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Abstract:

Accrediting bodies and other external constituencies are placing increased emphasis on the assessment of academic degree programs for continuous improvement. Most assessment plans are focused on determining how well program outcomes or goals are being met. However, benchmarking a degree program across institutions is rarely considered. This article provides general principles for assessing information systems programs and presents quantitative and qualitative methodologies and tools for benchmarking student learning in Information Systems programs.

Keywords: benchmarking IS programs, AACSB, ABET, direct assessment, indirect assessment, assurance of learning, ISA Exam, IS2010 Model Curriculum

Editor's Note: The article is based on a panel presentation at the Americas Conference on Information Systems, held in Lima Peru, August 2010.

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I. INTRODUCTION

As used here, assessment is defined as “the systematic collection, review, and use of information about educational (degree) programs untaken for the purpose of improving student learning and development” [Palumba and Banta, 1999, p. 4, parentheses added]. Although assessment is not new, it has received increased attention in recent years. For example, in 2007, the EDUCAUSE Advisory Committee for Teaching and Learning identified “establishing and supporting a culture of evidence” and “demonstrating improvement of learning” as the top two teaching and learning issues [Campbell et al., 2007, p. 15].

This increased emphasis on assessment is reflected in accreditation standards. The Association to Advance Collegiate Schools of Business (AACSB) first introduced the concept of “outcomes assessment” in its 1991 revision of standards required for accreditation. At that time, the AACSB allowed for the use of *indirect* assessment measures such as surveys of alumni and graduating students [AACSB, 2007]. In 2003, AACSB revised its standards again, but this time emphasizing the use of *direct* assessment of student learning. These standards, which were again amended in 2009 [AACSB, 2009], are referred to as “Assurance of Learning” (AoL) standards. They support two key principles of AACSB accreditation: accountability and continuous improvement. Accountability enables an organization to “assure external constituents … that the organization meets its goals” [AACSB, 2007, p. 2]. Continuous improvement can be achieved through measures of student learning that become the basis for planning improvement efforts, not only for the institution, but also for individual students [AACSB, 2007].

Similarly, the ABET Computing Accreditation Commission (CAC) has for many years required program assessment, distinguishing between program educational objectives (“broad statements that describe what graduates are expected to attain within a few years of graduation”) [ABET, 2010, p. 2] and student outcomes (“what students are expected to know and be able to do by the time of graduation”) [ABET, 2010, p. 2]. In order for an Information Systems, Information Technology, or computer science program (collectively referred to as computing programs) to become ABET accredited, it must also regularly use “appropriate, documented processes for assessing and evaluating the extent to which both the program educational objectives and the student outcomes are being attained. The results of these evaluations must be systematically utilized as input for continuous improvement of the program” [ABET, 2010, p. 3]. What ABET calls student outcomes, AACSB refers to as learning goals, “what students should be able to accomplish when they graduate from the program” [AACSB, 2007, p. 6]. AACSB uses the term *learning objective* to describe a measurable attribute of the overall learning goal, while ABET states that “effective assessment uses relevant direct, indirect, quantitative and qualitative measures as appropriate to the outcome or objective being measured” [ABET, 2010, p. 2]. Program educational objectives, as defined by ABET, are based on the needs of the program’s external constituencies, such as employers. AACSB includes these early career performance expectations in goals.

In addition to accrediting bodies, external stakeholders, including legislators, taxpayers, employers, and parents, are also asking to see more assessment [Bollag, 2006; Ikenberry, 2009; Mundhenk, 2005; Pringle and Mitri, 2007; Suskie, 2009]. In 2006, the U.S. Secretary of Education’s Commission on the Future of Higher Education called for increased accountability of colleges and universities to their constituencies. The Commission report, also referred to as the Spellings Report (after then-Secretary of Education Margaret Spellings), pointed out that “parents and students have no solid evidence, comparable across institutions, of how much students learn in colleges or whether they learn more at one college than another” [U.S. Department of Education, 2006, p. 14]. Therefore, the Commission recommended that “post-secondary education institutions should measure and report meaningful student learning outcomes” [U.S. Department of Education, 2006, p. 24]. Further, the Commission recommended the creation of a public database of information about colleges and universities that would eventually include learning outcomes of students.

