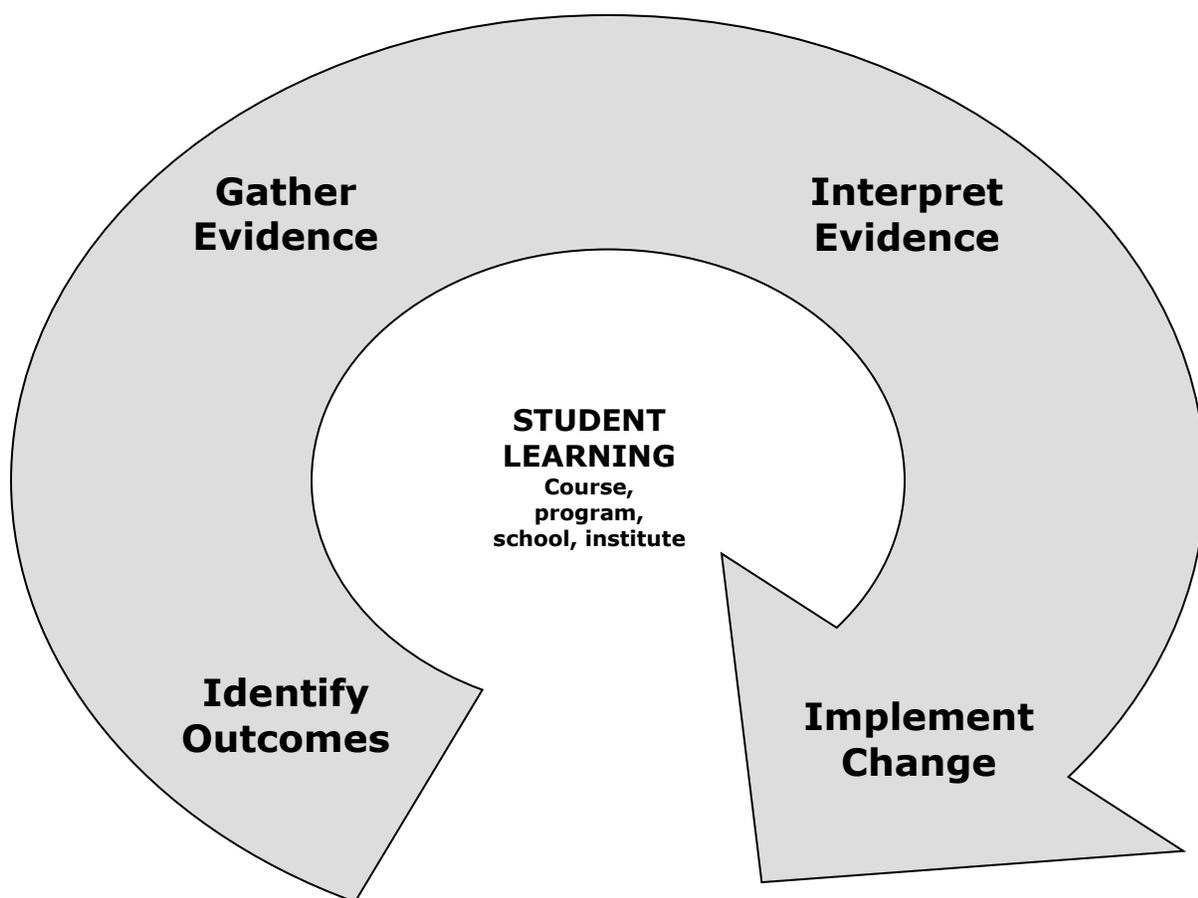


Assessment at Rensselaer

Student Learning Assessment



Revised 2013

Rensselaer Polytechnic Institute
Troy, New York

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Introduction

“Assessment is more than the collection of data” (Palomba & Banta 1999:4)

Assessment alone changes little. Its greatest contribution comes on campuses where information about learning outcomes is seen as an integral part of decision making (Derived in part from AAHE Student Centered Learning Goals)

Assessment structures, processes and practices foster positive learning outcomes. Regularized processes and protocols embed assessment into the culture of learning ensuring the use of assessment results to implement positive changes in teaching and curriculum. Opportunities to focus and coordinate existing assessment practices and develop new assessment initiatives ensure that the process of “doing assessment” is not only a perfunctory task but an integral part of the culture of student learning and institutional improvement.

The educational goals articulated in The Rensselaer Plan clearly establish learning assessment as a high priority for the Institute. The Rensselaer Plan affirms that the Institute will seek to continuously improve the quality of educational programs that “suggest exciting futures; provide a firm grounding in the fundamentals; bridge knowledge to practice; emphasize discovery, reasoning, and action; inculcate a world perspective and cultural understanding; and produce leaders.” The Rensselaer Plan also puts forth the specific goal to “integrate outcomes assessment and evaluation into all educational programs, ensuring timely and continuous improvement.”

