SECTION 1
Background/Introduction

CHAPTER 1

Adult learners in the emergency department

Ellen J. O'Connell, Kurt C. Kleinschmidt
Division of Emergency Medicine, University of Texas Southwestern Medical Center,
Parkland Health & Hospital System, Dallas, TX, USA

Introduction

"Why do I have to learn this?" is a common complaint among school-aged students while learning dreaded subjects. The teacher's answer is usually, "Because I said so." The standard student retort to this is, "Well, I'll never have to use this in the real world."

Adulthood has arrived; the real world. Unlike our youthful days when educational subjects were forced upon us, most adults seek to learn because of a motivation to do so. Adults seek experiences that have an identifiable impact on life. However, the motivation for adult learning is not always from within; external forces also affect motivation. Adults sometimes seek education, not because they are excited about the subject, but because they know it is in their best interest. Adults also seek learning so as to better deal with the real world. This is the basic difference of perspective toward learning between an adult and a child.

The purpose of this chapter is to explore the principles of adult education as it applies to teaching in the emergency department (ED). Examples of these principles will be applied to this specific clinical setting. The terms "learner" and "physician-in-training" refer to anyone in the position of learning. The "teacher," "instructor," or "educator" is the person at any level of training who is in the teaching role.

Learning theories

Physiologically, learning is building and strengthening the synapses in the brain. The details are complex and unknown. This unknown territory has resulted in the development of many learning theories, including three recognized classic theories [1]. Each of these theories creates an impact on curriculum design, teaching, and evaluation. Most educators use elements from each theory in any given situation rather than strictly adhering to one particular style.

Behaviorism is the learning theory commonly associated with the Pavlovian response: a subject performs a behavior, receives a positive result, and the behavior is reinforced. If the result is negative, then the behavior is discouraged and eventually eliminated. The behaviorist does not focus on the thought processes of the learner, but only on the response to a stimulus.

The cognitive learning theory is the opposite of behaviorism. It focuses on the learner's thought processes instead of a response to a stimulus. The interest is in how the learner integrates new information and applies it to new situations.

The third classic learning theory is constructivism. In this theory, the learner builds (or constructs) new ideas based on existing knowledge. Constructivism also focuses on how students interact and learn from each other, as well as from their educators.

Learning as a child

Pedagogy refers to the learning style of children. Its literal translation from Greek is "to lead the child." This is a teacher-centered style of learning. Because children are not thought to have sufficient experience to know what they need to learn, their educators make these decisions for them. Instructors decide what material to teach and how to teach it. Young students have little choice as to the content of their curriculum. Decisions and information flow 100% from instructor to student.

Aspects of the pedagogical style also apply to some adult learning situations. For example, during the preclinical years of medical school, adult students also have no choice regarding the content of their curriculum. However, unlike secondary school students, adults have chosen to do this curriculum because of their motivation to become physicians. The curriculum is a means to an identifiable end, providing motivation.

Learning as an adult

As the study of learning advanced, adult learning enthusiasts recognized that children and adults receive and process new information differently. This recognition suggested that adults should be taught differently, prompting radical changes in adult education in many institutions. In the mid-1950s, Malcolm Knowles began publishing his work on adult education, which at the time was an underexplored subject. He popularized the term *andragogy*, which he defined as "the art and science of helping adults learn." He observed that adults needed to be involved in their education rather than being "led" to it. While childhood learning is teacher centered, adult learning is student centered.

Much of the adult learning theory stems from five assumptions about adult learners developed by Knowles (Table 1.1). The assumptions reflect that adults are self-directed learners who seek information independently. They reconcile new information with their existing knowledge base, and they seek to apply it immediately to a known problem. It is important to note that these assumptions have not yet been validated.

Pedagogical learning is based upon discrete subjects, such as math, history, and spelling; or anatomy, cell biology, and pharmacology. This is appropriate for building lower levels of cognition, and for the development of a foundation of knowledge. However, applying very basic knowledge, acquired in a pedagogical style, to real-world problems is more difficult. Adult learning is more problem centered, an approach in which the learner pulls multiple bits of basic information from multiple, discrete subjects to solve a problem.

