Beyond Teaching

Presented to
Committee on Academic Affairs

Levelle Burr-Alexander, Associate Director
K – 20 Partnerships
Center for Pre-College Programs (CPCP)

Howard Kimmel, Professor of Chemical Engineering, Retired (Semi)

Ronald Rockland, Prof. and Chair, Engineering Technology
New Jersey Institute of Technology
Agenda for Today

• Why is this presentation Needed - Issues

• Overview on Workshops for Writing Learning Outcomes

• Suggested Next Steps
Teaching and Learning

Comic:

[Characters A and B are shown.]

Character A: I taught stripe how to whistle.

Character B: I don't hear him whistling.

Character A: I said I taught him. I didn't say he learned it.
“How do I know that I know what I need to know to know what I am expected to know in order to know what I am supposed to know from having participated in this learning environment. . . .”

Our goal should not only be that professors think they teach well

The goal should be students are learning well

Quality Education MUST include both teaching and learning

How do we know that students are acquiring skills and knowledge we think they should have? – Learning Outcomes
Agenda of Workshops for Writing Learning Outcomes and Assessment (Three in past 7 months)

• Outcomes, Accreditation, Accountability

• Learning Outcomes
  – What are they?
  – How are they written?
  – Writing Outcomes.

• Examining Learning Outcomes from Existing Courses

• Future workshop (Fall, 2012) on Assessing Achievement of Learning Outcomes
  – Assessment and Evaluation.
Key Questions for Planning a Learning Experience for Students

• What do I expect students to learn?
  – Expectations

• What experiences will contribute to learning? What must I include?
  – Experiences

• How will I know that they’ve learned it? How do I design my assessment to measure the learning that I want?
  – Assessment
Assessment

- Educational assessment should involve gathering and evaluating data collected from learning activities or programs.
- “Assessment” is not simply a method to give students tests and assign them grades.
- Assessment of learning is one type of educational assessment designed to serve several related purposes including:
  - Provide direction for the processes of teaching and learning.
  - Provide feedback to students on their performance.
  - Provide feedback to teachers on instruction and curriculum.
  - Ensure that standards of progression are met.
Rationale for Assessment and Evaluation (A/E) Process

• You think you are a good teacher, but how do you know students are learning?
  – How effective are the courses you are teaching?

• How can a program assure that needed material is being understood by the students?

• How can a program or department maintain consistency among different people teaching the same course in different sections?

• How can a program, a department or a school be effective with accrediting agencies in this area?
Assessment and Evaluation isn’t just about Accreditation

It is also about effective teaching and learning
Student learning and assessment must be an on-going process

We have to make sure that students have the opportunities to process the learning that has taken place during an instructional session
Connecting Classroom Practice with Outcomes

• Facilitate an instructional shift in emphasis from teaching to learning (i.e., from teachers "covering material" to students "learning content and skills").

• Outcomes are meant to define what students know (content) and are able to do (process) in terms of measurable student behavior, at the end of the course or program.

• Assessment must measure student achievement of the skills and knowledge defined by the learning outcomes.
  – Evaluation determines if those outcomes are met.

• Outcomes do not mandate a particular curriculum, or textbook, and may be achieved in a variety of ways.
How Would the Use of Learning Outcomes Benefit the Students?

- Help students learn more effectively.
- Students will know exactly what they will be expected to learn in the course.
- Students will know exactly what they will have to do or produce to document their levels of learning.
- Students can more easily appreciate the significance and relevance of required homework, in-class activities, assignments, projects, etc.
How Would the Use of Learning Outcomes Benefit the Instructors?

• Help instructors know exactly what students are expected to learn in their own courses, as well as in courses taken previously, simultaneously, and subsequently.

• Help instructors design materials and experiences more effectively.

• Help instructors select appropriate teaching strategies.

• Help instructors assess student learning and effectiveness of their instruction and have more specific feedback about how best to improve that effectiveness for student and course perspective.

• Ensure that appropriate assessment strategies are employed.
  – E.g., Assist in writing exam questions based upon expected outcomes.
How Do We Assess?

- Written work
  - Lab reports, papers, copies of slide presentations
- Exams
- Observations
- Discussions & Reflection
- Projects

Assessment must do more than simply provide course grades.

Assessment must provide evidence of student achievement of skills and knowledge as a result of the learning experience provided by the instructor.
Levels of Outcomes

• Program Outcomes for Students
  – describe the essential knowledge, skills and attitudes required by graduates of the program.

• Course Learning Outcomes for Students
  – reflect what the faculty and the department collectively identify as the essential knowledge and skills required for students successfully completing the course.

• Learning Outcomes for Students
  – describe in detail the behaviors that students will be able to perform at the conclusion of a unit of instruction such as a class, and the conditions and criteria which determine the acceptable level of performance.
Process Flowchart (Continuous Program Improvement)
Comparing Accreditation Requirements

- Specifications of student learning.
- Opportunities for students to achieve those learning outcomes.
- Assessment of student learning.
- Use assessment data to make improvements in student learning. I.e., **Continuous Program Improvement**!