Although assessment measures may enable a program to determine how well it is meeting its outcomes/goals, these measures do not always address the Spellings report recommendation of providing comparable evidence across institutions, that is, benchmarking. The purpose of this article is to present examples of benchmarking. The article begins by suggesting general principles for building assessment programs and then presents quantitative and qualitative methodologies and tools for benchmarking outcomes or goals and for assessing student achievement levels in Information Systems programs across multiple institutions. The article is based on a panel presentation at the Americas Conference on Information Systems (AMCIS) held in Lima, Peru, in August 2010.

II. GENERAL PRINCIPLES FOR BUILDING ASSESSMENT PROGRAMS

Assessment of student learning should provide the basis for program improvement. Data collection and assessment are moot without action. Results that are not actionable are of no value in terms of program improvement and may actually be detrimental as they may frustrate participants. Moreover, once data have been collected, it's too late to ask how the data can and should be used to generate meaningful dialogue and action that can lead to program improvements. Below are general observations, principles, and guidance regarding computing program assessment and quality improvement.

Key to developing a successful process for program improvement is a plan. In designing a plan for assessment it is essential to recognize that it is the program, the curriculum, that is being assessed and not the individual student or the faculty member. Student grades in classes are not an assessment of the program any more than are student evaluations of faculty teaching. For example, an appreciation for the role that Information Systems play in organizations is something that accumulates over the course of study as students see and learn about organizations and Information Systems from varied perspectives as they progress through the program. Indeed, assessing the students' appreciation of the role that Information Systems play in organizations is best measured at the end of the program even though the academic material directly related to this topic is presented in a course or courses that are likely much earlier in the curriculum.

Principles that are central to developing a successful program assessment initiative include:

- Using faculty members' time judiciously so that they can focus on program improvement and not clerical tasks
- Making sure participation in program assessment is rewarded and people are accountable
- Differentiating between "sustainable" and "disruptive" processes and changes
- Coordinating program assessment efforts among accrediting agencies such as ABET, AACSB, regional accreditation (e.g., the Southern Association of Colleges and Schools), and institutional assessment requirements
- Getting started! Continuous improvement is gradual, incremental, and experiential.

Borrowing from the innovation literature, the terms sustainable and disruptive are used here with parallel meanings to distinguish between change that improves the current situation and change that replaces or fundamentally alters the current situation. In this context, sustaining innovation primarily responds to internal forces and includes updating course content, incorporating newer technology into a course, and other incremental modifications, whereas disruptive innovation occurs when curriculum undergoes wholesale change, typically in response to external forces such as model curricula, accreditation standards, or industry advisory input. Data collected from students in select courses (e.g., core courses) can be used to assess achievement, but not content. For example, a specific level of SQL knowledge can be assessed by having students complete an assessment instrument at the end of the core database course, but students cannot judge whether the program should *teach* SQL. Questions of achievement can be addressed by assessing student knowledge, but questions of content and curriculum innovation are best addressed by indicators external to the program such as model curricula, pedagogical literature, industry advisors, faculty (particularly what AACSB calls *professionally qualified faculty*), program alumni, and other external changes in practice. Refinement is an ongoing activity, whereas disruptive change is episodic.

