

CHAPTER 1

Applying Educational Theory in Practice

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OVERVIEW

- Medical education has accumulated a useful body of theory that can inform practice
- Three educational theories can be applied in practice: social constructivism, experiential learning and communities of practice (CoPs)
- The range of cognitive skills that can be developed with expert guidance or peer collaboration exceeds what can be attained alone
- Experiential learning is a spiral model with four elements: (i) the learner has a concrete experience; (ii) the learner observes and reflects on this experience; (iii) the learner forms abstract concepts about the experience and (iv) the learner tests the concepts in new situations
- Effective knowledge translation (KT) is dependent on meaningful exchanges among CoP members for information to be used in practice or decision-making

Introduction

When confronted with a challenge in our clinical teaching, wouldn't it be a relief if we could turn to a set of guiding principles based on evidence or long-term successful experience? Fortunately, the field of education has accumulated a useful body of theory that can inform practice. The old adage that 'there is nothing more practical than a good theory' still rings true today. In the first edition of the *ABC of Learning and Teaching in Medicine*, I discussed the application of adult learning theory (andragogy), self-directed learning, self-efficacy, constructivism and reflective practice to the work of medical educators (Kaufman 2003). In this chapter, I extend that discussion by addressing three additional educational theories and show how these could be applied in the context of three case studies; these theories are social constructivism, experiential learning and communities of practice (CoPs). In social constructivism, we are talking about how learners learn from and with peers and in interactions with their tutors. In

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experiential learning, we are talking about how learners process and learn from concrete events and experiences. Lastly, in CoPs, we are talking about how learners are socialised into a profession and how they learn through participation in their professional community. Let's examine these three theories in more detail (Overview box).

Social constructivism

The primary idea of constructivism (i.e. cognitive constructivism) is that learners construct their own knowledge based on what they already know, and make judgements about when and how to modify their knowledge. There are some important implications of adopting a constructivist perspective. First, the teacher is not viewed primarily as a transmitter of knowledge but as a guide who facilitates learning. Second, since learning is profoundly influenced by learners' prior knowledge, teachers should provide learning experiences that expose inconsistencies between students' current understandings and their new experiences. Third, teachers should engage students in their learning in an active way, using relevant problems and group interaction. This is not just about keeping learners busy but the interaction must activate students' prior knowledge and lead to the reconstruction of knowledge. Fourth, if new knowledge is to be actively built, sufficient time must be provided for in-depth examination of new experiences.

Vygotsky (1978) elaborated this theory describing 'social constructivism', which posits that learners' understanding and meaning grow out of social encounters. The major theme of Vygotsky's theoretical framework is that social interaction with teachers and other learners plays a fundamental role in the development of understanding. An important aspect of Vygotsky's theory is the idea that cognitive development occurs in a zone of proximal development (ZPD). Vygotsky's (1978) often-quoted definition of ZPD is

... the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance, or in collaboration with more capable peers

– (1978, p. 86)

Full development of the ZPD depends upon full social interaction (Figure 1.1). Vygotsky asserts that the range of cognitive skills that

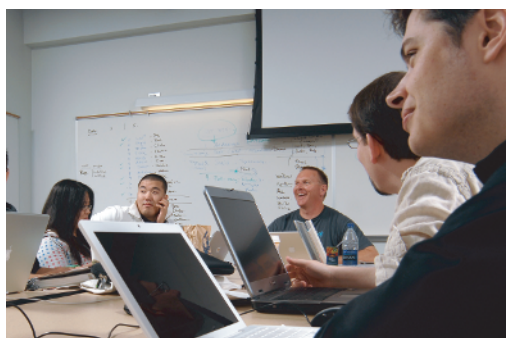
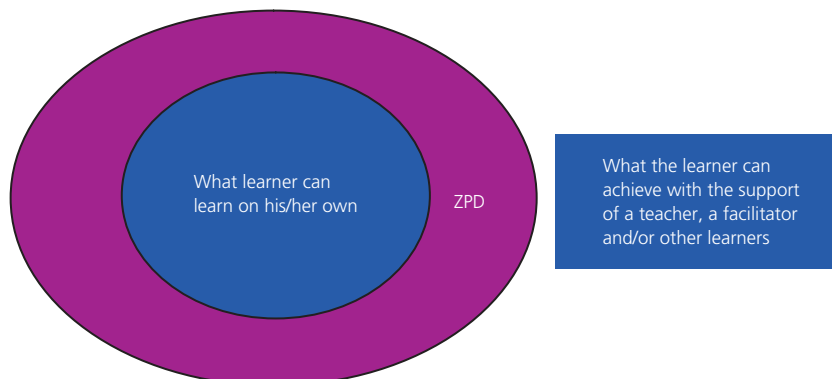


