What do GPs need to know? The use of knowledge in general practice consultations

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SUMMARY

In the course of the consultation in primary care, the general practitioner integrates knowledge of different types that are drawn from different sources. As a consequence of the way practitioners develop expertise, this use of knowledge is often hidden from the conscious mind of the practitioner and often hidden from direct observation. On the other hand, understanding of this use of knowledge is crucial to several necessary developments of the profession of general practice. A method involving collaboration between researcher and practitioner sheds new light on this knowledge-in-use.

Keywords: *professional knowledge; general practice consultation; learning techniques; competence.*

Introduction

> *'We cannot simply open up someone's head and directly measure the knowledge it contains.'*[1]

ONE feature that distinguishes a profession from a vocation or other occupation is its knowledge base.[2,3] Medicine is a typical example, in that a large systematic body of knowledge is continually being expanded and maintained by academic research. Schon describes the medical school as typifying the view of knowledge referred to as 'technical rationality'.[2] This view is based on the idea that science will be able to provide the answer to almost any question, provided that the question is appropriately formulated. Schon contrasts this 'technical-rational' view with his actual observation of professional practitioners in various fields, where he finds that knowledge use is highly contextualised. He says that the problem for the practitioner is not to find the right answer to a specific question, but rather to determine, within the complexities of the field, which are the right questions to address.

Experienced professionals, such as general practitioners, constantly draw on their personal and contextual knowledge in everyday practice. An example of this is shown in Box 1. However, in curriculum planning and assessment, this knowledge is often ignored in favour of the 'technical-rational' knowledge because it is not regarded as scientific. This poses a particular problem for the re-accreditation of experienced practitioners. It is also relevant to all stages of the medical curriculum, to the implementation of evidence-based practice, and to medical informatics. The challenge is to identify and describe this 'hidden' knowledge-in-use. We shall attempt to do this by examining these issues and suggesting a possible way of accessing and classifying such knowledge.

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Knowledge and the experienced practitioner

Studies in America and The Netherlands have assessed physicians of different lengths of service with the same test of knowledge;[4] they show a steady decline in score with increasing time after qualification. This finding is open to more than one explanation. Proponents of evidence-based medicine cite it as evidence that physicians are failing to keep up to date.[5]

An alternative view is that tests of knowledge appropriate to newly qualified doctors become decreasingly appropriate as the doctors become more experienced. Gale and Marsden have shown a consistent difference in memory structures between novice and expert clinicians.[6] This difference relates to the number and type of 'forceful features'[7] that the clinician identifies in a case presentation. Forceful features are particular cues that the clinician identifies in a case: they act as keys to specific memory structures that in turn give rise to a clinical interpretation. In this work, the difference between novice and experienced groups lay in which forceful features the doctors identified in a particular case. It is the content of thought rather than the way of thinking that develops with experience.

Grant and Marsden also show that different clinicians use different items of knowledge to solve the same clinical problem and that this individuality increases with experience,[8] having been temporarily reduced by medical school and the houseman year. Howie[9] found that experienced GPs made management decisions from fewer items of information from the same simulated patients than did trainees. Kleinmuntz's work with specialist neurologists came to the same conclusion.[10]

A theoretical basis for these findings is provided by models of expertise, developed by cognitive psychologists, that describe a transition in decision-making from a deliberative process to an intuitive one.[11,12] Behaviour becomes scripted and, except in instances of high challenge, partly automatic. Schmidt's work with doctors[12] describes a transition from constructs of disease in terms of pathology towards constructs framed in terms of illness scripts or case memories. Illness scripts and case memories are stories in the practitioner's memory. Diagnoses and prognoses are based on these doctors' stories and patients' stories that form the practitioner's experience.[13,14] By this account, a measurement of knowledge based solely on a classification drawn from the basic medical sciences is alien to the way the experienced practitioner works.

The other consequence of what these models describe is that the experienced practitioner's use of knowledge is largely unconscious and is subsumed into scripted behaviour. The practitioner does not know what he or she knows.[3] Polanyi[15] describes this as 'tacit knowing'.

