HOW LEARNING WORKS

7 Research-Based Principles *for* Smart Teaching

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APPENDIX D

What Are Learning Objectives and How Can We Use Them?

Learning objectives articulate the knowledge and skills you want students to acquire by the end of the course or after completing a particular assignment. There are numerous benefits to clearly stating your objectives, for both you and your students. First, learning objectives communicate your intentions to students, and they give students information to better direct their learning efforts and monitor their own progress. Objectives also provide you with a framework for selecting and organizing course content, and they can guide your decisions about appropriate assessment and evaluation methods. Finally, objectives provide a framework for selecting appropriate teaching and learning activities (Miller, 1987).

What makes a learning objective clear and helpful? There are four elements. First, learning objectives should be *student-centered*; for example, stated as "Students should be able to _____." Second, they should *break down the task* and focus on specific cognitive processes. Many activities that faculty believe require a single skill (for example, writing or problem solving) actually involve a synthesis of many component skills. To master these complex skills, students must practice and gain proficiency in the discrete component skills. For example, writing may involve identifying an

argument, enlisting appropriate evidence, organizing paragraphs, and so on, whereas problem solving may require defining the parameters of the problem, choosing appropriate formulas, and so on. Third, clear objectives should *use action verbs* to focus on concrete actions and behaviors that allow us to make student learning explicit, and communicate to students the kind of intellectual effort we expect of them. Furthermore, using action verbs reduces ambiguity in what it means to "understand." Finally, clear objectives should be *measurable.* We should be able to easily check (that is, assess) whether students have mastered a skill (for example, asking students to *state* a given theorem, *solve* a textbook problem, or *identify* the appropriate principle).

Determining the action verbs for learning objectives is made easier as a result of the work of Benjamin Bloom, who created a taxonomy of educational objectives (1956) that, with slight revision (Anderson & Krathwohl, 2001), is still used today by educators around the world. This taxonomy represents six levels of intellectual behavior, from the simple recall of facts to the creation of new knowledge. These levels, combined with verbs that represent the intellectual activity at each level, can help faculty members articulate their course objectives and hence focus both their and their students' attention and effort.

For examples of action verbs, see Table D.1, and for sample objectives, see Exhibit D.1.

Table D.1. Sample Verbs for Bloom's Taxonomy

Remember	Understand	Apply	Analyze	Evaluate	Create
Arrange	Associate	Calculate	Break down	Appraise	Assemble
Define	Classify	Construct	Combine	Argue	Build
Describe	Compare	Demonstrate	Compare	Assess	Compose
Duplicate	Contrast	Develop	Contrast	Check	Construct
Identify	Describe	Employ	Debate	Conclude	Design
Label	Differentiate	Estimate	Diagram	Critique	Formulate
List	Discuss	Examine	Examine	Detect	Generate
Locate	Exemplify	Execute	Experiment	Judge	Integrate
Name	Explain	Formulate	Extrapolate	Justify	Produce
Recall	Infer	Implement	Formulate	Monitor	Propose
Recite	Interpret	Modify	Illustrate	Rank	Rearrange
Recognize	Paraphrase	Sketch	Organize	Rate	Set up
Reproduce	Restate	Solve	Predict	Recommend	Transform
Select	Summarize	Use	Question	Select	
State	Translate			Test	
				Weigh	

Exhibit D.1. Sample Learning Objectives

By the end of the course students should be able to

- Articulate and debunk common myths about Mexican immigration (History)
- Discuss features and limitations of various sampling procedures and research methodologies (Statistics)
- Design an experimental study, carry out an appropriate statistical analysis of the data, and properly interpret and communicate the analyses (Decision Sciences)
- Analyze simple circuits that include resistors and capacitors (Engineering)
- Execute different choreographic styles (Dance)
- Sketch and/or prototype scenarios of use to bring opportunity areas to life (Design)
- Analyze any vocal music score and prepare the same score individually for any audition, rehearsal, or performance (Musical Theater)