Assessment and Learning Outcomes

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Overview

• What is “Assessment”?
• Learner-centered assessment in higher education - Recent developments
• Our focus today: Course assessment and its intended learning and achievement outcomes
  – Course assessment
  – Classroom assessment techniques
  – Learning assessment (Assessing students’ ability to think critically and solve problems)
• Using rubrics to provide feedback to students
• Reflecting on one’s teaching
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The Word “Assess”

• From the Latin verb “assidere” = “to sit by” (e.g., as an assessor or assistant-judge, originally in the context of taxes)
  – Hence “in assessment of learning” = “to sit with the learner”
  – Implies it is something that we do with and for students and not to students

• Assessment is the art and science of knowing what students know
  – It provides “evidence” of students’ knowledge, skills, and abilities
  – “Evidence” supports instructors’ inferences of what students know and can do (it guides and informs instruction)
One Definition of Assessment in Education

Assessment is the process of gathering and discussing information from multiple and diverse sources in order to develop a deep understanding of what students know, understand, and can do with their knowledge as a result of their educational experiences; the process culminates when assessment results are used to improve subsequent learning. (p. 8)

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Learner-centered Assessment in Higher Education

Three types, each with a very different focus:

- Institutional assessment
- Curricular and program assessment
- Course and learner-centered assessments
Institutional Assessment

- Call for accountability
  - In performance funding, some portion of the public monies earmarked for higher education are allocated to institutions based on institutional ability to meet performance targets like retention rates, graduation rates, or demonstrations of student learning.
  - Regional accreditation agencies require member institutions to conduct outcomes assessment in order to maintain their status as accredited institutions.
- Continuous improvement in higher education movement has paralleled W. E. Deming’s quality improvement movement (1986) with the latter’s core principle of gathering data for informed decision-making.
Institutional Assessment - A Few Recent Publications

  - “Clarifying the rationale for assessments and explaining how data will be used are fundamental prerequisites for progress in campus assessment practice.” Executive summary, p. 2.

Institutional Assessment - A Few Recent Publications

  – This paper ... Is designed to help readers distinguish between different types of assessments, understand various assessment tools, and learn how to develop effective assessments, analyze their results and appreciate the benefits of computerized assessments.”
  www.questionmark.com

  www.wascweb.org
A Quality Curriculum Requires ...

- Coherence in learning
- Synthesizing experiences
- Ongoing practice of learned skills
- Integrating education and experience
Guiding Principles for Curriculum Design and Assessment
A curriculum should ...

- Be founded on a carefully thought-out philosophy of education, clearly connected to the institution’s mission statement
- Articulate clear purposes and goals (what graduates should be able to know and do)
- Through its selection of course experiences and the specific quality and efficacy of these experiences, produce the stated intended learning and achievement outcomes for all students
- Be organized in a carefully ordered developmental sequence to form a coherent program of study based on the stated intended outcomes of both the curriculum and its constituent courses
- Include high-quality advising
- Include continuous assessment and improvement of quality
Curricular Outcome Goals and Objectives [Gardiner, 2007])

- Provide specific direction for the continuing monitoring - assessment and evaluation - of the actual outcomes that the curriculum produces

- Reduce the potential for untoward teaching to the test

- Obviate the “dumbing down” of curricula in response to increased student diversity by providing firm, clearly identified outcome standards and by requiring that the educational process will change in response to evolving student needs
Curricular Outcome Goals and Objectives [Gardiner, 2007])

• Guard against grade inflation and the consequent reduction in student (and perhaps faculty) quality of effort and the devaluation of degrees

• Enable a faculty to resist academic drift (to some other purposes or goals)

• Enable a faculty to deal effectively with conflict over curricular content (e.g., disputes related to departmental turf)

• Increase the perception of institutional openness, candor, and integrity among all of the institution’s academic members and stakeholders
Curriculum Assessment - A Few Recent Publications

