

Competency-based education in the health professions:

Implications for improving global health

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Improvements in global health can only be realized through the development of a workforce that has been educated to promote health and to care for those with disease. Increased attention is being placed on competency-based education as a means for optimizing the preparation of health professionals. The purpose of this paper is to describe the characteristics of competency-based education (CBE) and how this can be distinguished from the more traditional approaches to training health professionals. An approach to the implementation of CBE will be reviewed along with a discussion on implications for resource poor regions of the world.

Competency-based education

Competency-based education is a framework for designing and implementing education that focuses on the desired performance characteristics of health care professionals. Although this has always been the implicit goal of more traditional educational frameworks, CBE makes this explicit by establishing observable and measurable metrics that learners are expected to accomplish. The ability to perform to established expectations is the criteria by which a health professional is deemed competent.

Alternative, but complimentary, goals have more traditional educational frameworks have been on learning outcomes or objectives.¹⁻⁶ In a seminal article, Epstein and Hundert² established a commonly cited definition of competency in health care: “Competency is the

habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individual and the community being served.” Note that this definition includes any and all possible results of the educational process. It also emphasizes that these results are used or applied as part of regular practice – not as an exceptional performance.

The terms learning outcomes, or outcomes-based education, are often used synonymously with CBE. However, “competencies” often carries with it a broader, more conceptual connotation of what the learner is able to do as a result of the education whereas “outcomes” is often used in reference to the performance on exams and other metrics that document the learning that has taken place..

“Learning objective” is another term that has some overlap with “competency.” Well-written learning objectives can be competency based if the objective is to have the learner performing in a real world task. More often, “learning objectives” are used to describe the knowledge that teachers are hoping that students will acquire from their curriculum or teaching exercise.

Albanese et al.⁷ propose five characteristics to define a competency:

- 1. A competency focuses on the performance of the end-product or goal-state of instruction**

Traditional education tends to focus on what and how learners are taught and less so on whether or not they can use their learning to solve problems, perform procedures, communicate effectively, or make good clinical decisions. By emphasizing the results of education rather than its processes, CBE provides a significant, even dramatic shift in what educators and policy-makers look for in judging the effectiveness of educational programs. Figure 1 illustrates the

differing levels of educational goal states. For early learners, outcomes at the level of “knows” and “knows how” may be sufficient, but for more advanced learners, educational goals are more typically at the levels of “shows” and “does.” In CBE, the critical issue is that the learner reaches the specified level of performance in a competency; how he or she got to that point (the educational process) is secondary.

