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## Applying educational theory in practice

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## ABC of learning and teaching in medicine
# Applying educational theory in practice

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How many times have we as teachers been confronted with situations in which we really were not sure what to do? We "flew by the seat of our pants," usually doing with our learners what had been done with us. It would be useful to be able to turn to a set of guiding principles based on evidence, or at least on long term successful experience.

Fortunately, a body of theory exists that can inform practice. An unfortunate gap between academics and practitioners, however, has led to a perception of theory as belonging to an "ivory tower" and not relevant to practice. Yet the old adage that "there is nothing more practical than a good theory" still rings true today. This chapter describes several educational theories and guiding principles and then shows how these could be applied to three case studies realting to the "real world."

## Adult learning theory

Malcolm Knowles introduced the term "andragogy" to North America, defining it as "the art and science of helping adults learn." Andragogy is based on five assumptions—about how adults learn and their attitude towards and motivation for learning.

Knowles later derived seven principles of andragogy. Most theorists agree that andragogy is not really a theory of adult learning, but they regard Knowles' principles as guidelines on how to teach learners who tend to be at least somewhat independent and self directed. His principles can be summarised as follows:

● Establish an effective learning climate, where learners feel safe and comfortable expressing themselves
● Involve learners in mutual planning of relevant methods and curricular content
● Involve learners in diagnosing their own needs—this will help to trigger internal motivation.
● Encourage learners to formulate their own learning objectives—this gives them more control of their learning
● Encourage learners to identify resources and devise strategies for using the resources to achieve their objectives
● Support learners in carrying out their learning plans
● Involve learners in evaluating their own learning—this can develop their skills of critical reflection.

## Self directed learning

Self directed learning can be viewed as a method of organising teaching and learning in which the learning tasks are largely within the learners' control (as with the adult learning principles described above).

It can also be viewed as a goal towards which learners strive so that they become empowered to accept personal responsibility for their own learning, personal autonomy, and individual choice. Success in the first view would lead to attaining the second.

Philip Candy identified in the literature about 100 traits associated with self direction, which he synthesised as the ability to be methodical and disciplined; logical and analytical; collaborative and interdependent; curious, open, creative, and



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**Andragogy—five assumptions about adult learning**

● Adults are independent and self directing
● They have accumulated a great deal of experience, which is a rich resource for learning
● They value learning that integrates with the demands of their everyday life
● They are more interested in immediate, problem centred approaches than in subject centred ones
● They are more motivated to learn by internal drives than by external ones

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**Learners need to feel safe and comfortable expressing themselves**

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**Self directed learning**

● Organising teaching and learning so that learning is within the learners' control
● A goal towards which learners strive so that they become able to accept responsibility for their own learning

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motivated; persistent and responsible; confident and competent at learning; and reflective and self aware.

How do we develop these traits in our learners? Most importantly, learners must have the opportunity to develop and practise skills that directly improve self directed learning. These skills include asking questions, critically appraising new information, identifying their own knowledge and skill gaps, and reflecting critically on their learning process and outcomes.

## Self efficacy

According to Albert Bandura, people's judgments of their own ability to deal with different situations is central to their actions. These actions include what they choose to do, how much effort they invest in activities, how long they persist in the face of adversity, and whether they approach the tasks anxiously or assuredly.

These judgments, called "self efficacy," may or may not be accurate, but they arise from four main information sources. In decreasing order of their strength, these sources are: performance attainments, observations of other people, verbal persuasion, and physiological state. Successes raise our self efficacy, while failures lower it. Failures are particularly likely to lower our self efficacy if they occur early in the learning process and are not due to lack of effort or difficult situations.

Observing other people similar to us performing successfully can strengthen our beliefs that we can perform similar tasks, especially when the tasks are unfamiliar. Verbal persuasion from a credible source also can help.

Finally, we (both teachers and learners) need to re-interpret our anxiety or nervousness in difficult situations as excitement or anticipation, rather than as an ominous sign of vulnerability.

