

SUSTAINING A UNIVERSITY-WIDE APPROACH TO COMPREHENSIVE OUTCOMES ASSESSMENT

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Abstract — *In the late 1960's the senior faculty at WPI developed a project-based curriculum, which later lent itself very well to assessing learning outcomes. Well before outcomes assessment became widely discussed and practiced, WPI faculty had begun to assess the outcomes of these projects to determine their pedagogical effectiveness. This growing culture of assessment prepared WPI to respond comparatively quickly to the emphasis in the 1990's that accrediting organizations began to make on assessing learning outcomes. This paper concludes with seven recommendations for a sustainable institution-wide assessment program: involve the faculty early on; balance top down and bottom up; create a campus-wide steering committee; involve faculty governance; establish an early success and build on strength; stress the differences between assessing student learning and grading students; and be politically aware and set reasonable expectations.*

Index Terms — *improving learning, interdisciplinary education, outcomes assessment, project-based education*

INTRODUCTION

WPI had the good fortune to begin “outcomes assessment” well before that phrase began to shape public discussions of accreditation, especially of such issues as university effectiveness and efficiency. In the late 1960's, the WPI faculty designed a new undergraduate curriculum based on what came to be called capstone-learning experiences; several of these innovations later proved to be excellent vehicles for assessing outcomes. The new WPI curriculum replaced the conventional degree requirements of passing a collection of courses with a competency examination and major projects in three different areas. The competency examination—which would have been an ideal measurement of learning—proved impossible to sustain logistically and was replaced by a series of broad course distribution requirements in 1984. The three projects, however, have remained as hallmarks of WPI's project-based curriculum for over thirty years, in part because faculty advocates recognized that assessing how well students learn in these projects was politically necessary for maintaining wide support for them. In this presentation, reviewing the institutionalizing of this project- and outcomes-based curriculum will lead to recommendations for how to sustain a university-wide program of outcomes assessment.

ASSESSING AN EXPERIMENT IN INTERDISCIPLINARY EDUCATION

Faculty invested in the most innovative of WPI's projects, the nine-credit-hour Interactive Qualifying Project or IQP, began assessing how well students were achieving interdisciplinary learning goals in 1986. The expectations for the interdisciplinary project are unusual, daunting for both students and faculty: this requirement challenges students to complete projects on topics at the intersection between science and technology and societal values and structures. Outcomes assessment at WPI began with the interactive project. As faculty became more confident about assessing the outcomes of this project, they also began considering how to assess other learning experiences.

For sound reasons WPI wanted all faculty to participate, in some degree, in advising these interdisciplinary projects. But politically, by involving potentially all faculty members to some degree, the program was vulnerable in that if everyone owned some of it, no one really owned all of it. Unless unusual learning results could be demonstrated, it would be hard, once the novelty wore off, to argue against using interdisciplinary project resources elsewhere—like conventional disciplinary study and scholarship. Thus the leadership in the interdisciplinary program decided in the mid-1980's to begin a program of faculty peer review of finished project reports. Pairs of faculty, generally one in a technical area and another in humanities, social science or management, were asked to review each completed report in terms of how well it fulfilled previously-voted goals. Reviewers provided subjective qualitative judgments on how well each report articulated and addressed its proposed interdisciplinary problem. In addition, they commented on such presumed proxies for student learning as length of the report and appendices, and the presence and absence of such components of a professional report as an executive summary, literature review, and bibliography.

Beginning in 1986 and (with some breaks for other activities) annually thereafter, the interdisciplinary program chairs published a report to the faculty on the status of the interdisciplinary project, framed in terms of how many of the accepted learning goals for the program were being met according to the review. Solutions for commonly found problems were proposed and new materials, culminating in the eight part “Handbook for IQP Advisors and Students” (www.wpi.edu/Academics/Depts/IGSD/IQPHbook). This

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process was widely accepted in the simplest sense--few specific objections were raised. Some faculty did object to a form of peer review of them as faculty advisors implicit in the project review but never sanctioned by faculty governance. Consequently, distribution of the individual data forms filled out by reviewers back to the project advisors has been quite limited and currently is not practiced (except by request). Other faculty raised questions about the limitations of assessing student learning based only on the written documentation, which admittedly may not capture learning implicit in the process but not explicit in the formal documentation of the project work. (At present, this objection is acknowledged but not as yet removed by adopting a system to gather information on process through a vehicle like student and faculty reflections.)

