Domain of Competence: Practice-Based Learning and Improvement

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THE DOMAIN FOR self-directed learning and/or self-improvement as a physician is complex, involving 10 competencies focused on learning and improvement around abilities that allow a pediatrician to become a more masterful doctor. The notions of internal motivation, desire to improve and do better, and self-determination are all at work in this domain. Internal motivation is hard to directly observe but can be inferred by longitudinal observation of behaviors. Malcolm Knowles1 first established the definition of self-directed learning as a process in “which individuals take the initiative (with or without the help of others) in diagnosing their learning needs, formulating goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes.” Attributes of a self-directed, lifelong learner include

one who exhibits initiative, independence, and persistence in learning; one who accepts responsibility for his or her own learning and views problems as challenges; one who is capable of self-discipline and has a high degree of curiosity; one who has a strong desire to learn or change and is self-confident; one who is able to use basic study skills, organize his or her time and set an appropriate pace for learning, and to develop a plan for completing work; one who enjoys learning and has a tendency to be goal-oriented.2

Practice-based learning and improvement lends itself to watching a learner over time, allowing for inference, over many episodes in which they demonstrate self-directed behaviors. These themes thread throughout the following milestones.

REFERENCES

Competency 1. Identify strengths, deficiencies, and limits in one’s knowledge and expertise

Patricia Hicks, MD, MHPE

BACKGROUND: Residents’ ability to identify their strengths, deficiencies, and limits in knowledge and expertise are related to their ability to self-assess and their ability to use feedback from external assessment. An early learner’s awareness of his performance against an internal or external standard is often prompted by consequences or rewards within the educational system or other regulatory or institutional oversight. The motivation and vigilant awareness of this performance becomes more intrinsic with development. Guidance and external measures of knowledge and expertise will most likely continue to provide oversight (eg, maintenance of certification processes), although such oversight cannot determine the learning needs for individual physicians.1

The stimulus for identifying strengths, deficiencies, and limits in knowledge and expertise, when intrinsically motivated, usually arises from recognition of a gap in knowledge or skills identified in a particular clinical context.
Table 1. Facilitator Guide for Interactive Case-Based Discussion

<table>
<thead>
<tr>
<th>Generic Question</th>
<th>Specific Thinking Skills Induced</th>
</tr>
</thead>
<tbody>
<tr>
<td>What are the strengths and weaknesses of X?</td>
<td>Analysis/ability to draw inferences</td>
</tr>
<tr>
<td>Why is X happening?</td>
<td></td>
</tr>
<tr>
<td>What are the implications of X?</td>
<td></td>
</tr>
<tr>
<td>What is the difference between X and Y?</td>
<td>Compare–contrast; differentiate</td>
</tr>
<tr>
<td>Explain why X (Explain how X)?</td>
<td>Analysis</td>
</tr>
<tr>
<td>What is the nature of X?</td>
<td></td>
</tr>
<tr>
<td>What would happen if X?</td>
<td>Prediction/hypothesizing</td>
</tr>
<tr>
<td>What is a new example of X?</td>
<td>Application</td>
</tr>
<tr>
<td>How could Y be used to (achieve or result in) X?</td>
<td></td>
</tr>
<tr>
<td>What is X analogous to?</td>
<td>Identification and creation of analogies and metaphors</td>
</tr>
<tr>
<td>What do we already know about X?</td>
<td>Activation of prior knowledge</td>
</tr>
<tr>
<td>How does X affect X?</td>
<td>Analysis of relationships (cause–effect)</td>
</tr>
</tbody>
</table>

*Modified from King. The interactive case-based discussion is one in which residents' discussion could be observed, scored, and critiqued on the basis of the level and nature of inquiry as it relates to their level of knowledge, skills, and attitudes. Questioning by the learner reveals the current state of knowledge as well as that learner's ability to identify gaps in knowledge and understanding.

Table 2. A guide for the continuum of learner identification of level of knowledge, skills, and attitudes (KSA), including deficiencies and areas of strength. Achievement of this competency involves multiple areas of development and is therefore contingent upon achievement across all of these elements. Scoring this item is complex and may not reflect a synchronous progression along each of the elements, but rather a slower rate of achievement in some with a more rapid compensatory progression in others.

<table>
<thead>
<tr>
<th>Aspect of Milestone</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level of learning hierarchy that is identified as present</strong></td>
<td>Identifies ability (or inability) to follow instructions (to do what is told) for KSA</td>
<td>Identifies ability (or inability) to actually comprehend the KSA</td>
<td>Identifies ability (or inability) to actually apply the KSA</td>
<td>Identifies ability (or inability) to apply KSA in a differentiated fashion, elaborating on content (able to apply KSA to abstract or novel clinical situations with specificity of case)</td>
</tr>
<tr>
<td></td>
<td>Can compare and contrast with simple KSA to identify basic algorithms, patterns, or rules</td>
<td>Accurately predicts ability to solve clinical questions</td>
<td>Demonstration of KSA in teaching or supervisory role aligns with self-assessment of KSA</td>
<td></td>
</tr>
<tr>
<td><strong>Whether (or not) the identification of strengths, deficiencies, etc. is sought out or occurs due to external influence</strong></td>
<td>External: (negative) consequence-driven</td>
<td>External: consequence $\rightarrow$ external rewards-driven</td>
<td>Intrinsic: rewards from learning, ease of work, comfort, satisfaction</td>
<td>Intrinsic: desire to acquire more knowledge and expertise for self-development, to better serve patients, to become the best physician possible (even when no one is looking or would notice)</td>
</tr>
<tr>
<td><strong>Factors influencing likelihood of identification of strengths, deficiencies, gaps, etc. (whether internal or external)</strong></td>
<td>Recognition or anticipation of consequence or threat of consequence (external)</td>
<td>External prompts (pretest, priming assignment, other external query of KSA)</td>
<td>(Spontaneous or self-initiated) self-reflection or self-questioning (with or without acknowledgement of tension, uncertainty, ambiguity)</td>
<td>Learner response to dissonance with self: ideal model/image leads to broader self-assessment, needs assessment, or analysis of mastery/expertise</td>
</tr>
<tr>
<td><strong>Degree of Correlation of identified strengths...compared to absolute or gold-standard measure</strong></td>
<td>Blissfully and unconsciously clueless of knowledge deficits</td>
<td>Aware, but unresponsive or unable to reconcile evidence of identified gaps</td>
<td>Able to globally identify extreme deficiencies or strengths; lacks gradation of assessment gaps</td>
<td>Able to understand strengths, deficiencies, and limits of KSA</td>
</tr>
</tbody>
</table>

KSA indicates knowledge, skills, and attitude. 

*Includes deficiencies and areas of strength. Achievement of this competency involves multiple areas of development and is therefore contingent upon achievement across all of these elements. Scoring this item is complex and may not reflect a synchronous progression along each of the elements, but rather a slower rate of achievement in some with a more rapid compensatory progression in others.
The learner may be prompted to identify a gap when a patient’s problem is novel or outside of the scope of previous experience; when tension or dissatisfaction about perceived competence occurs during a learning activity; or when he is unable to meet the expectation (from self or others) to manage, teach, or elaborate about specific knowledge and skills and their application.

The resident’s ability to make “sense of the world,” in the words of John Dewey, is often influenced by doubt, uncertainty, or perceived difficulty. Kolb suggests that reflection on previous experiences helps us formulate hypothetical questions (prompted from recognition and response to perceived gaps in knowledge, skills, and attitudes [KSA]) and engage in active experimentation (eg, reading, applying various new strategies/approaches), both of which inform our learning going forward. Schön describes a process whereby one reflects on a clinical issue either during or outside of the immediate clinical situation. Such reflection, which embraces uncertainty, conflict, and ambiguity, pushes the physician toward seeking new knowledge or skills in an attempt to understand and then incorporate this new learning into practice. It is not only the identification of the presence of tension but also the identification of specific deficiencies or limitations in KSA that is critical.

