

**Annual Report on the Measurement of Student Learning Outcomes
For Ongoing Program Improvement**

**Prepared by
College of Engineering and Applied Sciences
Timothy Greene, Dean**

**Submitted to
Provost and V.P. for Academic Affairs**

August 1, 2007

1. Based on the evidence provided by the departments/units, evaluate unit-by-unit the implementation and use of assessment data.

At the undergraduate level, the Department of Industrial and Manufacturing Engineering (IME) is a leader in the implementation and use of assessment for program improvement. This is evidenced by the IME programs (Industrial Engineering, Engineering Graphics & Design Technology, Engineering Management Technology, and Manufacturing Engineering Technology) achieving re-accreditation by the accrediting body, ABET, following evaluation visit in Fall 2005. Another evidence in the use of assessment for program improvement by IME is a new curricular proposal for Industrial & Entrepreneurial Engineering that will be more current and relevant (with an emphasis on entrepreneurship) and flexible and attractive to students (students will be able to obtain a minor in any programs offered at WMU). The proposal has been approved by the College Curriculum Committee and the University Curriculum Committee for implementation in Fall 2007.

Also at the undergraduate level, all other departments are continuing to make progress in the implementation and use of assessment data for program improvement. The use of learning outcome assessment to improve programs is described in the reports prepared by the Aeronautical Engineering, Chemical Engineering, Civil Engineering, Computer Engineering, Construction Engineering, Electrical Engineering, Mechanical Engineering, and Paper Engineering programs during 2006-07 and submitted to the Engineering Accreditation Commission of ABET, in preparation for an Interim Visit in October 2007. The Computer Science-Theory & Analysis program completed an Interim Report to the Computing Accreditation Commission of ABET, addressing the use of assessment of educational objectives and learning outcomes to improve the program. ABET accreditation criteria are vigorous and are based on outcome assessment and use of assessment for continuous improvement.

Finally at the undergraduate level, the Department of Manufacturing Engineering has updated its assessment plan, and the assessment plan was approved by the University Assessment Steering Committee (UASC) in Fall Semester 2006. The department has begun initial implementation of outcome assessment in Spring Semester 2007. The Manufacturing Engineering program (MFE) is offered off-campus in collaboration with community colleges, and the department has only two full-time faculty members (the department chair plus one faculty at the Muskegon campus).

At the graduate level, assessment of learning outcomes has received less attention than the undergraduate programs for all departments with graduate programs.

2. Based on your evaluation of the departments/units, identify the specific steps the individual departments/units and the college will take to address:

- i. Full implementation of assessment plans

At the undergraduate level, programs undergoing accreditation Interim Visit and Interim Report will be involved in responding to the evaluation findings of the Program Audits in Fall Semester 2007. During the Spring Semester 2008, these programs will be involved in incorporating the latest outcome assessment results in the 30-day Responses to Draft Statements.

Also at the undergraduate level, the MFE program will be implementing the assessment plan which was approved by UASC in Fall Semester 2006.

At the graduate level, the Department of Computer Science has identified the task of revising the assessment plan for both the master's and doctoral programs for a workable plan to be in place by April 2008. Presently, the goals and learning outcomes are not well aligned nor are they measurable. Similarly for other departments, more formal assessment and documentation of graduate learning outcomes will need to be undertaken.

At the College level, faculty will review the learning outcomes of the graduate programs to identify possible common courses to improve efficiency of course delivery.

ii. Use of assessment data to improve programs

Since the assessment plan for the MFE program was approved by UASC in Fall Semester 2006, full implementation will begin in Fall Semester 2007. It is anticipated that the MFE faculty will be making the necessary changes to improve the relationship between direct measures, such as class activities/assignments, and learning outcomes.

The Department of Electrical and Computer Engineering has adopted the assessment strategies of collecting assessment data of four learning outcomes per year and use the assessment data to drive program improvements. It is anticipated that the ECE will be involved in collecting assessment data to improve student learning of these four outcomes.