Nonetheless, the process of assessing learning outcomes for a powerful but unconventional learning activity not only continues at WPI, but has become more sophisticated. In the 1990's, a new emphasis on outcomes assessment led to more careful articulation of reviewer expectations through defining rubrics and through cross-calibrating responses among readers. The adoption of new outcomes-based criteria for professional education in the engineering disciplines (the Engineering Criteria 2000 of ABET) strengthened campus-wide support for project assessment. Clearly, the interdisciplinary project provides students with rich opportunities to achieve learning in several of the specific outcomes ABET is most interested in, including teamwork, communications skills, and awareness of the global and societal impacts of science and engineering. Thus the interdisciplinary project peer review now provides information on student learning to the faculty as a whole and to those advisors requesting feedback on their own advised projects. Also, engineering departments can obtain data on ABET learning outcomes for their majors as a whole, to measure some of their achievements outside the discipline itself. (See "Review of IQPs Completed" on our "Outcomes" Web site: www.wpi.edu/Academics/Outcomes. Other references to the site will be referred to simply as "outcomes.")

BROADENING ASSESSMENT TO THE MAJOR FIELD

One happy result of this twenty-year evolution in assessing learning outcomes for the interactive project is that this degree requirement in technological education has not gone the way of many unconventional experiments in higher education. Another result was the adapting of outcomes assessment in interdisciplinary studies for assessing outcomes in the major. Beginning in 1990-91, WPI faculty began to consider that if assessing these reports had led to improving student achievement of interactive learning goals, a parallel assessment process should benefit learning in the major field. (ABET's mandating of outcomes assessment was still several years away, at least in the minds of most

engineering faculty at WPI, so improving education rather than responding to external pressures was largely the motivation here.) In fact, implementing a peer review of disciplinary projects was in some ways easier than for the interdisciplinary ones since the consensus was broader and deeper within departments as to what constituted high quality learning for their majors. Thus in 1995 when WPI decided to propose itself to ABET as a candidate for the then-new outcomes-based EC2000 Criteria, WPI faculty were on the third iteration of disciplinary reviews. The specific techniques of disciplinary project reviewing differed somewhat from department to department, since each department built upon the previous assessment experience in terms of its own needs and comfort level. This diversity of approaches proved invaluable, perhaps most importantly in the widespread sense of ownership each department had in its own procedures (rather than having to conform to a centrally-mandated model). The Provost's Office was able to assist materially by regularly scheduling meetings to exchange best practices, which helped significantly to prepare WPI for its role as one of two universities visited by ABET in 1996 to re-accredit under the then-experimental new criteria. (An example of an advisory on best disciplinary [MQP] review practices among the individual departments is available at the "Outcomes" Web site as "Summary of Best Practices"; see also there the reviews of MQPs in Computer Science and in Mechanical Engineering.)

Exactly what role the perception that "ABET wanted" such project reviews played in having departments develop them is hard to judge. Though the role of ABET was doubtless large, the desire to improve learning by measuring specific results of faculty activities also mattered, especially among those faculty whose scholarly contributions focused on teaching and learning. Such faculty took the lead in the next round of building a culture of assessment, by designing assessments tools for individual courses. Because WPI departments do not have fixed curricula (students can choose their own paths from various course options), no department has a set of courses that every student must take. But each department has for majors a small number of foundation courses in the discipline through which most students move at some point. Faculty in most of the engineering departments began in the last several years to look at these courses in terms of how student learning could be measured against the department's own published learning outcomes (available on the "Outcomes" Web site). For examples of courses redesigned in terms of assessing outcomes, see the following articles on the "Outcomes" Web site: Vaz and Arcolano, "Teaching Signals and Systems [EE2311] through Portfolios, Writing and Independent Learning"; and Goulet, "An Outcomes Oriented Approach to Calculus Instruction."

