

# Understanding Integration in Medical Education

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## Abbreviations

PBL Problem-based learning

## Introduction

Integration in medical education is often misunderstood. This is despite the fact that it is frequently seen as being a key idea to providing a medical education that will adequately prepare students for the world of modern medical practice. Integration is an idea with complex nuances and, unfortunately, those nuances often go unappreciated by many medical educators. If integration really is important then medical educators need to inform themselves of the nuances and the different levels of complexity involved. In this commentary, I provide an overview of some of that complexity. The main message is that we need an interdisciplinary approach to understanding integration. To fully understand what integration involves then we ourselves, as educators, need to integrate insights from a range of theoretical lenses. First, we consider integration at the curriculum level and then move on to integration at the level of the individual student and practitioner. One discipline that helps us understand integration is history.

## Integration at Curriculum Level

The history of medical practice is itself one of integration. There was the integration of medicine with surgery in the nineteenth century. This was soon followed by the integration of biological sciences which gave medical practice an empirical basis that has provided the foundation for astonishing advances ever since. While medical practice may now be seen as an historical example of successful integration, the same has not always been true of medical education. There are reports going back to 1860 [1] claiming that medical education programs were overstuffed with content. This can be seen as due, in part, to an absence of integration. Little seems to have been done about this until the latter part of the twentieth century. Even the reforms due to the Flexner Report [2] had little to do with integrating the curriculum and can be seen, in hindsight, as a “disintegration” of the curriculum. Since Flexner, the classic model of medical education has been one where the basic medical sciences were taught in isolation before students were permitted to see patients (2+2 in North America). It was assumed, naively as it turned out, that students would naturally be able to apply what they had learned in the class and the lab at the bedside. It was only in the latter part of the twentieth century that there were conscious efforts to integrate the curriculum.

Attempts at integration have shown great variety. At one end of the spectrum, there is a simple curriculum alignment where, for example, the physiology of the heart is taught about the same time as students are being taught the anatomy of the heart. Beyond this, there is a range of integration models varying up to case-based learning of which the best-known example is problem-based learning (PBL).

In a PBL-based program, there is an effort to provide a “core curriculum” of essential knowledge. Beyond this, the PBL sessions are used to encourage students to make their

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own decisions about what knowledge, or rather bodies of knowledge, they might need to bring together to solve cases. The writers of a PBL curriculum must design cases that encourage students to integrate knowledge from a range of disciplines. For example, in solving a case of heart disease, the anatomy and physiology of the heart will have to be combined with pathology and pharmacology. Beyond this, the PBL case can bring in public health measures such as those to reduce smoking and obesity in the wider population. The very same case can be used to raise ethical issues, such as deciding who gets a heart transplant and who does not. Social issues too can be integrated if a frail patient is to be discharged to a home with many stairs they will no longer be able to manage. The list goes on. This level of integration is complex enough, and there are many questions to be answered by those providing such a curriculum. What knowledge goes into the core and what does not? How is the PBL element related to other parts of the curriculum? For example, is there still a need to provide a dedicated anatomy course where students can dissect the heart for themselves? If so, exactly how is this integrated with the PBL program? Does it come before, during, or after the PBL cases on cardiology? These are all practical issues that medical educators providing an integrated curriculum must negotiate. However, there are other levels of complexity that are not considered as often. These can be summed up in the question: are there other reasons for integration? The literature on the sociology of medical education can help us here.

Bloom [3] claimed that in medical education, there was often “reform without change” (p. 294), meaning that integrative curriculum reform was undertaken for a range of reasons that had little to do with improving education. Bloom claimed that the overwhelming focus on research activity prevented any meaningful curriculum reform. According to Vinten-Johansen and Riska [4], the integration of the social sciences into the curriculum in US medical schools was often a cosmetic exercise in response to threats of government intervention. Brosnan [5] pointed out that in the UK, the newer medical schools have usually been the quickest to adopt a new and integrated curriculum, and this may have been done as a means of symbolically differentiating themselves from the more established medical schools. Thus, integration may be undertaken for reasons organizational rather than educational. Brosnan also pointed out that such curriculum reform can be subverted when the underlying value system remains in place. One of the dominant values in Western medical schools has been and, in many cases, continues to be high-quality research output. The less dominant value of providing care to human beings may be acknowledged but often plays a secondary role. There are several theoretical lenses available to help us understand these issues in a little more depth.

