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Guest Editorial

The mandate for outcomes assessment of technological programs is an international phenomenon as reflected in accreditation standards and mutual recognition agreements such as the Washington, Dublin and Sydney Accords. Outcomes assessment is the educational equivalent of industry's concept of quality assurance and the processes are, indeed, parallel. However, I believe in many cases the enthusiasm for the outcomes assessment process exceeds the maturity of the processes which are actually implemented and make up educational quality assurance. When selecting articles for this special issue on assessment, I tried to choose those that I believed addressed the international scope of quality assurance and some of the important elements of robust outcomes assessment process.

As an example of the international commitment to quality assurance of technical programs, the article by Liu *et al*., describes the emergence of an accreditation system in Taiwan. This article describes the educational system and how the accreditation system has evolved and the impact it has had on policy decisions.

The role of constituents is an integral part of any quality assurance process. It is important to understand what the needs are of those who have an interest in the success of the program and to systematically and substantively involve them in the determination of program educational objectives* Estes, *et al*., describe an assessment model from constituent input through program improvement. How constituents are involved and how the data are used to develop and evaluate the program are highlighted.

Two articles address a number of basic issues related to the assessment of program outcomes†. Yamayee and Albright present a program assessment cycle and discuss the important distinction between direct and indirect measures. They also give examples of performance criteria for program outcomes and the use of course embedded assessments. This article provides an excellent overview of the assessment of program outcomes with some helpful examples. Shay *et al*., stress the importance of developing efficient processes through understanding how the curriculum is mapped to the outcomes and making a purposeful decision about where the assessment data should be collected. This addresses a common mistake that many programs make by creating huge data collection systems requiring all faculty to collect data in every class for every student.

Four other articles are more focused on specific outcomes or assessment processes. Reid and Cooney discuss the use of rubrics for the assessment of non-technical skills. They provide examples and describe characteristics of rubrics and their multiple uses. Flateby and Fehr describe the use of an on-line software tool that has evolved into a structure to evaluate student writing consistently across multiple faculty. The tool includes peer review and has the capability of determining both cognitive levels and the quality of the writing. Lifelong learning is the focus of the article by Riley and Claris. They review the various definitions of lifelong learning and address the challenges of developing lifelong learning capacities. Ten practical ways engineering programs can promote the development of lifelong learning are outlined as well as examples of assessment tools which can be used including standardized instruments, rubrics, portfolios and others. They discuss the use of blogs as a way of providing evidence and documentation of the capacity for lifelong learning. LeFevre *et al*., discuss the use to the Fundamental of Engineering (FE) exam as a tool to assess specific student learning outcomes. Although I generally caution faculty to be sure that the underlying constructs of any given standardized exam is consistent with their desired outcomes, the FE exam is well suited for some of the outcomes desired for technical professionals. The article includes examples of different types of analysis of results which provides flexibility for its users.

The issue of using students as peer reviewers for the purpose of program assessment is often discussed and discounted as a means of data collection. Marin-Garcia, *et al*., provide new insights as they discuss their research on looking at the reliability of peer-assessment as compared to that of faculty assessment with the goal of improving the inclusion of students in the assessment process. The article describes their methodology and the multiple considerations that should be made when considering the use of peer assessment.

The quality and scope of these articles provide evidence that substantial gains are being made in the development of robust program assessment processes. Tools are being developed and tested, outcomes are being defined and systematically collected, constituents are involved in meaningful ways, and data are being used to improve technical education. It is important that those of us involved in technical education document what we are doing and create a community of educators who are committed to the quality assurance of our programs. These authors are making an important contribution to this effort.

Gloria M. Rogers, Ph.D.

* Attributes which describe the career accomplishments that the program is preparing graduates to achieve.

† What students are expected to know and be able to do by the time of graduation.

Gloria Rogers is currently the Associate Executive Director, Professional Services at ABET, Inc. the international accreditation agency for educational programs in applied science, computing, engineering and technology. Rogers has organized ten national symposia, 'Best Assessment Processes,' that have been attended by over 2000 educators from 400 institutions around the world. In addition, she has authored over 30 assessment-related articles, given over 70 invited presentations at national/international conferences and facilitated workshops/seminars at over 80 institutions. In 2006 she delivered the first week-long Institute for the Development of Excellence in Assessment Leadership (IDEAL) which has now trained 142 assessment leaders in assessment, change management and facilitation principles. In addition to her local and national involvement in assessment and educational reform, she has given invited presentations and workshops in twenty-one countries around the world including a Fulbright Senior Scholar assignment in Lima, Peru. She serves on advisory committees for the National Science Foundation, American Association of Colleges and Universities, and the Southern Association of Colleges and Schools and has been the guest editor of a special issue of the International Journal of Engineering Education.