- Curriculum and Assessment Resources
  http://www.nsba.org/sbot/toolkit/cnares.cfm


  http://www.thenationalacademy.org/readings/designing.html

  www.secsupport.org/pdf/curricassess.pdf
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Role of Course Assessment

• Equips students to learn and assess themselves beyond the immediate task

• Is constructively aligned with learning objectives and teaching and learning activities
  – Provides diagnosis
  – Sets standards
  – Evaluates progress
  – Communicates results
  – Motivates performance
Course Assessment: A Review of the Terminology

- **Learning outcomes** or learning intentions
  - What do we want students to know and be able to do as a result of this learning experience
- **Achievement criteria** or success criteria
  - What will students need to do in (or out of) class to achieve the learning outcomes/learning intentions, and to what standard?
- **Context** or task
  - What kind of learning experience will be appropriate to achieve the learning outcomes/learning intentions?

N.B.: Students’ understanding of the task and their achievement will be maximized if both the achievement criteria and the learning outcome(s) are shared with them prior to the lesson.
These criteria need to be the main focus of the feedback given to students.
Elements of the Course Assessment Process

Formulate statements of intended learning outcomes

Develop or select assessment measures

Create experiences leading to outcomes

Discuss and use assessment results to improve learning
Elements of the Course Assessment Process

Formulate statements of intended learning outcomes
  – Formulate learning goals and learning outcomes

Develop or select assessment measures
  – Direct assessments of student learning: projects, products, papers/theses, exhibitions, performances, case studies, clinical evaluations, portfolios, interviews, oral exams ...
    • These assessment activities, assigned by the instructor, yield comprehensive information for analyzing, discussing, and judging a learner’s performance of desired abilities and skills
  – Indirect assessment of student learning: surveys distributed to students
Create experiences leading to outcomes
  – The question to ask: How will this experience (e.g., service learning, field work, internship) help students achieve the intended learning outcome(s) of the course?

Discuss and use assessment results to improve learning
  – Effective feedback (Discussions between instructor and students)
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Classroom Assessment Techniques

What is classroom assessment?

- Systematic collection and analysis of information to improve educational practice
- Method for understanding student learning
- Based on the belief that the more you know about what your students know and how they learn, the better you can plan your learning activities and structure your teaching

Benefits of Classroom Assessment

• Helps clarify your teaching goals and what you want your students to learn

• Provides credible evidence regarding whether or not learning objectives have been achieved

• Provides specific feedback on what is working and what is not working

• Provides increased understanding about student learning in your classroom, allow to adapt your teaching as the course progresses
Three Examples of Very Simple Classroom Assessment Techniques

1. **One Minute paper**: Provides a quick and extremely simple way to collect written feedback on student learning.
   - The instructor stops class two or three minutes early and asks students to respond briefly to some variation on the following two questions: "What was the most important thing you learned during this class?" and "What important question remains unanswered?"
     Students write their responses on index cards or half-sheets of scrap paper and hand them in.
   - Instructor cumulates answers and provides feedback at the start of the next class.
Three Examples of Very Simple Classroom Assessment Techniques

2. **Muddiest Point**: Remarkably efficient, since it provides a high information return for a very low investment of time and energy.
   - The technique consists of asking students to jot down a quick response to one question: "What was the muddiest point in ........?" The focus of the Muddiest Point assessment might be a lecture, a discussion, a homework assignment, a play, or a film. Instructor cumulates answers and provides feedback during the next class.

3. **One sentence summary**: This simple technique challenges students to answer the questions "Who does what to whom, when, where, how, and why?" about a given topic, and then to synthesize those answers into a simple informative, grammatical, and long summary sentence.