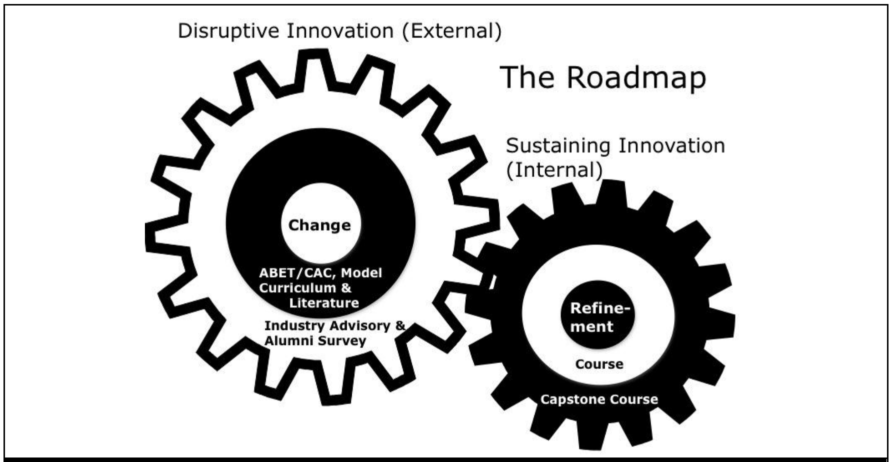

Figure 1. The Assessment Roadmap

The assessment roadmap (Figure 1) shows the relationship between program change and refinement—between disruptive and sustaining processes. Change is a slower process than refinement, indicated by the relative size of the gears. Disruptive and sustaining processes are meshed to drive quality improvement. The external drivers of model curricula, alumni surveys, professional advisory input, and pedagogical literature can lead to disruptive change resulting in wholesale changes to a program. On the other hand, refinements to courses are driven by internal feedback to make incremental improvements in student learning and development as assessment is compared to outcome and goal targets. Running this assessment roadmap requires a plan, management, and resources.

Assessment measures can be either quantitative or qualitative and direct or indirect. A quantitative measure is identified on a numerical scale that describes original data, whereas qualitative measures involve perceptions, beliefs, and opinions such as student performance in competition with others in programming and problem solving contests. Indirect measures are self-assessments, surveys, interviews, and focus groups which can gather qualitative measures *of* learning, *opinions about* learning or *reflections on* learning and by definition require *inference* about a student's knowledge, skills, abilities from a measure that does *not* reveal any direct evidence of the learning outcome [Palumba and Banta, 1999]. A direct measure is an unmitigated measure of knowledge, skills, and abilities that are relevant to the learning outcome or goal [Palumba and Banta, 1999]. A thorough assessment, such as is proposed in Figure 1, requires a combination of direct and indirect as well as quantitative and qualitative measures.

In addition to tools, successful assessment programs require leadership. Someone has to be in charge and accountable for the successful completion and implementation of the initiative and its continued operation. The leader should be a senior member of the faculty to indicate the importance of assessment and to command needed effort and resources. In addition to authority, the leader must be given resources. Resources include student and faculty assistance, clerical support, and database and application development.

A successful assessment program also requires faculty buy-in. Minimizing faculty clerical overhead, making sure that faculty know the plan and remain informed, and making sure results are actionable are all necessary to engage and maintain faculty support. Faculty are willing to be part of the process, but they are not willing to spend much time collecting data, especially at the end of a semester when there are many other matters demanding their attention. Thus, data collection has to be routine, simple, and automatic. Faculty buy-in also requires actionable results. Before collecting the data, know how the results will be used. Nothing will dampen enthusiasm for assessment more than collecting data that are never used to assess program performance. Action requires targets. That X percent of students achieve an outcome/goal may or may not require action, but if X percent of students fall below some benchmark target, this likely requires action. Faculty involvement in fixing targets is essential. Here again, it's good to remind faculty that it is the program, the curriculum, that is being assessed and not the faculty or students.

In terms of efficiency, all accrediting organizations require some form of assessment, and increasingly these organizations are demanding evidence of continuous improvement. The good news is that a comparison of AACSB, the Southern Association of Colleges and Schools (SACS), and ABET shows that the assessment categories are very similar [RiCharde and Moore, 2010]. Table 1, taken from material developed by RiCharde and Moore [2010], shows these similarities.

Table 1 is not comprehensive and only shows criteria where there is overlap across at least two of these three accrediting bodies. Nevertheless, the table shows that there is a great deal of duplication. This means that work done on assessment for any one of these accreditations can be used to inform the others. Some computing programs have found that their experience with ABET assessment and the overlap in assessment shown in Table 1 has placed them in a position to lead their school's (and even, university's) assessment initiatives.

