

Assessing Student Learning Outcomes

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Assessing Learning Outcomes

I: The Mindset

- * What is assessment
- * The "Questions"

II: Purpose / Principles of Assessment

III. Foundations of Assessment

- * Taxonomy
- * Teaching to Standards
- * Mechanics

IV. Forms of Assessment

V. Wrap-Up

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Assessing Learning Outcomes

Learning Outcomes for this Workshop:

Cognitive: Apply the purpose and principles of assessment to your real-world, unique learning environment to enable the design of assessment strategies for all domains of learning

Psychomotor: Implement 1, active-learning "CAT"

Affective: Compose a 1-sentence summary which describes what you believe to be the overarching value inherent in the assessment of student learning outcomes

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Assessing Learning Outcomes

What Should Students Learn?

How would we Know?

“If I taught something and no one learned it...what happened?

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Assessing Learning Outcomes

- The assessment of learning outcomes requires a mindset change: movement from teaching to learning – and learner-centered assessment.
- Millard Fuller (Habitat for Humanity): “It is generally easier to get people to act their way into a new way of thinking than it is to get them to think their way into a new way of acting”

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Assessing Learning Outcomes

- Differentiation between levels of Learning Outcomes and Assessments:
 - Institution
 - Program
 - Course
 - Student
- This workshop focuses on Student Learning Outcomes and assessment

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Assessing Learning Outcomes

EXERCISE #1
Background Knowledge Probe
Defining Features

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Assessing Learning Outcomes

- What is assessment of Student Learning Outcomes?
 - Formalized processes to collect and analyze learning outcome data that will be evaluated to derive meaning and purposeful use of the data for learning enhancement.
 - Assessment is meaningless unless evaluation occurs

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Assessing Learning Outcomes

- **Student learning outcomes defined:**

A particular level of knowledge, skills and abilities that a student has attained at the end (or as a result) of his/her engagement in a particular set of collegiate experiences

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Assessing Learning Outcomes

- This, then, begs the questions:
 - How to make evaluation meaningful?
 - What outcome data should be assessed and evaluated?
- O'Banion's 2 questions related to teaching and learning are:
 - Does it (whatever happens in the classroom) enhance learning?
 - How do we know?

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Assessing Learning Outcomes

- II. Purpose and Principles
- Purpose of Assessment (Cross Papers)
 - Faculty acquire information to enhance teaching
 - Students gain insight into effectiveness of their own learning processes
 - Provide support for student learning
 - Provide a means for assessing strengths/weaknesses
 - Evaluate effectiveness of teaching/learning strategies
 - Show evidence of progress or areas for improvement
 - Provide support for formative approach to improve ¹¹

Assessing Learning Outcomes

- Principles of Assessment (Cross Papers)
 - Learner-centered (learning vs. teaching)
 - Assess what matters: common expectations (taxonomies)
 - Assess for improvement vs. accountability
 - Banta: "...if we undertake assessment just for the purpose of demonstrating accountability, we waste our time. We must do assessment in a way that we are getting information that faculty can actually use to improve what they're doing."
 - Assess for "broad capability" – WICS (Sternberg)

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- WICS model: Wisdom, Intelligence, and Creativity Synthesized
- When teachers teach only for facts, rather than understanding and wisdom, they teach students how to get out of date
- Examples of WICS assessment model: (handout)
 - Social Studies Science
 - English Mathematics

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- Research validates that teaching for analytical, creative and practical thinking, as well as for memory, boosts achievement on assessment that measures achievement broadly – across subject matter areas; i.e. assessment focused on higher level processes positively effects achievement and learning outcomes in all areas of learning regardless of topic or particular assessment methodology.

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Assessing Learning Outcomes

- III. Foundations of Assessment
 - Bloom's Taxonomy of Learning
 - "Backward Design"
 - Teaching to Standards
 - What / How of Assessment

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“THE PLAN”

One Possible Reason Why Things Aren't Going According to the Plan...Is That There Never Was A Plan!

