Chapter 3.4b Formal educational interventions

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Key learning points

- "Education" is a broad and holistic term: while it conjures up a traditional didactic activity, the *effective* education of health professionals can be seen as an intervention, often with predisposing, enabling, and reinforcing strategies
- Large group sessions – the mainstay of traditional or formal continuing education (CE) – can also be made more effective by paying attention to rigorous needs assessments, and by increasing interactivity and engagement in the learning process
- Other interventions also show promise: small group learning, quality-driven activities, communities of practice, and distance education
- Finally, self-directed learning is increasingly better understood and may be assisted by the addition of portfolio learning and informed self-assessment exercises.

The term "education" has many meanings, though its gestalt – especially in continuing education (CE) – conjures the image of a large group session held in a hotel or conference setting, demonstrating little evidence of effect on clinician performance or health care outcomes. In fact, "education" is much broader than such large group, didactic sessions. For example, the American Medical Association (AMA) defines CE as "any and all ways by which physicians learn and maintain their competence" – clearly a much

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more fulsome construct than attending a short course [1]. This chapter describes educational interventions designed to promote the incorporation of best evidence into the practices of health professionals. It encompasses educational interventions more commonly considered as formal "CE" or continuing professional development (CPD). Other chapters build on the overview provided in Chapter 3.4a; they describe educational and KT interventions such as academic detailing (Chapter 3.4a), audit and feedback (Chapter 3.4d) and reminders (Chapter 3.4a), all of which are broadly "educational." While touched on here, a more complete discussion of educational theories is provided in Chapter 4.3.

In particular, this section comprises: a theoretical basis for physician* learning and education; an outline of effective large group methods; innovations in formal education employing high (and low) technology strategies; and finally, future trends in CE and health professional education.

What is the role of education?

The question of *why* health professionals learn is driven by many external forces. These include: the medical knowledge explosion, specialty society interest in CE, the use of CE "credit" to document maintenance of knowledge and competence, and a large interest by pharmaceutical and other commercial interests that recognize CE as a means to influence physician practice. Regulatory forces also exist: licensing and certification boards now require proof of participation on a regular basis; the process of recertification, at least in the USA, has given rise to a more active and effective form of continuing education [2]. There are of course many internal forces at work as well – including an innate sense of professionalism on the part of most health care workers.

The question of "*how*" physicians and other health care workers learn has also been extensively examined. For example, two decades ago, Fox and his colleagues asked over 300 North American physicians what practices they had changed and what forces had driven that change [3]. Physicians undertaking any change widely described an image of that change; for example, the general physician needing to be more comfortable with an ethnic population. The forces for change were varied. While changes arose from traditional educational experiences, many more were intrapersonal (e.g., a recent personal experience), or from changing non-medical external

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* In this section, reference is made most frequently to physician education, given that the majority of studies in this area have employed physicians. Where possible, reference is made to other health professionals.

factors, for example demographics (e.g., an increasingly aging patient population), patient demands, and other issues such as financial restraints or practice needs. Finally, the changes varied from smaller "adjustments" or accommodations (e.g., adding a new drug to a regimen within a class of drugs already known and prescribed) to much larger "redirections," such as adopting an entirely new method of practice.

Similar examples from seminal studies also reflect core learning principles. Schon describes the internal process of learning and "reflection," suggesting that a potent learning mechanism is secondary to self-appraisal and awareness built from clinical experiences, leading to a building of a new and expanded competency or "zone of mastery" [4]. Candy's description of the traits of the self-directed learner also deserves some elaboration [5]. These traits include: discipline and motivation; analytic abilities; ability to reflect and be self-aware; curiosity; openness and flexibility; independence and self-sufficiency; well-developed information seeking and retrieval skills; and good general learning skills. While these attributes may appear idealized, it is important for the knowledge translation process to bear them in mind as implementation plans are developed and executed.

Implementation strategies are about health professional and/or system change and have also been the subject of decades of research [6]. Rogers [7] referred to this as the decision-innovation process and Prochaska and Velicer [8] as the trans-theoretical model. Specifically focusing on physicians, Pathman [9] used a model comprising four stages – awareness–agreement–adoption–adherence – to describe how physicians progress as they learn about, agree with, begin to adopt, then fully adopt a new clinical process. These "stages" of learning are also important when considering the effect of educational interventions.

What is the process for education?

