

WHAT IS . . .

What is a spiral curriculum?

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Introduction

In planning a curriculum there are many questions to be answered (Harden, 1986). Much attention has been paid to aims and objectives, the content of the curriculum, teaching methods, assessment, and educational strategies such as problem-based learning, integration and community-based learning. A relatively neglected area has been the question of the organization of the content and the overall structure of the curriculum. A traditional view of the curriculum is of a series of courses, each with its own programme and assessment. There is a growing tendency, however, to break down barriers or boundaries between courses and departments and to look at the overall aims or objectives of the curriculum. It is in this context that the concept of a spiral curriculum has particular relevance.

The concept of a spiral curriculum

A spiral curriculum is one in which there is an iterative revisiting of topics, subjects or themes throughout the course. A spiral curriculum is not simply the repetition of a topic taught. It requires also the deepening of it, with each successive encounter building on the previous one. This concept was described first by Jerome Bruner in 1960:

I was struck by the fact that successful efforts to teach highly structured bodies of knowledge like mathematics, physical sciences, and even the field of history often took the form of a metamorphic spiral in which at some simple level a set of ideas or operations were introduced in a rather intuitive way and, once mastered in that spirit, were then revisited and reconstrued in a more formal or operational way, then being connected with other knowledge, the mastery at this stage then being carried one step higher to a new level of formal or operational rigour and to a broader level of abstraction and comprehensiveness. The end state of this process was eventual mastery of the connexity and structure of a large body of knowledge

The following are the features of a spiral curriculum:

- (1) *Topics are revisited:* Students revisit topics, themes or subjects on a number of occasions during a course. They may return to a body system, such as the cardiovascular system or the respiratory system. They may revisit themes, such as clinical skills, or medical ethics. They may return to generalizable and transferable skills such as management or communication.

Bruner (1960), when he coined the term 'spiral curriculum', suggested that such a curriculum would be structured "around the great issues, principles and values that a society deems worthy of the continual concern of its members".

- (2) *There are increasing levels of difficulty:* The topics visited are addressed in successive levels of difficulty. Each return visit has added objectives and presents fresh learning opportunities leading to the final overall objectives. Every visit can bring:
 - new knowledge or skills relating to the theme or topic;
 - more advanced applications of areas previously covered;
 - increased proficiency or expertise through further practical experience.
- (3) *New learning is related to previous learning:* New information or skills introduced are related back and linked directly to learning in previous phases of the spiral. Previous learning is a prerequisite for the later learning. Dowding (1993) described how "This prerequisite sequencing provides linkages between each lesson as the student spirals upwards in a course of study. As new knowledge and skills are introduced in subsequent lessons, they reinforce what is already known and become intertwined with previously learned information."

What is learned about a topic in early loops of the spiral is linked to what is learned in later loops. With a controlled introduction in the first loop of the spiral, the student is not overwhelmed with the subject.
- (4) *The competence of students increases:* The learner's competence increases with each visit, until the final overall objectives are achieved. This progressive gain in competence can be tested through the assessment procedures.

Spirals in action

An example of a spiral curriculum is given in Figure 1. Students at the University of Dundee study normal structure, function and behaviour in phase 1 of the curriculum through a system-based approach (Harden *et al.*, 1997). They revisit the same systems in phase 2 when they look at abnormal structure, function and behaviour,

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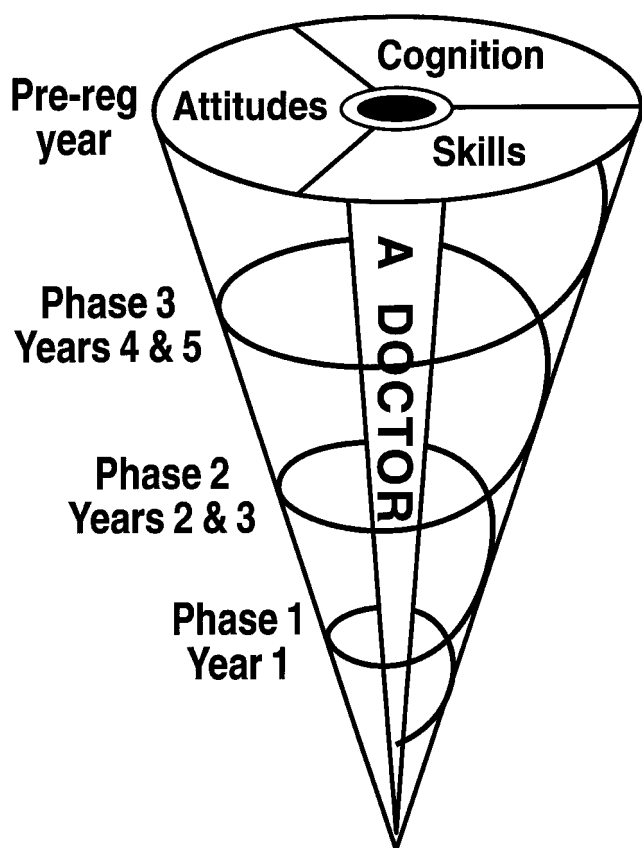


