

Learning Objectives



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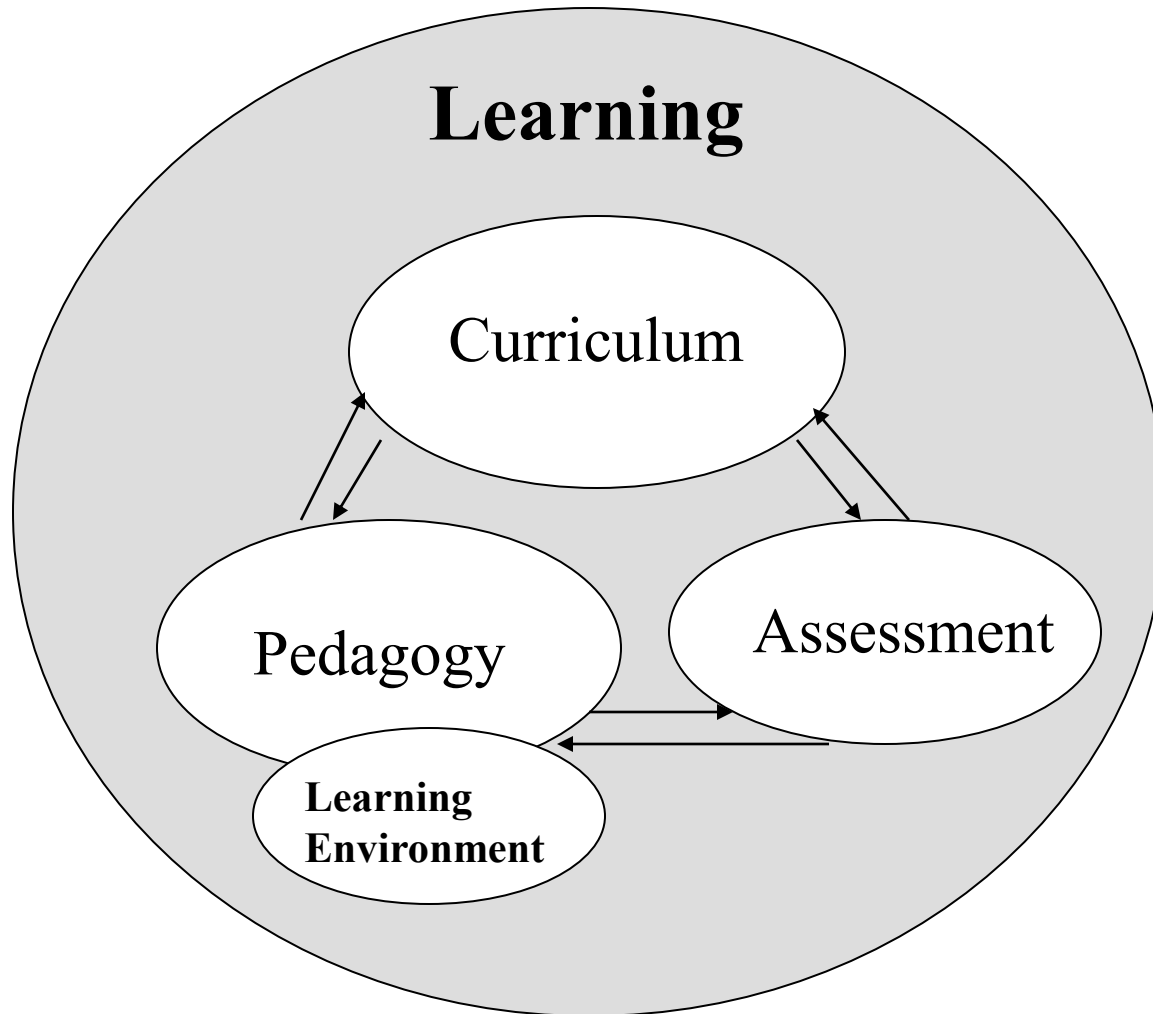
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Today's Learning Objectives

- As a result of today's session, you will be able to:
 - Describe ways to use objectives to improve learning
 - Write measurable learning objectives
 - Classify learning objectives
 - Appreciate the importance of communicating expectations to students

A Learning Framework





A Learning Design

(Wiggins & McTighe, 1998)





Related Terms

- Educational goals
- Educational aims
- Educational objectives
- Student learning outcomes
- Intended learning outcomes
- Learning targets
- Assessment targets



Why use learning objectives?

(Gronlund, 2000)

- To provide a focus for instruction
- To provide guidelines for learning
- To provide targets for assessment
- To communicate expectations to learners
- To convey instructional intent to others
- To provide for evaluation of instruction



Effective statements of learning objectives ...

- Focus on skills and abilities central to the discipline and based on professional standards
- Are general enough to capture important learning, but clear and specific enough to be measurable
- Focus on aspects of learning that will develop and endure but that can be assessed in some form now.



Effective statements of learning objectives ...

- Are student-focused
- Focus on the learning resulting from an activity, or course, or program
- Reflect the institution's mission and the values it represents
- Are in alignment at course, academic program, and institutional levels
- Focus on important, non-trivial aspects of learning that are credible to the public



Exercise:

- Use the 8 criteria on the previous slides to evaluate the learning objectives for your course.
- Give an example of an objective that meets most of the criteria.
- If you did not bring your objectives, use the samples that follow.

Evaluating
Learning
Objectives



Sample Learning Objectives

- Calculate lift and drag for blimps and airfoils.
- Use lift and drag calculations to evaluate aerodynamic vehicle performance.
- Design an internal structural configuration for simple trusses, beams, columns, and shafts in order to meet specified loading and deformation criteria.
- Explain at a level understandable by a non-technical person how jet propulsion works.
- Create models of inviscid, steady fluid flow over simple profiles and shapes.



