

## **Beyond Accreditations – Institutionalizing Continuous Improvement Across Campus**

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### **Abstract**

Ever since the approval of the new Accreditation Board for Engineering and Technology (ABET) Engineering Criteria (EC 2000) on November 2, 1996, educational institutions across the United States have had to assess their undergraduate engineering programs focusing on continuous improvement. The University of Puerto Rico at Mayaguez (UPRM) undertook steps fully four years prior to the actual site visit in November 2002. The experience gained, in outcomes assessment and in the development of assessment instruments, was subsequently utilized as a springboard towards successful institutional reaccreditation, and thereafter, in the establishment of a permanent office to propel and sustain the institutionalization of continuous improvement across all academic and administrative units on campus. The paper will discuss what has been done, and what needs to be done, including challenges along the way.

### **Keywords**

Accreditations, continuous improvement, assessment

### **Objective**

The objective of this paper is to demonstrate how the experience gained in the process of preparing for reaccreditation of engineering programs, as well as for subsequent institutional reaccreditation, has helped in institutionalizing the spirit of continuous improvement. More specifically, illustration of concrete steps that have been taken to revise, develop, and implement assessment plans across all administrative and service units, and academic programs at UPRM.

### **1. Introduction**

The University of Puerto Rico at Mayaguez (UPRM) is one of the 11 campuses of the University of Puerto Rico System. The UPR System is a public institution, which was created by the Puerto Rico Legislative Assembly on March 12, 1903. It collectively enrolls about 65,000 students. The Mayaguez Campus (UPRM) is a land grant institution that began in 1911 with the College of Agricultural Sciences. Subsequently, other colleges were added as follows: College of Engineering (1913), College of Arts & Sciences (1943), and the College of Business (1970). As of the first semester 2005, the student body consisted of 11,258 undergraduate and 1,080 graduate students. Approximately 40 percent of these

students were in the College of Engineering, and of which, 35 percent were females, which was one of the highest in engineering among U.S. institutions.

The UPRM recently went through three very successful accreditation processes, such as ABET's EC 2000 for engineering programs, the Middle States Commission on Higher Education (MSCHE), and the National League for Nursing Accreditation Commission (NLNAC). Two accreditation processes, the National Council for Accreditation of Teacher Education (NCATE) and the Association to Advance the Collegiate Schools of Business (AACSB) are currently in the pipeline and are being actively pursued. Assessment has become a key methodology for measuring outcomes for an institution, program, course, or any service, which is offered by an academic institution of higher education. The intent of assessment is continuous improvement, which drives quality. Continuous improvement is at the core of ISO 9001 Standards used by the private sector. Universities depend on external accreditations for assuring quality. The new outcomes-based criteria, whether ABET's EC 2000, or MSCHE's Standards of Excellence, require that these processes be eventually internalized by an institution.

## **2. The EC 2000 Experience**

ABET's EC 2000 was designed to employ the philosophy and practice of continuous quality improvement to engineering programs. Engineering Criteria 2000 call for each engineering programs to identify its constituencies and, based upon their feedback, to formulate the services that each program will provide. Therefore, in the College of Engineering at the University of Puerto Rico at Mayagüez, the first step was the development of program educational objectives – statements describing expected achievements of graduates in the early years of their careers after graduation as a result of their educational preparation (ABET, 2003). Usually, educational objectives are expectations of graduates' performance after they have left the school and been in the workforce for three to five years. Subsequently, the second step required the more specific definition of program outcomes – skills, knowledge and behavior that would be expected of students at the time of their graduation. All this required considerable time and effort, not only to clearly define the program educational objectives and program outcomes, but also to develop proper continuous assessment methods and tools, the documentation, the processes, and the necessary culture and philosophy changes that would be introduced as a consequence of the cyclical processes.

At UPRM, we realized the significance of EC 2000 early on and undertook planning and organizational steps fully four years prior to the actual site visit ([www.abet.uprm.edu](http://www.abet.uprm.edu)). All six of our undergraduate programs in civil, chemical, mechanical, electrical, computer, and industrial engineering were evaluated during November 2002 and reaccredited. A highlighting comment in the final report stated that “The institution's systematic and innovative effort to introduce the culture of outcomes-based assessment to the College of Engineering community is especially noteworthy.” The entire EC 2000 experience at UPRM is described in detail by Sharma et al., (2004).

## **3. System for the Evaluation of Education (SEED)**

Inherent to the ABET accreditation efforts was the establishment of a permanent office within the College of Engineering, called the System for the Evaluation of Education (SEED) in mid-year 2001, with the goal of developing assessing strategies for the undergraduate engineering programs ([ing.uprm.edu/SEED.php](http://ing.uprm.edu/SEED.php)).