Resource-seeking and question-asking skills are critical to identifying and specifically sorting out strengths versus deficiencies. The formation of questions enables a learner to more clearly determine the difference between their current versus ideal knowledge and skills, to develop a vision of the ideal competencies and behaviors, and to reflect on the forces encouraging and impeding change. Developing questioning skills was identified as a critical first step. The nature, clarity, and specificity of the questions, as well as the resources sought to answer those questions, are critical to the learner’s identification of knowledge and expertise.

Gorman and Ely et al report on the large number and the type of questions raised by those in practice. The nature and quality of the questions spanned a wide range, and the resource seeking for answers varied as well. King designed a tool to help students in large-group learning sessions develop questions by introducing them to a generic stem template (Tables 1 and 2).

**DEVELOPMENTAL MILESTONES:**

- Acknowledges external assessment of performance, but understanding of performance level is limited to the overall grade; there is little understanding of how the performance measure relates in a meaningful way to specific abilities of KSA.

  **Example:** During a semianual review, a learner is unable to describe in any specific terms how he has performed when asked to do so by his mentor. In response, the mentor reviews and interprets the learner’s evaluations and then asks the learner to reflect on the discussion. The learner repeats the language used and recites the overall score/grade without interpretation of further meaning or inference regarding the reported performance assessment.

- Seeks to address gaps in KSA, citing that purpose is to respond to uncertainty, discomfort, or tension in completing clinical duties. Assesses own performance on the basis of successful or unsuccessful performance of the task at hand without appreciation for how well it is done and whether there is need for improvement.

  **Example:** The learner seeks external assessment of performance as ability “to do” or “not able to do” with little understanding of what the assessment means. “Are these orders written correctly?” “Did I do that correctly?” Seeks feedback approval on whether KSA were “right” or “wrong.” Does not seek “how” or “why” as part of request for feedback to assist identification of KSA.

- Seeks to address gaps in KSA, citing response to uncertainty, discomfort, or tension in completing clinical duties as prompt. Actively questions and applies knowledge in developing a rationale for care plans or in teaching activities.

  **Example:** “Why would we use this antibiotic for this condition?” or “The patient has underlying condition X. Does that alter therapy y for this patient?” or “I think we should order study w for this patient, because sometimes this disease presents with underlying condition Z.”

- Seeks to increase level of KSA, citing the desire to expand KSA beyond what is needed for the current or immediately anticipated clinical care of a patient. Uses elaborate questions to further explore gaps and strengths in KSA.

  **Example:** In caring for a patient with an illness not previously encountered, this practitioner says, “I have experience taking care of patients with this acute illness, but have never had a patient with both this acute illness and this particular underlying condition. I wonder if the chronic condition might alter the clinical course in this patient?”

- Seeks to increase level of KSA, citing the desire to expand KSA beyond what is needed for the current or immediately anticipated clinical care of a patient. Uses elaborate questions to further explore gaps and strengths in KSA.

  **Example:** In caring for a patient, a practitioner becomes aware of a gap in KSA, and in response (with or without consultation from a mentor) seeks to learn more. A PICO-formatted question (P = Patient, I = Intervention, C = Comparison, O = Outcome) is constructed, followed by a process of identification of learning needed.

**REFERENCES**

Competency 2. Set learning and improvement goals

Patricia Hicks, MD, MHPE

BACKGROUND: Malcolm Knowles' first established the following definition of self-directed learning (SDL) that guided work in this area: a process in “which individuals take the initiative (with or without the help of others) in diagnosing their learning needs, formulating goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes.” As our understanding of SDL has grown, more recent definitions, such as that of Hammond and Collins, reflect the complexity of the phenomenon:

A process in which learners take the initiative, with the support and collaboration of others, for increasing self and social awareness; critically analyzing and reflecting on their situations, diagnosing their learning needs with specific reference to competencies they have helped identify; formulating socially and personally relevant learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies; and reflecting on and evaluating their learning.

The very nature of practice, especially for residents, involves addressing a variety of patient problems. As such, the development of short- and long-term goals may require the collection and analysis of information from several sources. However, as a result of the task-centered, hypothetico-deductive world experienced by the learner, the need to solve individual patient problems may only give rise to goals that are short term in nature. Often, learners need assistance in envisioning longer-term or more elaborate goals within which shorter-term goals can be more systematically developed and staged. One method of developing these goals is through the use of learning partners, as described by Charles Campion-Smith, in which physicians work in pairs to assist one another with the development of goals and with other steps in the SDL process, including evaluating achievement. This kind of partnership works well beyond the setting of goals and extends into actual learning. The work of activity theorists and of Vygotsky suggest that one physician in the pair inevitably leads, pulls, or pushes the other to a new perspective or greater understanding. This dynamic can lead to accelerated learning and change that may not be achieved by the individual alone.

In setting learning and improvement goals, physicians respond most commonly to perceived needs. Discovery of these needs can be stimulated by several situations, including caring for a particular patient, discovering a surprise that challenges usual practice, anticipating a needed skill generated through reading, engaging in conversation with a colleague, overhearing a conversation among other physicians, or attending a formal educational session. Other prompts to learner self-directedness that contribute to initiating learning and improvement goals include motivation, self-regulation, and learner self-efficacy. For many, however, these self-directed needs may be unknown or subjectively understood, and they may not reflect actual learning needs. This underscores the importance of structures, such as learning partners, supervisors/teachers, and oversight institutions, in the development and implementation of and accountability with learning and improvement goals.

DEVELOPMENTAL MILESTONES:

- Constructs learning goals at the “how-to” level, prompted by the acute needs of patients with well-defined conditions. The goal is to find the answer to the “then this” in the “if this–then this” logic statement.
  Example: Dr. Moore is admitting a patient with asthma and realizes the need to write admission orders. With Internet and supervisory resident-based resources available, he asks his supervisor for the asthma protocol, then proceeds to copy the orders line by line. When questioned on rounds about knowledge gaps, he cites the goal as using a protocol to address gaps.

- Constructs learning goals to address gaps in knowledge, skills, and attitudes (KSA) identified in the context of care delivery. These goals may be reinforced by other team members, such as through peer questioning or request for teaching. Goals extend beyond the “how to” KSA to include understanding of the pathophysiologic basis or underlying basic science principles.
  Example: Dr. Kim is on call and is in the process of admitting a patient with an acute exacerbation of asthma, brought on after playing with a friend’s cat. As Dr. Kim is writing the orders, a third-year medical student asks about the steroid dose. Dr. Kim does not simply answer the student’s question with the protocol’s written dosage but begins to think about why steroids are used in asthma. This interaction prompts Dr. Kim to look for materials that describe the inflammatory changes in the airways in patients with asthma.

- Constructs learning goals to address gaps in KSA needed to care for hypothetical patients who vary from the index case or who, upon reflection, were previously encountered.
  Example: Dr. Smith seeks further knowledge and sets out to retrieve a systematic review of steroids in asthma and establishes a new goal to learn about their use in allergy-triggered events versus other triggers.

- Constructs learning goals focused on readiness self to teach and lead others. Goals have a more elaborate contextual framework, with content areas linked by common pathophysiologic grounding or other relationships, such as common clinical symptoms or signs.
  Example: As Dr. Doe reads about the management of asthma and the role of anti-inflammatory medications in the management of disease exacerbations, related questions arise, with new goals, such as: 1) Why are anti-inflammatory medications used for prevention? 2) How does the mechanism of action of a steroid medication differ from a mast cell stabilizer medication? 3) How ought one ideally manage a currently asymptomatic child who was going to visit his grandmother (who has several cats) for the weekend if that child had cat allergy–induced asthma exacerbations?

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* Hypothetico-deductive reasoning is a scientific method whereby testable hypotheses are gathered from an existing set (from within the individual’s knowledge or from an available source); then one systematically tries to falsify those hypotheses. This approach presumes to have an established start point where a finite number of possible hypotheses or working models lead to an outcome, and one goes about eliminating those possibilities. This method is in contrast to an approach whereby one accumulates favorable evidence to induce a theory, to construct a hypothesis, or to assemble a critical mass of evidence to support an evolving or existing theory or hypothesis.
• Identifies multiple learning goals as a habit. Content areas are based on ongoing reflection and continuous effort to expand KSA. Cites desire to develop others through teaching and leading with improved KSA, including teaching others how to set learning goals. (Relates to professionalism milestone of learning for the sake of becoming the best physician, ready for best practice.) Example: After seeing several patients in a continuity clinic with asthma on the problem list, Dr Jones realizes that many of the patients have had frequent exacerbations that suggest difficulty in their ability to manage their asthma. He sets new goals to learn about motivational interviewing and seeks the help of a master in achieving this goal.