Problem-centered learning is very relevant in the ED. For example, the ED physician, faced with a female who has right lower quadrant abdominal pain, simultaneously gives attention

Table 1.1 Malcolm Knowles' adult learning assumptions.

Adults are self-directed and autonomous
Adults have life experiences that need to be respected
Adults desire to learn tasks related to everyday life
Adults are problem centered and seek to immediately apply learned material
Adults are motivated by internal drives rather than external factors

Refs [6, 8].

to all systems that may cause pain in this region, thus deciding: "Is this gastrointestinal (appendicitis, gastroenteritis), gynecologic (ectopic pregnancy, ovarian torsion, pelvic inflammatory disease), genitourinary (ureterolithiasis, pyelonephritis), vascular (aortic dissection), or other (shingles)?" The physician combines basic knowledge of these different systems and conditions with clinical experience to narrow the diagnostic possibilities and begin the appropriate evaluation.

Before embracing Knowles' theories blindly, one must note that there are many criticisms of Knowles' work. The lack of data used to formulate the assumptions is commonly cited [2–5]. This is particularly concerning in medicine's current culture of evidence-based practice. Additionally, Knowles' work is often considered "theory." This is an inappropriate use of this word, since a scientific theory is one that has been rigorously tested, and these learning assumptions have not.

Norman [2] questions at what point a student optimally transitions from a child to an adult learning style. It is not likely an age-based phenomenon, as chronological and mental ages are not always congruent. He suggests that the time of the transition is not effected by an internal condition of the learner, but rather by the change in learning style needed to meet a new pressure or situation.

Some have suggested that the motivation for adult learning is rarely exclusively internal; that motivation often stems from external forces [3, 5]. Adults may only acknowledge their conscious internal motivation, neglecting a subconscious external motivation. For example, physicians must receive continuing medical education (CME) in order to maintain their certification. A physician may satisfy an internal drive to learn more about dental emergencies by attending a lecture on this topic at a conference; the external motivation of receiving CME credits is also satisfied by attending this lecture.

The assumption that adult learning is all self-directed is also debatable [2, 5]. Self-direction is a quality of a mature learner. A young learner may possess this quality, whereas a chronologically older student may not. In addition, before indulging into any self-directed learning, students must do self-assessments to identify their weaknesses. However, young students often perform inadequate self-assessment. The drive to learn is partly fed by success. Consequently, students are more likely to study topics with which they are familiar, feeding the hunger for success rather than

focusing on weak areas. Adult learners facing new subjects may need a little "pedagogical guidance" from instructors.

Another criticism of Knowles' work is that he did not comment on the use of reflection in learning [5]. In reflection, the learner considers the new material, integrating the new material with preexisting knowledge and resolving conflicts between new and old information. The learner can also consider how to approach a task the next time, based on successes and mistakes in the first experience. Taking time to reflect upon a newly learned topic serves to ingrain the material into one's mind, strengthening the newly formed synapses.

Educating adults

Adults are experienced learners who derive part of their identity from life experiences. Adult learning is enhanced when educators demonstrate *respect* to the adults, as well as to their experiences. Any dismissal of the learner's experience is perceived as a rejection of himself or herself [6]. With the learners' cadre of life experiences come well-established, difficult-to-break habits [6]. Despite their motivation to learn, adults are generally resistant toward changing their habits. Educators must balance respect for the learners' experiences with needed modifications of problem habits. Failure to balance this may risk alienating the learners.

Dependence on the teacher within a pedagogical structure is counterintuitive to adult learners. Adult learners seek to solve problems on their own using previous experience. Instructors of adult students are seen as facilitators, not teachers. Facilitators are guides who do not merely hand out information but who help students to develop their own questions and to find their own answers. This develops student self-reliance and skills that will be useful in solving future problems. Knowles and others have developed recommendations for these facilitators of adult students [7, 8], detailed with examples in the following section.

