XXIII. Core Knowledge in Scholarly Activities
D. Principles of Teaching and Learning
D1. Educational Theory

“A mind is a fire to be kindled, not a vessel to be filled” — Plutarch

Understand the basic principles of adult learning theory (Knowles 1984)
Self-directed — able to determine and pursue own learning needs
Experiences — provide framework and foundation for new knowledge and skills
Goal-directed — values learning to advance in current role
Problem-centered — application to authentic problems in everyday life
Internal (intrinsic) motivation — Internal desire to succeed, the satisfaction of learning and personal goals have greater effect on maintaining motivation than external incentives and rewards
Curriculum is not something that is transmitted to, or acts upon, the students. The learner is an active contributor in the learning process. The physician-learner is stimulated to learn through interactions in the practice environment.

Understand the attributes of an effective learning environment
Physically and emotionally comfortable
Learners feel safe to freely express themselves without judgment
Learning objective, goal or desired outcome
Relevant to the learner
Involve learners in mutual planning of content and learning process
Ensure meaningfulness to trigger internal (intrinsic) motivation
Provide task-relevant knowledge
Learners are encouraged to take control of their learning
Formulate their own learning objectives
Identify resources and strategies to get their needs met
Learners involved in evaluating their own learning
Modeling or demonstrations of skill, behavior or process (e.g. talk through clinical reasoning)
Observation gives image of desired skill/behavior as guide or standard of performance
Guided practice and positive feedback solidifies skills (doing right)
Corrective feedback is integral to effective learning (not doing right)
Knowledge-building requires opportunity to make meaningful (cognitive)
Skill-building requires opportunity to practice (physical)
Attitude-building requires opportunity have experience (emotional)
Abraham Maslow’s “Hierarchy of Needs” Applied to Education (Maslow 1970)

Self-Actualization - Aware of own individual needs; knows strengths and learning gaps; prioritizes, plans and pursues learning based on interests and career goals.

Self-Esteem Needs - feels respected as a learner and/or as a teacher. Sense of competence

Belonging Needs - feels accepted in a community, accepted in social role (e.g. senior resident).

Safety Needs - physical safety, emotional safety, social safety and “grade” safety

Physical Needs - comfortable temperature, can hear the speaker, not hungry, bladder empty, etc

Understand the importance of “reflective practice” in teaching and learning (Shön 1987)

Formal theoretical knowledge is often not useful to the solution of messy, indeterminate problems of real-life practice.

Theory and practice inform each other. Theory guides practice and is interpreted in light of personal current and past experiences. Practitioners are positioned to test and revise theories through practice. They do so by reflection and action.

Reflectivity in practice is a learned skill of critical thinking and situation analysis.

Teacher models and fosters this creative process.

- Demonstrates the skill and shares examples
- Facilitates learner’s ability to perceive options and reframe the problem
- Assists learners to reflect on the actions and options they chose and the knowledge and values that influenced the choice
- Helps them to critically consider what was learned and integrate the new knowledge
- Facilitates ongoing systematic experiential learning, on-the-spot experimentation, reflection on process, actions and outcomes
- Comments positively when observing that reframing has occurred to make the learner consciously aware of the process of learning.
Identify strategies that motivate learners

Learning is most effective and motivating when it is relevant to the solution of real-life needs or problems. (Swanwick 2010)

Passing exams is a real-life problem, is an extrinsic motivator for learners, intrinsically rewarding when passed [rose to challenge and triumphed!]

Experiential learning theory (Kolb 1984) states that learning is best achieved in an environment that considers both concrete experiences and conceptual models.

Active learning strategies requires arousal (attention), engagement and increases learning

- Low tech—questions, cases, discussions, role plays, standardized patients, games
- High tech—audience response system (clickers), simulation labs, online modules
- Blended learning—an online component to live educational activity

Problem-based learning uses patient problems as a context for students to acquire knowledge by problem-solving with clinical reasoning skills and identifying learning needs in an interactive process, self-study, applying newly gained knowledge to the problem and then by summarizing what has been learned, evaluating the information sources used and analyzing how they might have better managed the patient problem.

Situated learning theory (Lave 1991) describes the transformative experience of participation in community activities (e.g. medical community or community-based experience).