## Constructivism

Constructivism has important implications for teaching and learning. Firstly, the teacher is viewed not as a transmitter of knowledge but as a guide who facilitates learning. Secondly, as learning is based on prior knowledge, teachers should provide learning experiences that expose inconsistencies between students' current understandings and their new experiences. Thirdly, teachers should engage students in their learning in an active way, using relevant problems and group interaction. Fourthly, if new knowledge is to be actively acquired, sufficient time must be provided for in-depth examination of new experiences.

## Reflective practice

The theory of reflective practice is attributed primarily to Donald Schön, whose work is based on the study of a range of professions. He argues that formal theory acquired through professional preparation is often not useful to the solution of the real life "messy, indeterminate" problems of practice.

Schön labels professionals' automatic ways of practising as professional "zones of mastery"—that is, areas of competence. Unexpected events or surprises trigger two kinds of reflection.

The first, "reflection in action," occurs immediately. It is the ability to learn and develop continually by creatively applying current and past experiences and reasoning to unfamiliar events while they are occurring. The second, "reflection on action," occurs later. It is a process of thinking back on what happened in a past situation, what may have contributed to the unexpected event, whether the actions taken were appropriate, and how this situation may affect future practice.
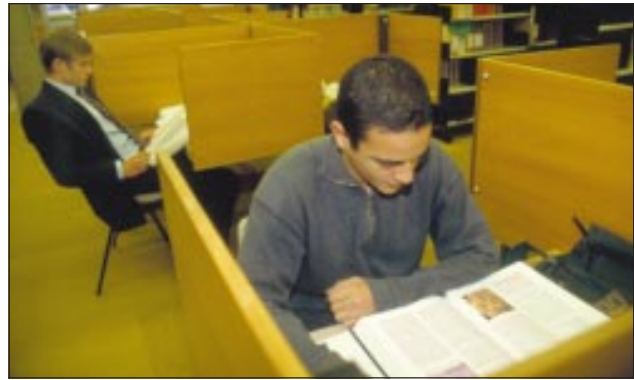

Learners should identify their own knowledge gaps and critically appraise new information
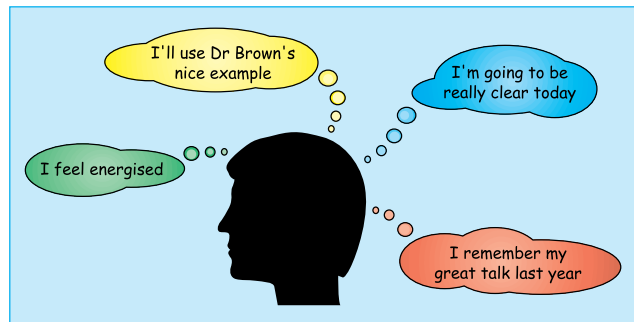

Teachers and learners need to view any anxiety or nervousness in difficult situations as excitement or anticipation

**Self efficacy—roles for the teacher**
- Modelling or demonstration
- Setting a clear goal or image of the desired outcome
- Providing basic knowledge and skills needed as the foundation for the task
- Providing guided practice with corrective feedback
- Giving students the opportunity to reflect on their learning

**The primary idea of constructivism is that learners "construct" their own knowledge on the basis of what they already know. This theory posits that learning is active, rather than passive, with learners making judgments about when and how to modify their knowledge**
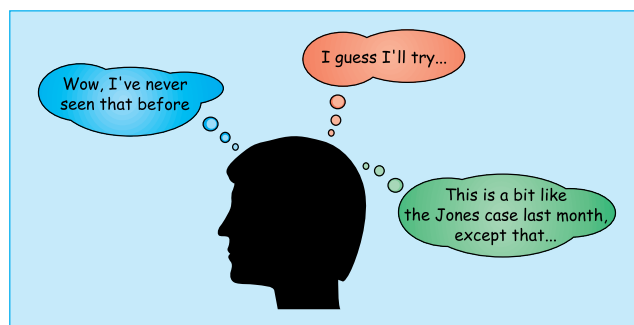

"Reflection in action"

Through the process of reflecting both "in practice" and "on practice," practitioners continually reshape their approaches and develop "wisdom" or "artistry" in their practice. Activities such as debriefing with peers or learners, seeking feedback from learners on a regular basis, and keeping a journal can provide vehicles for reflective practice.