The principal goals of this office were to:

- Establish and facilitate a strategy for continuous evaluation of engineering programs and student learning outcomes assessment.
- Coordinate with engineering departments and accreditation committees (ABET's EC2000 and the Middle States Commission on Higher Education) the College of Engineering's activities regarding accreditation processes, including their implementation strategies.
- Assess outcomes of the College of Engineering's Strategic Plan.
- Become the College of Engineering's repository of assessment strategies, assessment instruments, and assessment results and reports.
- Coordinate professional development activities concerning evaluation and assessment.
- Disseminate assessment results to stakeholders and decision-makers for their information and decision-making.

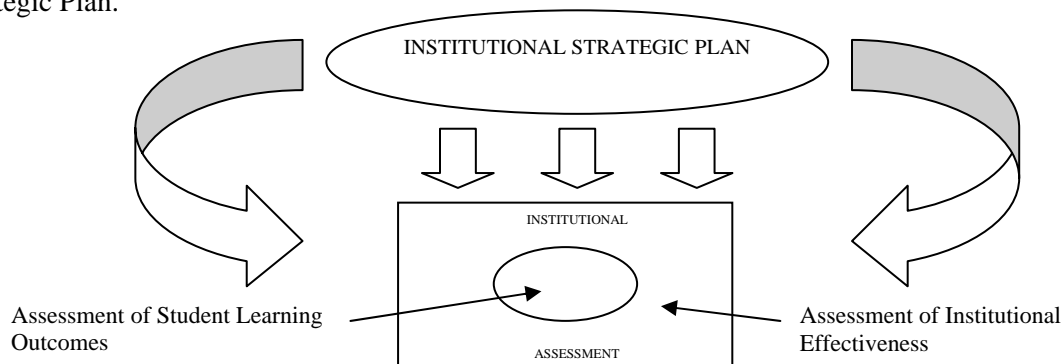
The SEED Office counts on the services of a coordinator on a part-time basis, a person in-charge of database management and web page maintenance, and a full-time secretary. As an extension to this concept, similar offices were subsequently created in each of the six departments with synonyms such as Continuous Improvement Center, The Curriculum Renewal Plan, and Center for Academic Research.

#### 4. Continuous Improvement Educational Initiative (CIEI)

The role of this new two-year initiative (2003-2005) was to not only prepare for the joint institutional re-accreditation visit in 2005 from the Middle States Commission on Higher Education (MSCHE) and the Puerto Rico Council on Higher Education (PRCHE), but to also sustain the institutional assessment process in the long run. This initiative took effect in February 2003 building upon the momentum, experience and successes of the ABET accreditation process. The UPRM-MSCHE Institutional Steering Team drew upon a dynamic group of motivated individuals from all four academic colleges at UPRM, and consisted of eleven (11) task forces with an overall coordinator to address the MSCHE's fourteen (14) standards of excellence ([www.uprm.edu/msa](http://www.uprm.edu/msa)).

##### 4.1 Institutional Assessment Plans

As a start, the UPRM-MSCHE Institutional Steering Team developed two institutional assessment plans, namely: the Overall Institutional Assessment Plan (Banerjee and Dika, 2003) and the Institutional Student Learning Assessment Plan (González, 2003). The two plans are conceptually represented below (Figure 1), with the Student Learning Assessment Plan at the core, and both being subsets of the Institutional Strategic Plan.



**Figure 1: Conceptual Diagram of Strategic Planning and Assessment at UPRM**

Overall institutional assessment was carried out via the following customized questionnaires, which were developed by the UPRM-MSCHE Institutional Steering Team. These questionnaires served as assessment instruments to provide an institutional snapshot:

Chancellor, Administrative Board, Deans of Academic Colleges, Administration, Students, and Academic Affairs, Elected Senators, Department Directors, Office of Institutional Research & Planning, Budget Office, Finance Office, Purchasing Office, Alumni Office, Human Resources Office, Physical Plant, Admissions Office, Registrar's Office, Computing Center, Research & Development Center, Agricultural Experiment Station, Agricultural Extension Service, Student Ombudsman, Guidance & Academic Counselors, Presidents of Unions, Graduate Studies, Library, Professional Enhancement Center, Faculty, Students, Non-Teaching Personnel, and Continuing Education Division.

These questionnaires resulted from the charge questions, which were identified first to address the following MSCHE's Standards of Excellence (MSCHE, 2002):

- Missions, Goals, and Objectives
- Planning, Resource Allocation, and Institutional Renewal
- Institutional Resources
- Leadership and Governance
- Administration
- Integrity
- Institutional Assessment
- Student Admissions
- Student Support Services
- Faculty
- Educational Offerings
- General Education
- Related Educational Activities
- Assessment of Student Learning

The UPRM-MSCHE Institutional Steering Team identified the following institutional student learning outcomes; characteristics, which, the UPRM students should possess and be able to do by the time of their graduation:

- Communicate effectively.
- Identify and solve problems, think critically, and synthesize knowledge appropriate to their discipline.
- Apply mathematical reasoning skills, scientific inquiry methods, and tools of information technology.
- Apply ethical standards.
- Recognize the Puerto Rican heritage and interpret contemporary issues.
- Appraise the essential values of a democratic society.
- Operate in a global context, relate to a societal context, and demonstrate respect for other cultures.
- Develop an appreciation for the arts and humanities.
- Recognize the need to engage in life-long learning.