- Learning occurs through collaboration with other learners and more senior members of the community carrying out activities
- Learning occurs through social interaction. Acquires knowledge through “talk” of the community and observes behaviors of more senior members
- Learn values, shared knowledge and practices of the community

Motivate by supporting sense of self-efficacy (Bandura-social cognitive theory-1986)

- Judgment of your own capability will affect how much effort invested, how long will persist and whether task is approached anxiously or with confidence
- Based on authentic experiences of mastery, often task-specific
- Vicarious experience (seeing someone else do it successfully) can raise belief that you can perform the new task too
- Verbal persuasion (encouragement) can be influential
- Past experience and knowledge will affect perceptions of self-efficacy, which will, in turn affects the choice of new experiences and goals.
- Learners’ values, attitudes and beliefs influence their learning and actions and building self-awareness is important for learner development.

Motivate by developing Self-Directed Learning (SDL) (Tolsgaard MG et al 2013)

- Essential in the development and maintenance of professional competence; a hallmark of best practice
- Create learning environment supportive of inquiry and respectful discourse
- Challenge existing knowledge structures (schema) to provoke uncertainty
- Critical reflection on one’s own learning and experience
- Identify knowledge gaps
- Develop competency at asking questions
- Determine additional learning needs and set goals accordingly
- Critical appraisal of new knowledge
- Ongoing, life-long process
Recognize the impact of the "hidden curriculum" on learning (Hafferty 1994)

*Formal curriculum*—that which is stated

*Informal curriculum*—can be explicit, implicit or serendipitous goals occurring in interactions between the learner, the teacher, clinical environments, other students and through personal interests.

*Hidden curriculum*—practices and routines of the community, particularly in relation to coping and thriving. Often teaches values and moral judgments; may be found in policies, language, assessment strategies and allocation of resources in an institution. Often unintentionally imparted through actions, discussions and relationships among members of the community.

Communities of Practice (Lave 1991)-- a persistent, sustaining social network of individuals who share and develop an overlapping knowledge base, set of beliefs, values, history and experiences focused on common practice and/or mutual enterprise. (e.g. SDBP; AAP)

D2. Feedback and Evaluation

**Identify components of effective feedback**

Explicitly call it “feedback” otherwise they may not realize they received any

Timely, specific, respectful, supportive and an expected component of the experience

Public if routine and involves group in learning and models of giving/receiving feedback

Private if significant correction or professionalism violation

First invite self-reflection “How do you think that went?”

Use active listening and specific probes

Own your observations “I noticed that…”, “I felt that…”,”It seemed to me that …”

Focus on observed behaviors and facts

Use of checklists assists observation of specific behaviors e.g Mini-CEX (Norcini 1995)

Goal--identify and encourage learner recognition of own strengths and acquired skills

Teaching point--we build on existing competencies and expand; strength-based

Goal--identify skill or knowledge gaps; areas that need improvement

Teaching point--Identification of gap is good; otherwise it is a hole to fall into

Goal--develop self-reflection and self-directed learning

Teaching point--provide follow-up opportunity to display the acquired knowledge

Conclusion--feedback is understood by learner who develops action plan with follow-up

**Distinguish between formative and summative feedback**

Theme: *Begin with the end in mind*

Clarify learning goals and expectations for learner

Review expectation of feedback

Types:

- Formative
- Mid-cycle
- Summative

**Formative Feedback**

Feedback to learners about their progress and areas needing further development

Informal, ongoing, frequent, non-judgmental and short

Integral to the teaching and learning process

Active and dynamic interaction engages and encourages deeper learning

Allows more detailed and specific feedback

Offers help with specific remediation and fosters self-directed learning
Develops the teacher’s skills of observation, interactive instruction and active listening
Inform curriculum development (e.g. need for simulation of giving difficult news)
(suggested) Mid-cycle Review
Scheduled formal feedback session midway through rotation
Enables learner to improve performance with specific feedback

**Summative assessment**
Scheduled, formal feedback at the end of a course, rotation or periodic review
Measures attainment of relevant goals and objectives
Data driven- review of formal assessments (e.g. tests), preceptor evaluations, peer-to-peer evaluations, multi-source “360” evaluations (e.g. nursing), multiple observations and observers
Portfolio review--examples of work products (Friedman 2005)
Decision making-- met or did not meet criteria for advancement
Decision making--need for remediation

**Distinguish between evaluation and feedback**
**Evaluation:** formal assessment that has been constructed for decision making purposes; makes judgment; Includes a variety of sources and testing modalities.
**Feedback:** assessment that is formative and informs the learner about their current performance; dynamic and interactive;

**Understand strengths and weaknesses of various methods to evaluate learners** (Epstein 2007)
**Reliability:** are the results reproducible?
**Validity:** the extent to which the competence that the assessment claims to measure is actually measured?