III. THE INFORMATION SYSTEMS ANALYST (ISA) EXAM

As depicted in Figure 1, program refinement includes assessment of individual courses. One course that defines the IS degree is Systems Analysis and Design. This section details direct assessment of student knowledge of material taught in this course.

Direct assessment efforts provide unmitigated evidence of students' abilities to demonstrate their knowledge or skills [Martell and Calderon, 2005]. Direct assessment of learning objectives measures the level of performance achieved. The dissemination and analysis of the *aggregate* results is useful in refining courses within an existing curriculum, whereas the dissemination and analysis of the *individual* results can provide instrumental/developmental feedback to

Table 1: Similarities Across Accreditation Agencies		
SACS	AACSB	ABET
Mission		
2.4—Institutional Mission 3.11—Institutional Mission	Standard 1—Mission Statement Standard 3—Student Mission	Criterion 2—Program Educational Objectives
Effectiveness		
2.5—Institutional effectiveness 3.3—Institutional effectiveness 4.1—Student achievement	Standard 4—Continuous Improvement Objectives Standard 16—Undergraduate Learning Goals	Criterion 3—Student Outcomes Criterion 4—Continuous Improvement
Financial Resources		
2.11.1—Financial resources 3.10.1—Financial stability 3.10.2—Submission of financial statements		Criterion 8—Institutional Support
Physical Resources		
2.11.2—Physical resources 3.11.1—Control of physical resources 3.11.3—Physical facilities		Criterion 7—Facilities
Educational Program		
2.7.2—Program content 3.4.1—Academic program approval 3.4.2—Continuing education/service programs 3.4.3—Admissions policies 3.4.4—Acceptance of academic credit 3.4.6—Practices for awarding credit 3.4.9—Academic support services 3.4.10—Responsibility for curriculum 4.3—Program curriculum 3.4.11—Academic program coordination 3.4.12—Technology use	Standard 6—Student Admission Standard 7—Student Retention Standard 8—Staff Sufficiency-Student Support	Criterion 1—Students Criterion 5—Curriculum
Faculty		
2.8—Faculty 3.7.1—Faculty competence 3.7.2—Faculty evaluation 3.7.3—Faculty development 3.7.4—Academic freedom 3.7.5—Faculty role in governance	Standard 9—Faculty Sufficiency Standard 10—Faculty Qualifications Standard 11—Faculty management and support Standard 12—Aggregate Faculty and Staff Educational Responsibility Standard 13—Individual Faculty Educational Responsibility	Criterion 6—Faculty

instructors and test takers [AACSB, 2007; Pringle and Mitri, 2007; Martell and Calderon, 2005]. Figure 2 provides a summary of the refinement process.

Figure 2 uses AACSB terminology of learning objectives and goals. The center of the refinement process is the learning goals. Learning goals detail the specific knowledge, skills, and competencies that graduating students should possess [Blood, 2006]. Each goal is then operationalized into learning objectives. Direct assessment of learning objectives provides a measure of a program's performance.

When searching for a direct assessment instrument, the allure of a purchased/standardized exam is undeniable. A standardized exam requires minimal faculty development time; it can be implemented quickly and easily; grading is objective, is consistent, and requires minimal effort; and the results typically provide inter-institutional benchmarking information. Furthermore, to the extent that a standardized exam has widespread adoption or an independent validation/certification, the results can infer a level of program credibility [Prus and Johnson, 1994; Smith et al., 2010; Soulsby, 2009].

Although the benefits of using a standardized exam are clear, several disadvantages should be considered as well. The ongoing costs associated with purchasing the exam have budgetary implications. Faculty within the program must agree to adopt and agree on how the assessment will be delivered. Because the faculty have minimal or no input regarding the questions on the exam, there may be apprehension associated with potential negative reactions from students. There may also be an overall lack of ownership and indecision regarding how to incentivize students