Figure 1. Four spirals in the curriculum.

building on what they have learned about the normal in phase 1. Students revisit the systems for a third time in phase 3, when they relate their studies to clinical practice, applying what they have learned in phases 1 and 2. The spirals broaden as the students pass from phase 1 to phase 3 in the curriculum. In a fourth spiral students, as pre-registration house officers, put the theory into practice.

An early use in medicine of the term 'spiral curriculum' was recorded by Kabara (1972) in a US college of osteopathic medicine. He described a 'spiral of information' with productive repetition and constant reinforcement of learned skills and facts. More recently, the concept has been described with community-based training programmes (Jira & Kaba, 1998). The idea of curriculum spirals was applied to nursing education to allow students exposure to a given area of content at a gradually increasing level of difficulty (Beattie, 1986). Practical nursing experience was planned to interlace with the revisiting and development of theory and reflected the gradual development of skilled practice (Jinks, 1991).

The spiral concept has been widely applied from optometry to arithmetic and from postgraduate studies to nursery education (LeeKeenan & Edwards 1992). Dowding (1993), concluded, however, that "although the concept of a spiral curriculum is good, it has not been successfully implemented on any large-scale basis over a substantial period of time". Factors likely to lead to an increasing application of the concept to medical education include the increasing emphasis on problem-based learning and integration (Harden et al 1984), on 'education for capability' and on-the-job performance, and on outcome-based education (Harden et al 1999).

Value of spiral curriculum

The value of a spiral curriculum lies in:

- (1) *Reinforcement*: Once learned a topic or subject is reinforced if there is continuing exposure to it. A common complaint of teachers is that topics learned by students early in the curriculum are forgotten later. In the spiral curriculum students are continually looking back on subjects previously learned.
- (2) *A move from simple to complex*: Students are introduced in a controlled way at a level at which they are not overwhelmed, and at which they can master the subject. They then go on to build new knowledge on prior knowledge. Students achieve a better understanding by exploring the same topics at deepening levels.
- (3) *Integration*: Traditionally, a curriculum was viewed as a series of courses, each with its own programme and assessment, but this compartmental approach is inadequate. We must break down the barriers and boundaries that have grown up between courses and departments (GMC, 1993). This integration is greatly aided by the adoption of a spiral curriculum.

As Kabara (1972) suggests, "the spiral curriculum approach is usually alien to departmental teaching. Departmental course offerings to medical students are different and less holistic. Because the student's exposure to any discipline by a department is a one-shot affair, faculty feel justified to teach all in one dose. The method outlined above obviates this classical approach."

In the spiral curriculum there is continuity from one stage of the curriculum to the next and vertical integration between the different stages. The utility of the basic sciences becomes obvious to the teacher and student as competences gained in the early years are built on in the later years.

- (4) *Logical sequence*: Attention is paid in a spiral curriculum to both the scope and sequence of topics. The spiral curriculum can help to bring some order to the increasingly complex nature of medicine and medical education.
- (5) *Higher level objectives*: In a spiral curriculum students are encouraged to go beyond factual recall to an application of knowledge and skills. An understanding of thyroid hormone synthesis gained in early phases of the curriculum, for example, is applied in later phases to thyroid disorders and the management of patients with thyroid disease.
- (6) *Flexibility*: The spiral curriculum is also a flexible one. It allows, for example, students to transfer directly to the second spiral of a medical course of study if they have mastered the first level in a science-based course.

Conclusion

The concept of a spiral curriculum merits careful consideration. The iterative revisiting of subjects throughout the course is particularly relevant in integrated and problem-based learning and in outcome-based education.

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