale shift in approach; rather it is a change in perspective that has the capacity to create a change in thinking about learning and teaching. While difficult to categorise the myriad of teacher education programs, the shift towards clinical practice in education is moving towards:

- viewing practice from an inquiring stance (Cochran-Smith & Lytle, 2001; Darling-Hammond & Richardson, 2009)
- a greater emphasis on routinely evaluating and incorporating research *evidence* into practice, in conjunction with *student data* generated by observing, questioning and formatively and summatively assessing student performance
- *team* based planning, evaluation and *collegial critical* reflection
- schools that are cast as sites of clinical practice for pre-service teachers
- making school-based experiences a significant and entwined component through closer *relationships* between school-based experiences and university coursework, and stronger *links* between university staff and school mentors at each site. Pre-service teachers *learn through* highly supervised practical experiences involving *probing conversations* that are designed to *improve* their practice by challenging not only what they did or plan to do, but also by exposing their reasoning and underpinning world views**.** In working with pre-service teachers in this way, mentor teachers also shift their thinking, an important process of reciprocal learning (Le Cornu & Ewing, 2008).

Clinical practice is characterised when these elements are present.

So, in summary, clinical practice is evidence-based, occurs in a social context and is built on probing conversations whereby participants' inquiring stance underpins an approach in which reasoning is articulated and interrogated.

What is Clinical Reasoning?

The term clinical reasoning is used interchangeably with clinical judgment or decision making in medical literature. Problem solving and critical thinking are related

terms that may be used synonymously or viewed as elements of clinical reasoning. For our purposes, clinical reasoning describes the analytical and intuitive cognitive processes that professionals use to arrive at a best judged ethical response in a specific practice-based context (Higgs, 2008; Levett-Jones et al., 2010; Pelaccia, Jacques, Triby, & Charlin, 2011). This results in planning and implementing interventions (actions) and assessing the outcomes. Clinical reasoning is a type of logical thinking and discourse in which case specific evidence is evaluated, different types of knowledge are integrated and applied, and reflection on processes and decisions is used to articulate "the multiple possibilities to achieve the desired goals" (Benner, Hughes, & Molly, 2008).

Clinical reasoning makes tacit or intuitive knowledge visible in order for it to be shared, developed and analysed (Linn, Khaw, Kildea, & Tonkin, 2012; Rycroft-Malone et al., 2004). A useful way to consider the thinking that takes place in clinical reasoning is as an ongoing inquiry to learn for practice and from practice (Darling-Hammond & Bransford, 2005; Timperley, 2010). Inquiry requires questioning which has "an ability to transcend given information, an understanding of knowledge, and a mental willingness to undermine and rebuild existing knowledge structures" (Harpaz & Lefstein, 2000). Clinical reasoning involves "colleagues working together, bringing their perspectives to bear on inquiries into the complexities and messiness of teaching and learning" (Cochran-Smith and Lytle, 1999). It is a way to systematically bring forth knowledge which "is personal, context-bound, and gained through experience" (Swennen & Klink, 2009, p. 12)—the kind of implicit knowledge "that is embedded within action that cannot be separated from that action" (Swennen & Klink, 2009, p. 12).

The expert practitioner is often unaware that they have implicit knowledge. Expert teachers intuitively decide to take a course of action—their practice is non-rule governed and uses intuition (Benner, Tanner, & Chesla, 2009), involving the recognition of pattern, similarity, salience and deliberate rational thought (Jefford, Fahy, & Sundin, 2011). Conversely, novices work on a set of rigid and clearly articulated rules (Dreyfus & Dreyfus, 1986). The pre-service teacher or new graduate is not ready to work outside the rules, nor have they developed the capacity for expert intuition. Using a defined process and conversation prompts that elicit similarities, patterns, and the conspicuous characteristics of the context or case, clinical reasoning mirrors the way teachers develop metacogniton in students:
Learning happens as personal meaning is developed through dialogue with others (Fisher, 1998). The mentor teacher, as more expert, must model and articulate their reasoning to enable the novice-teacher to deepen understanding and to synthesise both practical and theoretical knowledge.

A clinical reasoning approach may be applied to conversations that occur beyond the more expert and novice to wider collaborative settings, creating potential to shift from isolated classroom practice to shared and professionally contextualised practice. In time this leads to conversations that no longer rely on a scaffolded process as the practitioners have reached a level of expert use and the processes become internalised.