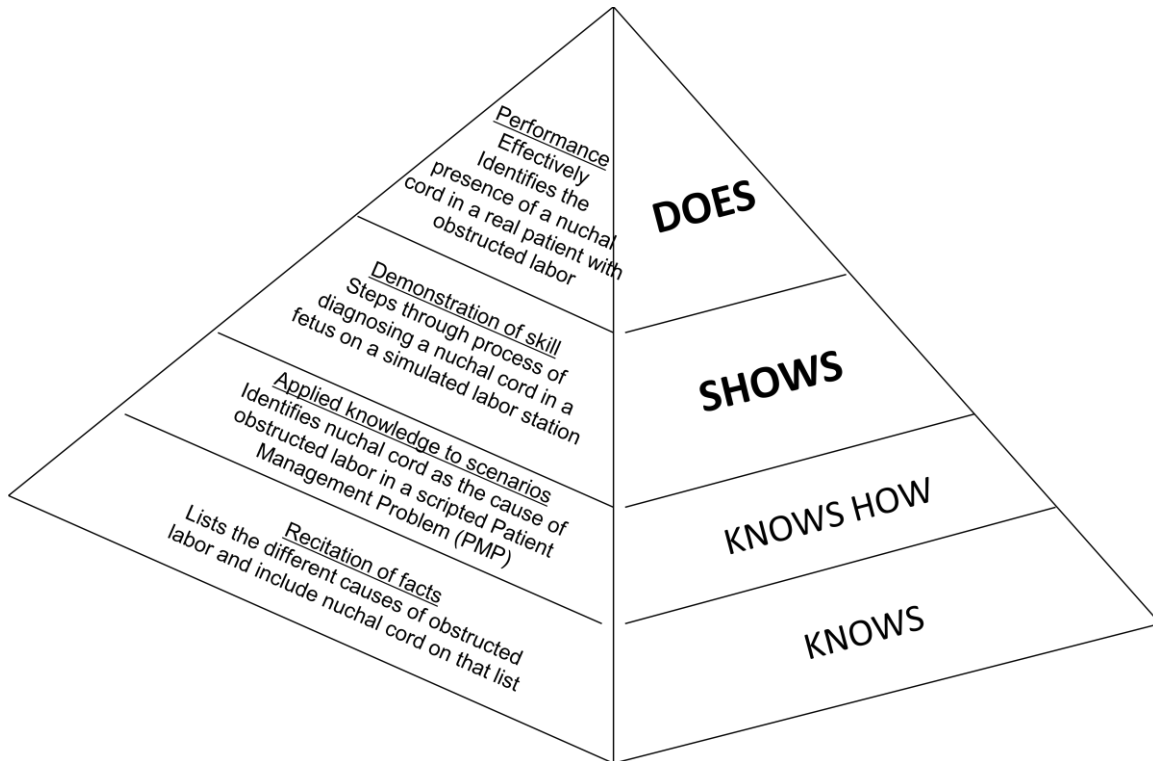


Figure 1

Miller's Pyramid⁸

2. A competency reflects expectations that are external to the immediate instructional program

Traditional educational programs too often have an insular character in which the expectations of learners are based on what has been taught with internal, educational metrics of

success such as performance on a standardized exam. In CBE, success is determined by the ability to perform to expectations that are largely determined by stakeholders outside of the educational program itself.

3. A competency is expressible in terms of measurable behavior

Although traditional education does assess learner knowledge and progress, CBE places a much higher premium on learner performance of tasks and activities representative of the competencies. These assessments are more than just paper-and-pencil tests of knowledge; they emphasize behavioral measures that depend on integrating knowledge and skills derived from an aggregate of educational experiences and parts of the curriculum.

4. A competency uses a standard for judging competence that is not dependent upon the performance of other learners

Each performance assessment of competence must be accompanied by an explicit criteria for determining whether or not a given learner has or has not attained the required level of performance to be considered “competent.” These criteria or performance standards are not determined by the performance of other learners (i.e., not graded on a ‘curve’) but by the expert judgment of practitioners and educators in the field. Thus, it is desirable that ALL learners will achieve “competence” after training.

5. A competency informs learners, as well as other stakeholders, about what is expected of them

By focusing on the outcomes of education, CBE is often much more transparent and therefore accountable to learners, policy-makers and other stakeholders. Indeed, defining a discipline’s values, goals and priorities is an implicit part of defining competencies, which

enables the competencies to communicate these values and expectations to various stakeholders within and outside the discipline.

In addition to Albanese, et al.'s five characteristics of "competencies," two other terms often used in discussions on educational frameworks warrant a clear definition. "Assessment" is integral to CBE and refers to any of a wide variety of measurements of learner performance. CBE's emphasis on learner performance as evidence for having achieved a competency is predicated on the ability to accurately and validly measure performance in tasks and situations reflective of that competency.

"Standard" refers to the actual threshold or level of performance in a given assessment that, in the judgment of relevant stakeholders, constitutes an acceptable or targeted level of achievement. "Standard," in its CBE definition is integrally tied to the judgment that someone is "competent," i.e., has reached an acceptable level of performance on a designated competency. In this usage, "standard" refers to learner performance and contrasts with the frequent use of "standard" in reference to a "standard curriculum" and even a "standardized examination."

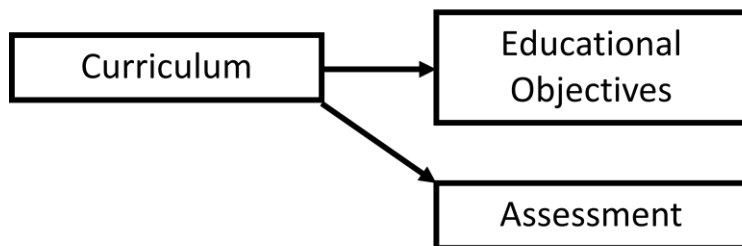
Defining the curriculum for competency-based education.