Education is one means to effect performance change and improve practice outcomes, thereby achieving translation of knowledge into practice. In the current context of relatively autonomous practice, it may afford the only means at the implementer's disposal to effect change. Green's PRECEDE model provides a highly useful construct to understand, develop, and deploy effective educational interventions [10]. The model incorporates elements characterized as predisposing (setting up the change), enabling (facilitating or supporting the change acquired in the predisposing phase), and reinforcing (supporting the change once it has begun to occur). In this model, predisposing methods may include mailed guidelines, didactic lectures, conferences, and rounds which may *predispose* the learner in

Table 3.4b.1 Examples of educational interventions in the context of stage of physician learning and change

Learning/change continuum	Awareness	Agreement	Adoption	Adherence
Elements of change:	*Predisposing elements:*	*Enabling strategies:*		*Reinforcing elements:*
Possible roles for educational interventions	Conferences, lectures, rounds, print materials	Small group learning activity; inter-activity in lectures	Workshops; materials distributed at conferences; audit and feedback	Audit and feedback; reminders

knowledge uptake; patient education materials and other tools (flow charts, for example) which might *enable* the change; and finally *reinforcing strategies* including reminders or audit and feedback, useful in solidifying a change already made. At least one systematic review supports this construct [11] and allows us to consider aligning educational interventions to the stage of learning as shown in Table 3.4b.1. Similarly, Grol describes the potential of employing multifaceted interventions, for example, coupling more traditional methods (predisposing to change) with elements such as reminders facilitating and feedback (to either health professionals or patients) to reinforce changes [6].

Putting together these characteristics and the process through which the learner adheres to a new practice (Pathman's awareness/adherence model) provides a useful if inexact framework to strategize the deployment of educational interventions. First, several systematic reviews have identified that most didactic conferences [11, 12] or mailed materials [13], employing only one technique, are infrequent producers of change in performance. This finding, however, may undervalue such traditional modalities since they often play a crucial role in predisposing to change – but not in effecting change by themselves. For example, where health professionals are unaware of new evidence, conferences, print materials and rounds may alert them to a new finding, treatment modality, or guideline. Second, if learners are aware of a new finding or guideline but do not agree with it, small group learning, or increased interactivity in the conference setting exposes the learner to peer influence [14, 15], a strong predictor of increased discussion and possible consensus. Third, if the issue is one of adoption of a new manual or communication skill, or a complex care algorithm, more in-depth workshops or interactive, online learning experiences may facilitate the

change [15]. Finally, once the process has been adopted, system-based interventions such as reminders or audit and feedback may be considered to facilitate sustainability [16]. Table 3.4b.1 outlines these principles, based on an earlier model of implementation [17].

What educational interventions can we use to effect knowledge translation?

Large group sessions

Educational events for relatively large numbers of learners are common-place although the evidence indicates that the purely didactic type of this educational intervention produces little, if any, performance change. However, several studies [11, 12, 18–20] have outlined relatively useful and effective strategies within the large group model to increase the impact on performance and health care outcomes. These strategies include: more refined and objective needs assessments [18]; increased interactivity [19]; and variation in the educational method [12].

Determining needs and setting objectives

There is ample evidence (and increasing awareness) that not only the needs of learners but also that of their patients or health care system should drive CE content [12]. However, considering *only* system or patient needs and ignoring health professionals learning styles and habits misses an understanding of the learning process and may fail to change professional performance. In contrast, CE planners frequently use solely subjective needs assessments despite evidence that clinicians may be poor self-assessors [21, 22] and that objectively determined gaps may more closely link the CE process to demonstrable outcomes. Subjective needs assessment strategies include questionnaires, focus groups, structured individual interviews and diaries or log books which are described in more detail in Chapter 3.1. To offset the self-assessment deficiencies inherent in these methods and to create a more balanced needs assessment strategy, objective tools can be used including standardized assessments of knowledge and/or skills, chart audits, peer review, observation of health professional practice, and reports of practice patterns and physician performance data [23, 24].

The results of these combined subjective and objective needs assessment can be used to produce objectives for educational activities. To progress the concept of knowledge translation, CE – along with undergraduate and (post)graduate education – has shifted from conceiving of these as learning objectives (what the learner should know at the end of the activity), to

behavioral objectives (what the learner should be expected to *do* as a result of what has been learned).

Formatting large group sessions

Several strategies can enhance the delivery of effective formal, large group CE. They include: increasing the interactivity of the sessions, employing multiple methods within the framework of the activity, and using other strategies to increase the reach and impact [12].