Adult learning in the ED

The ED is a very rich, problem-based, learning environment. Most emergency medicine (EM) physicians are "action oriented" people who say, "I learn best by doing," or "I learn on my feet." The ED provides the ideal setting for such learning. Patients are present here with a complaint to be diagnosed, not a diagnosis to

be managed. The educational moments are "live;" they are "now." Skilled educators exploit these attributes of the ED, incorporating principles of adult education to create rich learning experiences for the young physicians.

However, the ED is not a "comfortable" learning environment. Constant distractions are normal. Another significant barrier to education in the ED is time. Faculties are clearly under increasing pressures to see more patients, further limiting the time for teaching. The balancing of time between patient care and teaching is just another ED triage; only that this is "time triage." Not all cases need to be an educational moment, nor must every aspect of each case be dissected to provide thorough teaching. Educators must choose their moments.

Set the environment

There are two environments to optimize for learning: physical and interpersonal. The physical environment of the ED is a constant assault on all the senses, resulting in an array of distractions that is unparalleled in the world of education. Patients are constantly coming and going whereas providers are ever darting about. Noise emanates from patients, monitors, radios, telephones, overhead speakers, and chatter between coworkers. The lighting is harsh. The department is never big enough, with patients overflowing from rooms into hallway beds or large rooms with chairs. Nurses and physicians also have to battle for computer space; if there are enough computers, there is not enough counter space. Supplies run short, textbooks are old, and "who took the last cup of coffee without making a new pot?" interruptions are frequent. New learners in the ED also face shear intimidation. Despite these inordinate challenges, learners must focus on good quality, one-at-a-time, patient care. It would seem impossible to also get the learner to focus on educational moments, one-at-a-time. Teachers in the ED must choose their moments among the distractions. It is important to "read" your learner to see if they are ready for educational moments. If a student is too distracted with a current situation, you cannot effectively teach. Save the pearl for later.

The interpersonal or relationship setting is the most important piece in the entire educational endeavor. As noted earlier, adults have years of experience for which they expect and deserve respect. Establishing an open and respectful relationship with the adult learner is the most important initial step in providing adult education. It is this relationship that encourages learners to come to their

teachers, and also makes the teachers approachable. Simply, learning will not occur if the students do not want to approach or hear from the teacher. Since in the teaching ED, physicians-in-training have to present their cases, it seems that the learners have no choice but to come to the teachers. However, if the learners do not have a good relationship with the teacher, they will modify their presentations in ways to minimize exposure to the instructors. When faculties try to teach in the setting of poor relationships, learners will be minimally receptive. Tension easily worsens with each encounter. Various reviews have been done that describe the characteristics of

Table 1.2 Characteristics of effective teachers.

Enthusiasm
Psychosocial focus
- Stresses relationships with patients and staff
- Patient centered
- Understands personal perspectives and social values
- Humanitarian

Identifies self as a teacher
Communication skills
- Listens to students
- Rapport with students
- Nonthreatening (approachable)
- Questions carefully done
- Clear and lucid
- Organized
Role model actions
- Positive
- Responds to teaching needs
- Listens to patients
- Rapport with patients
- Emphasizes relationships
- Emphasizes psychosocial aspects of cases
- Knowledgeable
- Clinically competent
Encourages education and independence
- Actively involves students
- Provides direction and feedback
- Stimulates intellectual curiosity
- Promotes self-direction

Refs [10–15].

good teaching faculty (Table 1.2). Upon review of these characteristics, it can be noted that they are all based upon the establishment of an open and respectful relationship with the learners.

Set goals

Goals are the centerpiece of education. Adult learners should assist in determining their learning goals as much as possible. Learners can reflect on their existing knowledge and identify gaps that must be filled. This strengthens their internal motivation and develops a sense of responsibility for their education. In an ED, goals can be established any time including orientation, the beginning of a shift, or on the fly as a resuscitation is about to begin. However, learners cannot determine these goals alone. Goals may result after negotiation between the student and the teacher. Educator input is also valuable in ensuring that learners have set specific, achievable, and measurable goals.