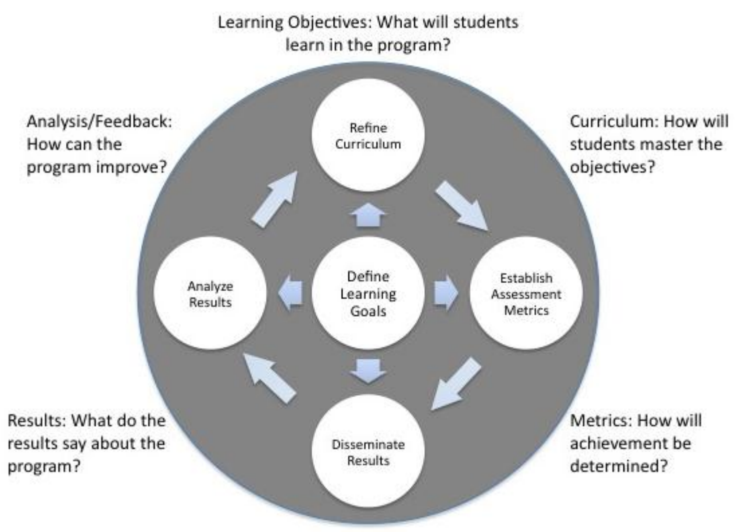

Figure 2. The Refinement Process

within grading schemes and concern that mediocre student results may be interpreted as poor instruction or poor program quality. Similarly, without faculty ownership, the assessment results might be ignored or marginalized by the faculty, calling to question the relevance and value of the exam [Prus and Johnson, 1994; Smith et al., 2010; Soulsby, 2009].

Because of the cost of purchased exams, pre- and post-instruction experimental designs are often prohibitively expensive. Subject/group selection practices vary across institutions. The results of purchased instruments are summative in nature; that is, the data describes student achievement *after* learning has occurred in contrast to formative data which provides feedback *during* the learning process where it can be used to adjust the learning process. While benchmarking data provide inter-institutional comparisons, in light of differing administrative practices, these data should be used with great caution when comparing across institutions [Bain, 2004; Huba and Freed, 2000; Prus and Johnson, 1994]. Table 2 summarizes advantages and disadvantages of using standardized exams.

Table 2: Advantages and Disadvantages of Standardized Assessment Exam

Advantages	Disadvantages
• Can be adopted and implemented quickly • Minimal initial costs • No faculty instrument development time • Minimal grading time • Objective and consistent scoring • Provides benchmark • Provides a degree of external validity/credibility • Potential professional certification	• Ongoing costs • Lacks the ability to provide formative evaluation data • Exam content and program learning objectives may not match • Assessment results are more susceptible to misinterpretation/misuse such as using results as a surrogate for program quality • Administration practices vary across institutions

Arguably, the biggest issue when using a standardized exam is the consistency between program learning outcomes (objective and goals) and the actual questions on the exam. Obviously, if an exam does not assess what is being taught, the students will be frustrated, and the results will be meaningless. Nevertheless, “few characteristics of the school will be as important to stakeholders as knowing the accomplishment levels of the school’s students when compared against the school’s learning goals” [AACSB, n.d.].

One such standardized exam developed and mapped to both the ABET and AACSB standards is the ISA Exam. The ISA Exam was developed and is maintained by the Center for Computing Education Research (CCER). It is a standardized direct assessment exam consisting of 258 questions that can be administered online. Each student who scores sufficiently well on the ISA Exam is qualified to receive the ISA Certificate from the Institute for Certification of Computing Professionals (ICCP). To become an ICCP certified Information Systems Analyst, a student must pass the ISA Exam with a score of 50 or better, pay the ICCP certification fee, agree to live by the

ICCP code of ethics, and agree to provide proof of earning a computing degree to the ICCP office within a year of completing the exam [CCER n.d.; ICCP, n.d.; Longenecker, n.d.; Wagner et al., 2008]. According to the ICCP website (ICCP.org), there are over 50,000 ICCP certified professionals globally.

The ISA Exam is designed to assess programs that follow the IS2010 Model Curriculum. The IS2010 Model Curriculum was developed and is maintained jointly by the Association for Computing Machinery (ACM) and the Association for Information Systems (AIS). It consists of seven core courses: (1) Foundations of Information Systems, (2) Data and Information Management, (3) Enterprise Architecture, (4) IS Project Management, (5) IT Infrastructure, (6) Systems Analysis and Design, and (7) IS Strategy, Management, and Acquisition. The IS2010 Model Curriculum details specific learning objectives and proposed topics for each course [Topi et al., 2010]. Table 3 provides the loading of ISA Exam questions into the IS2010 Model Curriculum courses. A similar mapping has been developed for the ABET IS criteria.