Multiple methods

As discussed in Chapter 3.4a, there is as yet no clear evidence suggesting benefit of multi-component interventions over single component interventions. However, there is reason to believe that multi-component interventions could be more effective than single interventions, if they address different types of barriers for change. Within the context of the formal CE event, most recent evidence demonstrates that multiple methods used within the context of the activity may promote uptake and translation into practice [12, 25]. The methods may be characterized in several ways. First, formal sessions may use a variety of presentation media (e.g., audio recordings to present heart sounds; actual or standardized patients or videos; panel discussions to present conflicting perspectives on one topic; debates to highlight issues where agreement is lacking; quizzes to determine learning needs or outcomes). Second, given that knowledge is a necessary but not sufficient condition for performance change to occur, practice "enablers" may be useful in the course of a standard CE event. Examples include patient care reminders, protocols, and flow sheets, patient education materials, wall charts, and other measures which may be used in the practice setting after the conclusion of the activity [12]. Third, CE activities may use clinical scenarios and vignettes in an attempt to increase relevance and applicability of educational material. Vignettes are frequently derived from actual clinical cases, modified to ensure patient confidentiality and used to exemplify details of history, diagnosis, or management [26]. They promote reflection and interaction. There are many methods to present such cases or clinical stories: short paper cases can use prompts for discussion of diagnosis or management; standardized patients can present highly credible clinical findings and histories; video and audio cases, role playing, and sophisticated simulation techniques may add relevance and increase potential for learning [12].

Staging a learning experience so that it is interrupted or sequenced also shows evidence of increased effect [12]. Two workshops of three hours each held a month apart, for example, (compared to a one-time 6-hour

workshop) allow the learners to absorb information from the first event, apply it in the work setting and then discuss this process with reinforcement of learning, during the second event. The weekly or monthly recurrence of clinical rounds provides a prime example of this interrupted learning process.

Interactivity

With fairly clear evidence for effect [19], interactivity increases the exchange between audience members, or between participants and the presenter. There are a number of ways in which this can be accomplished:
- *Interaction between the presenter and participants:* planners may increase the question and answer sessions of lectures, divide lectures into 10-minute periods of lecture followed by questions and answers [26] and/or use an audience response system [27]. The last option may employ technology to poll the audience for responses to projected questions or use low-tech options (though not so anonymous) employing color-coded cards.
- *Interaction between participants:* buzz groups – described by the noise they make in a normally quiet audience – allow participants to engage neighboring audience members in conversation. Pyramiding or snowballing builds on interactions between pairs of participants, to groups of 4 or 6, and eventually grows to involve all participants. An example is termed "think–pair–share," a method in which practice reflection first occurs (a quiet moment for participants to think of a particular case, for example), followed by discussing the idea with a neighboring participant, then sharing it with the larger audience.

Small group learning

Small group learning involving health professionals is one of many innovations created by the growth in problem-based learning methods in undergraduate education. This method uses groups of 5–10 individuals and employs many of the principles of effective CE (case vignettes, relevant group discussion, peer interaction, and high degree of interactivity). Groups meet regularly, usually without an expert and are led by one of their own membership, who acts as a facilitator. Common in Canada and in Europe, these groups have demonstrated impact on competence and performance, most likely a combination of their concentration on evidence-based materials, and on their heavy reliance on collegial influence [15, 28]. While some groups are informal and self-organizing, many others are a part of national maintenance of competence and CE programs such as professional licensing bodies [29].

Distance education techniques

While formal, in-person CE remains a primary knowledge transfer vehicle, there are other ways in which knowledge translation may be accomplished. For example, visiting speaker programs may use web-, video- or audio-casts. Not unlike their live counterparts, these activities must be interactive in order to engage the learner and improve impact and may employ interactive cases and other methods to stimulate the learner to use critical thinking and problem-solving. Recent studies have shown increases in physician knowledge and knowledge retention following participation in online CE courses [30] and if appropriately designed, they may be superior to live activities in effecting physician behavior changes [31].

Online communities of practice [32] are another potential KT intervention. Motivated by common interests and issues, groups of learners experience audio conferences, case discussions, and follow up or support by electronic means using reminders, cases, and other means to promote networking and consulting among peers. These groups or networks can assist in evaluating the effectiveness of the education as well as determining needs for new activities and can build both a community and a shared knowledge base. These groups make use of knowledge "brokers" – individuals or networks of individuals able to disseminate and increase the uptake of best evidence [33].