During orientation, ask off-service rotators and medical students to consider what they hope to achieve during their time in the ED. Many will have very limited goals. Challenge them to expand their thinking, since the ED is a place for non-EM physicians to face problems outside their chosen practice. Consider having the physicians-in-training establish a goal for the day at the beginning of a shift. This may be a part of the history, such as asking each patient the nature of his or her employment. Alternatively, the learner can enhance physical exam skills, such as carefully listening to cardiac murmurs in each patient. Educators can help the learners recognize unrealistic goals, such as improving chest tube placement.

Some non-EM rotators may desire to learn everything related to EM while in the ED. However, non-EM physicians-in-training often present unique challenges because they may have goals for the rotation that are different than the teacher's desire to teach them "emergency medicine." An orthopedics physician-in-training may only seek musculoskeletal injuries, whereas an internal medicine physician-in-training may target lengthy, inpatient work-ups on ED patients at a rate of one patient per hour. It may be impossible to "make" these physicians-in-training meet the instructors' desired goals. Thus, negotiation becomes an important part of the process. Attempts to force certain goals upon some learners will only result in frustration for all. Admittedly, not all would agree with this, as some feel all rotators should be taught everything related to EM.

Learners may struggle to choose goals. Instructors can assist by asking questions to identify areas of weakness. For example, a physician-in-training may say, "I hate eye complaints." Questioning reveals that this aversion is due to a lack of comfort with performing a complete eye exam. If the physician-in-training is in EM, the instructor can ensure this is taught during the shift. If the learner in non-EM has no interest in learning the details of the eye exam, then time might be wasted in trying to do so. It might be the appropriate time to probe again and find a weakness that is of interest.

Plan and implement new material

Involving learners in planning educational activities has many benefits, including assisting the facilitators in identifying possible problems before they become definite issues. Facilitators can redirect learners when they are off-track and provide recommendations for problem solving resources.

This technique applies easily to procedures. All providers have preferred approaches for different procedures. Physicians-in-training may not have broad enough exposure to different techniques. Asking one to try a different technique or approach may result in some resistance. Querying, "Why do you think it may be valuable to know how to place internal jugular central lines rather than just femoral lines?" may help the learner realize that not all approaches are available in all patients. Consequently the physician-in-training gains motivation for learning a new approach as well. Having learners discuss about procedures before they are done reinforces the appropriate steps and identifies knowledge gaps before undertaking the tasks. Being present during the procedure is ideal though often impractical. It is reasonable to consider that different procedures have different levels of risks and thus different levels of need for physical presence by the teacher.

Implementing education is difficult during the middle of a procedure or resuscitation. Educators naturally want to intervene and/or make comments; but doing so may be at the expense of the physician-in-training. These moments require the difficult balance of patient care with education. Intervention by the teacher can embarrass the learner, potentially harming the student–teacher relationship. However, patient care is a very important consideration. There is no easy answer for these potentially conflicting interests. The best consideration is that there are no absolutes; neither should always

be the dominant one. Minor mistakes by a physician-in-training can be just as acceptable as the teacher stepping in at a truly life threatening moment. For those who practice EM, we recognize that the truly life threatening moments, where key decisions in a matter of very few minutes will truly affect life, are few. Usually, there is time for the teacher to discuss the situation with the learner, facilitating and guiding. An excellent location for the teacher is right behind the learner. This location enables the teacher to quietly make comments to the learner, enabling him or her to remain "in-charge." Once the life threatening moment has passed, then even the minor mistakes can be addressed during the postresuscitation review.

Another implementation opportunity occurs when a topic is raised to which the educator has a canned, brief presentation. Many teachers have a variety of topics, such as causes and evaluation of syncope, management of asthma when standard medications fail, emergency causes of chest pain, or how to interpret a chest X-ray. Educators keep these discussions fine-tuned and ready for use when the appropriate moments occur. These lectures are brief, usually no longer than 3 minutes. This aids the learner in retaining the information (by avoiding information overload), as well as avoids significant delay patient care.