The curriculum, or what is to be learned, is at the heart of all educational models. It is the genesis or origin of the curriculum that differentiates traditional models from CBE. Historically, the professions themselves have set requirements that serve to determine who can obtain membership based on completion of curricula that they determine. While often positioning themselves to serve the public good, there is also a tendency to serve the needs of their own professions and members. Curricula often become anchored to historical legacies that codifies the traditions, priorities, and values of the faculty in that profession. Over time, the curricula are modified with new information. Typically, this is additive with less attention to the removal of

elements that are less pertinent to current practice. Often, it is the expansion of new scientific knowledge that drives the curriculum, at the expense of a focus on the implementation of what is already known to be of benefit.

In addition, traditional curricula may or may not have explicitly defined objectives or purposes. Although there has been a greater focus on the need for learning objectives in the health professions, it is not uncommon for schools to ‘retrofit’ the objectives to reflect what the faculty desire to teach. In this sense, the curriculum drives the objectives rather than the desired learning objectives driving the curriculum (see Figure 2). This framework then results in a system of assessment that is again based on the mastery of a curriculum that may be detached from the needs of society.

Traditional Model



CBE Model

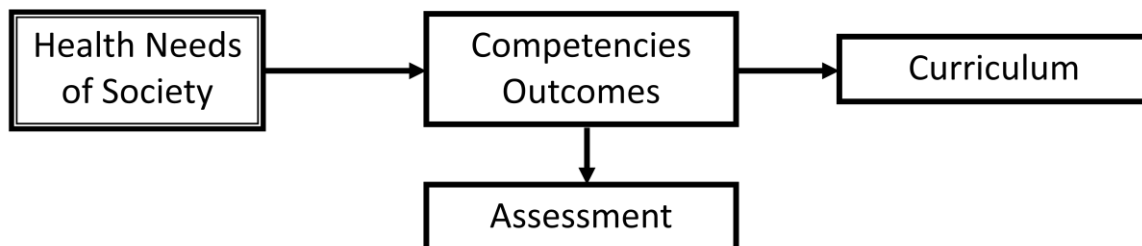


Figure 2

Comparing traditional and competency-based educational models

A systematically different approach to the design of curricula will be required that provides greater alignment with what society needs from those that are responsible for its health. These health care needs should drive the performance standards, or desired competencies, of health care professionals, which in turn should determine the curricula by which will result in the achievement of competency. More recently, input from stakeholders representing the public good have become more involved in seeking better alignment between the goals of professional education and the needs of society. For example, the United States National Board of Medical Examiners, which is responsible for the licensing of all graduating physicians in the U.S., has adopted a plan to realign its licensure processes to more substantially reflect the expectations of patients.⁹

When comparing CBE to some of the more traditional models of education (Fig. 2), three fundamentally different characteristics emerge. First, CBE explicitly maps the specific health needs of the populations to a set of competencies for the workforce to be trained. In other words, it guides decisions about what graduates of the educational programs must be able to do, in order to address the key health issues of the community. Second, CBE uses these expectations to then develop and implement learning experiences (the curriculum) designed to produce the requisite knowledge values, and skills in the learners to achieve these competencies. Finally, CBE uses the same set of competencies to develop critical assessment programs to determine the extent to which they are reached.

The practical steps in implementing a competency-based educational system

The past five years have seen an acceleration in the development of competencies in different health professional fields, including medicine, nursing, midwifery, and public health. Many of these efforts have been driven by the professional organizations themselves, in an attempt to define expected knowledge, skills and behaviors of graduate practitioners. While making important contributions, many fall short of a fully implemented CBE model often because of a focus on learning objectives that do not align with how a true competency is defined.

Common pitfalls to the establishment of CBE are as follows: (1) they fail to directly address the health needs of the community, (2) competencies are inadequately defined or too broad to be useful, (3) a lack of accommodation in the curriculum for the flexibility in learning rates and (4) the lack of assessment methods to determine when competency has been achieved.

1. Defining the health needs of the community

A CBE program has the potential to improve the health of the community it serves only to the extent that it uses context specific health issues to determine the desired competencies. Needs assessments that portray available health data along with input from the community and those responsible for public health are necessary to inform this process.