(All three techniques provide useful cumulated information if you have a course wiki or blog)
A Few Classroom Assessment Techniques (CAT) in Business Management (Angelo & Cross) - Handouts

• Assessing prior knowledge, recall and understanding
  – Empty outlines CAT # 4, 7 138-141
• Assessing skill in analysis and critical thinking
  – Categorizing Grid CAT # 8, 7 160-163
  – Pro and Con grid CAT #10, 7 168-171
• Assessing skill in synthesis and creative thinking
  – Word Journal CAT #14, 7 188-192
• Assessing skill in problem-solving
  – Problem recognition tasks CAT # 19, 7 214-217
  – What’s the Principle CAT# 20, 7 218-221
• Assessing skill in application and performance
  – Direct paraphrasing CAT #23, 7 232-235
  – Application Cards CAT #24, 7 236-239
• Assessing students’ awareness of their attitudes and values
  – Profiles of Admirable individuals CAT # 30, 8 267-278
Selecting Classroom Assessment Techniques

A. Each participant:
  1. Consider ONE lesson (class) you are (or will) teach.
  2. Select the most appropriate CAT in relation to that particular lesson

B. Participants form small groups:
   Justify your selection to team members

C. General discussion: what have we learned?
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In Assessment of Learning, What, Exactly, Do We Want to Assess?

The answer: Critical thinking and problem solving

Ask yourself:

• Are your students familiar with the current problems that experts in your discipline are trying to solve?

• How do you involve students in trying to solve them?

• How do you help students develop skills in critical thinking?
Essential Components of Critical Thinking and Problem-solving

From the perspective of cognitive psychologists three types of knowledge interact in the process of thinking critically and solving ill-defined problems:

- **Declarative knowledge**: knowing the facts and concepts in the discipline
- **Procedural knowledge**: knowing how to reason, inquire, and present knowledge in the discipline
- **Metacognition**: cognitive control strategies such as setting goals, determining when additional information is needed, and assessing the fruitfulness of a line of inquiry (p. iv).

Types of Learning Assessments

- Standardized tests (summative)
- Alternative assessments (formative)
Summative and Formative Assessment

**Summative Assessment**
- Is carried out at intervals when achievement has to be summarized and reported
- Looks at past achievements
- Adds procedures or tests to existing work
- Involves only grading and feedback of grades to students
- Is separated from the act of teaching
- “Certifies” achievement

**Formative Assessment**
- Informal: carried out frequently and is planned at the same time as teaching
- Provides interactive and timely feedback and response: which leads to students recognizing the (learning) gap and closing it (it is forward-looking)
- In addition to feedback, includes self-monitoring
- Fosters life-long learning: It is empirically argued that it has the greatest impact on learning and achievement
Summative Assessment: Standardized Tests

- Administered and scored in a standard manner.
- Designed in such a way that the questions, conditions for administering, scoring procedures, and interpretations are consistent
  Examples:
  Multiple-choice and true-false questions (can be tested inexpensively and quickly by scoring special answer sheets by computer or via computer-adaptive testing.)

Short-answer or essay writing components that are assigned a score by independent evaluators.
(Can be graded by evaluators who use rubrics [rules or guidelines] and anchor papers [examples of papers for each possible score] to determine the grade to be given to a response.

- Are not prescriptive
- Give capsulated view of a student’s learning
- Used in conjunction with performance-based assessment

What Does the Research on Formative Assessment Tell Us?

- All students can succeed with appropriate guidance
- Learners’ perceptions and beliefs about their capacity to learn affects their achievement
- Development of self-assessment is vital
- Need to move from “evaluation” to assessment

Therefore ...
- Consider separating feedback from grading
- Focus on learning rather than just summative assessment
- Encourage reflective assessment with peers
Examples of Formative Assessment

A selective list ...

- Paper/thesis; written composition
- Project (including group projects [collaborative learning])
- Experiment
- Development of a product
- Performance
- Community-based experience (service learning)
- Exhibition
- Case study / Critical incident
- Clinical evaluation
- Oral exam or presentation
- Interview
- Comprehensive exam
- Portfolio
Questions to Ask When Developing an Effective “Assessment Task” (Huba & Freed, Fig. 7-12)

1. What declarative knowledge [knowing the facts and concepts in the discipline] do I expect students to draw upon in this task?