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Foundations of Assessment

- Basic understanding of Educational Methodologies (building blocks) is important in defining learning outcomes and associated forms of assessment

- Can't build a house without a foundation
 - Definition of learning desired → choice of assessment method

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Foundations of Assessment

- Answer the Question: Students will...
 - Know, Think, Do
 - Attitude, Skills, Knowledge (ASK)
 - Cognitive, Affective, Psychomotor (CAP)
- How do you know? How will you measure? What will it look like?
- What assessments are appropriate and will provide evidence of learning

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Foundations of Assessment

- Learning Outcomes are statements of performance expectations:
 - Cognitive
 - Affective
 - Psychomotor

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Foundations of Assessment

- Domains: Learning (behavior change) occurs in three broad domains
 - Cognitive, Affective, Psychomotor (CAP)
- Within each domain are levels of learning that drive assessment

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Foundations of Assessment

- **Domain:** Cognitive
 - Knowledge: recalling facts
 - Comprehension: seeing relationships
 - Application: using information in new ways
 - Analysis: breaking information into parts
 - Synthesis: forming new information
 - Evaluation: judging value

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Foundations of Assessment

□ Domain: Psychomotor

- Perception: awareness of need
- Set: mental, physical emotional readiness to perform
- Guided Response: skill performed by imitation, trial and error
- Mechanism: habitual, skilled performance
- Complex Response: smooth, efficient, automatic
- Origination: adaptation to conditions

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Foundations of Assessment

□ Domain: Affective

- Receiving: willingness to hear
- Responding: willingness to react
- Valuing: demonstrating commitment
- Organization: establishing pervasive values
- Characterization: demonstrating characteristics of a unique individual

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EXERCISE #2 Cognitive Level Identification

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Foundations of Assessment

□ MAJOR POINTS:

- Students must not only demonstrate learning in all domains but must demonstrate progression within the domains
- You would never want a student to be “stuck” in lower levels and never progress
- Assessment strategies must be compatible with the level of learning desired

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Foundations of Assessment

□ Reflection: How can I structure and promote higher levels of learning for students?

- Answer: By ensuring a planned and structured learning environment with identified outcomes that address varying levels and demonstrations of learning

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Key Questions

□ Learning Outcomes:

- What is actual, highest level learning expected ?
- What will it “look like” when the student performs it?
- What are essential elements of performance necessary to demonstrate learning?
- What are the most effective ways for students to master these learning outcomes?
- How will I know the student has achieved?
- How can I assess it effectively?
- How can I document learning outcomes?

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Foundations of Assessment

- “Backward Design” (Tomlinson)
 - Imperative to define what students must know, think and do and understand as a result of instruction
 - Teaching must match these expectations
 - To teach for success, assessment must be aligned with knowledge, understanding and skill identified as learning outcomes: assessment is an integral part of curriculum design – not an afterthought.

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Foundations of Assessment

- Teaching to Standards (Santoyo)
 - Faculty must achieve consensus on the standards (outcomes) and expectations of student learning outcomes (domains, levels of learning, etc.)
 - Faculty must achieve consensus on the assessment strategies and methods to be used to effectively elicit outcome data as evidence of student learning
 - Examples of teaching to standards when no clear standards / assessment identified

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Foundations of Assessment

- Standard (outcome): The student will understand and use percents in a variety of situations
- Variety of assessments used:
 - What is 50% of 20?
 - What is 67% of 81
 - Shawn got 7 correct answers out of 10 possible on a science test. What percentage of questions did he answer correctly?

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Foundations of Assessment

- Assessments, cont'd:
 - J.J. Redick was on pace to set a college basketball record in career free throw percentage. Going into the NCAA tournament in 2004, he had made 97 of 104 free throw attempts. What percentage of free throws had he made?
 - J.J. Redick was on pace to set an NCAA record in career free throw percentage. Going into the NCAA tournament in 2004, he had made 97 of 104 free throw attempts. In the first tournament game, Redick missed his first five free throws. How far did his percentage drop from right before the tournament game to right after missing those free throws?

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Foundations of Assessment

- Assessments cont'd:
 - J.J. Redick and Chris Paul were competing for the best free throw percentage. Redick made 94 percent of his first 103 shots, whereas Paul made 47 of 51 shots.
 - (a) Which one had a better shooting percentage?
 - (b) In the next game, Redick made only 2 of 10 shots and Paul made 7 of 10 shots. What are their new overall shooting percentages? Who is the better shooter?
 - (c) Jason argues that if J.J. and Chris each made their next 10 shots, their shooting percentages would go up the same amount. Is this true? Why or why not?
 - (d) Describe in detail how you arrived at your answers.