A multitude of approaches could be considered. In Australia, for example, the provincial government struggled to change the health outcomes for key chronic diseases for remote, rural and Indigenous populations. However, using a training needs analysis drawn from interviews with key informants consisting of practitioners, local policy makers, and the staff of regional clinics, an organizational partnership of universities, health departments and Indigenous

organizations implemented a competency-based curricular framework targeted at multiple cadres of health providers to address prevention and early detection of these key chronic conditions.¹⁰

Alternatively, a curricular improvement model was implemented that involved the direct observation of graduates from nursing midwifery school in practice along with a survey of these practitioners regarding their perceived needs to better serve the for the community and the gaps that they recognized in their own training.¹¹ The data was then used to define competencies and outcomes that would guide the subsequent curricular revision in family planning, reproductive and child health.

Other efforts have stepped back from direct sampling, and have used multilateral expert panels to attempt to indirectly represent the health of communities within which they work. For example, at a global scale, The Millennium Development Goals could be considered one of the largest efforts to define shared public health goals, with quantifiable targets for health set among several clinical domains, drawn from a large international community of public health providers, practitioners and organizations.¹² It has been proposed that the development of any Global Health core competencies should begin by addressing these specific targets. More recently, in 2006 the Association of Schools of Public Health in the U.S. embarked on a national consensus-building process to identify core competencies for the Master's in Public Health degree. The project used a structured two-phase process with input from over 400 university faculty members, deans, public health organizations, and practitioner organizations.¹³ Implemented over two years, the effort resulted in specific competencies within 12 different domains that have been disseminated widely.

There are intrinsic advantages with explicitly addressing the health needs of society in any competency development effort. First, such a fully implemented CBE system and assessment

program provides outcome variables that can be mapped to desired changes in health. Second, the programs then become *accountable* to all relevant stakeholders, including patients, health providers, and governments. Finally, learners working within this system become accountable as well, to their own performance measures and how they measure up to the health expectations of society.

2. Defining competencies

The central step in shifting from a traditional to a competency-based educational framework is to define the target competencies for the specified set of learners. These competencies reflect specific goals of education, but also express institutional or national policy, in that the competencies defined by a given group are a statement of the priorities and values of that group. From national organizations, such as Scotland's Council of Deans (cf. the Scottish Doctor)¹⁴ to individual medical schools (University of New South Wales Graduate Competencies)¹⁵ to specialty associations (United States Clerkship Directors of Internal Medicine),¹⁶ competency definitions are largely contextual and reflect national, professional and client stakeholders, including learners. Such competency definitions are intended, among other things, to communicate priorities in a memorable and meaningful way. They are typically defined by the leadership of the relevant organization through various processes that reflect a consensus among these leaders.

Table 1 presents five different competency sets defined by different organizations for physician education. Such competency sets typically begin with a short list of competency domains (e.g. 6-12) which by definition are quite broad and inclusive (Table 1).

Schools, licensing agencies, and professional societies may each define the competencies differently or use different terminology for similar domains. For example, each of the five

examples outlined in Table 1 includes “communication skills”. However, only two contain competencies related to “managing information” or “lifelong learning.” Other competencies, such as “clinical skills” are represented in each set but under somewhat different labeling.

The level of generality represented in Table 1 poses a challenge for designing relevant educational activities or assessment methods. “Communication Skills,” as a description of a target competency, does not provide clear guidance for educators or learners. To make competencies relevant to education, they must be translated into much more specific statements that include the context, content, and criteria for the competency to be attained. This results in a hierarchy of competency specificity within any single domain.

Table 1
Examples of competency domains as defined by five different organizations involved in the education of doctors

Institute for International Medical Education¹⁷	Deans of Scottish Medical Schools (Scottish Doctor)¹⁴	U.S. Accreditation Council for Graduate Medical Education¹⁸	Indiana University School of Medicine¹⁹	University of New South Wales Medical school¹⁵
Professional values, attitudes, behavior & ethics	Outcomes for attitudes, ethical understanding and legal responsibilities	Professionalism	Professionalism and role recognition	Ethics and legal responsibilities
Scientific foundation of medicine	Outcomes for basic, social & clinical sciences & underlying principles	Medical knowledge	Using science to guide diagnosis, management, therapeutics, and prevention	Using basic and clinical sciences
Communication skills	Outcomes for communication	Interpersonal and communication skills	Effective communication	Effective communication
Clinical skills	Outcomes for clinical skills	Patient care	Basic clinical skills	Patient assessment and management
Population health and health systems	Outcomes for health promotion & disease prevention	Systems-based practice	The social and community contexts of health	Social and cultural aspects of health and disease
Management of information	Outcomes for medical informatics			
Critical thinking & research		Practice-based learning and improvement	Problem solving	
			Moral reasoning and ethical judgment	
			Self-awareness, self-care, and personal growth	Reflective practitioner
			Lifelong learning	Self directed learning and critical evaluation
				Team work