Table 3: Mapping ISA Exam Questions to IS2010 Curriculum Model

IS2010 Course	Number of ISA Exam Questions	Percent of Exam Coverage
IS2010.1 Foundations of Information Systems	37	14%
IS2010.2 Data and Information Management	43	17%
IS2010.3 Enterprise Architecture	26	10%
IS2010.4 IT Infrastructure	40	16%
IS2010.5 IS Project Management	43	17%
IS2010.6 Systems Analysis and Design	42	16%
IS2010.7 IS Strategy, Management, and Acquisition	27	10%

To effectively integrate the ISA Exam into a program's assessment program, the institution should map its program learning goals to the IS2010 Model Curriculum learning objectives and the topical coverage within the exam, as seen in Figure 3.

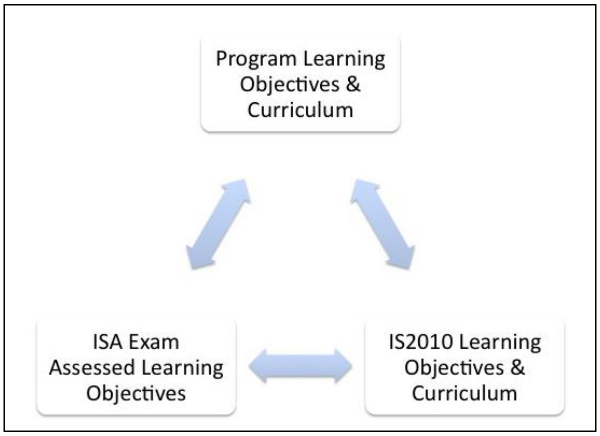

Figure 3. Relationship Among ISA Exam, IS2010 Model Curriculum, and Program Curriculum Model

Learning goals are specified as learning objectives within courses and the exam topical coverage is operationalized in the individual questions. Again, the relevance of the ISA Exam must be judged in relation to the program's specific course learning objectives. To the extent that a program follows the IS2010 Model Curriculum, the ISA Exam may be an excellent direct assessment choice.

IV. OTHER DIRECT ASSESSMENT BENCHMARKS

Outside validation is useful not only for validating the educational process, but also for helping students appreciate what they have learned and giving them self-confidence as they recognize the value recruiters and others place on their new abilities. Students also gain a sense of community by participating with their peers within and outside university borders. Three examples of benchmarking that help validate experiences are presented below: INTEX (a comprehensive Integrative Exercise), AITP National Collegiate Conference Contests, and the APEX Global Business IT Competition. Each provides an example of a different type of outside validation.

Integrative Exercises (INTEX)

Students at Brigham Young University (BYU) are required to participate in two integrative exercises (INTEX) during their junior year. Approximately 110–120 students majoring in Information Systems at BYU participate in an intense 30-credit-hour "core" of integrated IS course work. They are assigned to teams of four to six members throughout the semester as they all attend the same set of IS classes. The final week of the fall semester (Monday to Saturday morning) is designated as INTEX week and all other "core" year IS courses are cancelled for that week. Monday morning the twenty to twenty-five student "consulting" teams receive a comprehensive real-life case. They work long hours on the case throughout the week and submit hard copy documentation Friday afternoon at 4 P.M. The required documentation includes Significant Economic Feasibility Analysis, Analysis of Current Operations, a Comprehensive Proposed Solution, and the Project Management/Implementation Plan. Early Saturday morning, each "consulting" team gives a professional presentation to the "management," consisting of professors and industry professionals. One hour is allocated for each team's final presentation, including questions and feedback. After the question-and-answer sessions, all team presentations and documentation are evaluated. Individual peer evaluations are also collected. Verbal feedback is given to each group on both strengths and weaknesses. The outside professionals play an essential role in this process, often validating the reality of having to put together a proposal in a short time frame. Teams are "laddered" by performance score and the top teams receive rewards at a closing lunch meeting. After lunch, the professionals explain how they might have approached the case in a real-life scenario.