Educational impact of assessment
“Students don’t do what you expect, they do what you inspect”

Seek balance in assessment; be realistic
Assessment must balance rigor (reliability and validity) against practicality (feasibility, cost and acceptability). (Crossley 2002)

Quantitative versus Qualitative
“Do not assume that quantitative data are more reliable, valid or useful than qualitative data.” (Epstein 2007)
Miller’s Pyramid for Assessing Clinical Competence  (Miller GE 1990)

- **Does**
  - Workplace-based assessments

- **Shows How**
  - Tests of knowledge application
  - Performance-simulation tasks

- **Knows How**

- **Knows**
  - Tests of factual recall
## METHODS OF EVALUATION:

<table>
<thead>
<tr>
<th>Method</th>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
</table>
| **Multiple Choice Questions (MCQ) exams**   | - assesses knowledge  
- standardized  
- content specified  
- large number of students  
- cost-effective  
- computer analysis yields strengths/weak areas | - arbitrary cutoffs pass/fail  
- does not assess clinical competence (performance)  
- single assessment  
- particularly difficult to write MCQs in developmental-behavioral pediatrics as often many variables to consider. |
| **Computerized testing**                    | - Variety of applications  
- e.g. case-based with immediate feedback  
- Self-assessments  
- Useful for foundation skills (e.g. CITI training for research education) | - complex to develop  
- unclear transfer to clinical or “live” settings                                                                                                                  |
| **Written short answer or essay**           | - Assess synthesis of information, reflections, attitudes  
- formative or summative evaluation | - grading is time-consuming and dependent on training of grader                                                                                                         |
| **Simulations (with or without standardized patients)** | - standardized assessment  
- specific skills  
- can assess communication skills as well as clinical  
- multiple learners rotate through  
- multiple observers (examiner and or “patient” assessments) | - challenging to orchestrate  
- cost  
- artificial  
- short time at each station  
- parts of an encounter                                                                                         |
| **Global Evaluation**                       | - makes faculty to provide regular feedback  
- computerized versions facilitate completion and analysis | - content, scales and usefulness vary widely  
- Milestones Project will cause systems change                                                                                                                     |
| **Multisource “360” Evaluations**           | - solicits multiple viewpoints  
- validates team input  
- feedback culture  
- peer to peer  
- self-assessment  
- patient/parent feedback | - collection and interpretation challenging  
- may not be representative  
- confidentiality challenges  
- excess impact of limited interactions                                                                         |
Direct Observation
- supervising physician observes portion of exam and gives feedback
- standard checklist (mini-CEX) increases validity
- use of video may decrease impact on work flow
- time requirements to review and give feedback
- variability of patients and problems that present

Portfolio
- can include variety of work products and accomplishments
- promotes self-reflection
- examples of written reports
- reflections on experiences (field trips) or topics
- PowerPoints from talks
- time consuming to collect and review
- variable review standards across mentors

Swanwick (2010); Ende (2010)

3. Teaching Methods

Understand the strengths and weaknesses of various teaching methods

<table>
<thead>
<tr>
<th>Method</th>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
</table>
| Lecture       | - Economical  
- Large groups  
- Provide coverage of topic  
- Can bring new perspectives | - Individual needs not addressed  
- Can be too broad or too narrow  
- Passive learning  
- Can be boring |
| Small Group   | - Optimize student: teacher ratio  
- Can be modified for learners  
- Explores and integrate knowledge  
- Active participation  
- Face to face contact | - Additional faculty needed  
- Faculty skills may be lacking  
- Variability in learning experience across groups |
| Bedside Teaching | - Motivating to students  
- Demonstration/Observation  
- Modeling interpersonal skills  
- Role model of hidden curriculum | - Variability of patients available  
- Feeling intimidated/vulnerable  
- Time constraints  
- Risk of inappropriate actions |
| Simulation    | - Powerful learning tool  
- Safe, learner-centered  
- Deliberate practice of skills  
- Debriefing essential | - Can be expensive  
- Time-consuming  
- Question of transfer of skills  
- Risk of over-confidence |
Understand that individuals may learn more effectively with certain teaching methods (eg, reading, hearing, doing) than with others