Figure 1.1 Students in a small-group discussion.



can be developed with expert guidance or peer collaboration exceeds what can be attained alone.

The concept of ‘scaffolding’ is closely related to the ZPD and was developed by other sociocultural theorists applying Vygotsky’s ZPD to educational contexts (Wood *et al.* 1976). Scaffolding is a process through which a teacher or more competent peer gives help to the student in her or his ZPD as necessary and then gradually reduces the help as the student becomes more competent. Effective teaching is therefore about identifying the student’s current state (prior knowledge) and offering opportunities and challenges that are slightly ahead of the learner’s development, i.e. on challenging tasks they could not solve alone. The more able participants (or the experts) model appropriate problem-solving behaviours, present new approaches to the problem and encourage the novice (or the learner) to take on some parts of the task. As novices develop the abilities required, they should receive less assistance and solve more of the problem independently. Simultaneously, of course, they will encounter yet more challenging tasks on which they will continue to receive help (Box 1.1).

Box 1.1 Social constructivism

- Learners actively construct their own knowledge, influenced strongly by what they already know.
- Social interaction plays a fundamental role in the development of understanding and meaning.
- The range of cognitive skills developed with expert guidance or peer collaboration exceeds what can be attained alone.
- Effective teaching is slightly ahead of the learner’s development, with novices working with more capable others on challenging tasks they could not solve alone.

Experiential learning

Experiential learning theory (Kolb 1984) is a model of learning that posits that learning is a four-step process. It describes how learners learn from experience through four steps: (i) the learner has a concrete experience; (ii) the learner observes and reflects on this experience; (iii) the learner forms abstract concepts about the

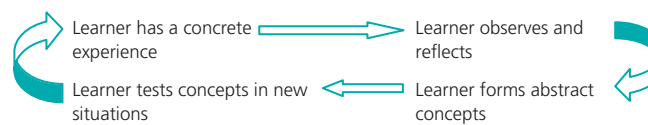


Figure 1.2 Experiential learning cycle.

experience; and (iv) the learner tests the concepts in new situations (Figure 1.2). Kolb asserts that experiential learning can begin at any one of the four steps and that the learner cycles continuously through these four steps. In practice, the learning process often begins with a person carrying out a particular action and then seeing its effect. Following this, the second step in the cycle is to understand these effects in the particular instance to be able to anticipate what would be the result in a similar situation. Following the pattern, the third step would involve understanding the general principle under which the particular instance falls, for example, by looking up the literature or talking to a colleague.

When the general principle is understood, the last step, according to Kolb, is its application through action in a new circumstance. Two aspects can be seen as especially noteworthy: (i) the use of concrete experience to test ideas and (ii) the use of feedback to change practices and theories (Kolb 1984: p. 21–22) (Figure 1.3). Learners along the medical educational continuum use various experiential learning methods such as (i) apprenticeship; (ii) internship or practicum; (iii) mentoring; (iv) clinical

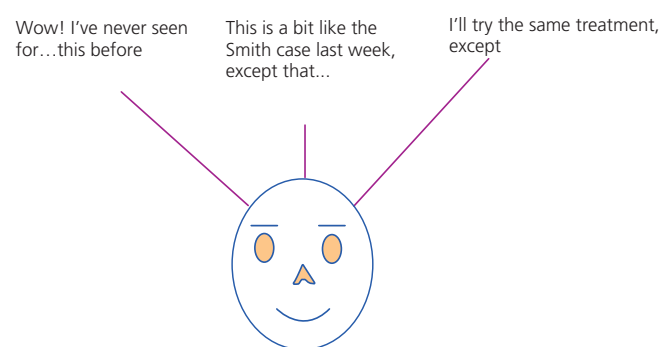


Figure 1.3 Student testing ideas.

supervision; (v) on-the-job training; (vi) clinics and (vii) case study research (Box 1.2).