REFERENCES

Competency 3. Identify and perform appropriate learning activities to guide personal and professional development

Patricia Hicks, MD, MHPE

BACKGROUND: The process of selecting learning resources requires an understanding of how one is able to take in new information, sometimes referred to as a learning style or preference; the type of learning content (knowledge, skills, reasoning, behavioral or attitudinal change, or growth) and what instructional methods best address that type of learning content (Table 3); awareness of available resources; skills in seeking those resources; and consideration of the appropriateness of the selected resource to achieve the intended outcome.

Understanding of one’s preference of instructional methods and the effectiveness and efficiency of those methods to achieve growth in knowledge, skills, and attitudes (KSA) often require a significant amount of discussion and consultation, although experience with various strategies through a trial-and-error approach often leads to preferences (albeit perhaps inefficient or suboptimally effective ones). Applying learner preferences to identify resources, the availability and accessibility of the resources, and their effectiveness and efficiency with respect to learners’ goals are important aspects in identifying what types of experiences will contribute to learning. Learners should be encouraged to select from both formal and informal educational resources and may need assistance to consider and weigh possible learning alternatives, such as clinical rotations or other clinical training experiences, formal courses, home-study modules, study groups, and online study.

The type of instructional method chosen for teaching various types of KSA is critical. Acquiring competence in the psychomotor aspects of procedural skills is optimally done using simulation, where demonstration and then deliberate practice can take place. Using simulation to expand one’s content knowledge would not be as effective as other instructional strategies. The curriculum presented to a learner will often provide resources for core KSA, but assessment of this competency aims to determine whether, when given a choice, the learner chooses a resource that uses an instructional approach that has been proven to effectively produce the desired outcome or achievement or does she choose an ineffective resource (Table 3).

Also, the learner must identify outcome measures for those learning activities. Indeed, one of the most difficult

<table>
<thead>
<tr>
<th>Educational Method</th>
<th>Cognitive; Knowledge</th>
<th>Cognitive; Problem Solving</th>
<th>Affective; Attitudinal</th>
<th>Psychomotor; Skills or Competence</th>
<th>Psychomotor; Behavioral or Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Readings</td>
<td>Y</td>
<td>?</td>
<td>?</td>
<td>?</td>
<td>N</td>
</tr>
<tr>
<td>Lecture</td>
<td>Y</td>
<td>?</td>
<td>?</td>
<td>?</td>
<td>N</td>
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<tr>
<td>Discussion</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>N</td>
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<tr>
<td>Problem-solving exercises</td>
<td>Y</td>
<td>Y</td>
<td>?</td>
<td>N</td>
<td>?</td>
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<tr>
<td>Programmed learning</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>?</td>
<td>?</td>
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<tr>
<td>Learning projects</td>
<td>Y</td>
<td>?</td>
<td>?</td>
<td>?</td>
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<tr>
<td>Role models</td>
<td>N</td>
<td>?</td>
<td>Y</td>
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<tr>
<td>Demonstration</td>
<td>?</td>
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<td>?</td>
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<td>Real-life experiences</td>
<td>?</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>Simulated experiences</td>
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<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>?</td>
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<tr>
<td>Audio or video review of learner</td>
<td>?</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>?</td>
</tr>
<tr>
<td>Behavioral/environmental interventions</td>
<td>N</td>
<td>N</td>
<td>?</td>
<td>?</td>
<td>Y</td>
</tr>
</tbody>
</table>

Y indicates recommended for instruction; N, not recommended; and ?, may be appropriate in some cases but best if used in combination with other methods.

*Modified from Kern et al. 2
tasks is selecting appropriate signposts of progress and valid indicators that goals are being met. It is important for each learner to participate in the selection of outcomes that are relevant and valid indicators of change. Further, where the desired goal may be long term, learners may wish to identify indicators along the way. Mazmanian and Mazmanian emphasize the importance of a written commitment to a specifically stated change or the level of dedication to learning specific KSA in bringing about the change or the new learning.

Norman challenged the notion that adult learners could self-direct their learning and suggested that the construction of goals and the selection of resources to reach those goals may be limited by self-awareness, knowledge and the ability to direct learning. Eva claimed that external guidance would always be required for unfamiliar areas of practice, “thus reducing the validity of the rhetoric around nurturing learners to be self-directed.” Schmidt put forward similar arguments for his claim that the importance of self-directed learning skills in professional practice had been overemphasized. Seeking resources for guidelines, policy, or more systematic approaches to learning, development, and change, however, does benefit the learner. The dissemination of lessons learned assists the learner further when that individual chooses to teach others and shares resources.

**DEVELOPMENTAL MILESTONES:**

- Engages in learning activities on the basis of readily available resources or curricular materials, irrespective of learning style, preferences, appropriateness of activity, or any outcome measures.
  
  Example: After realizing a need to better understand what medications should be used in the management of a clinic patient with moderate asthma, the learner asks a peer who is working with him in clinic rather than pursuing the references suggested by his clinic preceptor.

- Engages in learning activities assigned by others; prescribed instructional materials are provided by others.
  
  Example: A learner reads cases assigned for primary care in advance of coming to a scheduled clinic session where a discussion of the cases is to take place. After the session, the resident wonders about the case and its relevance to overall learning. The case is part of a core curriculum with learning goals and objectives. Later, in clinic, a patient presents with a problem similar to last week’s case discussion, and the learner is able to go back to that case to glean further information on how to manage the patient.

- Seeks learning resources on the basis of analysis of learning needs assessment and subsequent constructed goals, with consideration of the nature of learning content and method.
  
  Example: Having failed at intubation in the delivery room, the learner goes back to the simulation lab to receive further training on intubation with the manikin (and does not simply reread the Neonatal Resuscitation Protocol).

- Selects learning activities on the basis of instructional methods that are known to be effective in advancement of knowledge. Knowledge application, and skills or behaviors. Learning takes place through collaborative interaction with experts. Learning activities sought are ones that allow for constant course correction and interactive sharing of alternative perspectives.

Example: A learner is planning an advocacy workshop for parents of children with complex medical needs to improve their skills with managing medical devices. In the process of preparing for this workshop, he discovers that there is an in-service for parents of hospitalized patients in how to care for devices and participates in this learning activity. Through this in-service, he identifies written resources, models useful for demonstrations, and video-recorded illustrations of anticipated complications with device use. He chooses to conduct a practice rehearsal with some families in the inpatient setting, with course correction from the hospital’s nurse educator.

- Selects learning activities, shares activities of value with others, and seeks input from others regarding additional learning activities.

Example: Seeks to expand the types of devices discussed in the workshop and looks to the work published by the Institute of Medicine Committee on Safe Medical Devices for Children. Decides to pursue resources (experts in the field) to see if it would be possible to learn how to provide the instructional materials, plans, and workshops to parents throughout the state.

**REFERENCES**


Competency 4. Systematically analyze practice using quality improvement methods and implement changes with the goal of practice improvement

Robert Englander, MD, MPH

**BACKGROUND:** The ability to systematically analyze practice using quality improvement methodology, and to implement change as a result, is embedded in a variety of knowledge, skills, and attitudes (KSA). There are 3 important areas of
content knowledge: the standards of medical care (eg, evidence-based pathways and guidelines),

change management principles, and quality improvement methodology. From a skills standpoint, one needs to be able to apply this knowledge to one’s practice beginning at the individual patient level and extending to populations of patients and, in the most expert sense, to the system of care. From an attitudinal standpoint, one needs to develop the habit of reflective practice and to embrace change.