Learning styles are a popular concept that intended to identify how people learn best. Although there is little evidence that personal learning preferences influence learning results, it is useful to employ multi-modal teaching methods. Neil Fleming's VARK model, developed in 1987, is one of the most popular versions. In Fleming's model, sometimes referred to “VARK learning style”, learners are identified by whether they have a preference for Visual learning (pictures, movies, diagrams), Auditory learning (music, discussion, lectures), Reading and writing (making lists, reading textbooks, taking notes), or Kinesthetic learning (movement, experiments, hands-on activities). http://www.vark-learn.com

Cognitive Load Theory (Mayer 2010) A cognitive theory of multimedia learning based on three main assumptions: there are two separate channels (auditory and visual) for processing information; there is limited channel capacity; and that learning is an active process of filtering, selecting, organizing and integrating information.

Active Learning. Active learning is generally defined as any instructional method that engages students in the learning process. Active learning requires students to do meaningful learning activities and think about what they are doing. http://cetl.ucdavis.edu/wp-content/uploads/2010/10/Active-learning.pdf

Skill acquisition requires practice, formative feedback and more practice. You don’t become a good skier by discussion, reading books or watching videos though you may be able to see what everyone else is doing wrong.

D4. Educational Planning

Understand the role of needs assessment in educational planning

Begin with the end in mind or as Yogi Berra said “If you don’t know where you are going you might not get there.”

Needs Assessment is a critical component to planning an educational activity and is a required component when planning a Continuing Medical Education activity (now known as CPD-Continuous Professional Development).

A Needs Assessment gathers data from a variety of sources in order to:

- Identify the current state (shortcomings) of the target group-- the LEARNING GAP
- Determine the type of gap- Knowledge, Skill or Attitude (KSA)
- Identify the type of deficit the activity will address – either competence, performance or patient outcomes.
- Explain how the educational needs were determined Identify and list the resources and references used – i.e., QI data, chart audits, physician surveys, clinical guidelines, competence guidelines, etc.
- Identify the desired outcomes and the level at which the target audience will perform after the activity
- Identify and list 3 or 4 learning objectives that will help close the “Learning Gap”

What learners know and how they currently practice

Learning or Performance GAP

What learners should know and how they should practice in order to meet standards
**Distinguish between goals and learning objectives** (Turner et al, 2008)

**Goal** - general a general statement that communicates the overall purpose of instruction. Goal statements tend to be broad and vague. An example of a goal would be, “The student will be familiar with the management of ADHD.” Rather like a zipcode gives you the general area.

**Objectives** - describe specific and measurable outcomes. An objective might be, “At the end of the session, the participant will be able to outline at least two options for the medical management of ADHD in adolescents.” Rather like a street address and you can tell if they arrived at the right house.

**Identify components of well-formulated learning objectives**

Stating learning objectives can be made easier by asking the questions:

What is the intended result of the instruction in terms of the learner?

What should the attendee be able to do as a result of the educational experience?

The objective should focus on an attendee outcome rather than only what will be taught.

When possible, include objectives from all three domains: **knowledge, skills, and attitudes**.

- **Knowledge** -- cognitive-knowing,
- **Skill** -- psychomotor-doing,
- **Attitudes** -- affective-feeling.

Identify both lower and higher level cognitive objectives, and place a greater emphasis on higher levels of cognitive learning (application, analysis, synthesis, and evaluation).

For learning objectives to be most effective, they should help in identifying appropriate learning activities and describe, clearly and precisely, what the learner will do to demonstrate achievement.

Use SPECIFIC ACTION VERBS. The choice of verbs depends on the type of material.