As the Institute progresses toward a robust culture of student learning assessment, faculty and administration continue to be provided with information on learning assessment and its importance to improving teaching and learning and to the decision-making processes inherent in institutional assessment. Guided by the goals expressed in The Rensselaer Plan, individual schools within the Institute have developed or are refining and incorporating learning goals and their associated outcomes across departments. Recognizing that assessment of student learning is an ongoing dynamic process, these plans are seen as evolving rather than as established.

In an effort to enhance the learning environment and enhance the identification of learning goals and the subsequent assessment of student learning, the Provost has worked closely with the various schools over the past five years to provide information and guidance on developing learning goals. The objective has been to develop a foundation for learning assessment as a more permanent, formalized, operational function of the Institute. Through this initiative, each school has formally articulated school-level assessment plans and associated assessment processes focusing on learning outcomes. This initiative provides the basis for an Institute-wide assessment plan. The ongoing development of a comprehensive Institute-wide assessment plan and the concomitant integration of that plan into the various existing school assessment plans is proceeding in parallel with this initiative. Continuing development and expansion of assessment activities that support student learning and building an institutional culture of assessment remains an important and ongoing task at the Institute.

Context of the Assessment Movement

Assessment of student learning must be integral to an overall institutional assessment program that is responsive to educational outcomes and adaptive to dynamic learning goals and their changing assessment requirements. In an era of data-driven decision making and performance conscious strategic planning, documenting student learning has become a focal point.

The current focus on student learning assessment is driven not only by internal constituents, students, parents and alumni, but by external forces such as accrediting agencies and funding agencies as well as by employers, customers and competitors. As Barr and Tagg argue, institutions of higher education no longer “*provide instruction*” rather they “*produce learning*” (Barr & Tagg 1995:16). This focus on the student and their learning outcomes has its roots in the educational reform movement that has successfully re-defined reliable data about learning. In addition, emphasis on educational outcomes by legislators and other government officials have focused on accountability measures. Given this atmosphere, it is imperative that an institution identify, define and produce assessment results.

These contemporary forces are a key motivator for the Institute to vigorously promote Rensselaer’s long standing commitment to student learning and embrace an assessment culture that supports student learning. Building on the tradition of strategic performance planning begun in 2000 with the Rensselaer Plan, the Institute is well positioned to define and expand its assessment of student learning.

State of Student Learning Assessment at Rensselaer

Student learning goals at the school, program and course level at Rensselaer have been and continue to be guided by the Institute’s mission statement. At this time, broad-scale institute level core curriculum (general education) learning goals and related assessment activities are under development. The University’s governance structure through the Faculty Senate Curriculum Committee continues to develop specific learning objectives for the core curriculum for approval within that governance structure. Notwithstanding, definitive learning goals do exist in most of the Institute’s schools/programs and are in various stages of development or refinement through appropriate governance processes within the remaining schools/programs.

Rensselaer educates the leaders of tomorrow for technologically based careers. We celebrate discovery and the responsible application of technology to create knowledge and global prosperity. (1995)

The Rensselaer Plan has influenced the educational strategic plans of the various schools and programs by emphasizing certain broad educational objectives (e.g. first year experience and exposure to life sciences) that have, subsequently, prioritized more specific learning objectives at the school/program levels. However, the Rensselaer Plan goals are not necessarily directly associated with assessable student learning outcomes statements and, although these priorities are stated in the overall Rensselaer Plan, the

Institute recognizes that direct measures of student learning are often still the only definitive form of evidence that learning has occurred. To that end, an assessment plan has been developed that addresses school and program level learning objectives. This plan links assessment to institutional improvement through the Performance Planning process (institutional planning, budgeting, staffing, curriculum change and innovation, pedagogy, programming, student support). In addition, the plan defines learning assessment through direct, assessable learning outcomes statements supported by identifiable learning goals and substantiated by demonstrable methods to measure learning. A timeline as well as responsible parties are identified to coordinate the ongoing, dynamic process of assessing student learning.

Rensselaer's Learning Assessment Plan

“Assessment of student learning can be defined as the systematic collection of information about student learning, using the time, knowledge, expertise, and resources available, in order to inform decisions about how to improve learning.”
(Walvoord, 2004:2)

To focus activities as well as thinking about assessment, this plan provides a format for both defining and doing assessment. It focuses on describing assessment practices and connecting student learning assessment to institutional assessment through the various Portfolio's Performance Planning Processes which, in turn, provide for the strategic use of assessment results in decision-making and/or resource allocation and recognition/reward processes. Additionally, the procedures for de/refining assessment plans are outlined with an emphasis on both fostering a collegial climate for assessment activities and recognizing the differences in how assessment may be perceived by various parties. In this last regard, the plan openly acknowledges the differences between assessment as “summative” tool in which assessment is valued as a systematic procedure used to measure how/if goals are met, and, assessment as a “formative” tool in improving teaching/learning.