To some extent, the system in which one finds oneself will be a determinant of the capacity to master the requisite KSA for this competency. The knowledge content may be determined by the local quality improvement methodology used (eg, rapid cycle change using the Plan–Do–Study–Act methodology), and the application of that knowledge will depend to some extent on the degree to which the system is predisposed to change. Additionally, the traditional medical model with a focus on episodic care and individual physician autonomy is often at odds with the precepts of quality improvement and population and systems management. Hockey and Marshall perhaps articulate this tension best: “A defining role of the doctor of the future—and a justification for their intensive training, status, and remuneration—should be their willingness to balance the inherent tensions between providing all possible care for individuals and designing systems which make clinically effective care available to whole populations.” Of particular importance is an understanding of these precepts in the context of this competency and their implications for resident education. Almost 2 decades ago, Ashton underscored the importance of integrating residents into the hospital’s and practice’s quality improvement programs. With rare exceptions, we have made little advancement in this area in the interim.

Finally, the ability to analyze practice and improve generally requires a team approach. An example might be the pediatric practice that is trying to increase its compliance with known evidence-based care of patients with asthma by ensuring the documentation of a home management plan of care. The documentation of the asthma plan may initially be viewed as the sole purview of the doctor; however, on more in-depth analysis, improvement may require a front office practice to ensure the form is placed appropriately in all asthmatic patient charts, a nursing practice to review interval symptoms and medication adherence with the patient before the doctor’s arrival, a patient care assistant’s follow-up call, and a case manager’s interface with the third-party payer for special but appropriate prescriptions or for home visiting nurse services to ensure adherence.

Despite the potential system and team limitations to an individual’s development in this competency, a clear pathway can be outlined, understanding that the degree to which one progresses may be limited by the practice environment in which one finds oneself. Individuals in the earliest stage of development in this competency have a surface-learning approach. They accumulate unrelated facts and treat parts separately, show no evidence of reflection on purpose or strategy (ie, lack reflective practice), and find an answer to a problem without grasping the underlying issues or principles (ie, lack insight). In addition, individuals in this stage tend to become defensive when others provide them with evidence of their opportunities for improvement. For example, the pediatric intensive care unit director in this stage of development, faced with a high rate of catheter-associated bloodstream infections, might focus on why his patient population differs from the norm and argue each individual case.

As one continues along the developmental stages, one demonstrates increasing ability to reflect. Initially, this reflection is focused on individual patient encounters or experiences that allow improvement without much reliance on the system or team. These physicians might have little knowledge of or experience with improvement methodologies, and their improvements will thus be limited to the individual patient encounter and based to some extent on intuition. In addition, individuals in this stage tend to be dependent on external sources to delineate their performance and guide their priorities for improvement.

The more advanced physician in this competency both understands and applies the precepts of quality improvement and does so both for individuals and populations of patients. However, the improvement is focused on and limited to one’s own practice patients. These individuals demonstrate a deep-learning approach by relating new ideas to their previous knowledge and experience and by focusing on the critical aspects of a professional situation. They are also continuously evaluating their practice performance for opportunities for improvement and thus are able to prioritize their change management.

At the most advanced stage of development, the physician has developed the habit of reflection on practice and continuous performance review and has applied those reflections using sound improvement methodology to his own patient population. He seeks to influence improvement at the broader population level, such as through publication of results that can be generalized. An example might be the endocrinologist who develops a system of diabetic management that is far superior to the national benchmarks in outcomes (eg, hemoglobin A1c) and disseminates that change through publications and presentations at national meetings. The reader is also referred to another excellent example of mastery of this competency demonstrated in a series of practices working with payers in the Minneapolis/St Paul health care system to improve a population’s overall care.

**DEVELOPMENTAL MILESTONES:**

- Unable to gain insight from encounters as a result of a lack of reflection on practice. Does not understand the principles of quality improvement methodology or change management. Is defensive when faced with data on performance improvement opportunities within one’s practice.
- Able to gain insight from reflection on individual patient encounters, but potential improvements limited by lack of systematic improvement strategies and team approach. Dependent on external prompts to define improvement opportunities at the population level.
Competency 5. Incorporate formative evaluation feedback into daily practice

Carol Carraccio, MD, MA

**BACKGROUND:** Feedback is the control of a system by reinserting into the system the results of its performance. If these results are merely used as numerical data for criticism of the systems and its regulation, we have the simple feedback of the control engineer. If, however, the information that proceeds backward from the performance is able to change the general method and pattern of the performance, we have a process which may very well be called learning.1

It is important to be precise about what feedback is and what it means. In his classic article, Ende2 tells us that feedback occurs “when a student or house officer is offered insight into what he or she actually did as well as the consequences of his or her actions.” He highlights the difference between feedback and assessment. The former is specific to individual aspects of a learner’s performance, formative (ie, intended to help form the learner into a more successful professional), neutral, and not intended to make commentary on overall performance. In contrast, the latter is more generalized, summative, and intended to make commentary on a learner’s overall performance. He also makes the critical point that “observations are the currency of feedback,”3 with direct observation being the essential backbone of optimal feedback.

In the search for the development of responses to feedback, a seemingly sentinel article emerges from the higher education literature. In this article, Nichol and Macfarlane-Dick4 remind us that it is important to ensure that feedback, per se, has occurred before we think about the appropriateness of a learner’s response. The feedback message must not only be appropriately articulated but then “decoded and translated into action”5 by the learner. At the same time, they point out that feedback messages are complex and not readily translatable into action without some discussion that leads to further understanding and processing. The authors also stress the point that although we tend to think of feedback as being transmitted from external sources, internal feedback is critical. Focusing only on external transmission ignores the role that beliefs and motivation play in the response to feedback. This reference to internal and external sources calls into play the work of Forsythe4 as it bears on identity development. In the earliest stages of identity development, there exists only one point of view for the individual—his own. In the next stage, he can understand the viewpoints of others, but they are translated and internalized in a way that serves his own needs and interests. When applied to feedback, this suggests that the translation of the feedback may be different from the intended message and likely will not lead to the desired behavioral changes intended by the person giving the feedback. As one progresses along the continuum of identity development, one becomes able to see multiple perspectives simultaneously. At advanced levels of development, one is primarily motivated by personal expectations rather than the expectations of others. In other words, individuals at these advanced levels are proactive in seeking feedback because they want to improve rather than being reactive in responding to feedback because others would like them to improve.

Interestingly, Nichol and Macfarlane-Dick reinforce Forsythe’s3 construct of identity development using a model of response to feedback that is built on the foundation of self-regulation. The construct of self-regulation or self-monitoring has recently emerged in the medical education literature and provides some insight into an element of self-assessment that holds greater promise of accuracy than self-assessment. Archer6 defines self-monitoring as “the ability to respond to situations shaped by one’s own capability at that moment in that set of circumstances, rather than being governed by an overall perception of ability.” Although everyone is generally poor at self-assessment in the global sense of predicting how well we will do something, Eva and Regehr5 suggest that we are much better at knowing our limitations when we are actively
engaged in an activity at point of care. In essence, this type of reflection in action, or self-monitoring, is our response to internal feedback. For example, a learner may not be able to accurately assess his ability to resuscitate a newborn with perinatal asphyxia, but when called to the delivery room, he knows when he is in over his head and appropriately requests help to avoid compromising patient care.

It is important for a teacher to discern the level of identity development of a learner in order to package feedback in a way that can best help lead to desired behavioral change. Other major influences that have been reported to affect response to external sources of feedback are its source, duration, and monitoring. Feedback from a supervisor or administrator (as opposed to participation in a research intervention), providing feedback over the long term (years as opposed to months), and ongoing monitoring (as opposed to recording results of a short-term intervention) have been shown to enhance response to feedback. Relevance, by linking feedback to goal setting, in conjunction with facilitated support, are other key ingredients in enhancing receptivity and bringing about positive change.

Sargeant et al summarize their findings from a number of studies involving feedback. In addition to many of the influences noted above, they also highlight that physicians are more likely to respond to feedback from patients than colleagues. The authors also emphasize that feedback that is inconsistent with one’s self-perceptions may evoke strong emotional responses that inhibit assimilation and behavioral change. The recommended antidote to this emotional response is reflection, particularly facilitated or guided reflection. This is an important take-home message for educators.

DEVELOPMENTAL MILESTONES:

- Has difficulty considering others’ points of view when they differ from his own, leading to defensiveness and inability to receive feedback and/or avoidance of feedback; demonstrates a limited incorporation of formative feedback into daily practice.