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Foundations of Assessment

- CENTRAL POINT re: relationship b/w standards (outcomes) and assessment: standards are meaningless until you define how you will assess them
- Without dialogue, teachers may – and do – define standards (outcomes) according to personal level of expectations – which differ radically – and, therefore, teach to varying levels of mastery
- Assessment without consensus → poor outcomes³

Forms of Assessment

- Use of the appropriate assessment tool requires consideration of the purpose of assessment
 - Why are you assessing?
 - What do you want to assess?

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Forms of Assessment

- What and How of Assessment
 - Selection of the type of assessment depends on what faculty hope to learn from the assessment and what is being evaluated
 - Quizzes and exams: snapshots in time of recall ability and memory
 - Portfolios: longitudinal record of work and progress over time
 - Essays: ability to communicate in writing; analyze and solve problems; integrate ideas and information

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Forms of Assessment

- Although educators may denigrate the validity, reliability and usefulness of tests/quizzes to effectively evaluate learning, it is, however, the most dominant form of assessment
- Tests / exams / quizzes can be successful when questions focus and reflect learning outcomes and assess learning in different domains (Bloom)

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Forms of Assessment

- Example:
 - If students know they will be tested on facts, they will memorize
 - If students know they will be assessed for comprehension and application, they will study and learn differently
 - Creation of a table (Cross) that reveals percentage of time spent on concepts at various domain levels defines the nature of questions for assessment

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Assessing Learning Outcomes

Domain	Questioning Strategy	Concept 1	Concept 2	Concept 3
□ Knowledge	Recall information and facts	25%	10%	15%
□ Comprehension	Understand and interpret concepts	25%	35%	10%
□ Application	Employ concepts in new situations		15%	15%
□ Analysis	Classify information into components		20%	15%
□ Synthesis	Produce structures /patterns: create new meaning	30%		30%
□ Evaluation	Make judgments or valuations		30%	30%

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Assessing Learning Outcomes

- **Good Assessment Practices:**
 - Start with clear statements
 - Assess what is taught
 - Collect more than one kind of evidence
 - Make assignments and testing clear
 - Ensure that assignments and testing relate to learning objectives (matrices)
 - Score assignments fairly and consistently (rubrics)
 - Evaluate the outcomes of assessment efforts and revise strategies

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Assessing Learning Outcomes

Exercise #3 Knowledge and Understanding

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Assessing Learning Outcomes

□ Assessment Data:

- Quantitative: numbers indicate learning or achievement (points, grades)
- Qualitative: quality differences vs. amount; judgment-based – observation of performance, interviews, etc.

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Assessing Learning Outcomes

□ Assessment Score Interpretations:

- Norm-referenced: comparison of student performance to other people in a referenced population; relative standing vs. specific mastery (grading on the curve)
- Criterion-referenced: comparison to precise score that indicates mastery or competence (COMPASS, licensure scores, etc.)

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Assessing Learning Outcomes

□ Assessment Characteristics:

- Reliability: degree to which scores are consistent over repeated applications of the assessment
- Validity: ability of the assessment to measure what it purports to measure – measurement aligned with learning outcomes and free of bias

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Assessing Learning Outcomes

□ Assessment Types: (Earl and Tomlinson)

- Formative: ongoing, periodic assessment of learning – “assessment for learning”
- Summative: end-point assessment – “assessment of learning”
- Informative: “assessment as learning”
- Alternative: assessment of processes students use for learning: performance-based; reflective writing; portfolios, etc.

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Assessing Learning Outcomes

Formative Assessment:

“Assessment for learning” allows corrections to be made in the t/l process; evidence used to adapt teaching to meet learning needs

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Assessing Learning Outcomes

- Elements of Formative Assessment
 - Specific learning goals / outcomes clearly communicated to students
 - Specific criteria for meeting these goals / outcomes communicated via a rubric
 - Frequent interaction b/w faculty and students for clarification and reinforcement of expectations
 - Timely feedback re: assessment results
 - Willingness of faculty to modify curriculum and t/l strategies based on results

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Assessing Learning Outcomes

To be effective and provide maximum learning value, a variety of assessment techniques should be applied numerous times during a course.

Comprehensive assessment includes formative and summative strategies - with variety of methodologies. Students tend to excel at 1 or 2 methods – to the detriment of others who might excel at others. A variety ensures that all students have opportunity to demonstrate learning.