Self-directed learning

Some health professionals possess a learning style preference or logistical need for more self-directed choices. These include traditional sources – such as textbooks, monographs, clinical practice guidelines, and journals – which provide clinical information. Important developments to aid self-directed learning have included the advent of printed or computerized self-assessment programs, which provide learners with feedback about their competence as they read materials and answer questions, receiving feedback.

Portfolio-based learning [34, 35] is also an important tool in self-directed learning, derived from the concept of the artist's or photographer's collection of his or her work. More complex than a simple accumulation of exemplary work, however, the portfolio is intended to document educational activities undertaken by the clinician, quality documentation (chart reviews, procedure logs, or achievement of performance milestones), identified learning gaps, examples of learning plans, and objectives and resources used to meet them, and other data related to performance and health care outcomes. Portfolios can be used for self-reflection, self-assessment and learning, or may be employed in an

educational manner – providing grist for conversation with a peer or other mentor or applied to questions of relicensure, recertification, remediation, and other needs.

What are some current and future trends in CE?

Multiple trends and challenges exist in the construct, delivery, and use of CE leading to a more holistic and integrated role for this last and longest phase of clinicians' learning. They are important to understand in the context of knowledge translation and include:

• *The changing construct of "CE":* from a traditional understanding of CE as an information transfer vehicle to a more complete if complex understanding of the learning process and the complex health care world in which this occurs.

• *An increasing focus on health care outcomes and performance:* using performance measures to plan and evaluate CE. This shift moves CE planners to increase attention to Levels 4-6 of the Moore [36] evaluation schema (Table 3.4b.2), rather than its previous occupation with lower levels.

• *Maintenance of licensure and certification:* the traditional notion of "credit," linked solely to CE participation for physicians, is increasingly questioned by licensing boards, specialty societies and certifying boards citing evidence of the "failure" of traditional CE. While the traditional time-based credit hour has served to document CE participation, it falls short in demonstrating translation to maintained competence or improved performance. With the movement toward more informed self-directed, practice-based learning, critics have argued for a system that provides higher value credit for those activities that demonstrate improved practice.

Table 3.4b.2 Outcomes for continuing education/continuing professional development [36].

Level	Outcome	Indicator
1	Participation	Attendance
2	Satisfaction	Participant satisfaction
3a	Learning: declarative	Knows
3b	Learning: procedural	Knows how
4	Competence	Shows how; observed in educational setting
5	Performance	Changes in practice performance
6	Patient health	Changes in patient health status
7	Population health	Changes in population health status

This notion is incorporated into the movement to maintenance of licensure and certification in the USA and Canada [37, 38].

• *Increased use of electronic means of communication:* to replace and/or enhance health professional learning – online learning resources, social networking, blended practice and learning methods described by the American Medical Association as "Point of Care" Learning [39–41].

• *New and emerging disease states:* here the need for rapid response educational technologies exists in the face of serious pandemics such as, pan-flu and bioterrorism issues. In the event, such disease states speak to the need for technologies such as text messaging, fax networks, email, tweeting, and other means including the concept of "push" technologies, or point of care learning [42].

• *Interprofessional learning:* It is increasingly apparent that the traditional physician-only targets of most "CE" activities requires re-thinking and modification, given increasingly complex health care settings and the recognition that quality of care is clearly a multi-professional team activity [43]. In this case, accommodation for a variety of learning needs, styles, practice roles, and other unique dimensions of health professionals' roles requires careful consideration and attention. It can similarly be argued that – just as clinical guideline development increasingly employs engagement and the input of patients and public members – CE planning and development also requires this consideration.

• *Chronic disease management:* health researchers have outlined the need for improved management of chronic diseases, many with comorbidities, in an aging population. These needs show promise in driving the educational aspects of KT – creating meaningful interprofessional education initiatives, disseminating and incorporating complex care algorithms, point of care learning resources and other methods.

Future research

The study of health care delivery requires many research directions in which CE plays a significant role. Of these, several become important in an era of accountability and movement towards demonstrated competence and performance as the result of CHE participation. They include: questions about the learner (are self-assessment and self-directed learning core character traits or can they be taught? If the latter, how can this best be accomplished?); the communication vehicles (what knowledge translation vectors work best? For example, are mobile technology mediated educational messages more effective than formal educational ones); how does the context or setting of learning influence on learning and knowledge use (for example

how can learning be supported by remuneration pattern, or linkage to information technology and electronic health record resources?). Finally, a large question for CE research to undertake is the uptake of evidence in which the variables include questions about the nature, complexity, compatibility, and strength and quality of the evidence to be adopted.

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