- Is dependent on external sources of feedback for improvement; is beginning to acknowledge other points of view, but reinterprets feedback in a way that serves his own need for praise or consequence avoidance, rather than informing a personal quest for improvement; little to no behavioral change occurs in response to feedback (eg, listens to feedback but takes away only those messages he wants to hear).

- Understands others’ points of view and changes behavior to improve specific deficiencies that are noted by others (eg, understands that the perceptions of others are important even when those perceptions are different from his own, such as when a nurse interprets a response as abrupt when it was not intended to be, causing him to examine what prompted this perception).

- Internal sources of feedback allow for insight into limitations and engagement in self-regulation; improves daily practice on the basis of both external formative feedback and internal insights (eg, is able to point out what went well and what did not go well in a given encounter, and makes positive changes in behavior as a result).

- Demonstrates professional maturity and deep emotional commitment that lead to deliberate practice and result in continuous reflection, self-regulation, and internal feedback that lead to ongoing improvement beyond a focus solely on deficiencies.

Competency 6. Locate, appraise, and assimilate evidence from scientific studies related to their patients’ health problems

Ann Burke, MD

BACKGROUND: Evidenced-based medicine (EBM) is defined as “the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients.” Given the increasing amount of medical information and knowledge, physicians need to develop systematic strategies to deal with and manage all of the information regarding their patients. In this developmental milestone, we will examine the knowledge, skills, and attitudes (KSA) required for the actual steps involved in EBM, recognizing that in reality one cannot practice EBM without the ability to set learning and improvement goals or the motivation to be a lifelong learner.

The classic steps that need to be repetitively accomplished to practice EBM include the following:

- Convert the need for information into an answerable question

   This may also be described as formulating a clinical question typically in PICO format, addressing the problem/population (P), intervention (I), comparison (C), and outcome (O). Again, to recognize the critical importance of this learning activity, one must have the requisite motivation and maturity to set learning and improvement goals.

- Search for best evidence to find answers

   Residents need to learn, via practice, what to look for, how to look for it, and where to search.
**Critically Appraise the Evidence for Its Validity, Applicability, and Impact**

This step involves asking and answering the following questions: What are the results? Are the results valid? Are the results relevant? Critical appraisal involves a complex series of cognitive tasks that include processing information in research studies, weighing evidence, and balancing the multifactorial information about the individual patient’s unique situation to arrive at an evidence-informed medical decision. Critical appraisal is the art of EBM; it is far more complex than following steps to take care of generic patients (or to participate in so-called cookbook medicine).

**Integrate Findings with Clinical Judgment**

Taking into account patient values and clinical circumstances. To accomplish this step, one must simultaneously move along the developmental continuum in other areas of practice-based learning and improvement and other competencies.

**Bring About Change**

One must be able to apply the evidence and then evaluate one’s effectiveness and efficiency, seeking ways to improve both.

The following attributes and descriptions characterize learners in various stages of development.

**Early Development of KSA for Evidence-Based Practice**

Characterized by a learner who needs help identifying personal knowledge gaps and converting knowledge gaps into an answerable clinical question. The novice asks others with more perceived experience for answers to general questions. Initial forays into literature searching involve use of general search engines (e.g., Google) with excessive return of low-level evidence. In the searching process, there is an inability to filter searches to limit returns to high-quality studies with optimal methodology. A novice or early learner has minimal ability to critically appraise an article. Application of the study findings to a patient is often inappropriate.

**Intermediate Development of KSA for Evidence-Based Practice**

Characterized by a learner who is able to identify knowledge gaps in the course of patient care. The learner is additionally able to convert knowledge gaps into answerable clinical questions. Learners in this developmental stage begin to ask more specific questions (foreground questions) in areas where content knowledge is more advanced. They can successfully perform a literature search using Medline databases and retrieve high-quality evidence to answer clinical questions. They are also able to utilize methodologic filters to increase the quality and decrease the quantity of the citations returned. Critical appraisal is improving using standardized tools that are specific to each study design. The learner may begin to apply the findings of studies of populations to individual patients, taking into account the patient’s own values and resources and the clinical context.

**Advanced Development of KSA for Evidence-Based Practice**

Characterized by demonstration of ongoing, habitual asking and answering of clinical questions from one’s patient care as part of an ongoing commitment to continuous professional development. The learner demonstrates effective and efficient search strategies for complex clinical questions utilizing a variety of medical databases and best-evidence resources. Additionally, the learner is able to improvise to find clinical evidence when initial search strategies fail. This stage is characterized by advanced skill in critical appraisal of clinical studies of multiple methodologies (e.g., randomized controlled trial, cohort study, systematic review, cost–benefit analysis). Masterfully able to integrate evidence gained from literature searching into complex clinical decision making; consistently takes the patients’ values and resources, as well as the clinical context, into consideration. Seeks out and enjoys the difficult clinical questions to continually push and expand capabilities in evidence-based practice. A number of guidebooks contain information on how to teach critical appraisal skills and attitudes via the systematic approach that is called EBM. In terms of teaching and learning EBM, it is important to note that the literature informs us that the outcomes of teaching EBM are improved if there is practice- or case-based learning and time is set aside for this learning. Thus, introducing EBM to undergraduates in their curriculum is a favored technique to allow learners to actively practice EBM in a clinical setting at a point when large time constraints are not present and to allow one to methodically respond to the steep learning curve. In a systematic review of the effectiveness of EBM and critical-appraisal teaching starting at the postgraduate level, Coomarasamy and Khan concluded that the studies showed a significant improvement in knowledge but not in attitude, skills, or behavior during residency. Most sources agree that to become proficient in EBM, a learner must utilize interactive and clinically integrated activities in addition to interactive classroom-based activities and must begin this process early in their education. Therefore, a sound strategy is to teach and practice EBM in undergraduate medical education, with subsequent practice of EBM on a regular basis to improve KSA as a resident. EBM skill development truly spans the continuum of medical education.
DEVELOPMENTAL MILESTONES:

- Explains basic principles of EBM, but relevance is limited (eg, by little clinical exposure).
  Example: The senior resident asks each member of the inpatient team to answer a clinical question that he raised during rounds and to be prepared to discuss it the next morning. The learner goes to a more senior colleague for help because he cannot work through a case or article using the critical appraisal approach, mainly because of a lack of clinical context to work from.

- Identifies knowledge gaps as learning opportunities. Makes an effort of care (eg, netbooks, workstations on wheels, smart-technology that brings access to the classroom and to the point enabled by the World Wide Web, commoditized technology, nearly universal access to this information which include the exponential growth in clinically relevant and evolve.1–7 The field has changed dramatically in a relatively short period of time as a result of several factors, which include the exponential growth in clinically relevant information, nearly universal access to this information enabled by the World Wide Web, commoditized technology that brings access to the classroom and to the point of care (eg, netbooks, workstations on wheels, smartphones, iPads), and the widespread adoption of electronic health records (EHRs) and learner portfolios.9

- Formulates answerable questions regularly, seemingly as a result of care.10
  Example: In response to a clinical question raised during rounds and the senior resident’s request that everyone answer the question, the learner is able, with help, to frame the question in a Population–Intervention–Comparison–Outcome (PICO) format. He has searching capability, but the search and the steps of analyzing and applying the evidence are time intensive, so he is not prepared to discuss his findings on rounds the next morning.

- Recognizes the importance of using current information to care for patients and responds to external prompts to do so. Able to formulate questions with significant effort and time; online search efficiency is minimal (eg, may require multiple search strategies).
  Example: In response to the clinical question raised during rounds and the senior resident’s request that everyone answer the question, the learner is able, with help, to frame the question in a Population–Intervention–Comparison–Outcome (PICO) format. He has searching capability, but the search and the steps of analyzing and applying the evidence are time intensive, so he is not prepared to discuss his findings on rounds the next morning.

- Identifies knowledge gaps as learning opportunities. Makes an effort of care.11–13

- Formulates answerable questions regularly, seemingly as a result of demonstrated increasing self-motivation to learn more. Incorporates use of clinical evidence in rounds and teaches fellow learners. Quite capable of advanced searching. Able to critically appraise topics and does so regularly. Shares findings with others to try to improve their capability, but the search and the steps of analyzing and applying the evidence are time intensive, so he is not prepared to discuss his findings on rounds the next morning.