2. What procedural knowledge [knowing how to reason, inquire, and present knowledge in the discipline] do I expect students to use?

3. What metacognitive knowledge [e.g., setting goals, determining when additional information is needed, and assessing the fruitfulness of a line of inquiry] do I expect students to develop and reveal?
Questions to Ask When Developing an Effective “Assessment Task” (Huba & Freed, Fig. 7-12)

4. In what real-life settings do individuals use the knowledge that I identified and what ill-defined problems do they typically address?
5. For each ill-defined problem, what task(s) could I sketch out for students to complete?
6. Which task best exemplifies the characteristics of an exemplary assessment task (See previous slide)?
7. Which assessment format will work best for this task?
8. What criteria should my students and I use in shaping and critiquing student work?
9. In view of 8, and if necessary, how can I improve the task so as to reflect more clearly the characteristics of an exemplary assessment task?
Characteristics of an Exemplary “Assessment Task”  
(Huba & Freed, Fig. 7-11)

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Yields useful information to guide learning</td>
</tr>
<tr>
<td>Coherent</td>
<td>Is structured so that activities lead to desired performance product</td>
</tr>
<tr>
<td>Authentic</td>
<td>Addresses ill-defined problems/issues that are enduring or emerging</td>
</tr>
<tr>
<td>Rigorous</td>
<td>Requires use of declarative, procedural, and metacognitive knowledge</td>
</tr>
<tr>
<td>Engaging</td>
<td>Provokes student interest and persistence</td>
</tr>
<tr>
<td>Challenging</td>
<td>Provokes, as well as evaluates, student learning</td>
</tr>
<tr>
<td>Respectful</td>
<td>Allows students to reveal their uniqueness as learners</td>
</tr>
<tr>
<td>Responsive</td>
<td>Provides feedback to students leading to improvement</td>
</tr>
</tbody>
</table>
Teaching in the Context of Assessment – Depends on ...

- Providing effective feedback to students
- Encouraging students’ active involvement in their own learning
- Adjusting teaching to take account of the results of assessment
- Recognizing the profound influence of assessment on students’ motivation and engagement (both are crucial in learning)
- Ensuring that students assess themselves and understand how to improve
Learner-Centered Assessment
Implications for Classroom Practice

- Clarifying learning outcomes at the planning stage
- Sharing learning goals with students
- Asking appropriate and effective questions
- Encouraging students’ self-assessment against the learning outcomes
- Focusing oral and written feedback on the learning outcomes of lessons and tasks
- Organizing individual student target-setting that builds on previous achievement as well as aiming for the next level up
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Using Rubrics to Provide Feedback to Students

• “Rubric” defined:
  – “an authoritative rule ... an explanation or introductory commentary.” (Webster)

As applied to assessment of student work:
[a rubric] “explains to students the criteria against which their work will be judged (the “scoring rules”).
  It makes public key criteria that students can use in developing, revising, and judging their own work

• Elements of a good rubric
  – Levels of mastery
  – Dimensions of quality
  – Organizational groupings
  – Commentaries
Developing Useful Rubrics for Specific Assessments

<table>
<thead>
<tr>
<th><strong>Question</strong></th>
<th><strong>Action</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- What criteria or essential elements must be present in the student’s work to ensure that it is high in quality?</td>
<td>- Include these as rows in your rubric</td>
</tr>
<tr>
<td>- How many levels of achievement do I wish to illustrate for students?</td>
<td>- Include these as columns in your rubric and label them</td>
</tr>
<tr>
<td>For each criterion or essential element of quality, what is a clear description of performance at each achievement level?</td>
<td>- Include descriptions in the appropriate cells of the rubric</td>
</tr>
<tr>
<td>- What are the consequences of performing at each level of quality?</td>
<td>- Add descriptions of consequences to the commentaries in the rubric</td>
</tr>
<tr>
<td>- What rating scheme will I use in the rubric?</td>
<td>- Add this to the rubric in a way that fits in with your grading philosophy</td>
</tr>
<tr>
<td>- When I use the rubric, what aspects work well and what aspects need improvement?</td>
<td>- Revise the rubric accordingly</td>
</tr>
</tbody>
</table>
**Task-Related Rubrics for Specific Assessments**