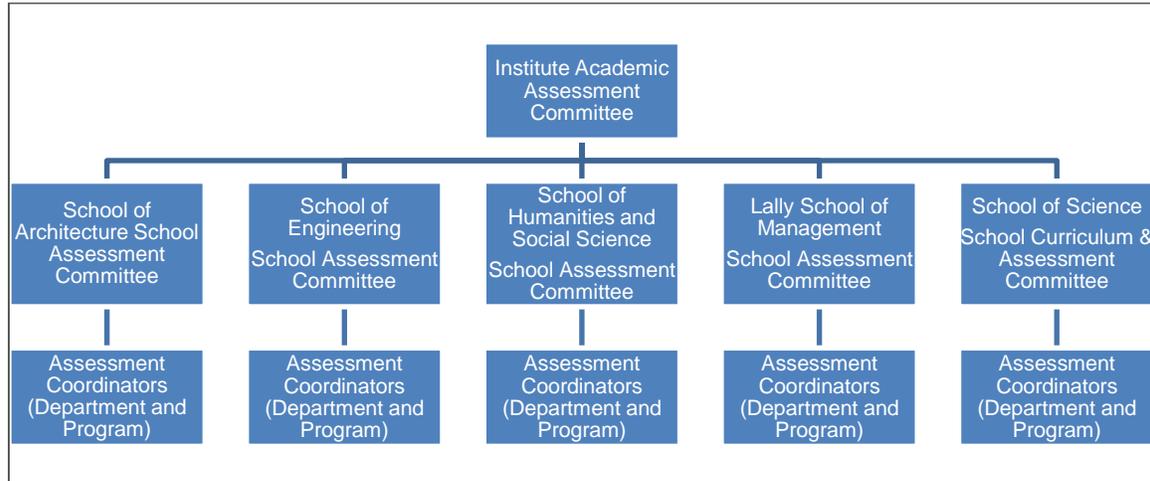
The Learning Assessment Plan provides the necessary steps to realize improved student learning and enhance the student learning experience. It does so through a focus on realizing goals centered on student learning and directly linking planning and resources to improved student learning opportunities. This creation of a teaching/learning assessment climate fosters continual renewal through a process designed to document student learning and promote/reward innovation in teaching and learning aimed at improving the student learning experience and outcomes. Most importantly, this plan recognizes the abundance of assessment already taking place on campus and readily distinguishes between various levels and distinct purposes of assessments of student learning. Although broad and expansive, it prioritizes “local” knowledge on student learning through empowering the various schools and their programs to design and implement assessment activities that highlight and enhance particular programmatic aspects unique to the program/school. In addition, this plan does not limit learning to that which can only be measured objectively, but encourages “informed professional judgment” (Walvoord 2004:2) to assess complex aspects of student learning (critical thinking, scientific reasoning, ethical development, understanding of diversity).

Further, the flexibility in this plan is evident in its promotion of various types of methods and measurements to capture the student learning experience. Both qualitative and quantitative measures are seen as “evidence” with direct measures viewed as the most definitive form of assessing learning, but indirect assessment of student learning goals recognized where appropriate. Finally, the transparency of this process is considered an important aspect in providing useful (versus hidden) information that can systematically link assessment results from the classroom to the department, program, school, institute level decision-making processes. To this end, Digital Measures, an online database program, is being used to facilitate sharing of information as needed.

At the end of the day, assessment is more than collecting data. It is improving the learning experience of students. Hutchings and Marchese (1990) remind assessors that the goal is best captured by the key questions related to the expectations of higher education: *What should college graduates know, be able to do, and value?* In that spirit, the Learning Assessment Plan documents the process and structure of student learning assessment as it exists today at Rensselaer Polytechnic Institute, demonstrates the linkage of these processes to the Rensselaer Plan and the associated Performance Planning Portfolios related to academic and administrative functions and encourages and envisions ways in which student learning assessment processes and practices can be sustained and expanded in the future.

The Learning Assessment Plan follows a three-step approach that guides the effort of each school/program/department as they prepare to participate in an Institute wide assessment of student learning. The steps involve establishing a set of expectations, determining assessment parameters such as timing, cohorts, and responsible groups, and developing mechanisms for interpreting and sharing results of assessment to make the education more effective. The oversight structure for the plan resides with two principal groups. At the institute level, the Institute Academic Assessment Committee comprises of representatives from each school (academic associate deans or their representatives) and the Deans for both Graduate and Undergraduate Education. Within each school, an outcomes assessment committee, chaired by the academic associate dean and with representatives from each department and/or program, will coordinate assessment including data collection within academic units. An organization chart of the assessment framework is shown in Figure 1.

Figure 1: Organizational Chart for Assessment Activities at Rensselaer



Subsequent sections of this report talk about each of these steps in more detail.

2011-2012 Assessment coordinators by department:

- Check that all syllabi for courses taught by faculty in the respective department have a Learning Outcomes section; (see *Syllabus Template* and *Syllabus Checklist*)
- Check that all faculty complete the *Course Assessment Action* form and implement any changes needed at the course level each semester a course is taught
- Collaborate with the Program coordinators to have a plan based on learning outcomes
- Decide the assessment measures (formative and summative) that will be used and supervise the changes needed across department by closing the assessment loop

2012-2013 Program Assessment Coordinators:

- Develop a Program Assessment plan based on learning outcomes and have a list of learning outcomes statements for the program
- Develop a plan/map for the program by showing how the courses belonging to the program help the implementation of the program learning outcomes, by course learning outcomes;
- have a detailed program assessment plan by showing the assessment measures (formative and summative) at program and course level and how the changes were implemented; and document how was the loop closed.