For example, the Graduate Capabilities at the University of New South Wales¹⁵ identifies “effective communication” as one of its eight competencies. However, it goes on to refine this broad domain to include three more detailed competencies: “communicates effectively with patients and their families,” “communicates effectively with peers and tutors,” and “communicates with communities” (see Figure 3). There is then further specificity with more operational competencies such as “counsels patients appropriately on a range of health risks

including poor nutrition, smoking cessation, drug and alcohol management, and refers to community programs and services if appropriate.” . It is easier to develop educational activities and assessment tools for the more specific, detailed competency statements than for the more broad domains.

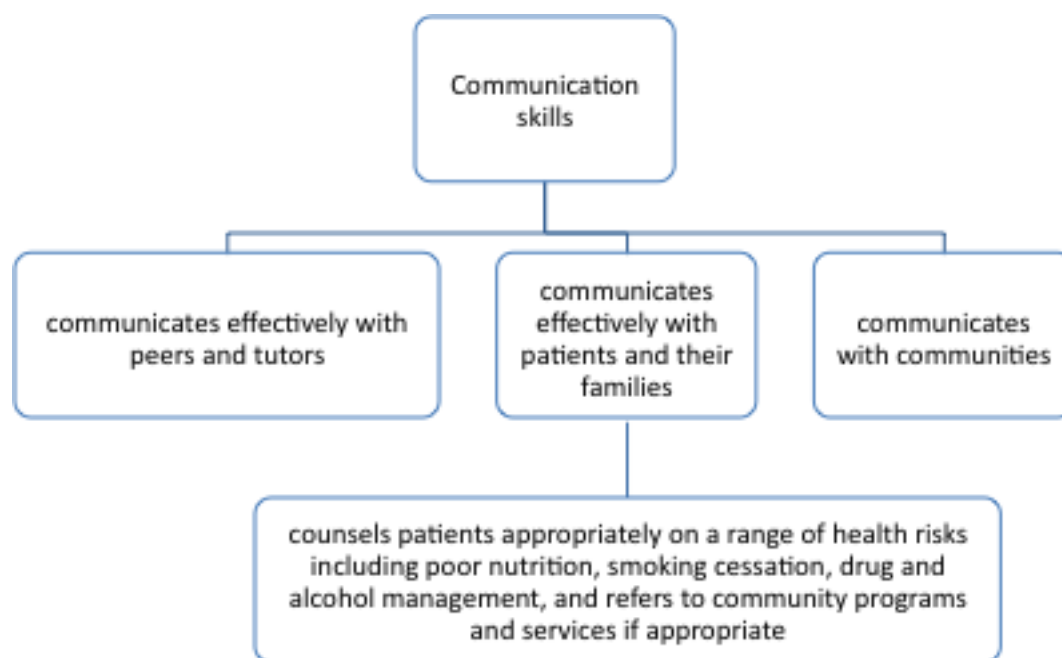


Figure 3

An illustrative segment of a competency framework hierarchy (University of New South Wales¹⁵)

A major practical consequence of translating a set of competencies from the top level of the hierarchy to the level of detail necessary for defining educational outcomes is that the number of competencies rapidly expands as they become more focused on teachable and observable skills or performance. For this reason, few organizations define competencies at the lowest levels of the hierarchy. Indeed, comparisons of various competency frameworks indicates that those defined by licensing bodies or professional associations often stay at the level of broad

domains. Competencies defined by individual medical schools and other training programs are more likely to spell out specific, measurable performance competencies because their mission is focused on the practical exigencies of teaching the individual learner.

