PREPARING STUDENTS FOR THE COMPLEXITIES OF FUTURE EMPLOYMENT: LINKING LEARNING OUTCOMES, 21ST CENTURY COMPETENCIES AND THE GEOSCIENCES

Dave Gosselin¹, Karin Kirk ²,
and Cathy Manduca ²

1. Environmental Studies Program, University of Nebraska-Lincoln,
Lincoln, NE
2. Science Education Resource Center, Carleton College, Northfield, MN

Big Question: What End does Your Program have in mind for your students?

Your End defines what the student knows and is able to do when they complete your program and how well it prepares them for the workforce, graduate and professional studies, and/or life-long learning.

(Learning Outcomes)

Why plan with the end in mind?

Bottom Line:
By knowing where you intend to go, you increase the chances of you, your program, and your students getting there!!!!

Guides:
Instructional and Curriculum Planning – Important/value
Instructional Delivery
Instructional Effectiveness – focus and organize

Provides:
Learner with focus, expectation, and prioritization

What do they know?
Knowledge-Centered Outcomes
Facts, Concepts and Theories central to the discipline

What can they do?
Skill-Centered Outcomes
- Cognitive: Critical Thinking, Problem-solving, Computational Skills
- Technical: Data Collection Techniques, Measurement Techniques, Technology
- Interpersonal: Communication, Teamwork, Collaboration, Initiative and leadership

What personal qualities will they possess?
Value and Disposition Outcomes
- Open-Mindedness and Love of Knowledge
- Willingness to learn and modify perspectives
- Desire to develop personal interests
- Diligence and Integrity – Perseverance in one’s work habits; Pursue quality results
- Humble about one’s own importance
- Social Responsibility – Ethical awareness
- Appreciation for diversity

What are the Geoscience Occupations for which we are preparing our students?

Geoscientist
- Environmental Geology
- Earth's Atmosphere
- Earth's Interior
- Earth's Hydrosphere
- Earth's Biosphere
- Earth's Lithosphere

Geotechnical Engineer
- Soil and Rock Mechanics
- Foundation Engineering
- Earthquake Engineering

Geomatician
- Remote Sensing
- Geographic Information Systems
- Cartography

Geologist
- Lithospheric Processes
- Sedimentary Processes
- Mineralogy

What are the Geoscience Occupations for which we are preparing our students?

Geoscientist
- Environmental Geology
- Earth's Atmosphere
- Earth's Interior
- Earth's Hydrosphere
- Earth's Biosphere
- Earth's Lithosphere

Geotechnical Engineer
- Soil and Rock Mechanics
- Foundation Engineering
- Earthquake Engineering

Geomatician
- Remote Sensing
- Geographic Information Systems
- Cartography

Geologist
- Lithospheric Processes
- Sedimentary Processes
- Mineralogy
"The geosciences will continue to be a highly relevant discipline during this century, but its role has expanded. In the past, geosciences contributed to the advancement of society mostly through the exploration and exploitation of natural resources. Currently, the role of geosciences has expanded to include environmental issues. Thus, workforce development models need to adapt to the new demands. Geoscientists now need to be able to work in interdisciplinary teams, address issues at the systems level, be literate in issues related to finance, social sciences, and engineering. In addition, the workforce must be able to work in multicultural settings and demonstrate leadership skills."


Question: How do our programs meet the needs of sustainability professionals and/or support these types of programs?

- Life and Career Skills
  - Flexibility and Adaptability
  - Initiative and Self-Direction
  - Social and Cross-Cultural Skills
  - Productivity and Accountability
  - Leadership and Responsibility

- Learning and Innovation Skills
  - Creativity and Innovation
  - Critical Thinking and Problem Solving
  - Communication and Collaboration

- Soft Skills or Personal Competencies

For what are they being prepared?

Competencies

- are a way of talking about what helps people get results in their jobs.
- refer to skills or knowledge that lead to superior performance.
- provide a framework for distinguishing between poor performances through to exceptional performance.
- are not “fixed”—they can usually be developed with effort and support.

Modified from: http://www.carltonglobal.com/samplelesson_HR.pdf
For what are they being prepared?

Employer Expectations  
Provider Expectations

Data suggest there is a disconnect

Meet the Challenge
Talk with Colleagues

Resources to Meet the Challenge

Selected References
Include workforce reports, student preparation for the 21st Century workforce

http://serc.carleton.edu/integrate/workshops/workforce2013/references.html

Resources to Meet the Challenge

http://serc.carleton.edu/integrate/workshops/workforce2013/competencies_and_LO.html

Competencies and Learning Outcomes

- Competencies and learning outcomes are two related educational terms that can create confusion. Competencies and outcomes can be described as learning opportunities, and outcomes must be measurable. This document compares the concepts and the following: competencies and outcomes.
Resources to Meet the Challenge

http://serc.carleton.edu/integrate/workshops/workforce2013/LD_BP.html

Thank you!!

Questions?