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SHORT COMMUNICATION

Assessing competencies using milestones along the way

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Abstract

This paper presents perspectives and controversies surrounding the use of milestones to assess competency in outcomes-based medical education. Global perspectives (Canada, Europe, and the United States) and developments supporting their rationales are discussed. In Canada, there is a significant movement away from conceptualizing competency based on time, and a move toward demonstration of specific competencies. The success of this movement may require complex (rather than reductionist) milestones that reflect students' progression through complexity and context and a method to narrate their journey. European countries (United Kingdom, France, and Germany) have stressed the complexity associated with time and milestones for medical students to truly achieve competence. To meet the changing demands of medicine, they view time as actually providing students with knowledge and exposure to achieve various milestones. In the United States, milestones are based on sampling throughout professional development to initiate lifelong learning. However, the use of milestones may not imply overall competence (reductionism). Milestones must be developed alongside outcomes-based curriculum with use of faculty and competency committees. The perspectives outlined in this paper underscore emerging challenges for implementing outcomes-based medical education and call for new conceptualizations of competence.

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Introduction

Over the past decade, interest in outcomes based education has grown significantly. Many educational programs, at both the undergraduate and postgraduate levels, have created "competencies" that describe the fundamental knowledge, skills, and abilities that are required for the successful completion of a program. These have been elaborated further with the development of "milestones" which are intended to monitor and measure the progress of a learner.

During the 2012 meeting of the Association of Medical Education in Europe (AMEE) in Prague, a symposium was organized to explore the different interpretations and misinterpretations of "competencies" and "milestones", debate their application and usefulness in health professions education, and probe the controversies inherent in measuring them. These concerns were examined from a European, American, Canadian and Australian perspectives. The purpose of this short communication is to synthesize the viewpoints presented at this symposium.

Background

There are currently two models or discourses concerning the nature of education. The first is the familiar *time-based* model which assumes that education will occur within fixed periods. During this period, all students are expected to acquire the necessary knowledge and skills to be a medical doctor. Naturally, the focus of this model is on the educational processes that enable such development.

In contrast, the past few decades have seen growing interest in an *outcomes-based* model of education. Here, specific, measureable competencies are identified and learners will work towards them until they are achieved. Such programs will be learner-centered and outcome-focused. Time, as a measure, will have decreased importance, and training length may increase for some learners and decrease for others.

A similar perspective was offered by Frenk et al. (2010) in an article in *The Lancet*. In the *traditional* model, educational objectives are defined within the context of the academy and assessment is directed at ensuring that those objectives are met. In the *competency* model, the health care needs of the community serve as the foundation. These needs define the competencies and outcomes which, in turn, determine the curriculum and assessment. Through this model, students acquire the skills and procedures needed most by the community.

Canadian perspective on the competencies

In Canada, there is a competency movement based on the CanMEDS "flower" that has had significant impact around the world. The CanMEDS flower is an illustration of seven physician roles that are intended to define the necessary

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medical education competencies and ultimately to improve patient care. The roles are medical expert, communicator, collaborator, manager, health advocate, scholar, and professional.

Several experiments are currently taking place in which residency programs in surgical specialties are fully competency-based. A set number of modules must be completed, but there is no fixed ending time. If successful, competency-based models may provide help to reduce the doctor shortage, student debt, and long patient wait lists (see "Competencies, the tea bag model, and the end of time", Snell & Frank 2010).

Despite these potential advantages, there are also concerns about the competency-based model:

- *Lower standards*. It emphasizes the bare minimum or lowest common denominator, and this may lead to a general lowering of standards.
- *Utilitarian tendencies*. It tends to focus training on practical concerns only.
- *Complicated logistics*. Individual pacing presents logistical issues with scheduling.
- *Emphasis on routine skills or teaching to the test*. Originally, the competency-based approach began in technical and vocational fields, which do not have the complexities or judgment-based aspects that are present in the medical field.
- *Social responsibility*. Can social responsibility be operationalized and assessed? The competency-based model may be insufficient to address the complex and relational aspects of medicine.

The major implication is that, to be successful medical education, competence must be understood as an integrative whole, and this places pressure on medical schools and teachers. New "competence committees" must assess and move students forward when they are holistically competent and not simply based upon a set timeframe. These considerations are expected to be incorporated in the new CanMEDS model in 2015 which will emphasize "intrinsic roles" and ensure that they are integrated into the greater whole.

Reevaluating how we define and measure competencies

When defining standards we may need to think about the nature of the concept "competence". It is increasingly recognized that competence cannot be determined by a reductionist checklist approach; competence is more than a list. The analogy with a concept like "health" is obvious; "health" cannot be evaluated by checklists alone. Those of us who are MDs have been taught never to diagnose or treat a patient based on lab values alone but rather to incorporate human judgments; not only our own but also those of other experts (pathologists/radiologists, etc.). Language, or in the form of narrative, is the doctor's main tool in describing and evaluating a patient's health situation. Narrative enables description of a patient's situation, their complaints, signs, symptoms, the diagnosis and the suggested management.