Students report that the INTEX team experience is very helpful, although they face difficult team scheduling problems, and they report needing more guidance and time. Nevertheless, 82 percent of the 2010 participants felt INTEX was valuable. Students average twenty-six hours on INTEX I (fall semester). INTEX II is held during the last six weeks of the winter semester of the junior year, concurrent with course work, and it provides an even more in-depth experience. Industry professionals vie to participate in these experiences.

INTEX directly assesses team capabilities and the collective results reflect on the quality of the Information Systems program. Examples of INTEX student documentation are included in the IS program accreditation portfolio.

Association of Information Technology Professionals National Collegiate Conference (NCC)

A second example of a direct measure of student performance is provided by the Association of Information Technology Professionals (AITP) National Collegiate Conference (NCC) which is held each year during late March at various locations (http://www.aitp.org/ncc). AITP sponsors competitions for student teams in IS programs. Generally, some eighty programs involving 500 to 600 students participate in thirteen different contests, including PC troubleshooting, business intelligence/GIS, system analysis and design, graphics communication, network design, database, Java developer, and Visual Studio.Net development. The contest cases require practical solutions that tend to be quite technical in scope. Students use their own laptop computers to develop competing solutions, and participating volunteer faculty serve as judges. Cash and trophies are given to winners at the conference final dinner.

Direct assessment values include qualitative comparison of teams against a national population of academic programs. The competition gives students a chance to compete on a national stage and interact with colleagues from across the nation. Success promotes excitement and a positive attitude among students enhancing *esprit de corps* on campus. College administrators also welcome success as it adds great promotional value for the university administration, alumni, and recruiters. However, because this success depends on the performance of a small team of students who are probably among the best students in the program, such success can serve as an addition to more comprehensive measures of program performance.

APEX Global Business IT Competition

The APEX Global Business IT Case Challenge (http://apexglobal.smu.edu.sg) demands the synergy of IT and business knowledge in solving real-life business scenarios over five days. In contrast to the more technical knowledge of the NCC, APEX Global focuses on such issues as IT governance, change management, and IT agility. Undergraduate teams from North America, Europe, and Asia compete in this annual event. In 2010, participants represented twenty-four universities from fourteen countries. The Singapore Management University School of Information Systems hosts the event, and judges are industry leaders and volunteer faculty.

Here, direct assessment is the qualitative comparison of team performance against an international population of academic programs. Again, this success promotes excitement and a positive attitude among students, and university administrators encourage the success and publicize the students' participation among alumni and recruiters. As with other team competitions, such success can serve as an addition to more comprehensive measures of program performance.

V. INDIRECT MEASURES OF STUDENT LEARNING

The effective use of indirect measures is important to the success of any assessment program. Indirect assessment can be used in conjunction with direct assessment to benchmark and validate student learning. When assessing student learning, many programs fail to connect direct objective measures with related indirect subjective measures. For example, in the Computer Information Systems program at James Madison University the faculty has developed program-level educational outcomes specific to database modeling and implementation. Direct measures of student performance specific to database modeling and implementation are found in the annual assessment day test and in embedded questions found in the database course and in the CIS capstone course. In addition, indirect measures of student performance specific to database modeling and implementation are found in the CIS Alumni Survey and in the CIS Internship Survey.

One approach for the indirect measurement of learning outcomes is to measure the gap between the perceived importance of a skill and the perceived teaching effectiveness of the program in this skill area. Lending and Mathieu [2010] document the use of an alumni survey in an ABET-driven assessment process at James Madison University. In this example, the greatest expectation gap (as measured by mean difference) exists in the following areas: non-technical writing, analysis of technical solutions, and management of IT projects. These results are compared to related direct measure results in these areas for further investigation.