## Converting theory into practice

Each of the educational theories presented here can guide our teaching practices. Some theories will be more helpful than others in particular contexts. However, several principles also emerge from these theories, and these can provide helpful guidance for medical educators.

**Three cases studies**

The boxes (right) describe three "real world" case studies representing situations encountered in medical education settings. The educational theories described above, and the principles which emerge from them, can guide us in solving the problems posed in these three cases.

**Case 1 solution**

You could present an interactive lecture on the autonomic nervous system. You could distribute a notetaking guide. This would contain key points, space for written notes, and two key multiple choice or "short answer" questions requiring higher level thinking (principle 1, see box above). You could stop twice during the lecture and ask the students to discuss their response to each question with their neighbours (principles 1, 3, and 5). A show of hands would determine the class responses to the question (checking for understanding) and you could then give the correct answer (principle 5). Finally, you could assign a learning issue for the students to research in their own time (principle 4).

**Case 2 solution**

You could assign the students to small groups of four to six, and ask each group to submit two case studies describing clinical ethics issues in their local hospitals (principles 1 and 2). The ethics theory and approach needed to analyse these cases could be prepared by experts and presented on a website in advance of the sessions (principles 4, 5). The first of the six blocks of two hours could be used to discuss the material on the website and clarify any misunderstandings (principle 5). You could then show the students how to work though a case, with participation by the class (principle 7). The other five blocks could then be used for each small group to work through some of the cases prepared earlier, followed by a debriefing session with the whole class (principles 5 and 6).

**Case 3 solution**

You could first invite the registrar to observe you with patients, and do a quick debrief at the end of the day (principles 2, 6, and 7). With help from you, she could then develop her own learning goals, based on the certification requirements and perceived areas of weakness (principles 1, 3, and 4). These goals would provide the framework for assessing the registrar's performance with patients (principles 5, 6). You could observe and provide feedback (principle 5). Finally, the registrar could begin to see patients alone and keep a journal (written or electronic) in which she records the results of "reflection on practice" (principle 6). She could also record in her journal the personal learning issues arising from her patients, could conduct self directed learning on these, and could document her findings in the journal (principles 1, 4, and 6). You could provide feedback on the journal (principle 5). If practical, the

### Seven principles to guide teaching practice

1 The learner should be an active contributor to the educational process
2 Learning should closely relate to understanding and solving real life problems
3 Learners' current knowledge and experience are critical in new learning situations and need to be taken into account
4 Learners should be given the opportunity and support to use self direction in their learning
5 Learners should be given opportunities and support for practice, accompanied by self assessment and constructive feedback from teachers and peers
6 Learners should be given opportunities to reflect on their practice; this involves analysing and assessing their own performance and developing new perspectives and options
7 Use of role models by medical educators has a major impact on learners. As people often teach the way they were taught, medical educators should model these educational principles with their students and junior doctors. This will help the next generation of teachers and learners to become more effective and should lead to better care for patients

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**Case 1: Teaching basic science**

You have been asked to give a lecture on the autonomic nervous system to a first year medical class of 120 students. This has traditionally been a difficult subject for the class, particularly as it has not been explicitly covered by faculty in the problem based anatomy course. You wonder how you can make this topic understandable to the class in a 50-minute lecture.

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**Case 2: Ethics education**

You are a member of a course committee in the department of internal medicine, which is charged with the task of integrating the topic of ethics into the third year medicine rotation. Your committee has been given six blocks of two hours over a 12 week period. You wonder how to make the material engaging, understandable, and useful to the students.

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**Case 3: General practice training**

You are the trainer for a first year registrar in her first year of a general practice training programme. Your practice is so busy that you have very little time to spend with her. You wonder how you can contribute to providing a valuable learning experience for your trainee.

cohort of registrars could communicate via the internet to discuss their insights and experiences (principle 6).