Strive to introduce the statement of objectives as:

"By attending this session, the learner (participant) will BE ABLE TO…"

**Knowledge (cognitive) Learning Objectives** (Bloom's Taxonomy, 1956)

<table>
<thead>
<tr>
<th>a. Information</th>
<th>Remembering learned material</th>
</tr>
</thead>
<tbody>
<tr>
<td>cite</td>
<td>indicate</td>
</tr>
<tr>
<td>define</td>
<td>list</td>
</tr>
<tr>
<td>describe</td>
<td>name</td>
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<tr>
<td></td>
<td>outline</td>
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<tr>
<td></td>
<td>state</td>
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<tr>
<td></td>
<td>update</td>
</tr>
<tr>
<td>b. Comprehension</td>
<td>Explaining material that has been learned</td>
</tr>
<tr>
<td>assess</td>
<td>differentiate</td>
</tr>
<tr>
<td>classify</td>
<td>discuss</td>
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<tr>
<td>demonstrate</td>
<td>distinguish</td>
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<td></td>
<td>explain</td>
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<tr>
<td></td>
<td>locate</td>
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<tr>
<td></td>
<td>interpret</td>
</tr>
<tr>
<td></td>
<td>review</td>
</tr>
<tr>
<td>c. Application</td>
<td>Using knowledge to find or develop new solutions</td>
</tr>
<tr>
<td>apply</td>
<td>develop</td>
</tr>
<tr>
<td>complete</td>
<td>examine</td>
</tr>
<tr>
<td>demonstrate</td>
<td>interpret</td>
</tr>
<tr>
<td></td>
<td>report</td>
</tr>
<tr>
<td></td>
<td>treat</td>
</tr>
<tr>
<td>d. Analysis</td>
<td>The ability to break down material into parts so that its organizational structure can be understood</td>
</tr>
<tr>
<td>analyze</td>
<td>compare</td>
</tr>
<tr>
<td>contrast</td>
<td>differentiate</td>
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<tr>
<td></td>
<td>measure</td>
</tr>
<tr>
<td></td>
<td>summarize</td>
</tr>
<tr>
<td>e. Synthesis</td>
<td>Using end results to develop general rules</td>
</tr>
<tr>
<td>combine</td>
<td>formulate</td>
</tr>
<tr>
<td>document</td>
<td>manage</td>
</tr>
<tr>
<td></td>
<td>plan</td>
</tr>
<tr>
<td></td>
<td>specify</td>
</tr>
<tr>
<td>f. Evaluation</td>
<td>Judging the value of something for a given purpose</td>
</tr>
<tr>
<td>appraise</td>
<td>choose</td>
</tr>
<tr>
<td>assess</td>
<td>critique</td>
</tr>
<tr>
<td></td>
<td>determine</td>
</tr>
<tr>
<td></td>
<td>recommend</td>
</tr>
</tbody>
</table>
Examples: After completing DB:PREP the participant will be able to:

- Identify predictors of successful adolescent functioning
- Distinguish between methods of toilet training based on social learning versus behavioral therapy
- Plan the evaluation for children with ADHD

Resources:

- Bloom’s Taxonomy according to Pirates of the Caribbean: http://www.youtube.com/watch?v=cT4Q2n8S4bk
- Verb Lists: http://www.csus.edu/uccs/training/online/design/bloom.doc

Skills (Psychomotor) Learning Objectives

- Psychomotor skills are often easier to write objectives for as they are observable.
- Use Application verbs (see above).

Consider using the mnemonic SMARTER to help formulate objectives:

S = Specific (objectives should have a specific, not broad, outcome)
M = Measurable
A = Action oriented
R = Relevant to the material being studied
T = Time limited or time specific
E = Can be Evaluated
R = Realistic

Example: After participation in the genetics seminar the resident will be able to demonstrate and write up the examination of a child for dysmorphic features utilizing the checklist provided at least once during their DBP rotation.