The Clinical Reasoning Approach

The approach is set within the context of an inquiring stance and a collaborative culture as these are essential preconditions underpinning the process of

developing clinical reasoning. Time and energy in building relationships and developing a shared inquiring stance are important in realising the potential of this process. Participants need a shared commitment to inquiry as a means to improve teaching, in which they believe that they will learn from each other. As well as an inquiring stance, clinical reasoning depends on targeted questioning, vigilant listening, meticulous observations and recourse to other evidence including research. Although the model is useful between teachers at any stage of experience and expertise, this article takes as its focus the more experienced teacher and the novice practitioner and uses the terms mentor teacher and pre-service teacher. Mentor teacher are viewed as co-thinkers and learning companions rather than as experts (Orland-Barak & Hasin, 2010). There will need to be change in some mentor teachers' standpoint to incorporate clinical reasoning.

The four elements of the approach are
- respectful and reciprocal dialogue
- iterative use of data and evidence
- probing personal assumptions and theories
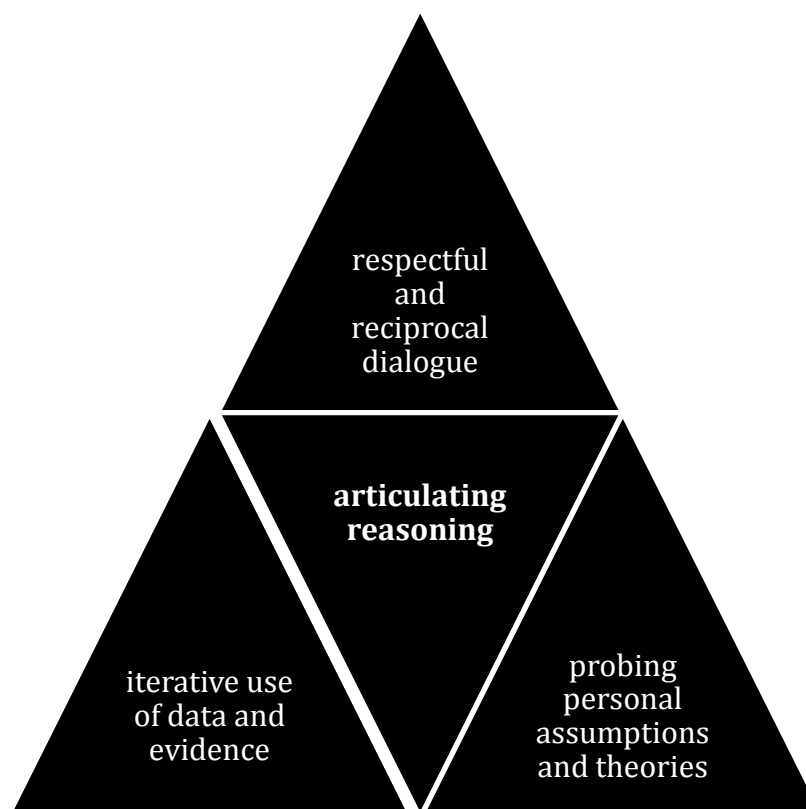- articulating reasoning (visible thinking).

Figure 1: An approach for clinical reasoning

Respectful and Reciprocal Dialogue

Skilled mentorship by school-based mentor teachers is a cornerstone in the development of clinical reasoning. A mentor is an active listener "who makes it easier for the novice to come to his or her own decisions" (Lindgren, 2005, p. 252). Active listening skills are important in creating conditions for respectful and reciprocal dialogue, but this

is not at the expense of challenging participants to strive for high quality teaching and learning. Quality conversation would be characterised by participants who listened at least as much as they spoke, and who take a thinking-encouraging approach (Golding, 2011). By creating and sustaining open dialogue and skilful prompting there is opportunity to uncover the personal beliefs about learning of the other person. "Through critical and thoughtful conversations, teachers develop and refine ways to study teaching" (Feiman-Nemser, 2001, p. 1042). Collaborative practices that make explicit the tacit inferences teachers make are included so that they can then be critically interrogated.

