GENERAL TYPES OF LEARNING OUTCOMES

Psychomotor – physical performance; may involve eye-hand coordination.
Examples: medical/nursing procedures; laboratory techniques; animal handling or grooming; assembling, operating, testing, or repairing machines or vehicles; singing; dancing; playing musical instruments; use of voice, face, and body in public speaking.

Affective – demonstration of appropriate emotions/affect.
Examples: demonstrating “good bedside manner”/empathy with patients; showing trustworthiness and concern for clients, customers, subordinates, or students; showing tolerance for differences; showing dynamism, relaxed confidence, conviction, audience responsiveness, etc., in public speaking.

Social – appropriate, productive interaction/behavior with other people.
Examples: cooperation and respect within a team; leadership when needed; assertive (not aggressive, passive, or passive-aggressive) behavior in dealing with conflict; negotiation and mediation skills.

Ethical – decision-making that takes into account the moral implications and repercussions (effects on other people, animals, environment) of each reasonable option.
Examples: medical/nursing decisions involving triage, transplants, withholding care, and prolonging life; lawyers’ decisions about whether and how to represent a client; managerial decisions involving social, economic, political, and/or legal trade-offs.

Cognitive – thinking about facts, terms, concepts, ideas, relationships, patterns, conclusions, etc.
Examples: knowledge/remembering (lowest level), comprehension/translation, application, analysis, synthesis/creating, evaluation (last four higher level).
Faculty group ratings for each combination of teaching format (approach) and objective/outcome

<table>
<thead>
<tr>
<th>Objective/Outcome</th>
<th>Lecture/Discussion</th>
<th>Lecture/Laboratory</th>
<th>Lecture/Skill-activity</th>
<th>Discussion/Lecture</th>
<th>Discussion/Skill-activity</th>
<th>Skill-activity</th>
<th>Seminar</th>
<th>Lab</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Substantive knowledge</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Factual knowledge</td>
<td>A</td>
<td>HA</td>
<td>A</td>
<td>LA</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Principles, theories</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>LA</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Applications</td>
<td>A</td>
<td>LA</td>
<td>A</td>
<td>A</td>
<td>HA</td>
<td>A</td>
<td>HA</td>
<td>A</td>
</tr>
<tr>
<td><strong>Lifelong learning</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Find, use resources</td>
<td>LA</td>
<td>LA</td>
<td>A</td>
<td>A</td>
<td>HA</td>
<td>A</td>
<td>H</td>
<td>A</td>
</tr>
<tr>
<td>Interest in learning</td>
<td>A</td>
<td>L</td>
<td>LA</td>
<td>A</td>
<td>HA</td>
<td>A</td>
<td>H</td>
<td>A</td>
</tr>
<tr>
<td><strong>Gen intellectual/academic skills</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication skills</td>
<td>LA</td>
<td>L</td>
<td>LA</td>
<td>HA</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td>Critical analysis</td>
<td>A</td>
<td>L</td>
<td>LA</td>
<td>HA</td>
<td>H</td>
<td>A</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td><strong>Specific skills/competencies</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prof skills/viewpoints</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>LA</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Team Skills</td>
<td>LA</td>
<td>LA</td>
<td>LA</td>
<td>LA</td>
<td>HA</td>
<td>A</td>
<td>A</td>
<td>HA</td>
</tr>
<tr>
<td>Creative capacities</td>
<td>L</td>
<td>L</td>
<td>A</td>
<td>A</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>LA</td>
</tr>
<tr>
<td><strong>Personal Development</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broad liberal education</td>
<td>A</td>
<td>L</td>
<td>LA</td>
<td>H</td>
<td>HA</td>
<td>H</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td>Values development</td>
<td>HA</td>
<td>L</td>
<td>LA</td>
<td>A</td>
<td>H</td>
<td>A</td>
<td>H</td>
<td>LA</td>
</tr>
</tbody>
</table>

**H** = High  
**A** = Average  
**L** = Low  
### Which Methods for Which Outcomes?

Place an X in the cell if the method in the far left is known to be effective in helping students achieve the learning outcome named at the top of the column. Assume the method is properly implemented and oriented towards that outcome.

<table>
<thead>
<tr>
<th>OUTCOME METHOD</th>
<th>Knowledge</th>
<th>Comprehension</th>
<th>Application</th>
<th>Analysis</th>
<th>Synthesis</th>
<th>Evaluation</th>
<th>Cognitive Develop’t</th>
<th>Shift in Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interactive Lecture (intermittent activities)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recitation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Directed Discussion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Writing/Speaking Exercises</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Classroom Assessment Tech.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group Work/Learning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student-Peer Feedback</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“Cookbook” Science Labs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Just-in-Time Teaching (JiTT)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Case Method</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inquiry-Based/Inquiry-Guided</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem-Based Learning (PBL)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project-Based Learning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role Plays and Simulations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service Learning with Reflection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Field Work/Clinicals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
TEACHING METHODS DEFINED

Lecture: Instructor presenting material and answering student questions that arise.