Box 1.2 Experiential learning

- Learning is a four-step cyclical (or spiral) process: feeling, thinking, watching and doing.
- Experiential learning can begin at any of the four steps.
- Each step allows a learner to reflect and form new principles and theories to guide future situations.
- Concrete experience is used to test ideas and these are modified through feedback.

Communities of practice

The term *community of practice* (CoP) was proposed by Lave and Wenger (1991) to capture the importance of integrating individuals within a professional community, and of the community in correcting and/or reinforcing individual practices. For example, a student joining a clinical team for a period of 6 weeks starts as an observer but gradually gets drawn into becoming a participant in team activities and interaction – this is a powerful driver of professional socialisation and the acquisition of professional norms and practices. There are many examples of CoPs including online communities and discussion boards. Barab *et al.* (2002, p. 495) later described a CoP as ‘a persistent, sustaining social network of individuals who share and develop an overlapping knowledge base, set of beliefs, values, history and experiences focused on a common practice and/or mutual enterprise.’ Within this context, learning can be conceived as a path in which learners move from *legitimate peripheral participant* (e.g. observer, questioner) to core participant of the CoP.

CoPs have gained prominence primarily as vehicles for KT, which refers to the acceleration of the process of making the most current information available for use. Effective KT is dependent on meaningful exchanges among network members for using the most timely and relevant evidence-based, or experience-based, information for practice or decision-making. CoPs are natural places for partnerships and exchanges to start and grow; in them, relevant learning occurs when participants raise questions or perceive a need for new knowledge. Moreover, internet technologies enable these discussions to occur in a timely manner among participants regardless of physical location and time zone, with discussions archived for review at a later date or by those who miss a discussion (Box 1.3).

There are a number of key factors that influence the development, functioning and maintenance of CoPs. The initial CoP membership is important. For example, a medical team with undergraduate and postgraduate students and a clinical mentor would be a typical and legitimate CoP. The commitment to the CoP goals, its relevance and members’ enthusiasm about the potential of the CoP to have an impact on practice are also key success factors. On the practical side, a strong infrastructure and resources are essential attributes; these include good information technology,

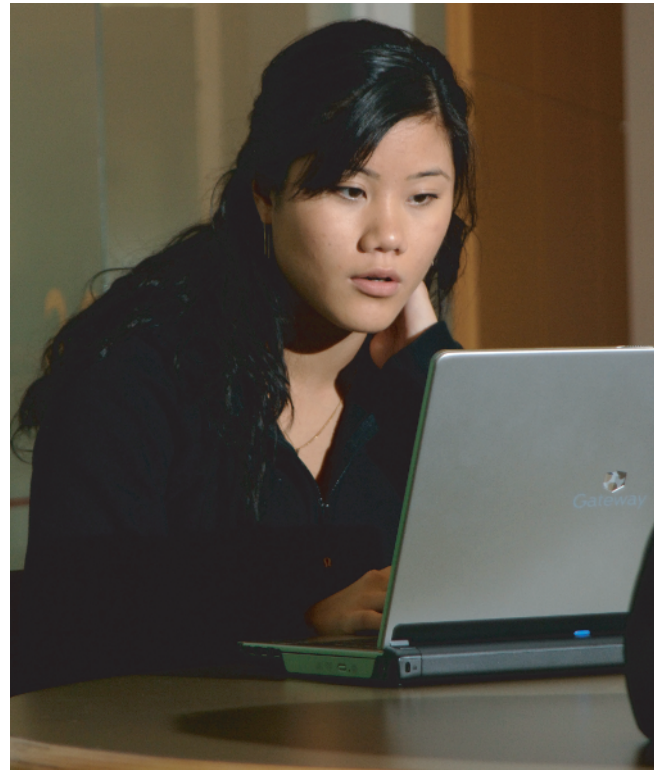


Figure 1.4 Student participating in an online CoP.

useful library resources, databases and human support. In order to provide these key factors, one or more strong, committed and flexible leaders are needed to help guide the natural evolution of the CoP (Figure 1.4).