- In addition to rubrics for high achievement, the following need to be asked as well:

<table>
<thead>
<tr>
<th>Question</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>What content must students master in order to complete the task well?</td>
<td>Develop criteria that reflect knowledge and/or use of content and add them to the rubric</td>
</tr>
<tr>
<td>Are there any important aspects of the task that are specific to the context in which the assessment is set?</td>
<td>Identify skills and abilities that are necessary in this context and add related criteria to the rubric</td>
</tr>
<tr>
<td>In the task, is the <em>process</em> of achieving the outcome as important as the outcome itself?</td>
<td>Include and describe criteria that reflect important aspects of the process</td>
</tr>
</tbody>
</table>
In Addition to Task-Related Rubrics: Teamwork Rubric

- Expectations of group members
- Participation of group members
- Level of involvement as team member
- Quality of work as team member
## Example of Team Rubrics
*(George Lucas Educational Foundation)*

<table>
<thead>
<tr>
<th>Team Rubrics</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooperative</td>
<td>Will not help -- ignores partner</td>
<td>Sometimes willing to help partner</td>
<td>Shares work when asked and listens to partner</td>
<td>Willingly explains things to partner and will use partner’s ideas</td>
</tr>
<tr>
<td>Creative</td>
<td>Never thinks of other ideas to solve a problem</td>
<td>Occasionally has a new idea, but little follow through</td>
<td>Has new ideas but will not share with others</td>
<td>Develops new ideas or ways of doing things. Products exceed requirements</td>
</tr>
<tr>
<td>On Task</td>
<td>Consistently talking to others in room, rarely works on task</td>
<td>Sometimes talks about unrelated subjects</td>
<td>Usually follows the task and talks only to partner</td>
<td>Always follows the steps of the task and sometimes goes beyond the concepts</td>
</tr>
<tr>
<td>Prepared</td>
<td>Never has supplies or willing to find proper place in task</td>
<td>Looks through to task to find place and sometimes borrows supplies</td>
<td>Uses daily wrap-up to find place in task</td>
<td>Arrives early for class and supplies are ready</td>
</tr>
<tr>
<td>Skillful</td>
<td>Makes no effort to learn new skills</td>
<td>Satisfies with answering questions, but no real understanding</td>
<td>Has general idea of task. Able to answer specific questions.</td>
<td>Has clear idea of task and its relationship to technology and education</td>
</tr>
</tbody>
</table>
Examples and Information about Rubrics

• Samples of rubrics (Huba & Freed - Figures 6-1, 6-2, 6-3, 6-12):
  – Rubric for formal oral communication (graduate Program
  – Rubric for engine design project
  – Rubric for economic bill writing project
  – Problem-Solving rubric

• The Rubricator (free membership for faculty [but reads the terms])
  http://www.rcampus.com/indexrubric.cfm
  Rubric Gallery (Accounting [7 samples], Business [28 samples], Finance [18 samples]
  http://www.rcampus.com/rubricshellec.cfm?mode=gallery&sms=publicrub&
  – Business rubrics (28 samples)

• Kathy Schrock’s guide for Educators: Assessment and rubric information
  http://school.discovery.com/schrockguide/assess.html
Ongoing Feedback: Quality Feedback Should ...

- Focus on the learning outcome of the task
- Occur as the students are learning
- Provide information on how and why the student understands or misunderstands
- Provides strategies to help the student to improve
- Assist the student to understand the goals of the learning
Effective Feedback Should ...

- Be specific - both positive and constructively critical
- Be descriptive rather than evaluative
- Be offered as soon as possible after the event
- Offer alternatives or ask the learner to do so
- Look forward to the specific next steps to improve performance
- Encourage and plan for opportunities for the feedback to be used as soon as possible
- Involve the learner wherever possible, to improve the chance of feedback being understood and acted upon
Training Students for Self-Assessment

In addition to providing rubrics for assessment ...