Interactive Lecture: Lecture with 2-to-15-minute breaks for student activities (e.g., answering objective item, problem solving, comparing notes, debriefing a mini-case, think-pair-share, small-group discussion) every 12-20 minutes

Recitation: Students answering knowledge and comprehension questions

Directed Discussion: Class discussion that follows a more or less orderly set of questions that the instructor has crafted to lead students to certain realizations or conclusions or to help them meet a specific student learning objective

Writing/Speaking Exercises: Any of dozens of informal assignments/activities, usually in-class and ungraded, to help students learn material, clarify their thinking, or make progress on a formal assignment

Classroom Assessment Techniques (CATs): Informal assignments/activities, usually in-class and ungraded, to inform the instructor how well students are mastering new material just presented or read; often overlap with writing/speaking exercises

Cooperative/Collaborative Learning: Students doing a learning activity and/or producing a product in small groups of two to six; must be carefully managed by the instructor

Student-Peer Feedback: Students giving one another feedback on a written or an orally presented product, usually a written draft or practice speech

“Cookbook” Science Labs: Pairs or triads of students conducting a traditional, often predictable experiment following cookbook-like procedures

Just-in-Time Teaching (JiTT): Instructor adjusts class activities and lectures to respond to the misconceptions revealed by students’ electronic responses to conceptual questions.

Case Method: Students applying course knowledge to devise one or more solutions/resolutions to problems/dilemmas presented in a realistic story or situation; an individual, small-group, or whole-class activity

Inquiry-Based/Inquiry-Guided Learning: Students learning or applying material in order to meet a challenge, such as to answer a question, to conduct an experiment, or to interpret data

Problem-Based Learning (PBL): Student groups conducting outside research on student-identified “learning issues” (unknowns) to devise one or more solutions/resolutions to “fuzzy” problems/dilemmas presented in a realistic story or situation

Project-Based Learning: Students (individuals or groups) applying course knowledge to produce something, such as a report (written or oral), process or product design, research or program proposal, computer code or simulation, etc.

Role Plays: Students acting out instructor-assigned roles, improvising the script, in a realistic, problematic social or interpersonal situation

Simulations (and Games): Students playing out, either face-to-face or on computer, a hypothetical social situation that abstracts key elements from reality

Service Learning with Reflection: Students learning from the experience of performing community service and systematically reflecting on it

Field Work/Clinicals: Students learning how to conduct research and/or make sound professional judgments in real-world situations
STUDENT LEARNING OUTCOMES DEFINED

Knowledge: to memorize or recognize facts and terms

Comprehension: to translate, restate in one’s own words

(Novel) Application: to utilize, apply, make useful

Analysis: to identify and examine components, compare and contrast, identify assumptions, deduce implications

Synthesis: to make connections, identify new relationships, design something new (new to students)

Evaluation: to make a judgment, assess validity, select and defend

Cognitive Development: to progress from dualism to multiplicity to relativism to a tentative commitment to the most worthy perspective available; to come to understand the nature of knowledge as inherently uncertain but subject to definite standards of comparison

Shift in Mental Models: to replace a faulty understanding of a phenomenon with the discipline’s more valid mental model

References


Effective Teaching Moves for Six Learning Outcomes
(Bloom’s Cognitive Operations)

KNOWLEDGE

For You to Do:
- Suggest prior knowledge to which students can link new and future information and knowledge.
- Chunk knowledge into coherent groups, categories, or themes.
- Share devices to improve memory such as mnemonic patterns, maps, charts, comparisons, groupings, highlighting of key words or first letters, visual images, and rhymes.
- Point out parts, main ideas, patterns, and relationships within sets of facts or information.

For Students to Do:
- Practice recalling and restating information.
- Practice recognizing or identifying information.
- Practice recalling and reproducing information.
- Practice restating concept definitions and principles.

COMPREHENSION

For You to Do:
- Outline new or upcoming material in simple form.
- Concept-map new or upcoming material.
- Explain with concrete examples, metaphors, questions and/or visual representations.

For Students to Do:
- Restate/paraphrase and summarize information or knowledge.
- Describe or explain phenomena or concepts using words different from those used in the initial teaching.
- Identify the correct meaning of concepts or terms.
- Add details or explanations to basic content.
- Relate new to previously learned content.
- Construct visual representations of main ideas (mind or concept maps, tables, flow charts, graphs, diagrams, or pictures).
APPLICATION

For You to Do:
- Give multiple examples of a phenomenon that are meaningful to students.
- Define the procedures for use, including the rules, principles, and steps.
- Provide the vocabulary and concepts related to procedures.
- Explain steps as they are applied.
- Define the contexts, problems, situations, or goals for which given procedures are appropriate.
- Explain the reasons that procedures work for different types of situations or goals.
- Assure students’ readiness by diagnosing and strengthening their command of related concepts, rules, and decision-making skills.
- Provide broad problem-solving methods and models.
- Begin with simple, highly structured problems, then gradually move to more complex, less structured ones.
- Use questions to guide student thinking about problem components, goals, and issues.
- Give students guidance in observing and gathering information, asking appropriate questions, and generating solutions.