A critical piece for the external validation of the CIS program at James Madison University is feedback from the CIS Executive Advisory Board (EAB). The CIS EAB plays a critical role by providing counsel to the faculty on emerging issues of concern to IS professionals and on faculty awareness of current trends in industry. Board members, in conjunction with CIS faculty, review direct and indirect assessment results. Not surprisingly, the richest discussions about the CIS program seem to stem more from indirect survey results than from direct assessment results.

Over the course of the past three years, both direct and indirect assessment results have pinpointed the need for improved writing skills among CIS students and have targeted the need for a cyber-security lab to give students an expanded skill set in the IT security domain. Involving EAB members in the assessment analysis process has been a very positive experience. External “eyes and ears” offer a unique perspective that often challenges the underlying assumptions held by faculty.

The external validation of student learning through indirect assessment provides invaluable feedback to an Information Systems program. Indirect assessment can be particularly effective at answering the following questions:

- Is the “right” skill set being taught?
- Does the program have the “right” learning outcomes?
- Does the program have the “right” balance between conceptual learning and skill-based learning?
- Do students leave the program with a solid foundation of professionalism?
- Do indirect measures (perceptions of alumni and recruiters) align with direct measures of student learning?

The final step in assessment is to use the results to improve the program. It is suggested that each program use a portfolio of direct and indirect methods which match the learning outcomes being measured. Assessment data should be fed back to those who can analyze the results and use them to design an action plan and implement improvement strategies. What do the results reveal about program effectiveness, and what steps should be taken to improve the program? Faculty at Kennesaw State University’s Coles College of Business, for example, found that their assessment efforts resulted in an awareness of problems, an opportunity for early intervention, and a continuous and open forum for a discussion of their strengths and areas that need improvement [Roberts, 2008]. “The feedback process is critical to creating and maintaining a systematic quality assurance system. When successfully implemented, all elements of the quality assurance process interact with one another” [Rogers, 2003, slide 10]. Assessment is not an end in itself, but a means to program improvement.

VI. SUMMARY

Accrediting agencies and external stakeholders are placing increased emphasis on assessment of student learning outcomes, an important component of a quality improvement plan. These assessment requirements are very similar among accrediting bodies such as AACSB, ABET, and SACS. In addition to internal assessment data, programs may also want to have external benchmarks to compare student learning across institutions and to calibrate their programs with external market and professional demands. This article has provided some methodologies that permit such comparisons through quantitative and qualitative and direct and indirect measures. Assessment can be conducted using standardized exams. However, a standardized exam requires ongoing costs, may not correspond to a particular program's learning objectives and may have limited value for quality improvement or benchmarking. Another approach is student competitions such as the AITP National Collegiate Conference and the APEX Global Business IT Case Challenge, which permit comparison of a student team against a national population of academic programs. Such competitions promote excitement among students and a positive attitude on campus, while also providing public relations value when students do well. However, success depends on the performance of a small team of students that may not reflect the overall quality of a particular program. In contrast, an internally run comprehensive integrative exercise such as INTEX, which is judged by a panel of invited industry professionals, can involve all upper-division majors and can be tailored to a program's learning outcomes. Although it is "program specific" and does not permit benchmark comparisons, it does provide some external validation.

Indirect assessment measures may include recruiter feedback, alumni surveys, and Executive Advisory Board input. These methods provide external validation in terms of the quality of firms that recruit on campus and the percentage of students who have secured positions prior to graduation. Alumni surveys provide data about how well prepared graduates felt they were for their first jobs, and an advisory board can provide guidance in calibrating a program with industry needs. Great advantages can be derived in gathering data from several sources, using several methodologies and different measures. Whatever methodologies are used, programs must be sure that they have an assessment plan that is comprehensive, systematic, and collaborative, and that data collected are actionable and consistent with program learning outcomes and objectives.

REFERENCES

Editor's Note: The following reference list contains hyperlinks to World Wide Web pages. Readers who have the ability to access the Web directly from their word processor or are reading the article on the Web, can gain direct access to these linked references. Readers are warned, however, that:

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2. The contents of Web pages may change over time. Where version information is provided in the References, different versions may not contain the information or the conclusions referenced.
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