Knowledge in the medical curriculum

More than two decades ago, the Royal College of General Practitioners (RCGP) described the learning needs of GP trainees (registrars) in *The future general practitioner, learning and teaching*;[16] learning objectives were framed in terms of knowledge, skills, and attitudes. This traditional view is based on Bloom's taxonomy of educational objectives,[17] which describes cognitive, psychomotor, and affective domains. This work was itself produced by an expert group working towards a consensus view.

A patient presents with crusting lesions on his face; he has recently had some facial pain and irritation of the skin. The lesions cover more than one dermatome, most are on one side of the face.

Formal (technical-rational) knowledge:
- Painful lesions which crust may be caused by herpes zoster (shingles)
- Shingles normally affects only one dermatome and is usually unilateral
- The dermatomes of the facial nerves may overlap across the midline
- Impetigo may cause pain and irritation and have a similar appearance

Personal and contextual knowledge:
- The pain and irritation preceded the rash by more than seven days - making herpes zoster less likely
- The GP has seen cases of shingles affecting several dermatomes and she does not believe that every individual's anatomy conforms to diagrams in textbooks
- This patient's mother had shingles last year
- This patient worries about his health and appreciates explanations

The GP thinks that this rash is probably due to impetigo, but takes time in the consultation to explain her reasons for making this decision. This is partly on account of the personal and contextual knowledge listed above but partly because of:

Process knowledge:
- Involving patients in the decision-making process improves compliance
- Acknowledging and sharing uncertainty can enhance the doctor–patient relationship

Box 1. Different types of knowledge in the consultation.

Specific knowledge
Items that relate to this patient, this family, this type of patient, this community; e.g. *this patient doesn't like taking medication; this patient's father had ischaemic heart disease.*

Generalisable
Items that apply to all sorts of patients; e.g. *beta-blockers can be used to treat hypertension; atenolol is a beta-blocker.* These items conform to the term 'general medical knowledge'.

Custom and practice
Items about how the health care system works and about routine medical management; e.g. *if I refer this patient to Mr A,. he is more likely to offer her laser ablation than a hysterectomy. In this practice we would offer symptomatic treatment for heavy menstrual bleeding while the patient waits for her outpatient appointment.*

Process
Items about the process of the consultation; e.g. *sometimes patients mention things that worry them most later on in the consultation. Asking closed questions too early in the consultation may restrict the consultation to the first-mentioned complaint.*

Box 2. Emerging classification.

Increasingly over the past 25 years, curriculum documents from the RCGP have been phrased in terms of competencies.[18,19] This reflects a general movement towards competency-based education and training (CBET) that has origins in industrial training. Now it is being applied to professional groups such as teachers in the United States, nurses in the United Kingdom, and lawyers in Australia.[20] Competencies are defined in a variety of ways, with observation in the workplace playing a large part. In parallel with this has developed competency-based assessment, which tailors assessment methods to the competencies defined in CBET.[21] A reflection of this trend is the development of the objective structured clinical examination (OSCE) as a method of formative assessment.[22]

One issue in competency-based education, training, and assessment is the relationship between competence and performance on the one hand, and skills and knowledge on the other. Figure 1 illustrates this relationship. As Messick[23] writes:

> *'Competence refers to what a person can do under ideal circumstances, whereas performance refers to what is actually done under existing circumstances. Competence embraces the structure of knowledge and abilities, whereas performance subsumes … the processes of accessing and utilising those structures and a host of affective, motivational, attentional, and stylistic factors that influence the ultimate responses. Thus a student's competence might not be validly revealed in either classroom performance or test performance because of personal or circumstantial factors that affect behaviour.'*

Only performance is observable, and it is then only a partial expression of competence. Competence is a construct that can only be measured indirectly. Knowledge and skills are components of competence.[1] Another way to describe this is in terms of the professional footballer who has the skill to kick the ball at speed into any part of the goal and knows how the goalkeeper is likely to react. This highly competent individual may well, in a match, lob the ball gently into the keeper's arms.

In spite of the move towards competency-based ideas in medical education, curriculum planning continues to be on traditional lines, based on a consensus of the profession's leaders rather than direct observation of practice.[25] This is in sharp contrast with the primacy afforded to empirical evidence as the basis for decisions in medical management.