- Middle States deals with Institutional Level Learning Goals (defined for NJIT by the Program Assessment Committee) – **ABET deals with Student (Program) Outcomes**
Fundamentals Of Engineering Design
(How Not to Write Outcomes)

• Students are learning the principles of engineering design and the solution of open-ended problems.

• Students learn the dynamics of team effort, leadership, scheduling, cooperation, responsibility, conflict resolution.

• Modules teach the principles at an early stage of eng. with “hands on”, “real life” problems.

• Students are excited and intrigued by the eng. problems and are determined to complete the eng. program.

• Students learn from the modules and give faculty suggestions for curriculum reform.
Economics
(How Not to Write Outcomes)

• Students will maintain a portfolio of the work that they do in each of their basic social science courses (6 credits). The portfolio will present the following evidence:

1. that the student has engaged the field in which the course has been taken.

2. that the student can think critically about the course material, supporting arguments based on documented evidence.

3. that the student has written papers, drafting them before preparing final copies.

4. that the student has made oral presentations in class.

5. that the student has encountered global perspectives in the course content.
Relating Learning Outcomes to Student Work

- Created 11 learning outcomes for one of our courses, ECET 300 (Circuit Analysis: Transform Methods)
  - Then identified a related student work to provide assessment for each learning outcome

- Example
  - **Learning Outcome**: Demonstrate the proper use of MATLAB to perform data analysis and graphing to solve technical problems
  - **Student Work**: MATLAB assignment 2: graphing functions using MATLAB and analysis of data to justify solutions to problems.
Available Resources

• NJIT Library
  – Provides resources on writing learning outcomes and assessment plans.

• Video of our Workshop on Learning Outcomes
  – http://www.youtube.com/watch?v=UbEbhYnprbc

• Internet Resources for Higher Education Outcomes Assessment – NC State University
  – http://www2.acs.ncsu.edu/upa/assmt/resource.htm

• Learning Outcomes Assessment Planning Guide – Cal Poly
Next Steps

• Re-establish learning on the same level as teaching.
  
  – Require learning outcomes for all courses; e.g., specify learning outcomes in all course syllabi (Required by UCRC for all new courses)
  
  – Require common learning outcomes for all sections in a course.
  
  – Require that prerequisites mean more than just earning a grade in a previous course. Completing a prerequisite course should mean that students have acquired requisite skills and knowledge from that course (learning outcomes).
From Provost Memo of August 10, 2011

• Syllabus should include “description of the course assessment criteria, methodology for final grade determination, and the weight of each course component in determining the final grade.
  – Very few existing courses have appropriate (or any) learning outcomes

• Chairs and Deans should maintain electronic files of course syllabi from current and past semesters, and they are charged to assess the content and format of syllabi for quality and completeness. These syllabi should be available so that faculty, students and others can access them through the department web site.
  – Math and some NCE departments have them
## THE NJIT Integrated Assessment System

<table>
<thead>
<tr>
<th>Genre</th>
<th>Form</th>
<th>Assessment</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exams</td>
<td>iSkills</td>
<td>{Assessment of Student Learning Curricular Development Resource Allocation}</td>
<td>Info Literacy Instruction Strengthen GUR AACSB Accreditation</td>
</tr>
<tr>
<td></td>
<td>ETS Proficiency Profile</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ETS Major Field Test in Business</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surveys</td>
<td>Course Evaluation</td>
<td>{Curricula Development Resource Allocation Faculty Hiring Salary Increases}</td>
<td>Improve Instructional Ability</td>
</tr>
<tr>
<td></td>
<td>Graduating Students</td>
<td></td>
<td>Improve Campus Life</td>
</tr>
<tr>
<td></td>
<td>Alumni</td>
<td></td>
<td>Improve Educational Experience</td>
</tr>
<tr>
<td></td>
<td>Employers</td>
<td>{Assessment of Student Learning Curricular Development Resource Allocation}</td>
<td>Improve Student Work Preparedness</td>
</tr>
<tr>
<td></td>
<td>Intern Supervisors</td>
<td></td>
<td>Improve Student Work Preparedness</td>
</tr>
</tbody>
</table>

- This framework satisfied Middle States.
  - But to measure “student learning” one has to examine learning outcomes within each course
SUMMARY

• **HAVE**: Many excellent and effective teachers on the NJIT faculty.

• **NEED**: Effective student learners.

• **HOW**: Writing effective learning outcomes that specify expectations of students by faculty and NJIT.

Quality Education = Effective teaching + Effective learning
Ronald Rockland  
rockland@njit.edu

Howard Kimmel  
kimmel@adm.njit.edu

Levelle Burr-Alexander  
Burr-alexander@adm.njit.edu

Thanks!