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Assessing Learning Outcomes

- Steps of Assessment: formative and/or summative
 - ID learning outcome to be assessed
 - Select assessment technique that will accurately and appropriately measure the outcome
 - Apply the assessment technique
 - Analyze the results of assessment
 - Share results with students and provide feedback
 - Respond to the results and effect changes

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Assessing Learning Outcomes

- Tools of Assessment:
 - Tests: quizzes, T/F, multiple choice, essays
 - Performance demonstrations
 - Portfolios
- Rubrics: eliminates ambiguity re: criteria to meet learning goals, expectations of performance and how evaluation will occur
- Qualitative and Quantitative rubrics acceptable

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Assessing Learning Outcomes

- Elements of Rubrics:
 - Identified levels of mastery (excellent, good, 5,4...)
 - Organizational groupings of skill sets: teamwork, problem-solving, etc.
 - Commentaries – description of elements to be identified in the work
 - Description of consequences

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Assessing Learning Outcomes

- **Benefits of Assessment: *Students***
 - Clear expectations upon which assessment is based helps students focus
 - Assessment motivates students
 - Feedback helps understand strengths and weaknesses (must be timely)

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Assessing Learning Outcomes

□ Benefits of Assessment: *Faculty*

- Assessment encourages faculty discussion on issues: what taught; why; standards; expectations
- Assessment links courses together to form coherent programs; how courses provide foundation for subsequent courses
- Assessment results are evidence of quality T/L

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Assessing Learning Outcomes

□ No one “right” or “best” way

□ Strategic Questions:

- *What do you want assessment to do?*
- *What questions do you want it to answer?*
- *What assessment method will answer these questions?*

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Reflection: Assessment

- Do outcomes determine what is assessed or does ease of assessment determine outcomes?
- Are achievements inferred from process completion or affirmed by assessment?
- Are assessment criteria and methods relevant and meaningful for outcomes being evaluated?
- How valid and reliable is the assessment of outcomes?
- Who assesses? Who evaluates? Are these assessors and evaluators selected for convenience or effectiveness?

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Reflection: Assimilation

- Does assessment occur on a regular, purposeful basis?
- How are assessment findings used for planning and decision making?
- How are assessment findings used to improve institutional, unit and program effectiveness?
- How are assessment findings used to improve teaching effectiveness and student learning?
- How are assessment findings used to reinforce personal commitment and enrich satisfaction?

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Reflection: Assimilation

- Is higher order thinking assessed when evaluating student learning?
- Should course outcomes, test questions, or assignments be revised?
- Does the assessment relate to and support course / program goals?
- Does the assessment support the development of stated learning outcomes and competencies?

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Reflection: Assimilation

- Are assessment methods appropriate to course competencies?
- Are learning outcomes clearly stated?
- Do assessment tools accurately reflect and assess identified learning outcomes?
- Are faculty in consensus as to assessment tools/methods and content so that learning outcomes for a given course can be assessed regardless of who has taught the course?
- Is there a common final exam, standardized assessment tool, portfolio, presentation, etc. that could provide across-course common outcomes assessment?

Assessing Learning Outcomes

□ Pat Cross “Basic Assumptions”

- The quality of student learning is directly, although not exclusively, related to the quality of teaching. Therefore, one of the most promising ways to improve learning is to improve teaching.
- To improve teaching, teachers need first to make their **goals and objectives explicit** and then to get specific, comprehensible **feedback** on the extent to which they are achieving those goals and objectives.
- To improve learning, students need to receive appropriate and focused feedback early and often; they also need to learn how to assess their own learning.