2012-2013 School Assessment Committee

- Each department has one representative at the school level
- School assessment committee members will discuss the school mission statement, formulate the school learning outcomes statements and check that all programs and departments comply with teaching based on student learning outcomes and that at department/program level there is documentation to show that assessment is based on student learning outcomes
- Decide and take action to implement any curriculum and plan changes based on information gathered from assessment based on learning outcomes
- Gather evidence of students learning outcomes assessment and gather documentation of implementation of changes based on outcomes

2012-2013 Institute Academic Assessment Committee

The mission of the Institute Assessment Committee (IAC) is to promote a culture of continual improvement in the quality of teaching and learning through assessment. A cross-campus committee, including representatives from each of the five Schools, representatives from the curriculum committee, as well as staff from the provost's office, will provide a forum for developing and implementing direct and indirect measures of student learning.

The Institute Assessment Committee will:

- *Review and update Institute and school-specific learning outcomes and ensure coordination between the schools*
- *Share information and expertise for exchange of ideas surrounding teaching, learning and assessment, and curriculum goals that support courses, programs, and the Rensselaer experience*
- *Collaborate in the development and implementation of campus-wide Institutional assessment strategies and measures*
- *Be familiar with accreditation requirements (ABET, AACSB, and NAAB, as well as our regional accreditor Middle States Commission)*
- *Include school representatives, who will also serve as de facto chair or liaison for each school assessment committee*
- *Verify that assessment results are being used to effect continual improvement in programs*
- *Review status of participation in all assessment initiatives*
- *Have a general institute wide assessment plan based on student learning outcomes (decide what measures will be used, decide timelines, help schools implement any changes, etc.)*
- *Overview how schools close the assessment loop and what changes need to be made at the institute level to ensure that assessment is an integral part of planning*
- *Interact regularly with Core Academic Committees (Curriculum Committee, General Education Curriculum Review Sub-Committee, HASS Core Curriculum Review Sub-Committee) and the Assessment Committee*

Office of Institutional Research and Assessment (OIRA) representatives will support the IAC, providing faculty development and assistance related to the integration of

assessment strategies into the curriculum, helping to view student assessment as an integral part of the learning experience. The OIRA representatives will be responsible for providing information concerning assessment and regional accreditation expectations, and will continue to secure appropriate technology and infrastructure to support assessment efforts.

A. Establishing Program Level Expectations

Each program is expected to develop a set of expected outcomes that would characterize graduates from that program; different courses in the program can contribute towards meeting these outcomes, or there may be other experiences in the program such as internships or work experiences that may have an impact. Once outcomes have been established, it would also be important to define both the methods as well as the criteria used to assess a particular outcome. A class exam, a portfolio of independent work, or participation in a team-based project may be some examples of such criteria and methods. Not only must the criteria be developed to determine learning outcomes but also the level of accomplishment which would indicate that successful learning has occurred. This means that not only must a program level expected performance be defined, but each program must collect baseline information and/or exemplars to serve as benchmarks for the expected level of performance.

B. School and Program Level Assessment Parameters

An important step in developing the learning assessment plan is to identify and establish the boundary conditions that define the proposed assessment. At the very outset, each program must identify who will be assessed. This group may vary, depending upon the nature of the particular program under consideration. The program should clearly indicate if all students within a program must be assessed or if the objective of the exercise is to focus on a select cohort. It is also important to establish a schedule according to which assessment data will be collected. For a particular course, data may be collected throughout the semester in the form of homework, project assignments, or tests. An instructor may solicit feedback from students through individual forms as yet another instrument of assessment. At the program and school level, assessment data may be collected upon completion of a certain portion of the program, when a student is ready to graduate, or after a graduate has been gone for a certain number of years. Many departments in the school of engineering collect assessment data in this manner. Finally, each school should identify individuals responsible for interpreting the results available in the collected data. Within a department, it is advisable to organize small groups of faculty responsible for a subset of courses within a particular area; a collective interpretation provides a broader perspective than would be available to, say, the instructor of a particular course. It may also be worthwhile to involve student representatives in this interpretation process. A second layer of interpretation of assessment data must be set up at the school level, involving external evaluators. This group could comprise of alumni, employers, or faculty from other schools at Rensselaer or other universities.

C. Interpretation and Implementation

Interpreting and using assessment data is probably the most challenging segment of the assessment exercise. The data can be quite revealing and may be surprising in many instances. It may indicate that a revision in the pedagogy is required, or the curriculum may need to change or be revised. For example, assessment data across the program an inference may emerge that new material that better reinforces quantitative reasoning is required in the program. It may indicate that a better connection between in-class and out-of-class learning is necessary. The data may also influence how a program should allocate resources in its planning process. It is important that each program and school develop guidelines on how and with whom the interpretation of assessment data will be shared so that the assessment cycle supports the continuous improvement process with all steps in the cycle repeated.