INCLUDING THE HUMANITIES AND ARTS

The general consensus on campus that outcomes assessment had succeeded with the interdisciplinary and disciplinary capstone projects led faculty in the Humanities and Arts department to begin assessment of the reports all WPI students must complete in those fields. (WPI requires all students to complete a three-credit-hour project culminating five courses of their own choice in a thematically related area of the humanities or arts.) Defining—much less measuring—outcomes in the humanities has been notoriously more difficult than in disciplines like engineering and science which lend themselves in many ways more to demonstrating outcomes through performance not attitudes. Thus assessment of completed projects in this domain has been more difficult; but a substantial start has been made in terms of assessing final projects, of linking them to a mission statement for the program, and of proposing a now-voluntary process of faculty encouraging students to reflect on the outcomes they perceive emerging from their work in this domain. (Humanities and Arts Department report on “Outcomes” Web site.)

PARTICIPATING IN NATIONAL OUTCOMES ASSESSMENTS

Presently, WPI participates annually in the National Survey of Student Engagement (NSSE) and Educational Benchmarking (EBI) surveys. The NSSE survey covers second-semester first and fourth year students in all majors while the EBI deals only with engineering majors in their final semester. Both are especially valuable because they offer comparisons of WPI students’ responses with those from similar AITU (Association of Independent Technological Universities) universities as well as with national norms. Both are comparatively easy to administer with minimal administrative time required (and none from the faculty), but both yield data by departmental major that are especially useful to ABET departments. (The absence of national comparisons is a vexing problem for other constituency surveys WPI has attempted such as those for graduates and their employers.) Both the NSSE and EBI surveys have produced data about student satisfaction here and at comparable schools which faculty have accepted as grounds for further study and possible program changes at WPI. (For an example of how WPI reports and uses such data, see “Year 2000 EBI Benchmarking Study Results” on the “Outcomes” Web site.)

ASSESSING OUTCOMES OUTSIDE THE ACADEMIC PROGRAM

Since becoming WPI’s 14th president in 1995, Dr. Edward Alton Parrish has been focusing on using outcomes assessment to guide and manage the university as a whole,

building on the faculty experiences with assessing learning. Management through assessing results is especially important in the budgeting process. The president oversees annual budgetary planning and program implementation, meeting regularly for these purposes with his Cabinet. The current budget becomes the first year in a regularly updated five-year budget model, which provides useful trends. WPI has been working hard to inform its strategic and annual budgeting process with data on learning and performance outcomes within the five vice-presidential divisions. For example, the president has responded to the documented success of first-year pedagogical innovations by continuing them when grant money expired—even at a time of tight budgets.

CONCLUSIONS

Ideally, every activity at WPI should profit from continuous improvement through outcomes assessment because the whole community—and the many people and constituencies within it—understands

- how their own roles and activities derive from WPI’s mission and goal statements (available on the Web site) valuing learning and research.
- how their success in accomplishing their objectives can be measured against agreed-upon metrics.
- how these measurements of success are assessed within the individual, departmental and institutional contexts.
- how these assessments of accomplishments “close the loop” in terms of influencing the ongoing discussion of mission and goals and the ongoing management and allocation of resources.

Needless to say, WPI reaches this ideal state better in some areas (notably the academic) than in others where outcomes assessment is only beginning. From our experience WPI can offer the following recommendations for developing and sustaining university-wide outcomes assessment.

Involve the faculty early on. As the discussion of an innovative program, the WPI interdisciplinary project shows, faculty who want to make a case for university-wide support of a program they care about can do so by assessing the learning outcomes of such projects effectively. Encourage them with resources (summer pay, for example) and reward them in the standard ways (counting scholarly publications resulting from assessing learning outcomes for promotion and tenure.) Require that faculty proposing new programs include what most funding agencies would expect—a robust assessment procedure. Make sure that successful experiments receive the resources they need for a sustained trial, and if merited, on-going institutionalization.