- Recognizes the importance of using current information to care for patients and responds to external prompts to do so. Able to formulate questions with significant effort and time; online search efficiency is minimal (eg, may require multiple search strategies).

- Teaches critical appraisal of topics to others. Strives for change at the organizational level as dictated by best current information. Able to easily formulate answerable clinical questions, and does so with the majority of patients as a habit. Able to effectively and efficiently search and access the literature. Seen by others as a role model for practicing EBM.
  Example: Is an EBM practitioner, as observed by conversations during rounds, whom others try to emulate. He enjoys teaching colleagues how to become EBM practitioners by role modeling. He helps team members develop and refine their skills using his expertise to make a difficult task practical and doable.

COMPETENCY 7. USE INFORMATION TECHNOLOGY TO OPTIMIZE LEARNING AND CARE DELIVERY

Bradley Benson, MD

BACKGROUND: Developing and maintaining competence in the use of information technology is vital in the modern practice of medicine, and its role will continue to expand and evolve.1–7 The field has changed dramatically in a relatively short period of time as a result of several factors, which include the exponential growth in clinically relevant information, nearly universal access to this information enabled by the World Wide Web, commoditized technology that brings access to the classroom and to the point of care (eg, netbooks, workstations on wheels, smartphones, iPads), and the widespread adoption of electronic health records (EHRs) and learner portfolios.9

THE EVOLVING FOCUS ON INFORMATION TECHNOLOGY: In the late 1990s, the Association of American Medical Colleges10 issued Report II of the Medical School Objectives Project, in which they noted that, “Physicians will have to possess the knowledge, skills, and attitudes (KSA) required to be competent in medical informatics if they wish to incorporate into their practices systematic approaches for promoting and maintaining the health of

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defined populations.” The report outlined learning objectives specifically related to medical informatics necessary to fulfill the following 5 roles of the physician: lifelong learner, clinician, educator/communicator, researcher, and manager. As with many of the other milestones, significant overlap exists between medical informatics competence and attainment of competence in the other domains. Here we will focus on the specific KSA related to the use of information technology that enhance one’s ability to fulfill each of the above roles.

Of note, since the introduction of the learning objectives for the roles related to information technology listed above, medical schools have made major investments in information technology, with nearly ubiquitous computer and internet access, creation of virtual campuses, and widespread adoption of technology-enhanced learning. A follow-up study 8 years after the initial report, however, showed that only a handful of schools taught and assessed medical informatics objectives that required interaction with patient health information, underscoring the importance of intentional focus on these objectives at this time. The importance of these objectives has been emphasized by the Accreditation Council for Graduate Medical Education and the American Board of Pediatrics, with increasing requirements for the use of EHRs in training, and the use of information technology for data collection and reporting of quality improvement projects as part of maintenance of certification, respectively.

**The Developmental Progression of Information Technology Capability:** The technology acceptance model (TAM), as originally described by Davis, is a critical tool in understanding the progression of capability with respect to the use of information technology. This model identifies the drivers of user acceptance of technology and notes 2 major factors that impact usage behavior: perceived ease of use and perceived usefulness. Of these 2 factors, perceived ease of use is the more important and has the greater impact on behavior. Understanding the determinants of perceived ease of use is vital, as it is an initial hurdle that early learners must overcome for acceptance, adoption, and use of a system. The work of Venkatesh in this area has built upon the TAM by integrating 4 factors that determine early perceptions of the ease of use of a new system:

- **Internal control**—Characterized by one’s own sense of computer savvy or self-efficacy.
- **External control**—Perception of support/facilitators in the environment to help with use of the new system (ie, availability of 24/7 tech support during Epic (Verona, WI) implementation).
- **Intrinsic motivation**—Characterized by “computer playfulness” or one’s intrinsic enjoyment in interacting with a new gadget or information system.
- **Emotion**—Characterized by computer anxiety and a negative affective reaction to computer use.

In applying this model to early learners in a medical setting, it is clear that the factors above impact individuals in a unique way, directly affecting their likelihood of embracing use of the new technology and ultimately their behavior. As individuals gain personal experience with the technology, however, these factors attenuate on the basis of their objective experience with the system and modify their perception of the system’s ease of use. Anyone with experience in implementing an EHR system has seen the variation in user acceptance and evolution over time. This literature is of great importance to information technology developers and consumers alike, as many investments in information technology have failed to yield the expected improvements in productivity or outcomes because of a lack of user acceptance.

In proposing developmental milestone levels related to the use of information technology, we rely heavily on the scholarly work cited above as well as the Dreyfus Model and the work on expertise by Bereiter and Scardemalia. Although it is widely perceived that the new generation of physicians in training are technologically savvy, there will always be variations in computer self-efficacy, playfulness, and anxiety that directly affect each learner’s progression and level of skill. Learners on the anxious and less confident end of the technology spectrum must gain enough objective experience and have enough success with the information technology to overcome their initial misgivings if they are ever to progress. Early attempts at literature searching or accessing a patient’s medical record may be overwhelming as a result of the number of information retrieval tools available, the volume of information retrieved, and minimal ability to filter or prioritize. As skills develop, learners are better able to choose which database to search to best answer a specific question, to know where to look in an EHR for a specific piece of patient information, and to develop a repertoire of experience in filling their own knowledge gaps.

Competent users of information technology have an emotional investment in the outcome; they feel good when they are able to successfully answer a clinical question using information technology resources and feel bad when they cannot. Similarly, if an EHR query or use of a new standardized best practice order set for a patient admitted with bronchiolitis goes well, then satisfaction results; if errors or difficulties occur, then dissatisfaction results. This emotional investment is evidence of an internal motivation that will help the competent learner continually improve and progress to a higher skill level. In these later stages, efficiencies develop, and the use of new information technology is often intuitive and enjoyable. Troubleshooting and problem solving are the responses to any failed attempts to use information technology for learning or patient care. As use of the EHR for individual patient care is streamlined, the gained time can be reinvested in use of the EHR for activities such as population health initiatives. At the highest stages of professional achievement, one contributes to the continuous improvement of current information technology systems and the development of new ones to improve patient care and learning.
DEVELOPMENTAL MILESTONES:

- Utilizes information technology only with mandatory assignments and direct help. Does not demonstrate discernment in choosing between multiple available databases for clinical query and does not filter or prioritize the information retrieved, which results in too much information, much of which is not useful. Requires direct supervision in use of EHR. Challenges in the use of information technology may lead to resistance to adopting new technologies.
- Utilizes information technology for patient care assignments or learning. Identifies and chooses among several available databases, search engines, or other appropriate tools, resulting in a manageable volume of information, most of which is relevant to the clinical question. Basic use of an EHR is improving, as evidenced by greater efficiency and efficiency in performing needed tasks.
- Beginning to identify shortcuts to getting to the right information quickly, such as use of filters. Also beginning to avoid shortcuts that lead one astray of the correct information or that perpetuate incorrect information in the EHR. Demonstrates a willingness to try new technologies.
- Retrieves (from EHR, databases, and other resources), manages, and utilizes biomedical information efficiently in solving problems and making decisions that are relevant to the care of patients and for ongoing learning.
- Consistently utilizes familiar information technology resources and seeks new ones to answer clinical questions and remedy knowledge gaps identified in the course of patient care; utilizes the EHR platform to improve the care not only for individual patients but populations of patients; and utilizes evidence-based (actuarial) decision support tools to continually supplement clinical experience.
- In addition to the behaviors illustrated in the milestone immediately above, engages in the continuous improvement of current systems and the development and implementation of new information technology innovations for patient care and professional learning.

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Competency 8. Develop the necessary skills to be an effective teacher

Ann Burke, MD

BACKGROUND: What is an effective teacher, and what characteristics do these teachers possess? In this competency, a number of knowledge, skills, and attitudes (KSA) form the conceptual framework for effective teaching. It is important to note that the definition of effective may be difficult to quantify because much of the literature on this ability is based on perceptions and not on learner outcome measures. The KSA may progress at similar rates, or some elements may lag behind while others progress. For example, someone may be very learner-centered and adaptable, but she may feel inadequate as a result of insufficient content knowledge. A few overarching themes that progress through the developmental process toward a good or effective teacher are teacher-centered versus learner-centered approaches; fixed approach with teaching methods versus adaptability; and inadequacy versus confidence. These are each discussed in turn.