Another consequence of defining detailed competencies is that may lead towards “checkbox education” and a focus on pieces of performance and the loss of the more holistic, comprehensive competencies we desire in professionals. These may include research, innovative approaches to patient care, complex problem solving, leadership, and the drive to improve. Although this concern may pertain to many competency sets, it is not an inherent limitation of CBE. If one can describe the desired performance outcome, it can be stated as a competency with an appropriate, high-level, complex assessment process and criteria for performance. For example, a competency in demonstrating research skill and innovation might readily be assessed through the conduct of a small-scale research project and judged for quality by a panel of researchers.

3. Self-regulated and flexible learning options

Competency-based education promotes a necessary flexibility in the time and sequence of what is to be learned. The frame of reference can be shifted from the traditional time-based curriculum to one that is regulated by the needs of the learner in their attempt to gain competency. Therefore, CBE allows for a highly individualized learning process rather than the traditional, lock-step, one-size-fits-all curriculum. Ideally, students would have an opportunity to explore a menu of choices in learning activities and methods that could allow them to achieve competency.

By way of example, Table 2 depicts competencies mapped to the global health problem of managing maternal obstructed labor, formulated within the 10 competency domains specified

by the Indiana University School of Medicine, one of the more deeply integrated frameworks within health professions education.¹⁹ For each specific competency, a set of both learning and assessment method options are listed, appropriately mapped to the pedagogical framework.

Within this scenario, consider the competency “The student can accurately assess risk of obstructed labor based on maternal pelvic anatomical dimensions and fetal size.” While lectures may improve specific learner knowledge and are efficient vehicles for the delivery of new facts, it is misguided to expect that this method alone would improve students’ ability to perform this advanced skill.

Some competencies may lend themselves to a greater number of learning options. Within the domain of “Using Science” (Table 2), the listed competency dealing with vacuum extraction specifically targets more factual knowledge within this topic. As such, lectures would be applicable, but may not be the *only* appropriate method; self-study modules, programmed reading, and small group discussions would also be appropriate as choices for the learners.

A system in which performance against pre-set expectations determines progress through a learning program challenges the notion of a “time-based” curriculum. As stated in the report on global minimal essential requirements for medical schools in China, competency-based education may lead to the situation where “time and method are the variables and achievement is the constant.”²⁰ The relationship of time and practice to skill development has been well established.²¹ However, it is also clear that different learners will require different amounts of time to achieve certain standards of performance. In addition, in only a few cases do we have evidence for how long it “should” take to acquire competence. Despite these observations, each school typically allocates its limited curricular time to topics or skills in a fairly idiosyncratic fashion that more often reflects local assumptions and priorities than it does educational

performance outcomes and the means necessary to obtain them. More importantly, successful graduation (and subsequent entry into independent practice) usually requires “passing” each fixed curricular element at pre-determined time points, rather than when the student is deemed ready to be assessed.

The logistics required to scale the implications of students learning at different rates are substantial. Clustering of learners facilitates faculty and student convenience, as well as efficient space allocation and resource expenditures. However, it also ignores the possibility that some learners may require *less* time to achieve competence than thought, or that some may be able to “test out” of a given set of educational experiences if they have demonstrated the required level of performance at baseline. As such, learning “efficiency” takes on a vastly different meaning when the time on task is individualized, flexible and variable.

Table 2
Linking competencies at the abstract and contextualized levels
with assessment and learning methods using Obstructed Labor as an example.

Competency Domain¹⁵	Competency in Context: Obstructed Labor	Learning Method Options	Possible Assessment Method
Effective Communication	The learner explains different options for accelerating birth to the mother in a calm, clear manner.	Structured practice using simulated patients. Assigned reading on treatment options.	Standardized patient exercise
Basic Clinical Skills	Using physical examination techniques, the learner identifies the presence of a nuchal cord as the etiology behind obstructed labor.	Simulation/Mannequin practice. Physical exam textbook. Supervised clinical experiences.	Structured direct observation and feedback. Standardized patient examination.