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Assessing Learning Outcomes

Exercise #4 Application and Performance

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Wrap-Up

- Questions
- Discussion

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Student Learning Outcomes

Tools for Future Reference

Associate various assessment methodologies
with the different levels

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Learning Process

- Let's play in the Domains vis-à-vis the writing of Learning Objectives:
 - **Cognitive: Knowing**
 - Knowledge: recalling facts
 - Comprehension: seeing relationships
 - Application: using knowledge
 - Analysis: breaking knowledge into parts
 - Synthesis: forming knowledge in new ways
 - Evaluation: judging knowledge's value and appropriateness

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Learning Process

Measurable Verbs: Knowledge

- | | |
|------------|-----------|
| □ Cite | □ Recite |
| □ Count | □ Repeat |
| □ Define | □ Tell |
| □ Identify | □ Write |
| □ Choose | □ Select |
| □ Match | □ Explain |

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Learning Process

Measurable Verbs: Comprehension

- Associate
- Compare
- Describe
- Discuss
- Contrast
- Outline
- Predict
- Report
- Restate
- Translate
- Summarize

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Learning Process

Measurable Verbs: Application

- Apply
- Classify
- Determine
- Illustrate
- Choose
- Interpret
- Restructure
- Solve
- Use
- Develop

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Learning Process

Measurable Verbs: Analysis

- Analyze
- Appraise
- Differentiate
- Distinguish
- Categorize
- Examine
- Inspect
- Question
- Summarize
- Infer

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Learning Process

Measurable Verbs: Synthesis

- Assemble
- Compose
- Create
- Formulate
- Design
- Integrate
- Organize
- Propose
- Synthesize
- Adapt

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Learning Process

Measurable Verbs: Evaluation

- Appraise
- Assess
- Critique
- Evaluate
- Conclude
- Criticize
- Judge
- Defend
- Revise
- Validate
- Prioritize
- Disprove

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Learning Process

Example: Cognitive

- Knowledge: List the components of a good objective
- Comprehension: Discuss the 3 Domains
- Application: Determine which of 3 objectives is appropriately stated
- Analysis: Classify 3 objectives by domain level
- Synthesis: Design objectives in all domains for a given learning scenario
- Evaluation: Revise these objectives for alternate scenario

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Learning Process

- Let's play in the Domains vis-à-vis the writing of Learning Objectives:
 - **Psychomotor: Skills**
 - Perception: awareness
 - Set: preparation to perform
 - Guided Response; demonstration trial/error
 - Mechanism: habitual skill development
 - Complex Response: smooth, efficient skill demo
 - Origination: adaptation of skill to conditions

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Learning Process

Measurable Verbs: Perception / Set

- | | |
|---------------|-------------|
| □ Perception: | □ Set: |
| ■ Listen | ■ Attend |
| ■ Observe | ■ Organize |
| ■ Ask | ■ Establish |

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Learning Process

Measurable Verbs: Guided Response / Mechanism

- | | |
|--------------------|--------------|
| □ Guided Response: | □ Mechanism: |
| ■ Perform | ■ Apply |
| ■ Demonstrate | ■ Use |
| ■ Establish | ■ Implement |

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Learning Process

Measurable Verbs: Complex Response / Origination

- Complex Response:
 - Integrate
 - Activate
 - Construct
- Origination
 - Adapt
 - Collaborate
 - Prioritize

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Learning Process

Example: Psychomotor

- Perception: Ask re: appropriate time to check BP
- Set: Organize materials to check BP
- Guided Response: Perform check with assistance of instructor
- Mechanism: Implement routine to check 10 patients without assistance
- Complex Response: Integrate BP checks w/ total assessment for a unit
- Origination: Adapt BP check for pt. with bilateral arm fractures

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Learning Process

- Let's play in the Domains vis-à-vis the writing of Learning Objectives:
 - **Affective: Valuing**
 - Receiving: willingness to hear
 - Responding: willingness to react
 - Valuing: commitment
 - Organization: establish pervasive values
 - Characterization: create "unique" person

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Learning Process

Measurable Verbs: Receiving

- Listen
- Perform
- Comply
- Assist
- Care
- Maintain

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Learning Process

Measurable Verbs: Responding

- Adapt
- Tolerate
- Accept
- Attend
- Interact
- Display

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Learning Process

Measurable Verbs: Valuing

- Cooperate
- Anticipate
- Consider
- Seek
- Influence
- Follow

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Learning Process

Measurable Verbs: Organization

- Respect
- Resolve
- Encourage
- Offer
- Establish
- Relate

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Learning Process

Measurable Verbs: Characterization

- Promote
- Share
- Motivate
- Initiate
- Educate
- Appreciate

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Learning Process

Example: Affective

- Receiving: Listen during class
- Responding: Display interest in using new material
- Valuing: Follow instruction re: new project
- Organization: Offer evaluation of the project
- Characterization: Promote behaviors consistent with new learning

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