## Conclusions

This article has attempted to show how the gap between educational theory and practice can be bridged. By using teaching and learning methods based on educational theories and derived principles, medical educators will become more effective teachers. This will enhance the development of knowledge, skills, and positive attitudes in their learners, and improve the next generation of teachers. Ultimately, this should result in better trained doctors who provide an even higher level of patient care and improved patient outcomes.

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The ABC of learning and teaching in medicine is edited by Peter Cantillon, senior lecturer in medical informatics and medical education, National University of Ireland, Galway, Republic of Ireland; Linda Hutchinson, director of education and workforce development and consultant paediatrician, University Hospital Lewisham; and Diana F Wood, deputy dean for education and consultant endocrinologist, Barts and the London, Queen Mary's School of Medicine and Dentistry, Queen Mary, University of London. The series will be published as a book in late spring.
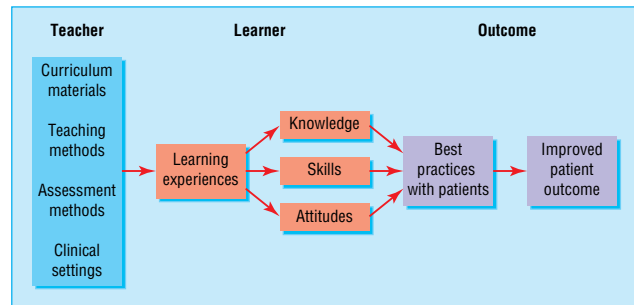
From theory to practice

### Further reading

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*When I use a word*

## Man hater

In his review of Steve Jones' book about the Y chromosome (*BMJ* 2002;325:841), Fred Kavalier wonders what the male equivalent of a misogynist is.

The Greeks had distinct words for man and mankind. A man (as opposed to a woman) was ἀυήρ (aner; root andr-) and mankind (as opposed to the beasts) was ἄνθρωπος (anthropos), from ἀυήρ plus ὄψ (ops), an eye. Of course, nothing is that simple. Aner also meant a man as opposed to a youth and a man as opposed to a god, although for the latter the words βροτός (brotos) or θυητός (thnetos, from thanatos, death) were sometimes used instead. Aner could also be a good and upright man (andres=gentlemen of the jury) in distinction to a slave or someone contemptuous (anthropos). But in his *Historia Animalium* Aristotle used aner to mean a male animal.

Some men have manliness in their names—Andrew, Androcles, Alexander, Leander, and Philander (in Ariosto's *Orlando Furioso*). Some women too—Andromache, Hector's wife, a warring woman, and Andromeda, a guardian or ruler of men. The title of Thornton Wilder's novella *The Woman of Andros* is a pun—the woman in question, Chrysis, is a prostitute.

Latin made the same distinction, between vir (a man) and homo (mankind). Vir was connected with vis, meaning strength, whereas homo was connected with humus, the ground. So virility was manliness as opposed to eunuchism, and a virago was a woman

acting like a man. A werewolf (or lycanthrope) is a man-wolf. And by Victorian double standards, virtue in a man implied courage, but in a woman sexual purity. So could a vir-gin be a man-trap?

The gender of a word must not be confused with the sex of the person to whom it refers. Anthropos and homo are both of masculine gender, but refer to people of both sexes. Conversely, persona, which in Latin originally meant a mask worn in a play, is of feminine gender. By using the word gender to mean sex, we have lost this distinction, just as we have when we use man to mean mankind.

So, one who hates mankind (men and women) is, like Molière's Alceste, a misanthropist. But one who hates men, the counterpart to a misogynist, is a misandrist.

Jeff Aronson  *clinical pharmacologist, Oxford*

We welcome articles up to 600 words on topics such as *A memorable patient, A paper that changed my practice, My most unfortunate mistake,* or any other piece conveying instruction, pathos, or humour. If possible the article should be supplied on a disk. Permission is needed from the patient or a relative if an identifiable patient is referred to. We also welcome contributions for "Endpieces," consisting of quotations of up to 80 words (but most are considerably shorter) from any source, ancient or modern, which have appealed to the reader.