Uses Data and Evidence Iteratively and Provisionally

The precondition for clinical reasoning is gathering data, and using it collaboratively. Teachers need to be "open to evidence of their impact on students, critiquing each other's impact in the light of evidence of such impact" (Hattie, 2012, p. 62) and should ground their "discussions in artefacts representing student learning" (Timperley, Wilson, Barrar, & Fung, 2007, p. XXX). Clinical reasoning is based on data collected from the school setting, commonly including observations of lessons and student work samples. It also draws on evidence from research. In the feedback conference in which mentor teacher and pre-service teacher review the data to diagnose learning and to determine the next intervention, rigorous interrogation of the data is necessary (Kayaoglu, 2012). The data must be valid and sufficient to support the conclusions that are made. Together the mentor-teacher and pre-service teacher draw on data to support their evaluation which in leads to well-reasoned designs for interventions based on their shared understandings

In education, pieces of data are frequently collected gradually, little by little. For example, as the pre-service teacher considers each student in the class, she considers the following: how did Pau score on the first quiz? What frequency and depth of response has he offered during lesson discussions? What understanding does Pau exhibit when he is privately asked questions during lessons? What evidence of organisation does Pau show in class? What quality of written work does Pau produce in class? What were the strengths and weaknesses of his first homework task? What were the results of the whole school literacy and numeracy tests for Pau? As the pre-service teacher builds her understanding of Pau she collects data and collates, compares and contrasts these data. Because this process is not static or time bound, and new pieces of data are forthcoming, the process is iterative and decisions made are provisional as more data are sought and analysed.

Though the collection and interrogation of data are essential in clinical practice, so too is the capacity to suspend judgement while further data is collected or accessed (van Leent & Exley, 2013). As well, to make provisional judgements yet be ready to adjust these is also crucial. Thus in this approach to clinical reasoning one must persist in asking for evidence-based explanations, *and* in asking what more do we need to do to find out what a child knows and is ready to learn.

Articulating Reasoning (Making Reasoning Visible)

Mentor teachers should articulate their reasoning clearly to others as unfounded assumptions might be drawn from decisions or advice provided without reasoning (Delany & Molloy, 2009, p. 122). This can take place within formal

consultations and through informal conversations with pre-service teachers that develop from the experience gained in the formal settings.

Mentor teachers can sometimes reveal their reasoning by describing their thinking out loud as they work through a situation. By articulating thinking, the mentor teacher lays bare the mental logic they constructed to improve learning by diagnosing learning needs, analysing data and intervening. In the hot action of classrooms (Beckett & Hager, 2002) it is generally not possible to think out loud. Thus, rehearsing and reviewing lesson planning, using questions such as *how will you form the groups?*; *why?; how will you know if a group is not on task?; what might you do if a group is not on task?;* are important to enable the development of clinical reasoning. As mentoring often takes place after teaching a lesson, in our conception of clinical reasoning this is also a key time to probe reasoning.

By articulating their thinking with reference to evidence, both mentor teachers and pre-service teachers learn to hone their capacity to clinically reason.

Probing Personal Assumptions and Theories

Probing personal assumptions is central to supporting the development of a more critical orientation towards improving teaching as it serves to interrupt the unquestioning acceptance and imitation of existing thinking and practices. Pre-service teachers bring prior experiences, which filter subsequent learning experiences. By probing and testing assumptions using evidence, taken for granted beliefs are scrutinized and can be changed (Feiman-Nemser, 2001). For example, the oft stated assumption – and misconception – that different teachers have their own 'style' and pre-service teachers need to develop their own style assumes that all approaches to teaching are equally effective and must be respected. In this approach such assumptions are challenged and replaced by an orientation to rigorous interrogation of what works better leading to continuing improvements (Earl & Timperley, 2009).

Conversation Prompts

The following conversation prompts used in this approach to clinical reasoning are not intended as a series of questions to be asked sequentially or rigidly, as in that form they can stymie conversations. Rather, they are viewed as samples that can be used or adapted as starting points to develop clinical reasoning expertise and are designed to be drawn on by both mentor teacher and pre-service teacher. As most readers of this article are likely to be teacher educators it is easy to assume that conversation prompts are selected and provided by the mentor teacher but many of the prompts are useful for the pre-service teachers to use to initiate and advance conversations.

The prompts are not designed as clinical *questions.* Rather, the emphasis is on clinical conversations (Timperley, 2001) to highlight the dialogic and reciprocal nature of the exchanges. As respectful and reciprocal dialogue is a central element of the process, conversation prompts signal the way that they can be taken up. They simply outline some ways of developing a conversation that will build up the capacity for clinical reasoning. This article employs the pronoun *we* in some of these example conversation prompts. This is used to facilitate *the principle of co-inquiry* which is the belief that all are involved in

the inquiry and learning from each other (Darling-Hammond & Bransford, 2005; Timperley, 2001). Using *we* in prompts also shapes a view of shared and cooperative responsibility for student learning.

