

Program Educational Objectives and Outcomes: How to Design a Sustainable, Systematic Process for Continuous Improvement

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Abstract - ABET adopted recently two new criteria for evaluating engineering programs: Criterion 2 (Program Educational Objectives) and Criterion 3 (Program Outcomes). A systematic process must be in place to assess the achievement of both the program outcomes – before students graduate – and the program educational objectives – after graduates leave the program. This process needs to be ongoing to ensure the continuous improvement of each program. The workshop addresses the design and implementation of a sustainable, systematic process for defining and assessing program educational objectives and program outcomes to satisfy ABET EC 2000 requirements. Results from the successful implementation of such a process will be presented. The workshop format will combine direct instruction, individual practice, interaction among the participants, and discussion. Participants will have an opportunity to develop their own tools and processes that suit their specific program.

Index Terms – ABET, continuous improvement, accreditation, program outcomes, assessment.

WORKSHOP ACTIVITIES

Participants of the workshop will have an opportunity to:

1. Define program educational objectives and unique program outcomes (other than a – k) that address specific strengths of their programs. Program educational objectives are defined with input from all program constituents and describe the expected accomplishments of graduates during the first few years following graduation. Program outcomes, on the other hand, describe what students should be able to do by the time of graduation from the program.
2. Analyze outcomes into elements and define a set of specific skills for each element [1]. Write clear and measurable course learning objectives that incorporate these skills and create a plan for assessing each objective using graded student work.

3. Select outcome indicators and performance targets to quantify the achievement of each outcome.
4. Develop / adapt special rubrics to accurately assess student performance in each outcome, especially in those that involve soft skills (ex. teamwork, lifelong learning, contemporary issues, ethics, global and societal issues, communication, etc.).
5. Discuss course and curriculum design that address specific program outcomes and / or increase student achievement in critical areas [2] – [6].
6. Design / adapt a systematic process and a timeline for assessing program educational objectives and program outcomes on a regular basis with minimum faculty workload. An example of such a process for outcomes assessment is shown in Figure 1 [7].
7. Discuss challenges inherent in the implementation of a continuous improvement process and brainstorm ways to overcome challenges.

REFERENCES

- [1] Felder, R.M., Brent, R., Designing and teaching courses to satisfy the ABET Engineering Criteria, *ASEE Journal of Engineering Education*, 92, 1, 2003, pp. 7-25.
- [2] Mourtos, N.J., Defining, teaching, and assessing lifelong learning skills, *Proc., 33rd IEEE / ASEE Frontiers in Education Conf.*, Nov. 2003.
- [3] Mourtos, N.J., DeJong-Okamoto, N., and Rhee, J., Open-ended problem-solving skills in thermal-fluids engineering, *UICEE Global Journal of Engineering Education*, 8, 2, 2004, pp. 189-199.
- [4] Du, W.Y., Furman, B.J., Mourtos, N.J., On the ability to design engineering experiments. Lead paper, *Proc., 8th UICEE Conf. on Engineering Education*, Feb. 2005.
- [5] DeJong-Okamoto, N., Rhee, J., Mourtos, N.J., Incorporating the impact of engineering solutions on society into technical engineering courses. Invited Paper, *Global Journal of Engineering Education*, 9, 2, 2005.
- [6] Mourtos, N.J., Papadopoulos, P., Agrawal, P., A flexible, problem-based, integrated Aerospace Engineering curriculum, *Proc., 36th ASEE / IEEE Frontiers in Education Conf.*, Oct. 2006.
- [7] Mourtos, N.J., Engineering program outcomes and assessment: A sustainable, systematic process for continuous improvement, Lead paper, *Proc., 9th UICEE Conf. on Engineering Education*, Feb. 2006.

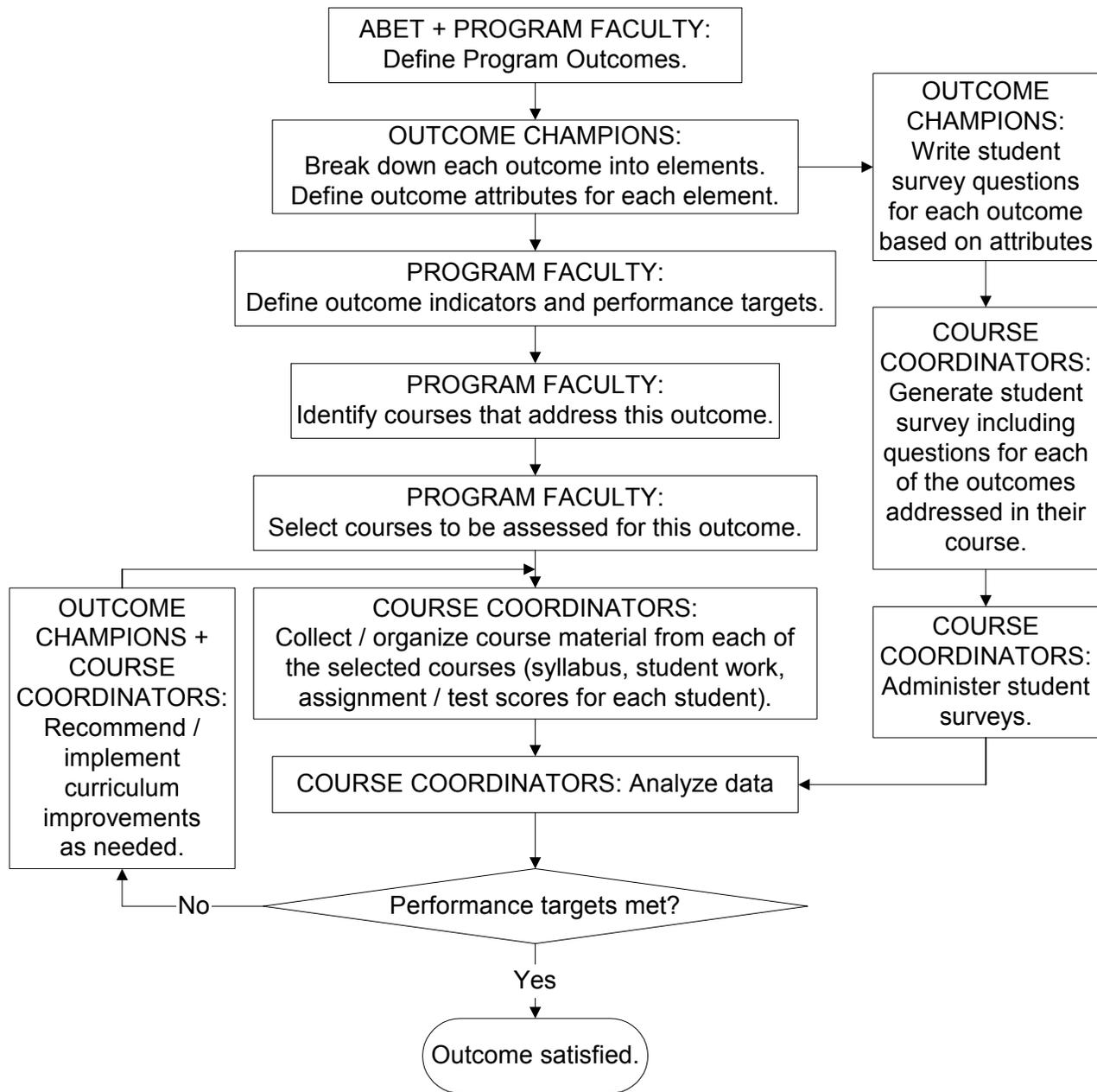


FIGURE 1
OUTCOME ASSESSMENT FLOWCHART