Learning Outcomes Assessment – Setting and Measuring Goals
Steven Frank, USA
sfrank@nmsu.edu

ABET

• Accreditation Board for Engineering and Technology
ABET Nomenclature

• Educational Objectives
  – Things that graduates can accomplish within 3 to 5 years after graduation

• Learning Outcomes
  – Things that students can accomplish upon graduation

Learning Outcomes

• Must be based on ABET definitions, Title 3, outcomes a through k

• Outcomes should not replicate a-k exactly, but rather should correspond to each outcome
Learning Outcomes

– a) apply math, science & engineering
– b) design and conduct experiments
– c) design a system, component or process
– d) work on multi-disciplinary teams
– e) identify and solve engineering problems
– f) understand ethical and professional duties

– g) communicate effectively
– h) understand the broad impact of actions
– i) recognize the need for lifelong learning
– j) know contemporary issues
– k) use modern tools and techniques
Learning Outcomes

• Developed by program faculty with input from government and industry partners (Advisory Committee)

• Measured and tested at regular intervals with results being used to improve the program

Learning Outcomes

• The key to successful outcomes is the ability to directly measure results

• Measurements of outcomes should match predicted goals
Developing Learning Outcomes

• Example learning outcome
  – develop the ability to appropriately collect, analyze, interpret, and apply survey and survey-related data

Developing Learning Outcomes

• Example metric 1
  – 80% of SUR 222 (Plane Surveying) students will receive a grade of “B” or better on their contour map project.
Developing Learning Outcomes

• Example metric 2
  – 80% of SUR 451 (Advanced Survey Measurements, Analysis and Adjustment) students will receive a grade of “B” or better on their network analysis project.

Measuring Learning Outcomes

• Example measurement 1
  – 60% of students received a grade of “B” or better on their contour map

• Metric 1 goal was NOT achieved
  – Increase class and practicum time spent on working on contour maps
Measuring Learning Outcomes

• Example measurement 2
  – 87% of students received a grade of “B” or better on their network design projects

• Measurement 2 MEETS goal
  – Reassess metric to see if it is appropriate
Observations and conclusions

– Metrics and measurements need to be well documented and well explained for ABET evaluators (formal process)
– Not all measures need be made in surveying courses but getting those not invested in the program to cooperate is difficult to impossible

Observations and conclusions

– Lower level courses where poor students have not yet dropped from the program are poor choices
– NCEES licensing examination results are now being issued and can be used for measuring learning outcomes