Competence Continuum of Learning a Skill: Tying Shoelaces

<table>
<thead>
<tr>
<th>LEVEL</th>
<th>EXAMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unconscious Incompetent</td>
<td>Doesn’t know can’t do</td>
</tr>
<tr>
<td></td>
<td>One year baby thinks shoelaces are for chewing on</td>
</tr>
<tr>
<td>Conscious Incompetent</td>
<td>Knows but can’t do</td>
</tr>
<tr>
<td></td>
<td>Three year old knows about shoelaces but can’t tie</td>
</tr>
<tr>
<td>Conscious Competent</td>
<td>Knows but has to think about doing it</td>
</tr>
<tr>
<td></td>
<td>Six year old can tie but has to think hard while doing it</td>
</tr>
<tr>
<td>Unconscious Competent</td>
<td>Knows but doesn’t have to think about it anymore</td>
</tr>
<tr>
<td></td>
<td>Sixteen year old can tie shoelaces while talking on phone</td>
</tr>
</tbody>
</table>

Usually attributed to Abraham Maslow
Attitudes (Affective) Learning Objectives

- Krathwohl’s Taxonomy for Objectives in the Affective Domain (1964)

<table>
<thead>
<tr>
<th>Level</th>
<th>Judgment</th>
<th>Examples of objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receiving (attending)</td>
<td>Learners are willing to receive the subject matter</td>
<td>The resident will listen attentively while the parent expresses his/her beliefs about the cause of child’s anxiety</td>
</tr>
<tr>
<td>Responding</td>
<td>Learners prefer the subject matter</td>
<td>The resident will answer a call for volunteers to work with community program</td>
</tr>
<tr>
<td>Valuing</td>
<td>Learners are committed to the subject matter</td>
<td>The physician will express appreciation for the contributions of all team members in the care of patients seen in clinic that day</td>
</tr>
<tr>
<td>Organization</td>
<td>Learners are forming a life philosophy</td>
<td>The resident will use empathic statements when working with medical students</td>
</tr>
<tr>
<td>Characterization by value or value complex</td>
<td>The learners’ values consistently guide their behaviors without conscious forethought</td>
<td>The physician will habitually abide by the standards outlined in the Hippocratic Oath</td>
</tr>
</tbody>
</table>

After Turner TL et al (2008) and Brightman HJ

Recognize the strengths and weaknesses of various educational outcome measures (eg, participant satisfaction, acquisition of knowledge and skills, behavioral change, patient outcomes)

Move from PROCESS (educational approaches) to PRODUCT (expected learning outcomes)

In 2013 the Accreditation Council for Graduate Medical Education (ACGME) launched the Next Accreditation System (NAS). The ACGME and specialty groups developed outcomes-based Milestones for resident performance within the six domains of clinical competence. The Milestones are competency-based developmental outcome expectations that can be demonstrated progressively by residents and fellows from the beginning of their education through graduation to the unsupervised practice of their specialty. The Milestones will also be used by the ACGME to demonstrate accountability of the effectiveness of graduate medical education. [www.acgme.org](http://www.acgme.org)

See GE Miller’s Assessment of Clinical Competence above
Outcomes-based Evaluations:
The Moore, Green, and Gallis model (2009) describes 7 Outcome Levels:

<table>
<thead>
<tr>
<th>Level</th>
<th>How Evaluated; examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>Participation</td>
</tr>
<tr>
<td></td>
<td>Sign in; registration</td>
</tr>
<tr>
<td>Level 2</td>
<td>Satisfaction</td>
</tr>
<tr>
<td></td>
<td>Standard activity evaluation form: level of satisfaction</td>
</tr>
<tr>
<td>Level 3A</td>
<td>Learning: Declarative Knowledge (Knows)</td>
</tr>
<tr>
<td></td>
<td>-Standard activity evaluation form: attendee opinion-were learning objectives met?</td>
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<tr>
<td></td>
<td>-Expanded activity evaluation form: Quiz at end asking for response to learning objectives e.g. list 3 stimulant medications.</td>
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<tr>
<td></td>
<td>-Written examinations e.g. Board examination</td>
</tr>
<tr>
<td>Level 3B</td>
<td>Learning: Procedural Knowledge (Knows How)</td>
</tr>
<tr>
<td></td>
<td>-Can explain knowledge/skill/attitude verbally or in written form</td>
</tr>
<tr>
<td>Level 4</td>
<td>Learning: Competence (Shows How)</td>
</tr>
<tr>
<td></td>
<td>-Can demonstrate in simulation or practice situation</td>
</tr>
<tr>
<td>Level 5</td>
<td>Performance (Does)</td>
</tr>
<tr>
<td></td>
<td>-Uses new knowledge/skill/attitude in practice (real-life)</td>
</tr>
<tr>
<td>Level 6</td>
<td>Patient Outcome</td>
</tr>
<tr>
<td></td>
<td>-Improvement in patient outcome measures</td>
</tr>
<tr>
<td></td>
<td>-example: 25% reduction in ADHD rating scale scores</td>
</tr>
<tr>
<td>Level 7</td>
<td>Community Health</td>
</tr>
<tr>
<td></td>
<td>-Improvement in systems (clinic, hospital, community)</td>
</tr>
<tr>
<td></td>
<td>-Impact beyond your own patients</td>
</tr>
<tr>
<td></td>
<td>-example: schools screen using Vanderbilt ADHD scale</td>
</tr>
</tbody>
</table>