Atkinson and Delamont [6] advocated using Bernstein’s [7] sociology of the curriculum. Bernstein often focused attention on boundaries, beginning with principles of selection

and combination. He was concerned with questions such as: how are contents of knowledge identified as such, and how are they related to each other? For example, Bernstein identified the collection type curriculum, which can be contrasted with the integrated curriculum. Traditional medical schools have a curriculum that is characterized by the collection model. There is a collection of distinctive subjects with strong boundaries around them, with an emphasis on the separation between subjects. The preclinical subjects, as a group, are also sharply demarcated from the clinical subjects. Within each group, the subjects are sharply demarcated from each other. These preclinical subjects also precede the clinical subjects. Atkinson and Delamont pointed out that the structure of a curriculum can impose a particular epistemological world view. The way knowledge is organized in a curriculum implies that this is the way the world itself is organized and that, therefore, knowledge of the world must be acquired in distinctive ways that match the structure of the curriculum.

In this way, curriculum structure can “naturalize” particular ways of organizing knowledge and professional practice so that they become normative. The traditional curriculum assumes that the basic medical sciences must be mastered before a student can begin to see patients, and the implication is that this is the way things must be. With strong demarcation, there is also strong framing. In Bernstein’s terms, framing refers to the management of the pedagogical encounter, the order in which knowledge is presented and how it is presented. One outcome of this strong framing and a strongly demarcated curriculum is that the roles of teacher and student tend to become circumscribed and fixed within a clear and definite hierarchy. In contrast, the integrated model has more porous boundaries between subjects with weak framing and predisposing to synthesis of ideas across disciplinary boundaries.

In an integrated model, there is an underlying principle of synthesis. Instead of individual subjects dominating a curriculum, there tend to be themes that draw on all subjects. For example, the scientific method can be a theme that runs throughout the entire curriculum including the study of the cardiovascular system mentioned above. The aim is to provide students with an overview of all relevant subjects that they can then apply to each case. In doing so, students are encouraged to see the links between different subjects and to understand how subject knowledge is applied to real-world cases. With the shift to more integrated curricula, there are also other shifts such as weak framing.

An integrated curriculum tends to foster weak framing, with many ways of implementing pedagogy. Problem-based learning tutorials can be dovetailed with traditional lectures and demonstrations. Students are also encouraged to come together within informal learning groups, to support each other rather than compete as individuals in the traditional model. There are changes in the expectations and roles of students and teachers. The old “expert–novice” relationship can give

way to a more collegial joint pursuit of knowledge and capability. Ignorance is not necessarily seen as a reason for shame and humiliation but is understood as an opportunity to learn. One consequence of this is to bring about a shift towards more self-directed learning, so that students also become more critical consumers of knowledge and are willing to become lifelong learners. There are other consequences of integration. Atkinson and Delamont [6] claimed that Bernstein's [7] insights allow for specific predictions to be made. The identities and personal qualities of students tend to become an explicit part of the integrated educational approach, whereas in a traditional collection curriculum, these features tend to remain part of the hidden curriculum. In attempts to make a curriculum more integrated, there is often a tendency to have more of a focus on clinical reasoning, and it is here that we can look at integration at the individual level. Medical students must eventually learn to reason their way through clinical cases as individuals.

### Integration at the Individual Level

Clinical reasoning is all about integration. In deciding a diagnosis and treatment plan, clinicians are doing a great deal of integration. There is the obvious integration of biomedical sciences and clinical sciences. Different bodies of knowledge must be applied to a real case. Here too, there are, however, other forms of integration that are less obvious. There is the integration between scientific knowledge and the personal experience and expertise of the clinician. The pioneers of evidence-based medicine emphasized the importance of this form of integration [8]. While this integration necessarily happens in practice, it is, unfortunately, rarely addressed in medical education. This is probably because most medical educators understand the vocabulary and discourse of scientific evidence but lack a vocabulary for dealing with personal experience and expertise and how they could be integrated with the best available evidence. The personal experience and expertise side of the equation thus tends to be ignored as well as how these factors might be integrated with the best available evidence. Fortunately, there are disciplines that do provide a vocabulary to articulate personal experience and expertise. If we apply these then we have a chance to provide a medical education where the full richness of clinical reasoning can be revealed and taught in all its integrative glory. These disciplines include the medical humanities and social sciences.