Table 2 (cont'd)

Competency Domain¹⁵	Competency in Context: Obstructed Labor	Learning Method Options	Possible Assessment Method
Using Science to Guide Diagnosis, Management, Therapeutics and Prevention	The learner explains the rationale and effectiveness behind the decision to use vacuum extraction in women with obstructed labor.	Assigned reading. Lecture.	Oral examination. Written examination.
Therapeutics and Prevention	The learner accurately assesses risk of obstructed labor based on maternal pelvic anatomical dimensions and fetal size.	Small group discussion. Lecture.	Scripted patient management problem
Lifelong Learning	The learner identifies resources that provide evidence-based guidelines for the management of obstructed labor in women with gestational diabetes.	Library seminar. Self-guided searching with feedback.	Written examination. Actual search for relevant literature in computerized database.
Self-Awareness, Self-Care and Personal Growth	The learner identifies signs of personal anxiety and stress when participating in the care of women with obstructed labor.	Seminar. Behavioral workshop on clinician wellness.	Post-event reflective exercise
The Social and Community Contexts of Health Care	The learner identifies community-based resources to assist in the prenatal management of women at risk for obstructed labor.	Self-guided search. Assigned reading.	Written examination
Moral Reasoning and Ethical Judgment	The learner explains the most important competing issues that weigh in the decision to perform life-saving maternal interventions that may place the fetus at risk in obstructed labor.	Small group discussion of case scenarios. Programmed reading.	Oral examination
Problem Solving	The learner appropriately identifies and refers high risk cases of obstructed labor that require sub-specialty management	Small group discussion with scripted patient management problems. Assigned problem set with feedback.	Chart audit

Professionalism and Role Recognition	The learner maintains confidentiality in the care of women with obstructed labor.	Lecture. Self-directed review of confidentiality policy.	Supervisor evaluation
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4. Assessing learners for competence

Without evidence of the learner’s ability to fulfill a given competency, it is impossible to judge the success of either that individual or the educational program. The diversity of competencies defined for a given set of learners also requires a diverse set of assessment methods. The contextualized competencies in Table 2 illustrate how different competencies need to be assessed in different ways but also how different methods may be appropriate for the same competency. Take, for example, the competency of “Lifelong Learning,” which could be defined in more detail and in context as “The learner identifies resources that provide evidence-based guidelines for the management of obstructed labor in women with gestational diabetes.” This competency could be measured by a written, case-based examination in which the learner lists relevant resources for addressing this clinical problem. It could also be assessed by having the learner actually conduct a literature search, possibly also requiring them to prioritize and critically appraise the literature resources obtained in that search. Table 2 also indicates that one assessment method (e.g., oral examination) could be relevant for multiple competencies.

The need to match more complex assessment methods with more sophisticated competency outcomes is also illustrated in Figure 1. While a multiple-choice examination may be a reliable and accurate reflection of “know,” they are inappropriate measures of “shows” or “does.” Higher order assessments would require direct observation, structured feedback on performance, or skills-based evaluations in simulated or real patients^{22,23}. We do not yet understand the difference in validity between assessments in actual work settings as contrasted

with structured testing environments.²⁴ However, without assessment, CBE becomes little more than traditional education with a more clearly defined set of goals and objectives.

Once competencies are defined and performance on these competencies assessed, CBE requires clearly specified performance criteria or standards on these assessments that enable faculty and other stakeholders to judge that the learner has reached the minimal level of performance that qualifies as “competent.” It is important to recognize that standards can be set ONLY after the competencies have been defined and assessment methods developed and applied. Once those steps are complete, one can consider the level of development intended for this group of learners and judge the corresponding performance on the assessment (Fig, 4). These judgments may require technically complex standard setting procedures,^{25,26} to define the actual score or performance metric by which a learner would be considered “competent.”

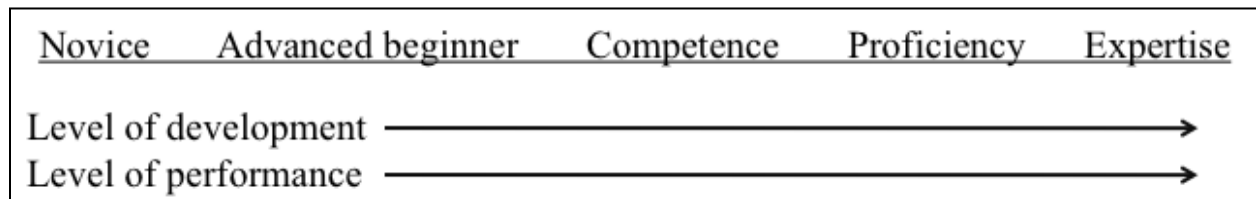


Figure 4
Levels of development and corresponding performance
(from Dreyfus²⁷)