Box 1.3 Communities of practice

- A CoP is a persistent, sustaining social network of individuals who share and develop an overlapping knowledge base, and focus on a common practice and/or mutual enterprise.
- Within this context, learning can be conceived as a path in which learners move from ‘legitimate peripheral participant’ to core participant of the CoP.
- CoPs have gained their prominence primarily as vehicles for *knowledge translation*, which depends on meaningful exchanges among network members.
- Internet technologies enable discussions to occur in a timely manner among participants regardless of physical location and time zone, with the discussions archived.

Implications for medical educators

In this chapter, three educational theories have been presented, each of which can guide our teaching practices. Some theories will be more helpful than others in particular contexts. However, a number of principles also emerge from these theories, and these can provide helpful guidance for medical educators (Box 1.4).

Box 1.4 Eight principles to guide educational practice

1. Learning is an active, rather than a passive mental process, with learners making judgements about when and how to modify their knowledge.
2. Learners should be given opportunities to develop their own understanding through self-directed learning, combined with dialogue with their teachers and peers.
3. Learners should be given some challenging tasks they could not solve independently, and then work on these with more capable others (teachers or peers); as they develop the abilities required, they should receive less assistance and work more independently.
4. Learning should be closely related to the understanding and solution of real-world problems.
5. Learners should complete the full experiential learning cycle in order to gain a complete understanding of a concept; the steps in the cycle are concrete experience, observation and reflection, forming abstract concepts and testing the concepts in new situations.
6. Learners should be given opportunities and support for practice, accompanied by self-assessment and constructive feedback from their teachers and peers.
7. Learners should be given opportunities to reflect on their practice, through analysing and critiquing their own performance and, consequently, developing new perspectives and options.
8. Learners should be included in a CoP focused on a clinical specialty, involving their peers, more senior learners, clerks, registrars, clinicians and others. The CoP will support meaningful exchanges among network members about the most timely and relevant evidence-based, or experience-based, information for practice or decision-making.

Back to the 'real-world' situations

How do the three educational theories described here, and the principles that emerge from them, guide us in the three cases presented? (Box 1.5)

Case 1. You would prepare an interactive lecture on the autonomic nervous system (principle 1), and include a clinical example of its application (principle 4). By interactive, I mean a lecture in which you would plan to stop at key points and interact with the students. A note-taking guide would be distributed in advance (for students to print from a website) containing key points, space for written notes and two key short answer questions to answer or partially completed diagrams for students to complete before the lecture, requiring higher level thinking and strategically situated in your lecture sequence (principles 1 through 5). You would stop twice while delivering the lecture and ask students to discuss their response to each question with their neighbours (principles 1 through 6). A show of hands would determine the class responses to the question (checking for understanding) and the correct answer then would be given (principles 5 and 6). Finally, you would assign a more challenging learning issue for out-of-class research (principles 1 through 6) and the solution given in a later lecture or posted on the website (principles 5 and 6).

Case 2. You could first invite the registrar to observe you with patients, and do a quick debrief while walking from patient

Box 1.5 Three cases**Case 1 – Teaching basic science**

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

Case 2 – Internal medicine training

You are the trainer for a first-year registrar in an Internal Medicine training programme. Your practice is so busy that you have very limited time to spend with her.

You wonder how you can contribute to providing a valuable learning experience for your trainee.