TEACHER-CENTERED VERSUS LEARNER-CENTERED APPROACHES: A learner-centered teacher asks learners about their needs and aims to align the teaching method and content with the specific learner at hand. This concept also includes creating a learning climate that facilitates optimal learning. For example, a teacher who shows enthusiasm and empathy for learners, does not interrupt presentations on rounds, and encourages questions is learner-centered. In contrast, a teacher-centered approach is one that focuses on the teacher’s needs. Little to no effort is put into assessing what the learner may need. This approach is typically symptomatic of a lack of insight and of feelings of inadequacy about the
knowledge and skills for teaching, which results in wanting to stay in a prepared and rehearsed mode of teaching to remain safe. Alternatively, it may be because of a lack of interest and enthusiasm for the task of teaching. An example of this concept is a new teacher who prepares every bit of detailed medical information about a topic so as not to appear to be lacking in knowledge; however, his talk may be overwhelming, too expansive, and unfocused, and thus unhelpful to the learners. Another example is a professor who is lecturing about a topic with no attempt to make it relevant to the particular audience. He may even speak for 10 minutes over time, again focusing on his desire to talk about everything he prepared rather than on the learner’s desire to have their time respected.

**Fixed Approach Versus Adaptability:** Adaptability refers to the willingness of teachers to modify the form and content of instruction, their ability to change style on the basis of subtle cues from learners, and their capability to not be fixed or limited in style. This theme includes the creativity of the teacher. Inflexible teachers do not change according to the situation. For example, a fixed or inflexible teacher would likely not shorten rounds to allow a resident to get to clinic because “that is how they always run rounds.” Another example is a resident who continues lecturing students long after a number of them have dozed off.

**Inadequacy Versus Confidence:** Confidence in teaching may stem from a number of factors, including positive reinforcement, enthusiasm, experience, and self-identity as a teacher. Some of these thoughts about self-efficacy and self-perception may be inaccurate or overvalued. That is to say, although confidence is a characteristic of effective teaching, one who is confident alone may not be an effective teacher. Often, early-stage teachers may be so focused on their own knowledge content and learning needs that they may feel inadequate and unsafe teaching others. A master teacher, on the other hand, probably has appropriate confidence in an insightful way and a positive self-image as a good teacher.

In one study, the following 3 key themes seem to emerge when faculty and residents are attempting to characterize and describe good teaching attributes: enthusiasm for teaching (current and future), learner centeredness, and self-knowledge about teaching. In this qualitative study, the intervention group of residents received 13 more hours of resident-as-teacher development compared to the control group. The study took place in a university medical center with primary care residents. Qualitatively analyzed resident interviews identified the above themes and found that their self-perceptions of their teaching roles persisted for over 1 year after the intervention. Other descriptions of effective teaching and precepting include similar themes, such as respect for learners, positive role modeling, and demonstrable patient care skills. In another study, the authors developed a validated faculty peer evaluation on teaching skills, which resulted in the following list of behaviors of effective teachers:

- Establishes a safe and positive learning environment and learner involvement.
- Leads teaching sessions.
- Communicates goals of teaching and is learner centered.
- Uses appropriate methods and materials.
- Primes the learner by asking for commitment, plan, and responses (in a learner-centered manner).
- Gives feedback to learners.
- Encourages learners to continue their learning.

In a study by Beckman, peer-to-peer evaluations occurred between faculty attendings on a general internal medicine hospitalist service. Many of the categories utilized were adapted from the Stanford Faculty Development Program-26 (SDFP-26), which is a validated questionnaire for students and residents to use in evaluating attendings. However, it is important to recognize that students may not have views completely similar to faculty and/or may not value the same teacher attributes that faculty value.

Being a teacher is generally perceived as a favorable quality or skill for a physician to have; however, it does require time and effort. The quality of teaching can become subject to contextual circumstances and can advance or regress through the milestones. In general, the progression through the milestones follows the 3 overarching concepts detailed above.

**DEVELOPMENTAL MILESTONES:**

- Demonstrates a completely teacher-centered approach; focused on what needs to be taught rather than the learning needs of the students. Barriers to effective teaching may include lack of content knowledge and/or lack of teaching skills and repertoires. Difficulty adapting because of need for preparation and scripted teaching. Early learner in medical content. This may be expressed as feelings of insecurity with teaching and low confidence level.
- Demonstrates an approach that is weighted toward teacher-centric; is able to identify a good teacher, but lacks insight to be able to articulate the discrete qualities that contribute to this skill. Adapting to others’ learning needs is challenging, so there is little deviation from any preset plans. Does not see learners as barriers/nuisance, but may demonstrate ambivalence with them. Expresses feelings of inadequacy/insecurity as a result of limited teaching repertoire and experience.
- Exhibits some learner-centered teaching behaviors, but remains mostly teacher centered. Able to identify a few of the discrete qualities of effective teaching behaviors. Teaching methods and repertoire are expanding and therefore less limited and more adaptable. Communicates a self-identity as one who likes to teach. Gaining confidence in teaching abilities, demonstrated as increasing interactions with learners and enthusiasm for assisting them in learning.
- Exhibits a learner-centered approach to teaching. Assesses learner needs and incorporates them to advance learners. Eager and enthusiastic to teach. Shows enriched insight and understanding of some teaching concepts and is able to adapt and modify teaching to meet unforeseen learner needs in most situations. Develops learner-centered goals. More relaxed and confident with teaching, with obvious enjoyment in this role.
- Consistently demonstrates a learner-centered approach to teaching. Understands and seeks new information regarding teaching and learning. Identified by others as a dedicated teacher on the basis of the time and energy committed to teaching, which is part of the core of her self-image. Ensures that both intended learning goals as well as newly defined goals of learners are achieved. Confidence in teaching skills allows for creative and adaptive teaching abilities.
Competency 9. Participate in the education of patients, families, students, residents, and other health professionals

Ann Burke, MD

BACKGROUND: This competency will focus on patient and family education; other competencies focus on students, residents, and other health professionals.

The concepts of educating oneself and educating others share many of the same features and abilities. Another competency, “Develop the necessary skills to be an effective teacher,” outlines 3 themes that establish the context within which effective teaching is considered. These 3 overarching themes are teacher-centered versus learner-centered approaches, fixed approach versus adaptability, and inadequacy versus confidence. That competency is perhaps more pertinent for medical teaching. This competency will focus on the additional aspects of exemplary educational interactions with patients and families.

Patient education involves a complex set of skills and capabilities, which span a number of competency domains described elsewhere in the Milestones document and requires the following:

- Knowledge about the particular disease process and/or health promotion concepts that pertain to each individual patient (medical knowledge).
- The ability to navigate the medical interview and encounter (patient care).
- The capability to counsel patients and families (patient care).
- The capabilities that allow physicians to communicate effectively with others across a broad range of socio-economic and cultural backgrounds (interpersonal and communication skills).

One difference between patient education and education of trainees and peers involves the dimension of professional satisfaction associated with demonstrating behaviors consistent with effective patient education. Consider that the profession recognizes and acknowledges medical trainee teaching with awards. Additionally, teaching medical students, residents, and peers is documented and valued in curriculum vitae. Physicians rarely receive formal recognition for ongoing, habitual, effective patient and family education; however, the professional and personal satisfaction gained is noteworthy. Thus, patient and family education seems to be rooted in altruism and mindful practice.1

One author considers the term patient education to be “unfortunate” because it suggests passive reception of information by the patient. In reality, the interplay of physician and patient/family is optimized when it is dynamic and interactive and consists of 2-way discussion.2 Patients who take an active role in their own care have better outcomes in terms of quality of life, health, and satisfaction.3 Physicians demonstrating capabilities at the more expert end of the developmental spectrum in this milestone are completely aware of and incorporate this concept into practice.