If we apply this metaphor to "competence" it leads us to explore the development and use of narratives specifically to describe for competencies – not only to define them, but also to enable the educators to describe, evaluate and improve the competence of students.

This thinking is perhaps somewhat contrary to what we are used to in medical education, and there are two important implications:

First, long lists of outcomes may be helpful but only as terms to use to construct narrative, not as lists of items to be completed. Just as a patient will not have all of the symptoms of a complete medical textbook, or as a writer need not use all the words in the dictionary, medical educators can both employ a range and selection of words and concepts to describe and evaluate their observations of students' competence. Therefore, instead of thinking of milestones, deliverables or entrustable professional activities as simple lists of activities that need to be completed, medical educators should consider detailed objectives as a "dictionary" that can be used to narrate competence.

Second, narrative allows for the combination of observations, judgments, results of tests, and reflections to be combined in order to determine a student's progress towards competence, much like the combination of complaints, visual, acoustic, and palpatory information on physical examination and the numerical value of 35 mmol/l for serum glucose can add up to a diagnosis of "diabetes mellitus". Narrative leads us toward a more integrative approach to education and away from a reductionist approach to assessment.

If this thinking is applied to, for example, the seven CanMED roles, and within those, the many sub-roles, it gives educators direction as to how to prevent the whole of competence from being lost in the details.

Reevaluating components that constitute competency.

Although competence is described through sub-competencies, we need to reevaluate how we assemble and combine information gathered from different learning environments. The typical assessment program consists of assignments, exams, attendance, and reports, and frequently the practice is to assign a percentage to each and add everything together to arrive at a decision about competence. The percentages, however, are arbitrary (typically they are all round figures) and generally lack a meaningful rationale. By contracts, an integrative narrative takes the elements collectively and employs them to describe and a student's competence holistically. In our diabetes example we do not "weight" a finding of absent peripheral arterial pulsations as contributing 30% to the diagnosis. An integrated narrative approach enables more meaningful decisions.

An average

Conventional methods used to assemble scores often use an average. However, measurements of health are not defined as an average. For example, we do not add up a combination of scores on history, lab testing, pathology, and physical examination to get at a total score, which is then compared to the population average in order to define whether a person is "healthy" or "unhealthy". Yet, in medical education,

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competence is often conceptualized exactly that way: the average of scores and assessments. We need to be careful in combining scores from disparate measures to ensure that our decisions about competence are valid and useful. There is, in our field, a general belief that numbers are more "objective" than narratives, but consider the fact that all quantitative research papers contain more words than numbers! Numbers provide information but words provide meaning.

Reconstructing the milestones

Milestones are sometimes described as simple tasks: ability to take blood pressure, to take a relevant history, to perform an abdominal exam. However, there is a broader domain of higher order competencies rooted in complexity and context. A meaningful narrative is more useful than a checklist to describe the student's progress in this domain, and a more powerful way to justify one's judgments of a student's progress along the road to competence.

Expertise

The richness of narrative is influenced by the expertise of the writer. If one does not know what to look for, then he or she will not see it, much less be able to capture it in words. Narrative may be the only way to maintain the whole of competence while describing it without deconstructing it into parts. Narrative allows the teachers and evaluators to describe what is seen, to defend whether students are competent or not, and to provide specific feedback to improve competence. Ideally a narrative is written in language reflective of teachers' and students' usual way of speaking and not using jargon that is abstract or alienating.

Competencies and milestones in the European context

Even though many view Europe as a single entity, each individual country has its own unique views about topics including medical training and competence. As competency based education is utilized more frequently in medical training and each country evaluates the milestones, there is continuous questioning of what constitutes a competence. Can it also be considered a trait – such as caring – that does not vary based on the situation or context? Likewise, there is a continuous questioning of the milestones and their role in the growth and development of professional expertise.

The vast diversity in Europe and the different perspectives can be illustrated in the ways in which three countries conceive of competence. In the United Kingdom, competence is defined in five categories: cognitive, functional, personal, ethical, and meta-competence. In France, competence is classified into three areas: cognitive, functional, and behavioral. In Germany, competence is viewed with respect to subject, personal, and social competence. A broader and more detailed view of these and other country-specific perspectives can be found in the Gold Guide (2014). As the European countries continue to develop competencies and milestones, several issues are being discussed.

