

## **The Impact of Assessment on a Small Nuclear Engineering Technology Program**

**By**

**Jerome J Davis, Mitty C. Plummer, Charles C. Bittle**

**University of North Texas**

### **I. Introduction.**

In the year 2000, the Technology Accreditation Commission (TAC) of the Accreditation Board for Engineering and Technology (ABET) modified the criteria<sup>1</sup> for accreditation of engineering technology programs. The shift was away from a large number of specific criteria to a more generalized outcomes based criteria in which the programs were allowed to state their own desired outcomes and develop methods for continuously measuring the extent to which these outcomes were being met. Each program had to develop and implement a plan for measuring attainment of program objectives and methods for assessing results to make program improvement. This paper is based on the experience in this process of the University of North Texas (UNT) Nuclear Engineering Technology (NUET) program.

The NUET program was started in 1990 for delivery to the Comanche Peak Steam Electric Station. In part, this program was responsible for converting a Department of Industrial Technology to a Department of Engineering Technology. A new department chair, who had some experience with an ABET accredited program, was hired in 1993 to seek accreditation of all UNT programs (Manufacturing, Electronics, and Nuclear). All programs were initially accredited in 1996 under the old proscriptive criteria.

The NUET program is funded entirely by the utility and no state funds are involved. The NUET program is considered as part of the "College Program" by the utility. The UNT part of the College Program is to deliver the upper division courses at the plant. The program has been visited three times (the initial visit, a focused interim visit, and a re-accreditation visit in 2002). The 2002 visit was based on the old criteria also. The lower division courses are delivered by a local community college. Further, the students take full advantage of correspondence and internet courses to fulfill the humanities requirements.

The program faculty consists of a full time lecturer and a part time director. Adjunct professors are hired for specialty courses outside the areas of expertise of the lecturer and director. The student body typically has 40 to 50 students in courses in the program.

## II. Response to ABET Identified Program Weaknesses and Concerns.

The 2002 visit was the last year for evaluation under the old criteria and noted the degree of preparation for implementing the new criteria. A number of department wide initiatives were undertaken to address the institutional weaknesses that included preparation for continuing assessment.

An early activity was to revamp the departmental charter to assure that it was carefully aligned with the college and university goals. The departmental objectives were then the basis for program objectives.

Program outcomes and objectives were then written for each course. Each course syllabus was then modified to fit appropriate objectives and labeled to show relationship to the program and departmental outcomes and objectives.

This work was done in a series of departmental meetings in which each program worked out its own modified paper work using templates provided by the department. All of this work was then assembled into large notebooks which represents the department's continuous assessment plan.

## III. Selection of Assessment Methods.

At this stage of the process a genuine disagreement over which methods, or tools, should be used to assess the program. The faculty members who had education backgrounds advocated that all available methods should be used. The faculty who had engineering backgrounds felt that the number of assessment tools should be minimized. Either approach could be correct in that the TAC of ABET criteria requires only that multiple means should be used in assessment. The NUET program selected the following seven feedback sources:

- A. Student feedback by surveys
- B. Faculty feedback based on grades
- C. Results of students taking the Fundamentals of Engineering Examination
- D. Feedback from the Industrial Advisory Board
- E. Graduating student exit interviews
- F. Employer satisfaction surveys
- G. Graduate satisfaction surveys

In the author's opinion, the feedback from the Fundamentals of Engineering Exam should be excluded because no student of the NUET program has ever taken the examination. There is a commitment to encourage students to take the exam, however.

## IV. Incorporating the feedback into assessment processes.

The department has solicited assistance from the university's Planning and Institutional Research operation in the data reduction process. The university maintains a database of the location of graduates and, when known, their employers. The operation also has a substantial data analysis capability. At this writing, no data has been submitted for reduction. The earliest likely date for such a submittal is May 2005.

## V. Changes to the NUET Program Based on TAC visitor comments.

Several changes in the approach to the program have been undertaken as a result of comments from the ABET visitor. The first comment was that the students could use a broader perspective than that provided by the lecturer alone from whom they had received the bulk of their instruction. In response to that comment four operational changes were made:

- A. The director began teaching more nuclear courses
- B. The program bought a series of lectures on disk by Greg Moses of University of Wisconsin
- C. The program enrolled two students in the Radioactive Waste Course developed by Sheldon Landsberger at the University of Texas in Austin. This excellent course was available by internet.
- D. The University of North Texas Nuclear Engineering Technology Program entered into a consortium with the Nuclear Science program at the University of Texas to exchange nuclear courses.

## VI. Conclusions.

In this program, the work of developing and implementing a continuous improvement process has not yet resulted in significant changes to the program. It appears that the time spent on this endeavor would have been better spent in making direct, though possibly undirected, improvements to individual courses.

The direct changes resulting from response to ABET observations are agreed to be of value. This source of feedback alone might be just enough in small programs in a state of continuous improvement.

## VII. References.

1. *Criteria For Accrediting Engineering Technology Programs*, Effective for Evaluations During the 2004-2005 Accreditation Cycle. ABET, Inc., 111 Market Place, Suite 1050, Baltimore, MD 21202

## Author Biographies.

JEROME J. DAVIS is a lecturer in Nuclear Engineering Technology at the University of North Texas. He is a Registered PE in Illinois and Wisconsin. He has 14 years of nuclear power industry experience. He is a member of the American Nuclear Society and the American Society of Mechanical Engineers. His NS and MS degrees are in Nuclear Engineering from the University of Wisconsin.

MITTY C. PLUMMER is an associate professor at the University of North Texas since 1992. He earned his BSEE, MENE, and PhD from Texas A&M. He worked in a variety of industrial positions for 22 years before joining UNT.

CHARLES C. BITTLE has been a Lecturer at the University of North Texas since 1997. He earned his B.S.E.E. at Lamar State School of Technology in 1960 and his M.S.E.T. at the University of North Texas in 2000. Mr. Bittle served in the U.S. Federal Service for 32 years