- Provide opportunities for self and peer assessment in each unit of work
- Create a supportive environment where students are willing to share and discuss features on their work in pairs, groups, and with the whole class
Developing a Supportive Classroom Environment

- Share models of work before the students begin a learning task to give them a clear idea of expectations
- Develop success criteria with students
- Reserve time periodically to discuss and reflect on the shared learning intentions in relation to the learning success criteria
Encouraging Active and Intentional Learning: From a Teaching to a Learning Environment

For the student
• Takes more responsibility for their learning
• Works independently without continually relying on instructor’s direction
• Looks at success criteria and talk about how and why they have met them

For the Instructor
• Lets go of his/her total control of the students’ learning
• Becomes better at sharing learning goals and success criteria
• Focuses on providing feedback to students and “looking ahead” techniques
• Spends less time recording assessment data by taking into account the students’ self and peer assessments
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Reflecting on One’s Teaching

- Students’ end of semester evaluation
- Informal mid-term formative evaluation
- A formative final evaluation
- Administrative evaluation
Students’ End of Semester Evaluations

• Not a formative process

• Too late for re-aligning the pace and the tasks

• Usually are “student satisfaction” responses rather than formative assessment of one’s learning and achievement outcomes.
Informal Mid-term Formative Evaluation

• Usually takes place between the 4th and the 6th week.

• Allows instructor to gather in writing information that can help in making immediate adjustments or corrections (For examples: See handouts)

• Benefits:
  – A perceptible improvement in the climate of your class
  – A strengthening of the ties between you and your students
  – An increase in the participation and motivation of the students
  – An improvement in the organization of the course (revised timetable, clearer instructions, improved rubrics ....)
  – An improvement in your teaching techniques
A Formative Final Evaluation:
A Good Way to Reflect about Your Teaching

- Prepared by instructor (not to be confused with teaching evaluations distributed at the end of the semester for administrative, summative purposes)
- Usually distributed a week before the end of the semester.
- Aspects most often evaluated are:
  - Competence of the professor
  - Structure of the course
  - Professor’s communication skills
  - Professor-student relations
  - Means of assessing students
  - Teaching materials
  - Laboratory or discussion sessions
  - General characteristics of the professor and the class

Pregent, Richard (2000). *Charting your course: How to teach more effectively.* Madison, Wisc.: Atwood (Fig. 9.2.1)
A Formative Final Evaluation:  
Another Option:  
Distribute a Student End-of-Semester Self-evaluation

Ask each student to respond in writing to the following questions:

• Has your approach to [course field/discipline] changed during this course or compared to previous courses? If yes, how?
• Have your attitudes or understanding about [course field/discipline] changed? If yes, how?
• How do you think that you performed in this course?
• What would you do differently if you had a chance to do this all over again?
• Describe the aspects of the course that you found most beneficial to your learning? Please be specific.
• What specific suggestions do you have for improving the course so as to facilitate or improve your learning? Please be specific.
• What else would you like to add?
Benefits of Student End-of-semester Self-evaluation

An analysis of the students comments about their learning and expectations provides:

– An opportunity to compare such comments with the course’s goals and learning objectives
– A clearer understanding of the diversity of learning styles and of student expectations
– An opportunity for improvement in the organization of the course (review of course’s pre-requisites, revised timetable to improve the pacing of the contents, improved rubrics, review of assessment tasks ....)
– An opportunity for improvement in your teaching techniques
– Together with what the students have done in the course (assessment tasks) contributes to the “culture of evidence” of student learning
Teaching Evaluations for Administrative Purposes

- Distributed at the end of the term
- In some cases, completed online
- Are mostly summative, to be used for promotion and tenure decisions
- Do not provide formative assessment of teaching and learning
  - Reflect students’ satisfaction with the course rather than assessment of their learning and their achievements
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