Case 3 – Clerkship academic half-day

You are a member of a course committee in the department of family medicine, which is charged with the task of integrating a weekly academic half-day into the third-year, 12-week, family medicine rotation. However, the students are geographically distributed in clinics and physicians' offices across the region. You wonder how your committee can overcome this obstacle.

to patient, and then at the end of the day (principles 1, 2, 4, 5). To complement this, you would assign a number of appropriate case-based simulations, either online or on CD) for her to work through (principles 1 through 7). There is a strong correlation between experiential learning and simulations. In fact, Kolb described simulations and games as presenting learners with a broad experiential learning environment that offers learners support for active experimentation (Kolb 1984). With your help, the registrar would then develop his or her own learning goals, based on the certification requirements and perceived areas of weakness (principles 1 and 7). These goals would provide the framework for assessing the registrar's performance with patients (principles 6 and 7). You would observe and provide feedback (principles 4 through 7), and the registrar would begin to see patients alone (principles 1 through 7). The registrar would keep a journal (written or electronic) in which he would record the results of each step of the experiential learning cycle: concrete experience, observation and reflection, concepts and/or principles learnt and results of testing in new situations (principles 5 through 7). The registrar would also record in his journal the personal learning issues arising from his patients, would conduct self-directed learning on these (principles 1, 2, 7) and would document his or her findings in the journal (principles 5 through 7). The trainer would provide feedback on the journal (principle 7). If practical, the cohort of registrars would communicate via the internet to discuss their insights and experiences (principle 8).

Case 3. You could meet with your IT department to discuss your needs, and agree either to purchase or develop a CoP software platform. You would enlist your willing departmental colleagues and support staff, and your registrars, to help you design the CoP structure (e.g. table of contents), enrol in the CoP and upload some

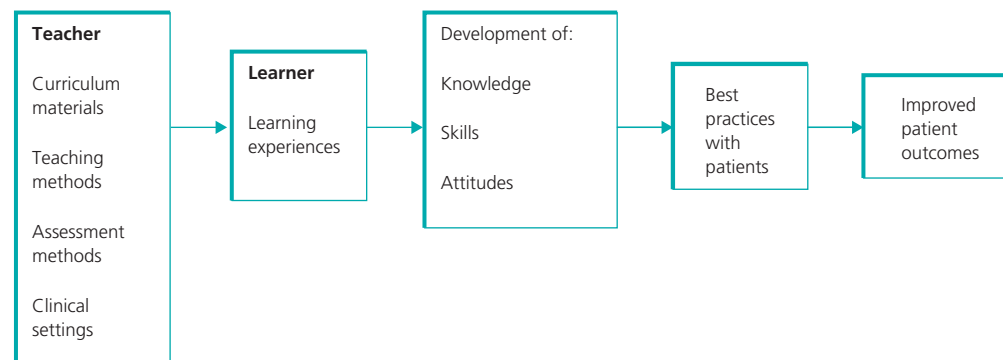


Figure 1.5 The medical education cycle.

content, for example, guidelines, cases, policies, administrative items, website links and so on (principles 1, 2, 8). You would collaborate with the director of the family medicine rotation, and the students would be enrolled in the CoP and assigned the task of uploading some content of their choice as a requirement of the rotation (principles 1, 2, 3, 8). Finally, you would set a schedule for asynchronous case discussions to occur throughout the rotation, with each student having a turn to organise and facilitate the online discussion (principles 1 through 8). These discussions would be archived so that you could provide feedback and a grade at the end of the rotation using a rubric for online discussions (principle 6; see <http://www.winona.edu/AIR/rubrics.htm>).

Conclusions

This chapter has discussed how to bridge the gap between educational theory and practice. In some situations, a theory can serve as a guide for decisions on educational practice. In other cases, the theory can be used to validate a practice(s) that a medical educator has shown to be effective. In either case, by using teaching and learning methods based on educational theories and derived principles, medical educators can become more effective teachers. This will enhance the development of knowledge, skills and positive attitudes in their learners, and also improve the next generation

of teachers. Ultimately, this should result in better trained doctors who provide an even higher level of patient care and improve the outcomes of their patients (Figure 1.5).

Further reading

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