Outcome Measures:

<table>
<thead>
<tr>
<th>Outcome Measure</th>
<th>Strengths/Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavior Change</td>
<td>-Educational activities should be transformative;</td>
</tr>
<tr>
<td></td>
<td>-If there is no change in behavior after an educational activity then at best, it</td>
</tr>
<tr>
<td></td>
<td>was entertainment; at worst, it was a waste of time.</td>
</tr>
<tr>
<td></td>
<td>-Assessing behavior change is difficult and expensive</td>
</tr>
<tr>
<td></td>
<td>-Behavior Change may be a planned change, an observed change or a reported change.</td>
</tr>
<tr>
<td></td>
<td>-Behavior Change that is unobserved may be the most important kind as it reflects</td>
</tr>
<tr>
<td></td>
<td>internalization of the knowledge, skill or attitude.</td>
</tr>
<tr>
<td>Sign-in sheet</td>
<td>-“Eighty percent of success is showing up”-Woody Allen</td>
</tr>
<tr>
<td></td>
<td>-Does not indicate learning, retention or change in performance (outcome)</td>
</tr>
<tr>
<td>Satisfaction Survey</td>
<td>-Attendee’s opinion whether met stated educational objectives (outcome)</td>
</tr>
<tr>
<td></td>
<td>-Can be done electronically</td>
</tr>
<tr>
<td></td>
<td>-Can provide feedback to faculty on content and delivery</td>
</tr>
<tr>
<td>Method</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Pre-test/post-test</td>
<td>Activity participants complete multiple choice questions concerning activity content before and immediately after activity.</td>
</tr>
<tr>
<td></td>
<td>- This method measures learning that occurred as a result of the activity.</td>
</tr>
<tr>
<td></td>
<td>- Strength is immediate feedback for participants and the faculty regarding what learning has occurred</td>
</tr>
<tr>
<td></td>
<td>- May not predict retention of the learning or change in performance.</td>
</tr>
<tr>
<td>Audience Response System</td>
<td>Electronic live audience response system (ARS) uses “clickers” or web-based smartphone application (app) such as Poll Everywhere (<a href="http://www.polleverywhere.com">www.polleverywhere.com</a>)</td>
</tr>
<tr>
<td></td>
<td>- Anonymity gives more accurate assessment of audience’s understanding but not of individual learner’s needs</td>
</tr>
<tr>
<td></td>
<td>- Can be combined with Case-based/Vignettes to tap into higher order skills</td>
</tr>
<tr>
<td></td>
<td>- Can be used as pre-test/post-test</td>
</tr>
<tr>
<td></td>
<td>- Data can be saved; used to revise educational activity or class progress</td>
</tr>
<tr>
<td>Post-activity assessment</td>
<td>Can be incorporated into standard activity evaluation form or separate quiz</td>
</tr>
<tr>
<td></td>
<td>- ex. Multiple choice from lecture; relevant Board question(s); factual short answer or reflection on lecture, activity or experience</td>
</tr>
<tr>
<td></td>
<td>- One Minute Paper- talk to peer or write down key point, questions that session raised, points that weren’t clear; can occur during or at end;</td>
</tr>
<tr>
<td></td>
<td>- Variable response and response quality</td>
</tr>
<tr>
<td></td>
<td>- Verbal responses invite more participation but hard to quantify impact</td>
</tr>
<tr>
<td></td>
<td>- Written response needs time to write, score and analyze</td>
</tr>
<tr>
<td></td>
<td>- Written responses can be collected into Portfolio for future mutual review with individual</td>
</tr>
<tr>
<td>Direct Observation</td>
<td>Direct observation of student for use and application of new skills.</td>
</tr>
<tr>
<td></td>
<td>- Checklist (Mini-CEX) standardizes observations</td>
</tr>
<tr>
<td></td>
<td>- Patient problems vary in clinic</td>
</tr>
<tr>
<td></td>
<td>- Variable quality of skill performance across learners</td>
</tr>
<tr>
<td></td>
<td>- Multiple observations of same individual increases validity</td>
</tr>
<tr>
<td></td>
<td>- Difficult to schedule observation and review</td>
</tr>
<tr>
<td></td>
<td>- Multiple agendas challenging to balance</td>
</tr>
<tr>
<td>Simulation/Standardized patient/parent</td>
<td>Skill acquisition monitoring (Formative) - safe environment to try it out, make mistakes, get feedback and review;</td>
</tr>
<tr>
<td></td>
<td>- Can be Competency Assessment (Summative); demonstrates meets a standard</td>
</tr>
<tr>
<td></td>
<td>- Complicated to arrange; expensive; time-consuming</td>
</tr>
<tr>
<td>Commitment to Change (CTC)</td>
<td>Participants are asked to write one to three changes that they plan to make a change as a result of our activities (Level 4 measurement).</td>
</tr>
<tr>
<td></td>
<td>- Evidence that stating in writing a commitment to change (CTC) predicts actual change in practice (Domino 2011);</td>
</tr>
<tr>
<td></td>
<td>- Measured effectiveness (performance in practice-Level 6) requires system for follow-up letter, fax-back or electronic survey and subsequent analysis</td>
</tr>
<tr>
<td></td>
<td>- Self-report measure but there is data supporting indicative of change.</td>
</tr>
<tr>
<td></td>
<td>- Requires ongoing contact with learner; needs administrative staff</td>
</tr>
</tbody>
</table>
Patient Outcome  
- If learners within the same system can use electronic health record to compare before/after educational activity  
- Quality improvement methodology can be used  
- Patient/Family surveys useful for professionalism/communication