Timeline for Implementation

The student learning assessment plan recognizes the disparity in the level of learning assessment across the different schools. Schools such as Architecture, Engineering, and Management have a more evolved structure for assessment in order to conform to requirements of other accrediting bodies. In the schools of Science and Humanities and Social Sciences, the assessment function was confined to either new programs or in those departments and courses where significant innovation in pedagogy had occurred and there was the need to evaluate the effectiveness of the new approaches for delivering education. To introduce a more uniform culture of assessment across the schools, it is important that schools observe the following timeline for developing key components of a process for institute wide assessment of student learning.

- a. As of Spring 2011, all course syllabi are to include a section of Learning Outcomes. Syllabi should comply with the Institute Syllabus template. Courses will be documented in the Scheduled Teaching section of Digital Measures, our online database supporting systematic documentation of learning outcomes and the assessment cycle.
- b. Each Department has a faculty member who is the Assessment coordinator who works closely with the program coordinator to implement an assessment of student learning based on course and program learning outcomes.
- c. Each school establishes an (outcomes) assessment committee by 3/1/2013. To conform to existing structure in some of the schools, it is recommended that the Associate Dean of the school serve as the chair of a committee comprising of faculty drawn from departments/programs.
- d. Programs should have listed program learning outcomes that are mapped by courses belonging to the respective program. An assessment plan based on student learning outcomes should be presented for each program by 4/15/2013.
- e. Establish an Institute Assessment Committee (IAC) co-chaired by Deans of Undergraduate and Graduate Education to monitor progress of school committees. This ad-hoc group will be the kernel for developing a continuous assessment cycle for all academic programs.
- f. Each school must define a set of learning outcomes that they would like to assess by 4/15/2013. If this is the first outcomes assessment in school, limit number of outcomes to determine how an assessment cycle will operate based on existing structures/processes
- g. For schools and departments with assessment programs in place, there is a need to organize data in a standard form. More specifically, the IAC requires that program assessment plans be assembled.

The IAC convened in Fall of 2012 to begin analyzing the progress made by the various assessment groups in each school, and to identify the next steps in the process of bringing about an institute-wide culture of assessment of student learning at Rensselaer.

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Appendix 1: Examples of Indirect/Direct Measures of Student Learning

The assessment process involves both direct and indirect measures, both of which are equally valuable to the ultimate goal of continuous improvement in student learning. Direct measures typically look at student work such as examinations, term papers, projects, artistic performances, laboratory work, software development, internships, etc., as a demonstration of meeting stated learning objectives. Indirect measures include student or other self-report of learning experience through interviews or surveys of students/alumni/employers. Indirect measures may also include data pertaining to job placement/career trajectories, retention/graduation statistics, course evaluations, and new teaching strategies or pedagogical innovation that may have been introduced.

These direct and indirect assessment measures can be identified at the institutional level, a program level, and at the individual course level. Examples of these are tabulated as below.

Institutional Level Student Learning Measures	
Direct Measures	Indirect Measures
<ul style="list-style-type: none">- Performance Tests (Writing, General Knowledge)- Criterion Based Rating for Core- Achievement Tests- Ask Students- Audits of Student Work Over Time	<ul style="list-style-type: none">- Surveys – Student Perception or Self-report of Activities- Study of Transcripts (Trends, Course Selections, Grading)- Annual Reports (Graduation/Retention, GPA's...)- Alumni Employer Surveys- Faculty Surveys of Student Strengths and Weaknesses

Program Level Student Learning Measures	
Direct Measures	Indirect Measures
<ul style="list-style-type: none"> - Capstone or Thesis Evaluation - Exhibits or Performances - Licensure, Certification Subject Area Tests - Student Publications, Conference Presentations - Internship Ratings of Student Performance - Portfolio Evaluations - Course Embedded Assessment 	<ul style="list-style-type: none"> - Student Perception Surveys and Exit Interviews - Alumni and Employer Surveys - Focus group Interviews - Registration/Course Enrollments - Department or Program Review Data - Job/Graduate School Placement - Curriculum and Syllabus Analysis

Course Level Student Learning Measures	
Direct Measures	Indirect Measures
<ul style="list-style-type: none"> - Course Evaluations - Classroom Exams and Quizzes, Term - Papers, Reports - Standardized Tests - Rubric Scores for Writing, Oral Presentations, Performances - Artistic Performances and Products - Research Projects - Class Discussion Participation - Observations of Field Work, Internship, Service Learning, Clinical Experiences - Case Study Analysis - Grades Based on Explicit Criteria Related to Clear Learning Goals 	<ul style="list-style-type: none"> - Course Evaluations - Outlines of Concepts and Skills to be Covered in Class/Tests - Fraction of Student Time in Active Learning - Number of Student Hours in Service Learning, Homework, Extra-Curricular Activities Related to Course. - Grades not Based on Explicit Criteria Related to Clear Learning Goals

Appendix 2: Student Learning Assessment in the Schools

This section provides brief summaries of the state of assessment activities in the various schools at Rensselaer. The Schools of Architecture, Engineering, and Management already have in place assessment structures and processes that are not significantly different from those being recommended in this formal written document. Schools of Science and of Humanities and Social Science are putting into place processes that will contribute to a more uniform structure of assessment across the Institute.