At the college level, based on the assessment of several critical engineering science courses, Supplemental Instruction (SI) has been implemented in Spring Semester 2007 to improve student success in ECE 2100, "Circuit Analysis," ECE 2500, "Digital Logic," ME 2500, "Materials Science," ME 2560, "Statics," ME 2570, "Mechanics of Materials," and ME 2580, "Dynamics." Results on the impact of Supplemental Instruction on student learning in these courses are not yet available.

The College will continue to monitor student performance in critical engineering science courses and to implement corrective strategies, including Supplemental Instruction, to improve student learning.

Finally, in 2006-07, the College continued to use formative assessment to improve the activities of its retention program for first-time first-year students. In the process, a discrepancy in the Cognos reports, Grade Distribution by Course (Report 89) and Grade Distribution by Section (Report 150), has been identified and reported to the Office of Student Academic and Institutional Research. The College will continue in 2007-08 to use these reports to monitor the progress of the retention program, which is funded by a grant from the National Science Foundation.

3. Based on your evaluation of the departments' use of assessment data to improve programs, what measures will the college take in Academic Year 2007-2008 to foster a culture of assessment?

It is a goal of the College that one faculty member of each department and the chair attend one training event in 2007-08 to build expertise on outcome assessment at the department level. During 2006-07, the College has supported the following training:

- Dr. Parviz Merati, Chair of the Department of Mechanical and Aeronautical Engineering, and Dr. Peter Parker, Professor of Paper Engineering, Chemical Engineering, and Imaging, attended the ABET Summit on October 25, 2006. Following the training, Dr. Merati briefed the College Executive Committee on lessons learned, particularly the breakout session sponsored by the Engineering Accreditation Commission (EAC).
- Dr. John Gesink, Chair of the Department of Electrical and Computer Engineering, participated in an all-day ABET workshop presented by the Electrical and Computer Engineering Department Head Association, on March 16, 2007. Following the workshop, Dr. Gesink shared the lessons learned with ECE faculty members.
- Fred Sitkins participated in ABET Technology Accreditation Commission (TAC) program evaluator training on April 28 and 29, 2007.
- Dr. Timothy Greene, CEAS Dean, attended ABET evaluator training by Institute of Industrial Engineers on May 21. Dean Greene shared the lessons learned with the CEAS Executive Committee on June 1, 2007.
- Dr. Haluk Aktan, Chair of the Department of Civil and Construction Engineering, participated in program evaluator training sponsored by ABET in Denver, CO on June 9-10, 2007.
- Dr. Said AbuBakr attended sessions on outcome assessment using capstone design and on ABET accreditation at the 2007 Annual Conference of the American Society for Engineering Education on June 18-21.

It is the ultimate goal of the College that one faculty from each department become a trained ABET program evaluator. This will allow that faculty to serve as the department expert on assessment of student learning and to become familiar with the latest development and trend on outcome assessment as it relates to accreditation. Toward this goal, Dr. Said AbuBakr and Haluk Aktan have completed program evaluator training, and Dr. AbuBakr has his first ABET evaluation assignment as an observer to the Chemical Engineering program at the University of Minnesota on November 11-3. In addition, Drs. Raja Aravamuthan, Peter Parker, and Edmund Tsang have applied to ABET to become program evaluators. Current ABET program evaluators in the College include Mr. Fred Sitkins and Dr. Timothy Greene.

Attachments:

Appendix I: Department of Civil & Construction Engineering Assessment Impact Report
Appendix II: Department of Computer Science Assessment Impact Report
Appendix III: Department of Electrical & Computer Engineering Assessment Impact Report
Appendix IV: Department of Industrial & Manufacturing Engineering Assessment Impact Report
Appendix V: Department of Manufacturing Engineering Assessment Impact Report
Appendix VI: Department of Mechanical & Aeronautical Engineering Assessment Impact Report
Appendix VII: Department of Paper Engineering, Chemical Engineering, & Imaging Assessment Impact Report