When using conversation prompts, the tone of voice and body language employed will change the purpose and influence the outcome of the process. For example, asking *why did you do that?* in a neutral or curious tone invites and is intended to shape an open conversation. In contrast if a shocked, horrified or judgmental tone is used when asking *why did you do **that?** ,* this will shape a completely different conversation. Experimenting with the conversation prompts in different contexts will assist in using them productively and confidently. Equally, use over time and observing their impact has the potential to generate other ways of having reciprocal conversation that lead to deeper and different outcomes.

Conversation Prompts
Identifying A Focus

What is the most important focus to consider?
What questions does this raise?
What intervention is likely to have the greatest impact?
What has been done and how can progress be made from here?

Seeking and Using Evidence

What evidence supports this? *or* How do we know?
How could we check if this is so?
How extensive and reliable is the data we have?
What further data do we need?
What literature can we seek to advance our thinking?
What do we make of any contrary evidence?

Checking and Developing Understanding

Are you saying … (clarifying question)?
Are there other ways to view this?
How does this help us to improve learning?
In what other ways could this be approached?
I noticed… Am I right about that?
It puzzled me when/that...
Why did you do that?
What is the key principle/s to be learned from this?

Testing Ideas / Assumptions / Decisions

What would happen if?
What is the assumption? How might you investigate (or test) that assumption?
Let me explain why I say that.
Explain why you say that? (Justifying question)?
How does this follow? (Probing the logic of the decisions made)

How do your reasons support your decisions?
What were /might be any unintended consequences of the action?

Conclusions

This approach is more than adopting or adapting a series of prompts. It requires an inquiring stance and a commitment to clinical practice based on the four elements outlined in this article. Mentor teachers, teacher educators and pre-service teachers could adapt this approach to refine the types of conversations and processes that are generative in making thinking visible to develop clinical reasoning in education. This approach to clinical reasoning is designed to inform and challenge teachers to think critically about their practice. This approach can be applied variously to the dialogue that occurs between mentor teachers and their mentee during professional practice, in professional learning communities (Vescio, Ross, & Adams, 2008) and in instructional rounds (City, Elmore, Fiarman, & Teitel, 2009). There is, for us, a clear message that teacher education relies on school-based mentor teachers who play a vital role as teacher educators in teacher preparation. Still more work is needed to provide them with specific and ongoing education of how best to provide conditions in which the pre-service teacher can develop. Though the focus of this article is the pre-service teacher, improving the capacity of teachers to reason clinically has potential for developing teachers at all stages of their career. Improving teacher learning in the school as a clinical setting can connect theory and practice at the point where powerful experiential learning happens.

Clinical reasoning ought to be embedded in teacher preparation programs and in school settings in forms such as school-based professional learning communities. This approach offers most promise within an "extensive and intensely supervised clinical work integrated with coursework using pedagogies that link theory and practice" (Darling-Hammond, 2006, p. 300). According to Darling-Hammond, stronger graduates are the outcome of programs that integrate clinical field experiences into teacher education (2006). Clinical reasoning can be a key focus of professional practice.

In rethinking the role of clinical reasoning in teacher education, although no single approach will be sufficient, using clinical practice can enable shifts in the ways that we think and talk about learning to teach. A shift towards clinical reasoning and clinical practice can enhance the development of teachers who are able to make context-responsive judgements based on collected data and research evidence. It is the judgement-making capacity that can be fast-tracked through clinical reasoning. However even the most expert judgements still need to be questioned and the "lesson is thus to treat the wisdom of practice with respect, with deference, albeit with careful scepticism" (Shulman 2004., p. 265).

This article has outlined an approach supported by conversation prompts that potentially can develop professionals with more critical approaches to teaching. Although limited to theory building, this article can contribute to broader theoretical discussions around the development of clinical reasoning in initial teacher education and the practical suggestions will be of benefit to initial teacher education and to professional education of teachers more broadly. As clinical reasoning is a major contributor to the growth of professional expertise, a systematic approach for its development is therefore important. It is a high-leverage practice which stimulates significant improvement in teacher thinking. The challenge is to create opportunities

for school based teacher-educators to learn about clinical reasoning and to use this to develop the skills necessary to advance pre-service teachers' understanding.

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