Courses in all Schools are subject to the standardized course assessment conducted through the Office of the Provost using Digital Measures (DM) proprietary software. DM provides raw data and a comparison of an individual faculty member's performance. Beyond this level of course assessment, each School has developed its own mechanisms of assessment and using results to improve the quality of student learning.

School of Architecture

In the School of Architecture (SoA), several internal and external processes are established for articulating, communicating and assessing student learning goals. Learning outcomes are established by faculty committees, the dean and individual faculty responsible for each course. They are communicated to students through course syllabi. The SoA's internal self-assessment of learning outcomes and courses involves formalized activities ranging from student course evaluations to faculty self/course assessment, public reviews of student design work, faculty retreats, and annual reviews by the program heads and Dean. Program assessment involves all school faculty meetings, the curriculum committee, a Dean's student advisory committee, the Dean's Advisory Council and Alumni(ae) focus groups and surveys.

The professional programs of the School (B.Arch and M.Arch 1 – representing over 80% of the student body) are accredited by the National Architectural Accrediting Board [NAAB]. Most State registration boards require graduation from a NAAB-accredited program as one of the prerequisites to licensure and the right to practice architecture. In addition to the internally driven self-assessment techniques itemized above, a comprehensive assessment is undertaken by the NAAB every six years. This review includes the development and submission of an Architecture Program Report [APR] (self-study) and visit by an accrediting panel of external reviewers who examine the institutional context and resources, faculty, curriculum, course syllabi and materials, student work and evaluations for all required professional and several optional courses that are taught at the SoA.

There are twelve conditions of the NAAB that must be met by the professional

programs, including thirty-two student performance criteria (“learning outcomes”) and a condition that specifically addresses the SoA’s ongoing ability to critically self-assess student learning goals throughout the curriculum. At each accreditation review the school must show evidence of meeting each of those criteria. The program must also provide the NAAB with an assessment of the degree to which it is able to measure its progress toward achieving the NAAB Conditions and Perspectives, as well as its own stated missions and strategic plan. The assessment plan must (and does) include a solicitation of faculty, student, and alumni feedback on the program’s overall curriculum and learning context. Feedback may be obtained through such techniques such as surveys and focus groups, but individual course evaluations are not deemed sufficient to provide insight into the program’s substantive focus and pedagogy.

The Curriculum Committee, in co-operation with the faculty, Associate Dean and Dean of the SoA are responsible for identifying, communicating, evaluating and changing student learning goals, implementing assessment practices, approving and adopting new curricula and pedagogy, and coordinating educational and institutional assessment.

School of Engineering

School of Engineering (SoE) programs at the bachelor’s level are accredited by the Accreditation Board for Engineering and Technology (ABET). Every six years, all departments in the School of Engineering prepare an extensive self study report and supporting documentation for ABET. ABET requires that each degree program has a clear statement of educational objectives (What the Program desires its graduate achieve within 3 to 5 years of graduation) that is clearly communicated to all program constituencies (Appearing on each program’s webpage, and with the program description within the RPI Catalog). Each program in the SoE has an accreditation coordinator responsible for maintaining additional assessment instruments such as senior exit surveys, program alumnae surveys, special survey forms for course instructors and industry sponsors of student projects (usually targeting specific educational goals in project courses), and other data viewed as important to assessing student and program performance including faculty teaching histories, class section size records, and data on course grades. Results from assessment instruments are reported to their associated program faculty and industrial advisory boards on an annual basis. These are then used by undergraduate curriculum committees associated with the individual programs to recommend changes in curricula, courses, pedagogy and the assessment process itself.

The SoE has a standing accreditation and assessment planning committee (AAPC) that has been in existence since 2000. This committee is chaired by the SoE Associate Dean for Undergraduate Studies and meets a minimum of seven times per year. It includes representatives for all 11 accredited undergraduate

engineering programs at Rensselaer. Consistent with fundamental element 1, the AAPC is responsible for articulating, communicating and coordinating assessing learning goals in the form of specific educational objectives and learning outcomes for each program. Initial proposals for these objectives are formulated by accreditation directors from associated with each degree program based on feedback from faculty, students, alumni, industrial advisory council, and recruiters, as well as through extensive committee discussion. Proposed objectives and modifications to existing objectives are vetted to faculty members, students, alumni, industrial advisory boards and other interested constituents for review and comment. Objectives are formally adopted through a vote of the full faculty associated with each program (and in many cases approval of their associated industrial advisory committee).