There are two further aspects of knowledge in the medical curriculum. First, the size of the biomedical knowledge base has led to an undergraduate curriculum that is overloaded by content.[26,27] Secondly, the pace of new discoveries and the re-evaluation of existing knowledge mean that much of the orthodox knowledge of a doctor in training is superseded during the practitioner's career. This is summed up in Samuel's phrase, 'the transience of truth'.[28] One consequence of these is that the ability to continue to learn throughout one's career is now seen as an important competency of a doctor.

The task for the practitioner here is to incorporate new research findings, which are initially in the technical-rational domain, into his or her working knowledge. Models of experiential learning described by Dewey[29] and developed by Kolb[30] provide a way of understanding how this occurs. Kolb writes that learning is an active process that involves creating new knowledge in the mind of the learner by transforming new information. Part of this process is reflective and involves comparing the new information with the individual's existing knowledge structures. Eraut[3] extends this idea with the suggestion that experiences may be remembered for some time as 'film clips' that are stored without being processed. At a later date these short narratives are brought to mind by another experience and are at that stage incorporated into the individual's knowledge base. This model of learning also emphasises the difference between two views of knowledge: knowledge as what is known inside someone's head and knowledge as represented by scientific literature.

Mapping professional knowledge

Eraut suggests a rough map of professional knowledge.[3] His

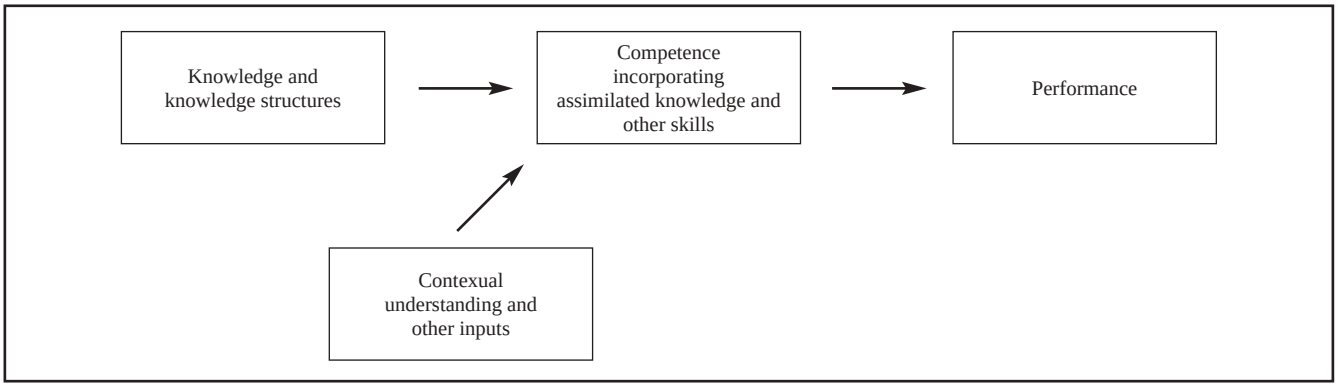

Figure 1. The relationship between knowledge, competence, and performance (after Wolf[1] and Stanton[24]).

model has the virtue of including both subjective and objective elements rather than propounding one or the other. He suggests three broad categories:

1. propositional knowledge, which may be public or personal;
2. impressions and personal knowledge; and
3. process knowledge.

In brief, public propositional knowledge is what is taught, having been verified by research; it is represented in textbooks and articles in scientific journals and is the substrate of many knowledge-based assessments.[31] In this definition, personal propositional knowledge is knowledge that an individual has learnt and that can be verified. In contrast, impressions and personal knowledge are contextual. Process knowledge is 'knowing how' rather than 'knowing that', and is closely related to skills.

Impressions and personal knowledge are difficult to codify.[3] On the other hand, understanding and redefining the GPs' knowledge base within these broader parameters would have benefits in the areas of curriculum planning, assessment, research, evidence-based medicine, and informatics.

Curriculum planning

An empirical definition of curriculum content, based on the evidence of what knowledge is used in practice, would allow the undergraduate and postgraduate curriculum to be tailored to practitioners' needs.

Assessment

Understanding and taking account of the way that experienced practitioners accumulate and use knowledge would allow assessments of knowledge to be framed in terms appropriate to the experienced practitioner. This ought to inform any re-accreditation assessments.