Sample Learning Objectives (cont.)

- Explain the division of the resistance of a ship into its components.
- Distinguish emissions from combustion characteristics.
- Create interactive 3-D models of products and environments using VRML.
- Analyze and evaluate different planning techniques.
- Solve a system of linear equations using Gaussian elimination.
- Solve a system of linear equations using matrix inverse and matrix calculations.



Sample Learning Objectives (cont.)

- Draw conclusions about the solvability of a system of linear equations using determinant and rank of a matrix.
- Solve geometric problems concerning lines and planes using vectors.
- Choose a basis for the plane or the space suitable for a specific geometric problem.
- Judge if proposals to modification or proposals to new uses are a) possible, b) suitable, and c) outstanding.



Sample Learning Objectives (cont.)

- ❑ Conduct a heat balance over a conventional steam power plant.
- ❑ Analyze the relationships among the properties, structures, heat treatment, and load for metals.
- ❑ Be aware of typical properties and applications for common kinds of alloys.
- ❑ Analyze the factors which cause metals to disintegrate in humid environments.
- ❑ Use energy principles to determine the stress and deformation states of structures comprised of one-dimensional elements (beams, columns, and rods).



Writing Learning Objectives

(Mager, 1975)

- **The skill or behavior** -- what the learner will be able to know, do, have an opinion about, etc.
- **The condition(s)** -- the environment, tools, situation in which the learner will perform
- **The criteria** -- the limits or range of an acceptable response, *i.e.*, how well does the learner have to perform?



Exercise:

- Examine the learning objectives for your course.
- Give an example of the
 - Skill or behavior
 - Condition(s)
 - Criteria
- Identify the parts of an objective in the sample learning objective distributed to you.

Writing
Learning
Objectives



Classifying Learning Objectives with Bloom's Taxonomy

- **Cognitive domain**

(Bloom, Englehart, Furst, Hill, & Krathwohl, 1956)

- **Affective domain**

(Krathwohl, Bloom, & Masia, 1964)

- **Psychomotor domain**

(Simpson, 1972)



Taxonomy of Educational Objectives: Cognitive Domain

- Knowledge
- Comprehension
- Application
- Analysis
- Synthesis
- Evaluation
- Faktakunskaper
- Förståelse
- Tillämpning
- Analys
- Syntes
- Värdering



Sample Objectives in the Six Levels of the Cognitive Domain

- K: Identify and define a system, its behavior, and its elements. (CDIO 2.3.1)
- C: Explain the links between engineering theory and practice. (CDIO 2.5.4)
- A: Use prototypes and test articles in design development. (CDIO 4.4.1)
- A: Analyze the strengths and weaknesses of the design team. (CDIO 3.1.1)
- S: Formulate solutions to problems using creativity and good decision making skills. (CDIO 3.1.2)
- E: Appraise operational systems and recommend improvements. (CDIO 4.6.4)



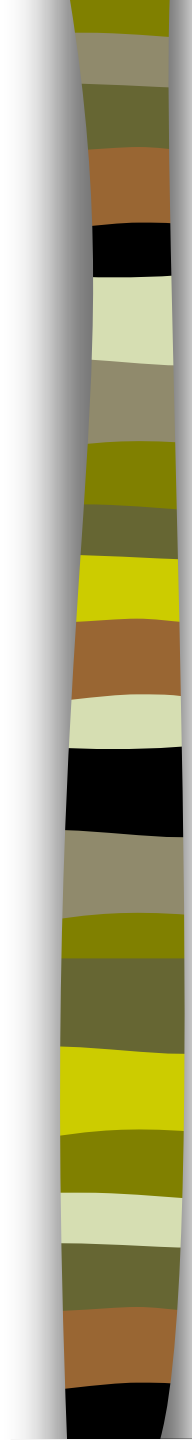
Taxonomy of Educational Objectives: *Affective Domain*

- Receiving
- Responding
- Valuing
- Organization
- Characterization by a Value System



Sample Objectives in the Affective Domain

- Recognize the ethical issues involved in using people in scientific experiments. (CDIO 2.2.3)
- Demonstrate the courage to act on principle despite adversity. (CDIO 2.5.1)
- Value the importance of hard work, intensity, and attention to detail. (CDIO 2.4.2)
- Commit to a personal program of lifelong learning and professional development. (CDIO 2.4.6)



Taxonomy of Educational Objectives: Psychomotor Domain

- Perception
- Set
- Guided Response
- Mechanism
- Complex Overt Response
- Adaptation
- Origination



Sample Objectives in the Psychomotor Domain

- Use appropriate nonverbal communications, *e.g.*, gestures, eye contact, poise. (CDIO 3.2.6)
- Create interactive 3-D models of products and environments using lightweight metals. (CDIO 1.3)
- Determine the stress and deformation states of structures using the appropriate physical tools and measures. (CDIO 1.3)



Use learning objectives to ...

- Communicate expectations to students at the start of a course or program (syllabus)
- Decide the best ways to teach the subject matter (teaching)
- Decide the best ways for students to acquire the intended knowledge, skills, and attitudes (learning)
- Plan ways for students to demonstrate their knowledge, skills, and attitudes (assessment)



Review

- Today's learning objectives:
 - Describe ways to use objectives to improve learning
 - Write measurable learning objectives
 - Classify learning objectives
 - Appreciate the importance of communicating expectations to students
- Classify each learning objective and identify the key parts of the objective.
- Estimate your progress toward achieving each of today's learning objectives.



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