For Students to Do:
- Generate new examples and non-examples.
- Paraphrase the procedures, principles, rules, and steps for using or applying the material.
- Practice applying the material to problems or situations to gain speed, consistency, and ease in following the problem-solving steps.
- Practice choosing the types of problem-solving strategies for different situations.
- Solve simple, structured problems, then complex, unstructured ones.
- Practice recognizing the correct use of procedures, principles, rules, and steps with routine problems, then complex ones.
- Demonstrate the correct use of procedures, principles, rules, and steps with routine problems, then complex ones.

ANALYSIS

For You to Do:
- Point out the important and the unimportant features or ideas.
- Point out examples and non-examples of a concept, highlighting similarities and differences.
- Give a wide range of examples, increasing their complexity over time.
- Emphasize the relationships among concepts.
- Explain different types of thinking strategies, including how to think open-mindedly, responsibly, and accurately.
- Emphasize persistence when answers are not apparent.
- Ask students questions that require their persistence in discovering and analyzing data or information.
- Encourage students to self-evaluate and reflect on their learning.
- Ask questions that make students explain why they are doing what they are doing.
- Explain and model how to conduct systematic inquiry, detect flaws and fallacies in thinking, and adjust patterns of thinking.
For Students to Do:

- Classify concepts, examples, or phenomena into correct categories.
- Summarize different types of thinking strategies.
- Use types of thinking strategies to analyze and evaluate their own thinking.
- Practice choosing the best type of thinking strategy to use in different real-world situations, and explaining why their choice is superior.
- Detect and identify flaws and fallacies in thinking.
- Identify and explain instances of open- and closed-mindedness.
- Identify and explain instances of responsible versus irresponsible and accurate versus inaccurate applications of thinking strategies.
- Answer questions that require persistence in discovering and/or analyzing data or information.

SYNTHESIS

For You to Do:

- Promote careful observation, analysis, description, and definition.
- Explain the process and methods of scientific inquiry.
- Explain and provide examples of (a) how to identify a research problem, (b) how to speculate about causes, (c) how to formulate testable hypotheses, and (d) how to identify and interpret results and consequences.
- Model inquiry and discovery processes.
- Encourage independent thinking and avoiding dead ends and simplistic answers.
- Show students examples of creativity and “thinking outside the box” to solve problems.
- Encourage students to take novel approaches to situations and problems.
- Explain phenomena using metaphors and analogies.
- Give students examples of reframing a problem—turning it upside down or inside out or changing perceptions about it.
- Explain and encourage brainstorming.
- Pose questions and problems with multiple good answers or solutions.
- Give students opportunities for ungraded creative performance and behavior.

For Students to Do:

- Explain their experiences with inquiry activities and the results.
- Resolve a situation or solve a problem that requires speculation, inquiry, and hypothesis formation.
- Resolve a situation or solve a problem requiring a novel approach.
- Design a research study to resolve conflicting finding.
- Write the limitations section of a research study.
- Write the conclusions section of a research study.
- Develop products or solutions to fit within particular functions and resources.
- Manipulate concrete data to solve challenging thinking situations.
- Practice reframing a problem—turning it upside down or inside out or changing perceptions about it.
- Explain phenomena using metaphors and analogies.
EVALUATION

For You to Do:
- Create conflict or perplexity by posing paradoxes, dilemmas, or other situations to challenge students’ concepts, beliefs, ideas, and attitudes.
- Explain how to recognize and generate proof, logic, argument, and criteria for judgments.
- Explain and show students the consequences of choices, actions, or behaviors.
- Provide relevant human or social models that portray the desired choices, actions, or behaviors.
- Explain with examples how factors—such as culture, experience, desires, interests, and passions, as well as systematic thinking—influence choice and interpretations.

For Students to Do:
- Evaluate the validity of given information, results, or conclusions.
- Draw inferences from observations and make predictions from limited information.
- Explain how they form new judgments and how and why their current judgments differ from their previous ones.
- Identify factors that influence choice and interpretations, such as culture, experience, desires, interests, and passions, as well as systematic thinking.
- Detect mistakes, false analogies, relevant versus irrelevant issues, contradictions, and faulty predictions.
- Critique a research study.
- Use research and analysis to devise the best available solutions to problems, and explain why they are the best.
- Choose among possible behaviors, perspectives, or approaches, and provide justifications for these choices.

Partially adapted from Goodson, L. (2005, March). Content, presentation and learning activities. Session presented at the annual meetings of the Southern Regional Faculty and Instructional Development Consortium, Lake Junaluska, NC with permission.