The purpose of the Student Learning Assessment Plan (González, 2003) was to guide UPRM academic departments and programs in the development of student learning outcomes assessment processes and continuous quality improvement programs. This plan could not reasonably include in full detail all

activities for the assessment of all levels of student learning goals. Rather, the focus in the plan was to set the frame for the development and implementation of assessment processes at the department and program level. It was intended to be a source of guidance without restricting experimentation or alternate approaches that may be developed by departments, or programs within the institution. Every department, or program, at UPRM was expected to develop and include in their student learning assessment plan a matrix depicting the relationship of their program outcomes with these institutional student learning outcomes, and a matrix outlining how each of the program outcomes would be assessed, and in what courses. The results of the completed survey forms were useful in developing an institutional snapshot with the objective of determining the next course of action, such as in redesigning the future questionnaires and in pushing for the development of assessment plans in administrative and service units. This was considered important in the long run, as institutional decisions on academic programs, courses, personnel, services, and resource allocations could be more objectively based.

A team of external evaluators visited UPRM in March 2005, during which the institution received 22 commendations in 10 out of 14 standards. These efforts are well documented under [www.uprm.edu/msa](http://www.uprm.edu/msa). Despite the strong positive outcome resulting in UPRM's reaccreditation for the next decade, the institution still needed to take additional steps to demonstrate:

- Implementation of a comprehensive strategic plan which linked long-range planning to decision-making and budgeting processes, and
- Progress made in the implementation of comprehensive institutional assessment and student learning assessment plans

## **5. The Office of Continuous Improvement and Assessment**

This creation of this permanent office on September 8, 2005 by the University Board, the Office of Continuous Improvement and Assessment (OMCA in Spanish), had its origin in a series of brainstorming sessions on how to permanently institutionalize the culture of continuous improvement and assessment, as well as to address MSCHE's above two concerns. The step was not taken as a random act, but built upon the success with the two-year Continuous Improvement Educational Initiative (CIEI), which, to a larger extent was instrumental in bringing about awareness on the need for continuous improvement and assessment at the institutional level. Thus, this action by the University Board, with leadership provided by the chancellor, was a positive step in internalizing UPRM's continuous improvement efforts. This new office (OMCA) began with a full-time director and a full-time secretary, which, more recently, also added a full-time assessment specialist. Additionally, two steering teams, an Academic Steering Team, and an Administrative Steering Team, along with a selected group of advisors guide the operations of the office. Team members were chosen on the basis of past performance in institutional and engineering accreditation efforts, while at the same time making sure that all academic colleges and administrative units were well represented.

Among the first tasks by the two teams of this newly-created office were to clearly define the vision and mission statements, the responsibilities and the strategies. This was soon followed by a thrust to review and update the student learning assessment plans for all academic programs in all four academic colleges. While almost all academic programs had assessment plans in varying degrees of implementation, earlier surveys from the CIEI efforts had indicated that virtually all administrative and service units lacked assessment plans. Thus, as a parallel effort, the administrative steering team designed a customized assessment plan template for all administrative and service units. This user-friendly template not only simplified the process for units that had no experience, whatsoever, in the development of assessment plans, but the completed assessment plans also served as their first assessment reports. The Administrative Steering Team provided institutional seminars and training sessions on how to complete and implement the first assessment plans. The plans stipulated their periodic revisions with identification

of strengths and weaknesses, and how to go about sustaining what is positive, as well as taking concrete steps to address the weaknesses.

### **5.1 Future Tasks and goals**

- It is the goal of the Office of Continuous Improvement and Assessment (OMCA) to synthesize these numerous administrative assessment plans, which were also the first assessment reports, and provide a snapshot of overall institutional strengths and weaknesses. It is believed that this information would help the university administration in the proper assignment of resources within institutional priorities as outlined in the UPRM's strategic plan
- The current Overall Institutional Assessment Plan was developed by the UPRM-MSCHE Institutional Steering Team in 2003. With advances made since then in its implementation, the plan is due for revision.
- The results of the administrative assessment reports would help OMCA in designing special seminars and workshops in areas of greatest needs.
- While it is within OMCA's workplan to make sure that the culture of continuous improvement and assessment gradually become an integral part of all activities at UPRM through its two steering teams, it has a much higher goal to prepare for and seek implementation of the Malcolm Baldrige criteria for performance excellence in education.

### **Acknowledgments**

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