Introduction

This paper presents a personal view of the relationship between science and the humanities within medical education, arguing for a more even balance between the two. This view stems from the author’s recent experience of exploring the literature of learning theory and the social sciences.

Background

For historical reasons, medical education is dominated by a positivistic paradigm which assumes the existence of a single objective external reality. This can seduce us into believing that positivism is not a paradigm at all, but simply how the universe really is. Clinical practice, however, takes place in a much less certain world, where reconciling different interpretations of truth is an everyday necessity. This paper outlines the perils of uncritical adherence to a traditionally ‘scientific’ mode of thinking.

Total internal reflection

In physics, total internal reflection is a phenomenon whereby light is reflected from the surface of a liquid without penetrating it, thereby making it impossible for anyone within a pool of water to see outside it. The author uses this concept as a metaphor to describe a limitation of perspective which characterises orthodox medical training, cutting students off from valuable sources of insight and understanding.

Conclusions

Medical education often fails to provide learners with the tools they need to interpret the literature of other disciplines. In particular, it ignores the importance of recognising different perspectives. The paper ends by pleading for a more inclusive approach to alternative paradigms within our educational system.

Keywords

Cultural diversity; curriculum; education, medical/*methods; humanities/*education; professional practice/standards.

Medical Education 2002;36:514–518

Introduction

I am a doctor in my mid-forties, with a background in surgery and general practice. Recently I have begun working towards a thesis on surgical training and have started to explore a new literature – that of education and the social sciences. At first, and greatly to my surprise, I found this literature almost impenetrable. Of course it was peppered with unfamiliar words, but I had expected that. My difficulties lay somehow at a deeper level, one I at first found hard to articulate. I had the disquieting sensation of moving into alien territory, where familiar landmarks had disappeared. Yet my problems in coming to grips with these fields seemed somehow disproportionate. After all, I have been interested in teaching and learning for years. So why should I find it so difficult to make sense of educational research?

I believe that my difficulties were caused by a clash of world views – or rather, a clash between the comforting solidity of orthodox ‘science’ and the fluidity of those disciplines which challenge their own paradigms as a matter of course. As a late arrival at the social sciences party, I have only recently become aware of the crucial significance of alternative world views, and how an awareness of them is key to making sense of any literature.

The fact that I have practised as a doctor for more than 20 years without being forced to confront these issues makes a telling point, not only about me but about medical education more generally. It seems to me that our system of medical training places formidable obstacles in the path of those who choose to move outside it. In this essay I shall try to analyse why this should be.

Department of Medical Sciences, University of Bath, Bath, UK
Correspondence: Roger Kneebone, Department of Medical Sciences, University of Bath, Bath BA2 7AY, UK. E-mail: r.kneebone@bath.ac.uk
Medicine and the humanities

Medicine is as much an art as a science, yet it usually takes its place amongst the sciences. To practise medicine well, however, requires the integration of intellect, skill and emotion. Too narrow a focus from any perspective creates imbalance, and there is a growing awareness of the importance of the humanities within medicine.\textsuperscript{1,2} Exactly what these humanities are and how to gain access to them, however, is much less clear.

Currently, for instance, there is a burgeoning interest in the arts in relation to medicine. Literature, painting, sculpture, poetry, theatre, music – all of these can provide us with an insight into ourselves and our relationships, and an awareness of their value is steadily gaining ground.\textsuperscript{3} But the relationship between these arts and professional life is not a simple one. Although exposure to such arts can affect individuals profoundly, it may also occur in parallel to professional practice, operating, as it were, in another compartment.

Greaves distinguishes between the ‘medical arts’ and the broader concept of ‘medical humanities’.\textsuperscript{4} He argues that the medical arts are generally seen as a counterbalance to the medical sciences, occupying a separate yet complementary realm. The concept of medical humanities, on the other hand, places the human at the focal point of medicine. Seeing medicine in these terms requires a radical change in philosophy, cutting across traditional boundaries. According to this view, art and science both contribute as appropriate, and neither is subordinate to the other.

‘The medical arts’, writes Greaves, ‘are essentially an ornament to medicine, whilst the medical humanities are an integral part of it. The medical arts are aimed at humanizing practitioners; medical humanities are aimed at humanizing medicine.’ It is how we access these medical humanities that I wish to discuss.

Medicine stands at the intersection of many disciplines. Some of these disciplines are obvious. No-one, for example, would argue that physiology, biochemistry, pharmacology and a host of other ‘sciences’ have not got a rightful place at medicine’s table. The claims of other disciplines, however, are less secure. What of sociology, for example, or education, or anthropology? These too can offer challenge, insight and a new understanding of how we think and practise. Yet from the perspective of an orthodox medical training such disciplines can seem foreign, expressed in language that is both woolly and obscure.