Research

The technical-rational model sees institutional academic research as informing practice in a one-way process. Better understanding of knowledge generated in the field would allow the relationship between research and practice to become a dialogue. Formal research and an individual's experiential learning are both ways of creating new knowledge.

Evidence-based medicine (EBM)

A major difficulty in EBM is how to relate facts derived from study of large populations to individuals in the consulting room.[32] Understanding the practitioner's knowledge map may help to translate evidence-based definitions of best practice into everyday practice.

Informatics

The electronic medical record has the potential to form a bridge between disease-based coding systems, such as Read codes,[33] and everyday practice by guiding the practitioner with information support.[34] In both instances, an understanding of the relationship between public propositional knowledge and the contextualised personal knowledge of the practitioner would be of benefit.

Dowie writes about the 'research practice gap'[35] to represent these difficulties in implementing research findings in practice. He rejects the two traditional accounts for this gap that explain it in terms of deficiencies in dissemination to practitioners or resistance or rejection on the part of the practitioner. His suggested explanation is a cognitive and value mismatch between researcher and practitioner. This is explained in terms of Hammond's cognitive continuum.[36] Research is fundamentally 'truth driven', with researchers seeking to minimise contamination of 'the facts' by 'values'. On the other hand, practice is fundamentally 'decision driven' and requires the integration of 'technical judgements' with 'value judgements'. His proposed solution is to use decision analysis as a common framework, a map and a language that can be understood and used by both parties.

A different analysis and solution is provided by the combination of the study of narrative and medical informatics.[37] The medical record is seen here as carrying the patient's story (the history), the doctor's story (illness scripts and case memories), and medicine's story (disease classifications, research findings, and evidence-based guidelines). The electronic record carries, and has the potential to integrate, these three stories by use of a mixture of coded and free-text entries.

A common feature of these two approaches is the reference to language and story. The study of the individual practitioner's knowledge base is the study of the syntax and vocabulary of the doctor's story. What is required is a way of mapping the practitioner's knowledge base.

Mapping GPs' knowledge

This task is problematic for the reasons discussed above. Knowledge that is routinely used is hidden from the practitioner (in unconscious scripted behaviour) and hidden from the observer (who can only observe performance and then infer the competence and knowledge that underlie it). The difficulties involved are summed up by these two quotes:

'*People do not know what they know*'.[4]

'We cannot open up someone's head and directly measure the knowledge it contains.'[1]

Knowledge use is hidden from both practitioner and observer. One way to map the practitioner's knowledge base is to use in-depth interviews with general practitioners about actual consultations, focusing on the second-by-second detail revealed in transcripts, audiotapes, or videotapes. Exploratory research has led to an outline classification of the knowledge base required for general practice and an understanding of the level of complexity of knowledge at which GPs work.[38] Initial findings of this early work are:

- A qualitative interview between researcher and GP, based on a consultation transcript, is an effective method of eliciting knowledge used in the consultation. It identifies more items and more information than either self-reporting by the practitioner or analysis of transcripts by researcher alone.
- All the consultations studied contain examples of cognitive dissonance between the practitioner's usual *modus operandi* and evidence-based guidelines that are known to the practitioner but ignored in the event.
- Sequential mapping of consultations shows the GP moving between items of knowledge that fall into four broad categories: the specific, the general, custom and practice, and process knowledge. These terms are defined in Box 2. Each category may be further subdivided in terms of the source of the knowledge, how confident the practitioner is of the 'truth' of the item, and how important it is perceived to be.

Flesh to go on the bones of the outline classification will come from analysis of consultations relating to specific conditions and conducted by a range of GPs. To do this systematically is a major task that will require a significant research effort.

Conclusion

Schon's dichotomy of technical-rational knowledge versus knowledge-in-action[2] is based on the philosophical distinction between objective and subjective knowledge.[39] The dichotomy persists in Greenhalgh's phrase, 'narrative-based medicine in an evidence-based world'.[40] One of the tasks for the GP during the consultation is to integrate these two world-views. Understanding and mapping the doctor's personal knowledge base is a crucial prerequisite to understanding this aspect of the consultation. It will provide an evidence-based account of what doctors need to know. Research involving collaboration between practitioner and researcher can shed light on this knowledge in use. This is less traumatic than 'opening up someone's head', but does offer the chance to 'see what knowledge is inside'. It is time to have a look.

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