Performance, transparency, and outcomes

The strengths of competency-based education include definitions and clarifications of the skills and behaviors that trainees are required to possess. It focuses on the performance and outcomes of the trainees but also provides transparency and accountability to those involved in the educational process. This approach provides measurable goals and educational outcomes which can be utilized to make cost-benefit decisions.

Simplified measurements

On the other hand, competency-based education can be viewed as a blunt method to measure proficiency and a societal obsession with appraisal and grading. Additionally, it is difficult to assess the complexity of practice *via* this model, and critics warn that it may lead to a more simplified or limited education for medical students and residents.

When is it most useful?

Competent behavior describes responses that are situation-specific and depend heavily on context. As such, competency-based education may be more applicable at the beginning of medical education.

What role does time play?

Since competency is highly dependent on situations and context, time may actually be important. According to Frank, "The goal will be to show that trainees met these milestones – not just that they put in the time" (Frank et al. 2010). Although time may not be the sole indicator of medical competence, it obviously plays a central role in medical training today. Exactly what role does "time" plays within the competency model?

Medical students and residents must be exposed to as many opportunities and experiences as possible throughout their training in order to understand the many varied aspects of a real workplace. There is more than one way to handle a situation or perform a task, and time is crucial to provide trainees with this knowledge and exposure. In today's world, doctors must act quickly and respond to rare and unfamiliar situations, often in difficult situations and under great pressure. Both time and smaller milestones are necessary to achieve the level of complexity required for a new doctor to truly achieve competence.

The skills that a doctor needs in the 21st century are different than ever before. The milestones must capture the changing demands of medicine in the 21st century, while holding the values that are rooted in each country.

Milestones in the US context

The Accreditation Council for Graduate Medical Education (ACGME) accredits postgraduate training programs in the US and in 1997 they initiated the Outcomes Project and adopted six competencies across the specialties (patient care, medical knowledge, practice-based learning, systems-based practice, professionalism, interpersonal skills, and communication). This signaled an eventual shift in focus from educational processes to trainee and program performance.

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The specialties first adapted these six competencies to their disciplines by developing a number of sub-competencies. This spurred development of tools to assess them, but it met with mixed success because it was unclear exactly what needed to be measured and when.

To address this deficiency, the concepts of the milestones and entrustable professional activities (EPAs) were introduced. These were intended to describe the characteristics of independent practitioners, as well as the steps along the way. To date, the specialties have developed educational milestones which form a blueprint for training. The underlying notion is that proficiency progresses on a continuum within each domain. Since their development, the following conceptual and practical issues have been raised about the milestones.

Reductionism

Milestones are reductionist by nature and that is an excellent way to guide curriculum development, assessment strategies, feedback, and resident self-assessment. At the same time, they are not enough. Completing them does not imply overall competence and integrated training experiences, assessments, and holistic feedback are needed.

Mismatch with time-based curriculum

Milestones are designed for an outcomes-based curriculum and they are being forced into a time/process-based system. Time is not an intervention, it is a context within which an intervention operates. However, the current rotation system of training is fragmented and ill-suited to a developmental model. Accreditation standards and the nature of training will need to evolve over time.

Lack of a system of ongoing education

Milestones are best set in the context of ongoing professional development. This will require a shift in focus from competence at the "end" of training to lifelong learning activity. Such a shift must be based on an effective program of continuous professional development and a seamless transition between it and formal post-graduate training.

Number of milestones

A major concern expressed by program directors is how a large number of milestones can be addressed. In fact, they do not. Assessment is about sampling so trainees do not need to be assessed on exactly the same things every time they are assessed, nor do those assessments need to focus on the same aspects of competence as each other.

Assessment forms

Program directors often wonder exactly which assessment forms should be used. In fact, rating forms make only a small difference in the quality of assessment – the faculty and the encounters make a big difference. Forms need to comport with what is to be assessed and be well written, but they need not be long and the wording and scaling will have only minimal impact. It would be very useful if efforts were aimed at developing item pools and not individual rating forms.

Clinical competency committee

Reaching conclusions about individual trainees out of so much data is an issue that can be resolved through the use of clinical competency committees. Such a committee would review all assessments and apply the same set of standards to them. It would be responsible for promotion, graduation, dismissal, and remediation.

Faculty development

Implementation of the milestones will require faculty development, since most of the assessment will rely on observation. Therefore, faculty is the measurement instrument. Although, the milestones make that training easier, they are not a substitute for it. Short and periodic training exercises should be sufficient.

In summary, the milestones have been criticized for a number of different conceptual problems. Some of them are not really problems (reductionism) and some of them will be addressed over time (with the movement to outcomes-based curricula and ongoing education). Likewise, the milestones have been criticized on the basis of feasibility. However, the magnitude of the task can be reduced through sampling and sharing items/forms, clinical competency committees can put assembled to reach individual judgments, and faculty training is needed.

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