The assessment coordinator and department chair for every undergraduate program in the SoE are jointly responsible for development and maintenance of the assessment processes supporting a degree program. To assure validity and consistency of learning goals and program Student Learning Outcomes, the assessment coordinator works with the responsible undergraduate committee, and course instructors to define specific assessment measures for each designated learning outcome and how these contribute to the realization of the program objectives. In most cases, individual learning objectives are assessed through multiple sources with inputs from faculty members, students, alumni and industry. Typically, the main assessment input from faculty is obtained by associating learning outcomes with specific courses in the corresponding academic program. The courses associated with learning outcomes are determined through a consensus building process involving course instructors, the program's accreditation director, and other faculty members affiliated with an academic program. Grades from individual assignments designed or chosen for the assessment purpose from appropriate combinations of courses, i.e., those most directly contributing to the realization of a specific curriculum learning objective, are used as one of many assessment inputs with specific target minimum grade point values helping to define one of several multifaceted measures of learning outcome and objective attainment. In some cases, course instructors use specially developed assessment forms that directly target specific learning outcomes. For example, data is collected on the written report grades and oral presentation grades in some project courses. Ratings for specific goals such as design, independent research skills, problem solving, etc., may also be obtained using special forms.

Student input for specific curriculum learning objectives is typically obtained using senior surveys and/or course level assessment based on the IDEA (now Digital Measures) course evaluation survey. Senior surveys measure the students' perception of the extent to which specific courses address specific objectives as well as general perceptions as to whether these objectives have been met through the overall undergraduate experience. In using the Digital Measures forms, instructors and assessment coordinators may develop

evaluation questions pertaining to specific objectives for inclusion with the regular course evaluation. The assessment coordinator then uses these responses to validate the consistency between a given course and the learning objective it is intended to support as well as the extent to which the course achieves the instructor's stated objectives. Alumni inputs are obtained for all SoE undergraduate programs using questions addressing whether the realization of specific program objectives have been addressed and contributed to the undergraduate experience. In some cases, assessment coordinators also use the Rensselaer co-op evaluation survey completed for individual students by industry employers where performance measures on the standard evaluation form are associated with specific learning objectives.

At the program level, learning goals are established through a consensus building process involving faculty, students, alumni and industry constituents. This is accomplished through meetings of the full departmental faculty responsible for each program in which proposals developed by responsible curriculum committees are reviewed and discussed, open meetings of curriculum committees where students are invited to provide inputs, special meetings convened to obtain student feedback on learning goal proposals, and industrial advisory board meetings held on an annual or semi-annual basis. Assessment results for learning goals are reported to departmental curriculum committees on an ongoing basis where they may prompt proposals for changes in course content, pedagogy and curricula

School of Science

Each department and the interdisciplinary Information Technology program that is managed by the SoS has a curriculum committee that is responsible for maintaining the curricula of the degree programs that reside in that department. These curriculum committees are also responsible for coordinating the educational assessment of those programs. In addition, there is a school-wide curriculum committee that is responsible for coordinating the curricula between the departments in the SoS. This school-wide committee is also responsible for coordination of educational assessment at the school level. The SoS Curriculum Committee (SoSCC) is chaired by the Associate Dean of Science for Academic Affairs and includes the chairs of the curriculum committees from each of the departments in the SoS.

Within each department, curriculum committees are responsible for articulating, communicating, and assessing student learning goals and outcomes for individual degree programs. Each committee is charged with developing a set of learning goals and outcomes for its programs. The current focus is on undergraduate programs. Input for these activities is obtained through discussions at departmental faculty meetings and through on-line faculty discussions. The SoSCC reviews and coordinates the work of the departmental

curriculum committees. The SoSCC is responsible for articulating, communicating, and assessing learning goals and outcomes at the school level. It is currently developing a set of learning goals and outcomes for the school as a whole to be completed by the Fall 2013 semester. Input for these activities will be obtained by the members of the committee through discussions they will lead within their departments.

Responsibility for coordinating educational assessment in the SoS will rest with the Associate Dean of Science for Academic Affairs. In each department, responsibility for coordinating educational assessment will rest with the department head and the chair of the departmental curriculum committee. Assessment measures used in the SoS include: alumni surveys, senior exit surveys, course evaluation forms and a variety for direct measures based on specific course activities.

The SoSCC is responsible for assessment of school-wide learning goals and outcomes for all programs in the SoS and serves as a review committee for the assessment plans developed in each department. It will review the departmental plans to evaluate their consistency with published student learning goals and outcomes. The department heads will serve as a review committee for the assessment plans at the school-wide level developed by the SoSCC.

All SoS faculty are responsible for identifying, communicating, evaluating and suggesting changes to student learning goals and outcomes for a program by working with the appropriate curriculum committee for that program. Similarly, all SoS faculty are responsible for implementing assessment practices in their own courses and for programs in which they teach courses. Guidance and coordination of the assessment activities will be provided by the relevant curriculum committees responsible for each program.

As the SoS gains experience in formally assessing learning goals and outcomes, the methods above will be refined. Sharing results between departments and with other Rensselaer schools will be emphasized. This is especially important since the SoS teaches a large number of courses taken by students from other Rensselaer academic schools. Every effort will be made to solicit feedback from constituents at all levels.