If we are to weave these disciplines into the fabric of our professional practice, we must be able to make up our own minds about what they have to tell us. We must engage with them on their own terms, judging them on their merits and weighing them as we would a scientific article, a novel or the complex pieces of a patient’s history. To do this we need the right set of tools. How then do these tools differ from those provided by orthodox medical training?

The scientific perspective

I will start by considering the paradigm with which most doctors will identify – that of orthodox science. Since medicine presents itself largely as a science, medical students are rigorously drilled in laboratory method, and most doctors believe their practice to be essentially scientific. Without defining precisely what this ‘science’ is, it has a comforting ring of objectivity and detachment. Here, however, a paradox emerges. In real life, medical decisions are seldom based on science alone, but rely instead on a complex amalgam of factual knowledge, personal experience, anecdote and empathy, played out against a background of professionalism and underpinned by a sense of care and compassion. To consider this process as ‘scientific’ risks dangerous oversimplification. But what is ‘scientific’?

The world view or paradigm that underpins our current training is the positivistic one of ‘traditional science’, the roots of which reach back to the Enlightenment. At its heart is a quest for an objective external reality, one where researchers themselves are in a sense incidental to the pursuit of knowledge. While this approach serves medicine well in certain circumstances (in laboratory experiments, for example, or when teasing out the pathophysiology of renal failure), it has severe limitations in many others (such as when considering how a possible treatment will affect an individual and their family). This is not to deny the effectiveness of orthodox science in answering the questions it is most suited to investigate. It is simply to recognize that not all questions can be approached in this way, and that other viewpoints are sometimes

Key learning points

Medical training emphasises a positivist, ‘scientific’ approach to knowledge.

Reading the medical humanities requires insight into differing world views.

‘Total internal reflection’ describes an inability to see outside one’s existing paradigm.

Medical students and doctors must develop the skills needed to interpret the humanities literature.
needed. To believe that we are acting scientifically when we are not is to deceive ourselves, and self-deception is a shaky basis for professional practice.

Observing the world from a ‘scientific’ perspective can tempt us into believing that it is not a perspective at all, that it is simply how the world really is. Scott and Usher, writing on educational research, point out the seductive nature of this perspective in seeming to be so evidently true from a common sense point of view.\(^5\)

‘How obvious it seems …’, they say, ‘that the world exists independently of us; how obvious that the measure of truth should be its correspondence with reality; how obvious that we should be able to delimit knowledge and separate the valid from the invalid; and how obvious, given the success of science, that scientific method should be the guarantee of validity and the road to truth.

‘Realism overlaid by positivism can be summed up’, they go on, ‘in three propositions – first, that reality is self-evidently available; second, that science is free of its own cultural confusions; and third, that knowledge is produced by means of immutable methods’.

### Alternative perspectives

Positivism, according to this traditional view, is not simply an epistemology but a way of theorizing social reality, a view of science as a cumulative, linear progression from ignorance to knowledge, a steady and inexorable movement away from incompleteness and error.

Seen from another perspective, however, things look very different. When your field of study is people, not molecules, there are many different versions of reality and many different ways of knowing. It all depends on points of view – yours and your patient’s. If truth is not an immutable, external reality but is created anew by each person on each occasion they seek it, then interpretation is key to any quest for knowledge. On reflection, moreover, interpretation must be an integral part of any scientific enquiry.

Why is interpretation of such importance in medicine? Consider the issue of text and the part it plays in presenting research. Traditionally, scientific writing is seen as a clear pane of glass through which an observer can see the work of a detached and unbiased researcher. In fact, however, the whole process of presentation is shot through with selectivity – any researcher wields a ‘colonial’ power, choosing which issues to present and which to ignore, how to present them, the framework for analysis and who writes the final text.\(^5\) The notion that any researcher can be independent of these issues is a simply a comforting conceit, strengthened by a collusion between researchers and the conventions they employ. The seductive effect of ‘scientific writing’ is to generate what Fine refers to as ‘ventriloquy’, which means ‘never having to say ‘I’ in the text, treating subjects as objects while calling them subjects, and denying all politics in the inevitably political work of doing research’.\(^6\) In other words, scientific writing is not nearly as objective as those who do it would like to believe.

Moreover, the notion of ‘scientific writing’ only has meaning when set alongside an alternative, which in this case is ‘literary writing’. Literary writing is often referred to disparagingly by scientists, relying as it does on deliberate manipulation of words, of meanings, on metaphor and figurative expression. In reality, of course, all writing serves the purposes of the writer, whether these be explicit or implicit, conscious or otherwise.\(^7\)

Writing, and reading what others have written, is as central to medicine and science as to any other field, but all too often it is regarded simply as a neutral mechanism for the transmission of data. In fact, however, a critical awareness of where an author is coming from must underpin any perceptive reading of their work. Moreover a reflexive stance, an ability to explore one’s own part in any process, is essential if researchers and clinicians are to recognize the complexity of their own practice. and it is this reflexivity that is often missing from orthodox science.