| Portfolios | - If learners within your program/rotation can collect evidence of change (presentations; written reports; reflections; learning plans; literature searches; community activities; quality improvement projects, etc)  
- Encourages self-directed learning and “deep learning”  
- Hard to measure; hard to compare learners |
| **“Community” outcomes** | - Difficult to measure broad impact  
- Maintenance of Certification (MOC)  
- Participation in “Communities of Learning” might enable systems of measurement as use of Milestones expands to include “Expert” learners |

And lastly, a little *lagniappe* (**LAN-yap**), Louisiana French meaning a little something extra.

Here is my **favorite educational planning mnemonic**

**GNOME**, (Roberts K, 1996) is very helpful when planning educational experiences.

G = goals  
N = needs assessment  
O = objectives  
M = methods  
E = evaluation

You’ll have to go to the article for the full explanation. Enjoy teaching (and learning)!

**RESOURCES:**

6. MedEdPORTAL: Providing Online Resources To Advance Learning. Association of American Medical Colleges. [www.aamc.org/mededportal](http://www.aamc.org/mededportal); repository of peer-reviewed educational materials of all types e.g. curricula, workshops and presentations. Place to publish educational scholarship.
7. The Derek Bok Center for Teaching and Learning: [http://www.bokcenter.harvard.edu](http://www.bokcenter.harvard.edu)
8. Center for Teaching Excellence: Univ. of Medicine and Dentistry of New Jersey; [http://cte.umdNJ.edu](http://cte.umdNJ.edu)
10. BEME guides-Best Evidence Medical Education; e.g. BEME Guide no. 7; Systematic review of the literature on assessment, feedback and physicians’ clinical performance. *Medical Teacher*. 2006;28-117-128.

12. Bloom's Taxonomy according to the movie *Pirates of the Caribbean* [http://www.youtube.com/watch?v=cT4Q2n8S4bk](http://www.youtube.com/watch?v=cT4Q2n8S4bk)

References:
4. Dennick R (2012) Twelve tips for incorporating educational theory into teaching practices *Medical Teacher* 34: 618-624

26. Thistlethwaite JE, Davies D


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