Some professional organizations or accreditation bodies have collected assessment instruments into “tool boxes” to imply the variety of instruments that are available to be utilized or further customized to the specific assessment needs at hand.¹⁸

Implications for competency-based education in resource poor settings

Resources for health are finite and, regardless of the setting, often felt to be insufficient. The recent focus on value in health care, defined as quality over cost, reveals a large variation among and within healthcare systems. Resource poor countries have a tendency to try and

emulate resource rich countries with regards to their educational standards and desired healthcare outcomes. Many of these, particularly in sub-Saharan Africa, also involve issues of legacy from previous colonial norms.

As a result, local educational standards are often driven by the desire to fit into frameworks that are in place elsewhere. This may be from established global standards that exist for physicians or nurses that most commonly focus on desired curricula or learning objectives rather than true competencies. Schools in resource poor settings may also strive to emulate the standards set by the professions in resource rich countries so as to validate their own systems of education. The strong desire to avoid “poor solutions”, as reflected in the perception of low quality education, for “poor people” is a dominant theme in standard setting for schools in low resource settings.

Several consequences of these factors present themselves. First, many of the educational systems that are being emulated have in fact changed or should be changing to better meet public needs. While there is a greater call in resource rich settings for greater accountability in educational outcomes to the needs of society, there is also much resistance within academia itself and the need to respect past legacies. Second, training to standards defined outside the region that are not aligned with the local resources often results in graduates that motivated to emigrate. This results in ‘brain drain’ which further limits the human resources needed for health in less developed countries.

As more attention is being placed on relevant educational outcomes, there will be a tendency to emulate the desired competencies that are being defined in resource rich settings. While many of the domains of competency, such as professionalism and communication, are universal, many of the more specific competencies that are promoted presume the presence of a

functional health care system and an education system in which those competencies can be nurtured and fully appreciated. This is not the case in resource poor countries. Furthermore, competency in domains such as professionalism and communication, like all competencies, is very sensitive to the context of the individual and their culture. The language or approach that is used to break bad news, tease out sensitive information, or motivate others to take care of themselves will vary widely with personal attributes and the setting.

While competencies are context-specific, there exist common approaches to CBE. As noted earlier, the local health issues and priorities of a country should serve as the starting point. This should be driven by stakeholders who are responsible for the health of the population such as Ministries of Health. While academia can inform this discussion and play an important role in articulating an approach to standards, they will often be encumbered by their own legacies and allegiance to the professions. Second, there needs to be a discussion of what kinds of competencies are needed to address the health care priorities. While these will often reflect the major domains referred to earlier, competencies will need to be very context-specific and take into account the availability of faculty and local resources. As access to bandwidth and mobile technology increases, IT solutions will hopefully provide for more shareable resources. Third, it should be clear which cadres are expected to be able to achieve which competencies. Who should be competent at caesarean section? All graduating physicians? Nurse mid-wives? Labor technicians? One of the consequences of CBE is that skills that were once considered the domain of only select professions could potentially be ‘task shifted’ to other cadres if they are able to perform at the same level of competency. Finally, while the definition of competencies is necessary, it is insufficient unless the metrics of achievement are clearly defined (by what

standard to we deem someone competent to be able to do a caesarean section?). These competencies should then in turn drive the curricula and the modes of learning.

Critics of such an approach will point out that a focus on pattern recognition and skill acquisition is only one part of being a professional. Professionals distinguish themselves by deeper knowledge and the expectation that reflection and inquisitiveness will create the future. Resource poor settings are in need of health professionals who are not just be compliant with expectations but to be leaders who help set these expectations and transform health through research, particularly operations research. These skills are particularly needed in resource poor settings where healthcare systems have yet to be optimally shaped. A competency-based focus on leadership, policy formation, management, and the direction of interdisciplinary teams is essential for the development of professionals in low resource settings.

Conclusion

The health-professions in the 21st century should increase their accountability to society for improving health. Education systems can improve the efficiency and effectiveness of their mission through competency-based education and a focus on the performance requirements for all health professionals.

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