The medical encounter with patients/families serves 3 functions, as outlined in the competency “Interviewing patients/families about the particulars of the medical condition for which they seek care, with specific attention to behavioral, psychosocial, environmental, and family-unit correlates of disease.” The 3 functions are to gather biological and psychological information, to respond to the emotions of patients/families, and to educate patients/families to ensure desired outcomes.4–6 The content areas of the last 2 functions, which are pertinent here, are as follows7:

RESPOND TO THE EMOTIONS OF PATIENTS/FAMILIES

- Define the nature of the relationship.
- Communicate professional expertise.
- Communicate interest and empathy.
- Recognize potential relationship barriers in the doctor–patient relationship.
- Gain insight into the patient’s perspective.

EDUCATE PATIENTS/FAMILIES AND SUBSEQUENTLY IMPLEMENT TREATMENT PLANS

- Negotiate and resolve any issues or conflict between physician and patient.
- Communicate about the diagnostic and prognostic characteristics of the diagnosis.
- Negotiate and recommend appropriate diagnostic procedures and treatment.
- Negotiate and recommend appropriate preventative measures, such as lifestyle change.
- Enhance coping skills and ability by enhancing understanding of health issues.

REFERENCES

Additionally, some authors suggest that the medical encounter can be divided into the following 4 distinct functional components: 1) data gathering, 2) building relationships, 3) patient education and counseling, and 4) activating and partnering. Activating implies the function that “facilitates the expression of patients’ expectations, preferences, and perspectives so that they may more meaningfully participate in treatment and management decision making.” Phrases such as “What do you think is going on?,” “I understand you don’t like that,” “Does that seem to be clear to you?,” which express concern for patient opinion and check for understanding, are components of activating and partnering behaviors. In the progression of these milestones, the partnering aspect of patient education will be emphasized. Further, there is an instrument to assess these interactions: the Roter Interaction Analysis System, or RAIS. This instrument can be used to assess resident progression through this milestone.

To clarify and further define the terms activation and partnering, a few points need to be emphasized. There can be a wide spectrum of effectiveness of interactions with patients from ineffective to effective in modifying behavior. Progressing through these milestones, one would become increasingly focused on the outcomes. A physician who habitually asks herself, “How can I modify behavior and have good patient care outcomes from partnering with and activating the child and family?,” is far advanced beyond the doctor who simply goes through the motions of patient education.

Some evidence about who simply goes through the motions of patient education and counseling outcomes from partnering with and activating the child and family?,” is far advanced beyond the doctor who simply goes through the motions of patient education without deliberate thought. Some evidence about patient encounters to consider when using a framework of enhancing change and promoting compliance include:

- Few patients change behavior with unilateral physician communication of information/lecturing-type education.
- Rates of patient compliance and behavior change increase with the simple addition of patient handouts/literature.
- Health literacy, or the level of understanding by reading and/or listening that a patient possesses, needs to be taken into account.

**Additional Considerations**

What characteristics aid a physician in becoming one who participates in education of patients and families? One study looked at characteristics, capacities, and skills that distinguish physicians as good at patient communication/education. In this particular study, the term capacities referred to physicians' values, beliefs, and intentions concerning the patient. Thus, capacities encompass constructs such as compassion, empathy, respect, honesty, and integrity. In this study, the patients were adolescents, and the components that appeared to be necessary to educate and communicate with this group of pediatric patients were empathy, nonjudgmental attitude, and self-reflection. In pediatrics, physicians must utilize the principles outlined above, but they must also modify and be flexible with regard to various ages, developmental stages, and literacy levels.

**DEVELOPMENTAL MILESTONES:**

- Adheres to a scripted type of patient education and counseling (which may be due to knowledge and experience) that may not meet the needs of the patient. Doctor-centered interaction.
- Demonstrates a somewhat flexible type of patient education and counseling (possibly as a result of closing some of the gaps in his knowledge and experience base), allowing him to educate patients and families in a way that begins to meet their needs. Education varies between doctor centered and patient centered, depending on the circumstances and the family dynamics. Responsive to patient’s educational needs. Checking for patient understanding when triggered by patient questioning.
- Demonstrates a solid breadth of both knowledge and experience; modifies teaching to meet the needs of the individual patient. Educational efforts are typically patient centered, and the learner is able to modify strategies to adapt to complex patient characteristics. Checks for patient understanding when cues suggest confusion.
- Demonstrates a broad knowledge base and significant experience with a variety of disease processes and patient characteristics. Facilitates the participation of patients in all discussions about their health. Is flexible with strategies of educating patients. Patient-centeredness is clearly a priority and a conscious effort. Consistently checks for patient understanding. Empowers and motivates patients.
- Engages in behaviors described in level immediately above and also continually demonstrates patient-centeredness. Seamlessly, skillfully, and comfortably educates and interacts with patients in a way that satisfies the patients. Exceptional ability to motivate and empower patients to make healthy changes and choices. Does not leave the patient encounter without knowing that the patient understands the counseling.

**REFERENCES**

Competency 10. Take primary responsibility for lifelong learning to improve knowledge, skills, and practice performance through familiarity with general and experience-specific goals and objectives and attendance at conferences

Ann Burke, MD

BACKGROUND: Responsibility for one’s own lifelong learning (practice-based learning and improvement) is a process that involves a complex framework of self-direction, self-efficacy, and insight. The concepts of lifelong learning and self-directed learning continue to be elusive, with learners and educators finding it difficult to define and to agree on their role in professional formation and continued learning.

A framework based on the work of Malcolm Knowles defines self-directed learning as a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating goals, identifying resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes. In 1977, Guglielmino developed an instrument to measure self-directed learning. She defines a self-directed learner, or one who takes responsibility for lifelong learning, as

one who exhibits initiative, independence, and persistence in learning; one who accepts responsibility for his or her own learning and views problems as challenges; one who is capable of self-discipline and has a high degree of curiosity; one who has a strong desire to learn or change and is self-confident; one who is able to use basic study skills, organize his or her time and set an appropriate pace for learning, and to develop a plan for completing work; one who enjoys learning and has a tendency to be goal-oriented.

An excellent exploration of the theories, frameworks, and complex considerations of self-directed learning, Self-Direction for Lifelong Learning by Candy, explores the ontogeny of self-direction. It is clear from this text that there is active discussion and debate about what constitutes lifelong learning. When discussing the skills and competencies of a self-directed learner, Candy points out that although the approaches to developing a profile of a self-directed learner have varied enormously among authors, the lists of skills and competencies have a remarkable degree of congruence in their qualities and characteristics. These qualities include the following: methodical and disciplined, reflective and self-aware, confident with a positive self-concept, developed information-seeking and retrieval skills, curiosity, openness, and motivation. Many of these qualities are utilized and embedded in the Jefferson Scale of Physician Lifelong Learning, one of the few instruments specifically validated for physicians.

The value in diagnosing the stage of self-directness lies in helping the learner move from a less advanced to a more advanced stage. Grow speaks to the levels of self-directedness beginning with dependent, moving through interested and involved, and finally culminating in self-directed. He provides strategies for teaching learners at each of these levels as well as tips for helping learners progress along this continuum.

DEVELOPMENTAL MILESTONES:

- Depends on external direction to learn. Learns what is required only. Possesses limited learning strategies and/or motivation to develop the concepts more deeply. The learning process is new to the learner, and he articulates little insight into how he learns or what strategies he may use to learn.
- Takes some initiative, but also depends on the help of others to engage in self-assessment and identification of learning needs. Develops some fundamental learning strategies based on his understanding of methods that work for him, and actively seeks ways to use those strategies and methods.
- Develops an internally motivated process of inquiry and reflection that drives learning with limited external guidance. Demonstrates the self-confidence and insight into abilities to identify learning needs, develop learning objectives, and identify appropriate resources.
- Drives learning using internal prompts, with self-confidence in abilities to pursue a learning goal and learning plan. Insightful, with a high degree of curiosity, as demonstrated by asking complex, thoughtful, and probing questions.
- Demonstrates self-efficacy, insight, and reflection in developing learning plans and evaluating one’s own learning process. Self-confident in ability to learn and continually reviews the process and progress of learning.

REFERENCES