Lally School of Management

At both the undergraduate and graduate level, guidelines for the management degrees, including articulating, communicating and assessing student learning are established through AACSB guidelines. AACSB re-accreditation is required every ten years and covers both the Troy and Hartford campuses. As part of the AACSB accreditation, the Lally School of Management (SoM) is required to abide by a set of standards established by the international AACSB organization which

also defines how student learning assessment should be done at an AACSB accredited school. The methodology for becoming accredited with AACSB takes the form of documentation supporting compliance with several standards created by the governing organization, with a focus on the creation and use of assessment feedback loops that help guide the school to meet their stated goals and objectives. There are specific standards that address the definition of learning goals for students and measurement of goal achievement by business schools.

There is an Assessment committee in the SoM that tracks and creates a repository for course and program-level Assurance of Learning data on an ongoing basis. The data are then shared with the appropriate SoM program committees (Undergraduate, Masters, PhD) who in turn use the data to track each program's progress vis-à-vis their stated goals and objectives. These program committees, student advisors and student mentors constantly cross reference program learning goals with course registration, syllabi, course level knowledge assessment, grading, student feedback, and job placement success. At the doctoral level, students are required to demonstrate achievement of knowledge and skills in original research, teaching abilities, and intellectual contribution. In the Ph.D. program, the Dissertation committee tracks each student's accomplishment of several learning goals established by the program, in addition to those that are course-embedded.

The Undergraduate and Master's Program committees are also responsible for making curriculum recommendations and lead faculty discussions on program goals and objectives. Working with the Assessment committee, each program committee helps create and maintain a spreadsheet that maps program objectives with specific outcome measures and their location within the program. As noted above, the corresponding data are gathered by the Assessment committee, and are then used by the program committees to facilitate discussion and provide data-driven decision making.

Feedback on student learning goals, assessment practices and curricula and pedagogy is obtained and utilized within the SoM in a number of ways. The primary mechanism is the use of course embedded measures that are reported via Digital Measures. Other mechanisms include exit surveys highly recommended for each graduate. The Dean also meets with undergraduate students at the end of every academic year to review potential issues and concerns. This information is fed back to the appropriate committees and helps shape future discussions and changes. The Office of Undergraduate Education also advising tracks job placement of the undergraduate students to analyze where there may be gaps between what is being taught and what students should be able to demonstrate both in the classroom and once employed. Potential employers are asked to supplement advice to be provided by the SoM Advisory Board. Program Directors also provide comment to their respective committees regarding student placement, as well as feedback gathered from both potential employers and from their interactions with students. As in other

schools at Rensselaer, the SoM faculty members also use the Digital Measures system to obtain feedback on teaching and learning techniques to improve pedagogy for future courses via the Course Evaluation process.

School of Humanities and Social Sciences

Although learning assessment is widely practiced within the school, formal processes of student learning assessment at the program level have not traditionally been a part of the academic culture within the School of Humanities (H&SS) at Rensselaer. However, significant strides are currently being made in this direction, including the important first step of clarifying the mission and objectives of each of the School's eight undergraduate degree programs. These include the Bachelor of Science degrees in Cognitive Science, Communications, Electronic Media, Arts, and Communication (EMAC), Economics, Electronic Arts, Philosophy, Psychology and Science, Technology and Society (STS). Presently, the HASS Assessment Coordinator is working with each department to establish learning outcomes for each degree program, a process that will be completed by the end of the spring semester of 2013.

Prior to the beginning of the 2005-2006 academic term each department chair appointed a coordinator to work with a departmental assessment committee to formalize the evaluation process. The task of these committees is to begin the process of gathering and assessing samples of student work. Additionally the groups were responsible for creating and administering survey instruments for different populations - e.g., seniors, graduates, employers, co-op sponsors. This would entail seven specific steps: constructing survey items in accordance with theory and research on surveying, making sure department faculty agree with/contribute to items on the survey, pre-testing the survey, establishing an appropriate sampling procedure, devising ways to contact various populations to be surveyed, devising a means of analyzing and reporting data for each survey and estimating costs of gathering and collecting data. The committees were also charged with creating an advisory board (of alumni and/or employers) that will come to campus and not only review student work but also review and help refine each department's goals. Finally, each committee was asked to prepare an assessment plan, with activities and a timeline for the first 5 years of assessment activities.

During the 2013-2014 academic year, each department's assessment coordinator will devise and begin carrying out his or her five-year assessment program. This should include continuing the work of surveying appropriate constituencies and gathering and assessing samples of student performance. During this academic year, assessment coordinators will also begin helping faculty see how to use results of the assessment to inform their teaching as described in fundamental element 3. In subsequent academic years, departmental assessment coordinators will continue to do the assessment work

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described above. They will also carry out an ongoing process of improving the department's assessment procedures as well as reviewing and, as necessary, guiding the revision of each department's learning goals for students in its degree program(s). As appropriate and helpful, department assessment coordinators will be able to draw on assessment procedures currently being developed by the First Year Studies (FYS) program, an interdepartmental program sponsored by H&SS.