### Total internal reflection

To many scientists, the idea of personal perspective can be uncomfortable. To them it seems axiomatic that their writing concerns a world which functions simply according to the laws of nature, independent of their viewpoint or anyone else’s.

So pervasive is the common sense positivistic view that until recently I had never thought to challenge it. Perhaps the best way to convey my experience is by an analogy from elementary physics. Total internal reflection is that phenomenon whereby light is reflected from the surface of a liquid without penetrating it. A goldfish in a goldfish tank therefore can only see clearly within the water he swims in. He is physically unable to see what is outside except by jumping out of the water and looking around him, a process both uncomfortable and hazardous. A similar process, it seems to me, can be traced from schools to university science faculties, and especially to medical schools. Being brought up in the captivity of an exclusively positivistic world view can lead to a limitation of thought which doctors can ill afford.

For me, jumping out of the positivistic goldfish tank led to a sudden barrage of new impressions. My main
problem lay in having no road map of the territory beyond my tank. I therefore started my reconnaissance by simply wandering about and trying to spy out the land. I did this by exploring a variety of books and articles. Immediately I ran into a difficulty – the language.

**Grappling with a new literature**

The ideas set out by writers like Scott and Usher are expressed in terms that at first I found difficult to understand. I have tried to analyse why this might be, and I believe the problem begins at medical school. The medical curriculum is dominated by facts and the need for detail. Medical teaching relies heavily on the presentation of isolated nuggets of information. The task of creating an overarching structure of knowledge with which to make sense of these nuggets is left to each student. An obvious danger is that this may not happen, and that students will form a fragmented view of learning, assiduously collecting unrelated shards without knowing how to create a conceptual whole that allows them to practise what they have learned.

The way scientific information is disseminated makes this problem worse. In undergraduate medical training, textbooks are often weighty tomes by myriad authors. They are not intended to be approached as a whole, but to be consulted on individual topics. The system demands that these topics be ingested, but not necessarily assimilated. Further along the educational process, scientific papers, whether in physical or electronic form, become the chief vehicle for accessing information. Such papers are necessarily short and usually conform to a standard pattern. They can seldom provide more than a brief summary of existing literature, a literature which is itself widely dispersed. This distributed character of scientific literature places the onus squarely on the reader to create a wider meaning from a collection of discrete chunks. The implicit paradigm within which this integrative process occurs is almost always that of scientific realism, and it is here that a lack of awareness of alternative world views can be baneful.

The humanities, however, operate differently. The literature of education and sociology deals more with ideas and less with the transmission of isolated facts than does most of medical literature. The coherent exposition of such ideas requires sustained and often lengthy argument and is therefore presented mainly in the form of books. Since these are much longer than scientific papers, they lend themselves less readily to the piecemeal absorption of unrelated morsels. Moreover, they use a language of their own. Part of this is simply jargon, a problem for any newcomer to an unfamiliar field. A more fundamental difference, however, lies in the world views underpinning these arguments of social science and education. These imply rejection of the positivist paradigm in its classical form, but without replacing it with one single alternative. Instead, there is a range of possible world views to choose between, and awareness of this diversity is the key to interpretation.

Every writer has a particular perspective; every reader has another. Within the humanities this is accepted as a given. Recognizing this range of perspectives and interpreting its effect on both writer and reader is a basic skill, like understanding statistics when evaluating an article in a medical journal. The literature of education, for example, embraces a wide variety of epistemological positions. To anyone in the field, passing references to these positions are more than adequate to conjure up the necessary associations and allow the reader to situate the writer within this wider context. To a complete newcomer, however, they represent an impenetrable jungle. Like breaking into a clique, finding a way into another intellectual world is not easy, especially when that world is self-referential and has no obvious starting point. The newcomer is faced with the need to assimilate all at once a daunting array of conflicting positions. The process resembles having to get to know an unfamiliar colleague who is a member of a large extended family of eccentric relatives, all of whom speak different languages.

It takes time to grow comfortable with different paradigms, to recognize their similarities and understand their differences. This process involves thinking outside traditional boundaries, moving beyond what medical training so often takes for granted, and gradually piecing together the parts of a larger picture. For any newcomer to the field, expert guidance can be immensely valuable. But expert guides are in short supply, especially within medical education.

**Conclusion**

Exploring the humanities can challenge our entrenched ideas about science and the nature of knowledge. Most importantly, perhaps, it demands a willingness to look through new spectacles and critically examine long-held assumptions.

Gaining access to the literature of the humanities involves more than a visit to the library. It requires wide reading, the development of a working knowledge of unfamiliar jargon and an understanding of alternative paradigms. To read effectively we require a special set of tools of a kind that traditional medical training
seldom provides. My plea is to include within the medical curriculum not only an open-minded exploration of what the humanities can offer, but explicit guidance in how to gain access to this world and make it part of our own. The potential reward is an intellectual diversity that our professional sorely needs.

References


Received 9 September 2001; editorial comments to author 23 November 2001; accepted for publication 8 January 2002