The scientific approach that has dominated medical education is now being integrated more and more with the social sciences and the humanities. According to Sullivan and Rosin [9], while the natural sciences can

help us to establish relative certainty making the world “more amenable to rational understanding and effective action”, the social sciences can “open up for examination the diversity of human possibilities and experience” while the humanities can “provide means of understanding and interpreting the complexities of purpose and meaning” (pp. 94–95). The integration of the different disciplines opens up the possibility of developing professionals who can combine scientific analytical thought and the critical thinking of the humanities into what has been called practical reason. Within the medical world, practical reason is exemplified by narrative medicine.

The advocates of narrative medicine [10, 11] claim that it is an example of how scientific thinking can be integrated with humanities thinking. Clinical cases can be seen as following generic narrative formats that can help us organize vast amounts of scientific knowledge. A narrative mode of thinking may not provide scientific certainty, but it does provide a means of exploring and making sense of situations and contexts of action where scientific thinking and discourse falter. A narrative approach can open up the sources of human meaning and value that may permit clinicians to see why patients are often resistant to what seems so scientifically obvious [12]. These narrative insights can then open up the possibility of engaging with patients in ways that allow clinicians to provide good care that is acceptable to someone with a non-scientific worldview. Approaches, such as this, that use integrated ways of thinking are also ethical in that the humanity of others is fully recognized, and a scientific approach is not imposed on people simply because it is known to be scientifically effective. There are other disciplines that also offer us the chance to understand the integration of educational experience and the development of medical expertise. One such discipline that may be a surprise to many medical educators is philosophy.

A very practical form of philosophy that can be used to articulate the practice knowledge needed in clinical reasoning is Neo-Aristotelianism, based on the work of Aristotle [13]. Neo-Aristotelianism recognizes traditional propositional knowledge (episteme) but also technical knowledge of how to do things (techne) and in addition, the practice wisdom that comes directly from engaging in practice (phronesis). While phronesis cannot be taught directly, our education needs to provide opportunities for students to meet the challenges of practice and thus develop phronesis for themselves. However, in order for students to develop phronesis, they need to engage in relevant practice in sufficient depth, with sufficient frequency, and with sufficient mentoring and reflection. As the philosopher, Nicholas Davey, observed:

“What makes a practice a practice rather than a method is precisely the fact that it is based upon acquired and accumulated experience. The acquisition of discernment, judgment,

and insight is based not so much upon what comes to us in a given experience but upon what comes to us by involvement and participation in a whole number of experiences. ... Experience of this order affords a wisdom” ([14], p. 245).

In other words, a professional practice, like medicine, is not simply the ability to apply knowledge and procedures. It is much more. There is the requirement to develop practice wisdom, to integrate the best evidence with personal experience and expertise called for by Sackett et al. [8]. There is also here a clear indication of the kind of education that is needed for all this to happen. Students need to be mentored and guided in their reflections on their own practice experience so that their clinical reasoning goes beyond the simplistic application of protocols and clinical methods. They need many opportunities to gain experience and to reflect deeply on that experience so that expertise can begin to emerge.

## Conclusion

Integration in medical education is important because medical practice itself requires a great deal of integration. The integration of insights from a range of disciplines helps us to gain an in-depth appreciation of the subtleties and nuances that exist in a complex professional practice such as medicine. In the same way, an integrated, interdisciplinary approach allows us to understand what an integrated medical education can look like. Medical educators need the courage to embrace an interdisciplinary approach and familiarize themselves with the vocabularies of other disciplines such as the social sciences and humanities. If they do, then we have the chance to provide a medical education that really does prepare people for the world of practice.

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