Evaluate
By evaluating their learning experiences, adult learners identify ongoing knowledge gaps and recognize whether goals were met. These evaluations do not use formalized exams; rather may be done with a brief discussion between the learner and the teacher. Reviewing key aspects of patient encounters can be very helpful, especially if it includes comments on previously established goals.

The verbal discussion (or evaluation) is routine during standard patient presentations by physicians-in-training. After the presentation of a history and physical condition, ask a physician-in-training to formulate a differential diagnosis, what he or she wants to do from this point, and the thought processes behind both. This gives the educator insight into the learner's understanding of the patient's illness, as well as whether the learner has an appropriate diagnostic approach or not. This also is a chance for the educator to guide the learner back on track should the plan not seem appropriate based on the presentation.

A similar recap should take place after the physician-in-training has undertaken a specific challenge, such as a new approach in a

procedure. A similar query of, "How did you think this went, what did you learn, what would you have done differently?" gives the learner a moment to evaluate his or her own performance, again reinforcing the new material.

Role model

> Example is not the main thing in influencing others. It is the only thing.
>
> <div align="right">Albert Schweitzer</div>

Role modeling is very important to education in the ED. In some ways, this is the easiest education that teachers deliver. It requires little thought or planning, and mostly the teachers being the role model themselves. Amazingly, EM teachers may be unaware that they are role modeling. Physicians in any senior position should be aware of their behavior being emulated at any time [9]. Thus, in other words, this can be the most difficult part of being a teacher, as you are onstage 100% of the time. An EM teacher's every action or word is interpreted, and the interpretation may be very different than what was intended by the teacher. Every verbal interaction is seen by at least one person, and the patterns soon become clear. The disgusted look given to the technician for delivering the latest electrocardiogram is generally witnessed. The challenge is to be the best human we can be as much of the time as possible. It is no surprise that most positive human attributes are the same as the characteristics of an effective teacher discussed earlier (Table 1.2).

Observation of a teacher's history and the physical exam of a patient can be illuminating to a learner. The clinician's techniques can be incorporated into their own routines: subtle uses of humor, good eye contact, or the shake of a hand. Educators can then point out findings to the learner and explain why certain questions were used.

One of the most important items that can be role modeled is how the teacher thinks. For example, after having heard the differential diagnosis and plan from the physician-in-training, the teacher explains his or her differential and plan loudly. This is more than just stating a differential and plan. It is very powerful for the learner to see the educator model his or her thought processes by "thinking out loud."

An instructor may also model an experience, which is difficult to teach, such as conveying to the family the death of a loved one. The educator can identify ahead of time specific techniques, such as bringing a chaplain or nurse as an escort and clearly stating that the

loved one died. This serves as cues for which the learner should be watching as the role model proceeds in his or her task. Afterward, the instructor can ask the learner for his or her thoughts on the experience. This serves both as feedback for the instructor and to embed the experience in the learner's mind.

Conclusion

To summarize, adult learners are self-directed and goal oriented, seeking information that they can readily apply. The ED provides many appropriate educational moments for adult learners. Educators can seize these moments by helping the learner set goals, serve as a guide on the learner's path to learning but not spoon-feed answers, and help the learner evaluate his or her performance to further solidify the new information.

Summary points

- Adult learners have internal motivation, frequently combined with external motivation, to actively seek new information, reconcile new information with existing knowledge, and plan to rapidly apply information to a problem.
- Reflection on newly learned material or tasks serves to integrate the new material into a learner's brain, making it more readily retrievable in future experiences.
- Adult learners need from their educators respect for their existing knowledge base.
- Setting a positive interpersonal environment will help overcome the ED's physical impediments to learning.
- Physicians-in-training must develop learning goals; learners must evaluate both independently and with their educator how those goals have been met.
- Educators must be open to identify opportunities for learning in the ED, such as patient presentations by physicians-in-training, procedures, and resuscitations.
- Educators should realize they are always role models; their behavior, both positive and negative, is always on display for absorption by learners.

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