Balance top down and bottom up. Support for comprehensive assessment must be both top-down and

bottom-up, with advocacy from the president and/or provost matched by their activities in support of assessment. Senior administration must communicate the sense that outcomes assessment is inevitable both because it will make learning more effective (internal argument) and because external agencies (market competition, legislators, accreditation bodies) require it.

At the same time, a few key faculty in every academic program must buy into the concept that assessing learning outcomes is a rational extension of faculty concern for effective learning, which—if well done—will save faculty time overall by helping students assume greater responsibility for their learning. Not every person in a department or program need support or be heavily engaged in outcomes assessment, but most if not all must be willing to consider changing the way they teach in order to make assessment possible in their unit. Unlike conventional preparation for accreditation visits (with which outcomes assessment is sometimes unfortunately confused), outcome assessment must involve everyone to some degree—even if at one end of that spectrum involvement is well-thought-out opposition.

Create a campus-wide steering committee. Those faculty and administrators developing an assessment program need to be publicly identified and be accessible to everyone in favor of (or opposed to) assessment. The process of constituting such a committee will vary according to the political practices of the university, but such a group should be identified early on to nurture and share best practices around campus and to advocate the spread of assessment practices around campus. Such a group can include assessment professionals (in Institutional Research, for example), but should also include faculty who understand what needs to be assessed and what resources are both necessary and reasonable to assign to the task. Charge this group with keeping work on assessment in the forefront of faculty consciousness, through seminars, workshops, presentations—whatever works on your campus to send the message that “assessment matters and our department/program better get on board.” The steering committee can also take the lead in drafting campus-wide learning outcomes and performance metrics.

Involve faculty governance. At both the departmental and university-wide levels, make sure that people on curriculum and policy-making committees are fully involved. At most campuses, changes like moving to campus-wide assessment will require formal governance support, and the faculty elected to these positions will be likely to be those interested in pedagogical scholarship and reform. The campus-wide steering committee needs closely to coordinate with governance, and often can draft position statements and resource documents to help move and shape governance decisions.

Establish an early success and build on strengths. As the review of WPI’s experience with outcomes assessment shows, start with a single program for which consensus exists that assessing learning outcomes is desirable. (In WPI’s case it was a nascent innovative program; at your campus it might be a different target of opportunity like an established program being reviewed for accreditation.) Make sure your first assessment program is carried out well and does not suffer from political subversion, since it can then be the model for other more difficult tasks and more sophisticated approaches.

Stress the differences between assessing student learning and grading students. Faculty often say when asked about beginning to assess learning outcomes that they do that already when they assign grades. True—but. The evidence for giving a grade in a course is often limited to how well individual students performed relative to the class on traditional tests within some subset of the teacher’s discipline. Such performance may say little about what the student learned *and* can apply subsequently even in the same discipline much less in “real-world” cross-disciplinary work. Try to encourage faculty to think of teaching as offering opportunities for students to learn on their own rather than covering the subject matter and/or textbook. The emphasis then is on students not the discipline. If desperate, ask faculty how many of their graduates they know who have had successful careers where their job consists of getting A’s in courses.

Be politically aware and set reasonable expectations. Perhaps above all, have expectations reasonable for your campus about what outcomes assessment can and cannot do. Outcomes assessment activities can be killed off as effectively by friends as by foes if its advocates demand too much time of others or never are satisfied with sufficient data upon which to make decisions. Push the envelope but be prepared to react when you hear the fabric tearing. For example, WPI backed off of tying the loop too tightly in terms of using peer evaluations of faculty-advised projects in faculty merit reviews when faculty protested that the administration was confounding program assessment with performance review. To preserve support for the former we dropped the latter.

In summary, implementing a campus-wide outcomes assessment program requires shared leadership sensitive to:

- what the institution wants, needs, and can endure;
- what is feasible in terms of resources (principally money, faculty and administrative time);
- the value the faculty attaches to assessment as a way of improving learning and therefore making everyone’s job more efficient.
- establishing and sustaining a vision all share in.