

# Outcome Assessment of Learning Objectives: A Case for using e-Learning Software

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## ABSTRACT

There has been widespread interest within institutions of higher education to measure learning outcomes. This has resulted in considerable debate on how to best define, measure, and achieve quality learning outcomes assessment. Yet, there has been no development of electronic processes and tools for continuous program assessment and feedback. This project addresses this challenge, with a \$200K grant from the Davis Foundation, by using a commercial e-learning system, WebCT™, as a technology platform to support the articulation, implementation and reporting of common learning objectives defined across multiple academic disciplines. The project will develop a set of processes and a dashboard system to monitor and report on course and program level learning outcomes in accordance with the University's learning objectives. The goal of this project is to develop an electronic outcomes assessment process to improve the learning environment for students, the sharing environment for faculty and the reporting environment for administrators.

## Keywords

Outcome assessment, electronic learning systems and digital dashboards.

## INTRODUCTION

In the last decade there has been widespread interest within academic institutions to better define student learning objectives and to more credibly measure student learning against those defined objectives. This has resulted in considerable debate on how to best define, measure, and achieve quality learning outcomes assessment. One approach has focused mainly on the process of assessing student learning within courses and academic programs (Banta, 2005). Another approach has focused on measuring outcomes assessment within specific fields or majors, as the process of developing and implementing learning outcomes and assessment procedures across disciplines is challenging and complex, requiring collaboration and communication among faculty who do not typically work together. In part, this is a reaction to increased calls for accountability in higher education as expressed by various political and competitive forces, encouraged by the debate surrounding the reauthorization of the Higher Education Act of 1965 (Lovett, 2004; Shulock, 2004). Both regional and professional accreditation agencies acknowledge this growing call for accountability and have integrated assessment standards into the accreditation process (AACSB, 2005).

Depending on one's role in a college or university, the term assessment may be interpreted differently. A student considers an examination or course project a form of assessment, an instructor considers these measures along with student interactions and perhaps course evaluations while the dean often examines enrollment, retention and completion rates. While each of these individuals may participate in the assessment process from their own institutional perspective, a commonly accepted definition of assessment suggests that ultimately, "Assessment is the systematic collection, review, and use of information about educational programs undertaken for the purpose of improving student learning and development." (Palomba & Banta, 1999). This definition, broad enough to incorporate varying institutional perspectives, focuses assessment on the collection and review of various types of data with the intent of ultimately improving student learning. This definition helps to move beyond a specific course assessment or evaluation activity to a broader understanding of how different types and levels of assessment (and accompanying data) can be used to improve the learning process.

The current process of monitoring the integration and achievement of learning outcomes within courses and degree programs is typically a labor intensive, paper-based process often driven by accreditation visits and timelines. Faculty are asked to report which outcomes are addressed by which course activities and how student achievement is assessed. This information, along with sample student work, is then collected by department chairs and deans who organize and present it to visiting accreditation teams. While assessment as a tool for improving student learning and educational programs offers great promise, existing processes for presenting learning outcomes and collecting and summarizing student achievement are somewhat limited. What is needed is a method for clearly linking course level activities and assignments to program and institutional-level learning outcomes.

To date, not much has been done on the development of electronic processes and tools for continuous program assessment and feedback (Jarmoszko, et al., 2003). The process of monitoring and tracking the learning objectives and student performance is currently an expensive, labor intensive, paper-based process; requiring a manual review, tracking and reporting of learning outcomes coverage and student achievements. This project addresses both challenges by proposing to use a commercial learning management system, WebCT™, as a technology tool to support the articulation, implementation and reporting of common learning objectives defined across multiple academic disciplines. To the best of our knowledge, we have not found any other university using a commercial learning management system (E-Learning System) like WebCT for tracking learning objectives and measuring outcomes assessment.

The goal of this project is to assess common learning outcomes within interdisciplinary courses, strengthen the broader undergraduate curriculum, expand faculty development, and support a more effective and consistent teaching and learning experience. This project proposes to develop WebCT Vista course sites that clearly articulate learning objectives, course assignments and related assessment activities for all participating interdisciplinary courses. In addition to streamlining and enhancing the assessment process of course and program-level learning objectives, this project will:

- Improve the learning environment for the students by increasing student access to content, instructors and peers (e.g., 24x7 anywhere access, content sharing);
- Improve content and assessment consistency across multiple disciplines;
- Facilitate student development of web-based academic portfolios, and
- Reduce overall administrative costs through an online paperless assessment, reporting, e-portfolio, and tracking approach.

The key questions this research plans to address are “*Can e-learning systems be used to capture the outcomes assessment activities as per the learning objectives of the degree program?*” and “*What is a good approach to report the learning outcomes to faculty and administrators?*”

## PROJECT BACKGROUND

Our University has been a leader in the integration of academic technology into the teaching, learning and research processes, understanding that technology is a lever that assists institutions in adapting to economic, political and societal changes. Faculty within the University, like many other universities, have developed vision statements, mission statements, and learning objectives for most degree programs. We are now in the process of further refining and implementing assessment activities which clearly map stated University and College learning objectives into a variety of interdisciplinary courses. Accreditation agencies like AACSB and others require universities to articulate their mission and learning objectives for their academic programs. Once defined, they want colleges to measure and report on the achievement of these objectives on a regular basis. While it is easy to layout the mission and learning objectives, capturing data from academic programs on learning objectives achievement is not easy. During this implementation phase, it has become clear that an e-learning system can facilitate capturing and presenting data on learning outcomes and assessment activities conducted across the courses in the academic program.

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### Current Process – Self Reporting

Currently, the faculty self-reports on the learning objectives fulfillment by filling out a matrix on a spreadsheet matching the learning objectives to the activities in their classroom as shown in the [Table 1](#) below. The “A” on the matrix means that the learning objective was *assessed* in the course, while “C” on the matrix means the topic was *covered* in their course. Assessed is defined as some form of testing or evaluation on the objective in the course either through an exam or assignment. Covered means the objective was discussed in class but no evaluation was done to assess the students’ understanding on the topic. For assessed topics faculty are asked to provide samples of assignments, exams, and other materials at the end of semester for reporting requirements. The current process is very subjective, self-selective, cumbersome, tedious and prone to errors. In addition, there is inconsistency in reporting and considerable delay in getting all the materials from the faculty.

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<b>Learning Objectives</b>	63.301 Intro to MIS	64.201 Accounting	40.201 Psychology	34.255 Writing	<b>Aggregate Summary</b>
COMMUNICATION SKILLS: Evidence of effective listening and feedback skills within the context of a business problem or opportunity.	A	A	A	C/A	A
QUANTITATIVE SKILLS: Evidence of applying quantitative decision making tools to business problems.		A	A		A
TEAM PARTICIPATION: Evidence of contributing useful content to team discussions and facilitate the decision making/problem solving process.	A			C	A/C
TECHNOLOGY USAGE: Evidence of using information technology and business productivity software.				C	C
ETHICS: Evidence of clearly and fluently articulating personal business values and views regarding business social responsibility and distinguish between ethical and unethical business behavior.	A	A	A	C/A	A

**Table 1: Learning Objectives Reporting Matrix**

### New Process: A Reporting Example

This project is developing an electronic outcome assessment reporting system which will allow faculty to assign the learning objectives to every learning object they create on the e-learning system like assignments, discussions and exams at the time of course (content) design. Once the course is produced, the electronic learning system will catalog and track all learning objects for all courses by the degree program’s learning objectives, like a dashboard system, as shown in Figure 1 below.

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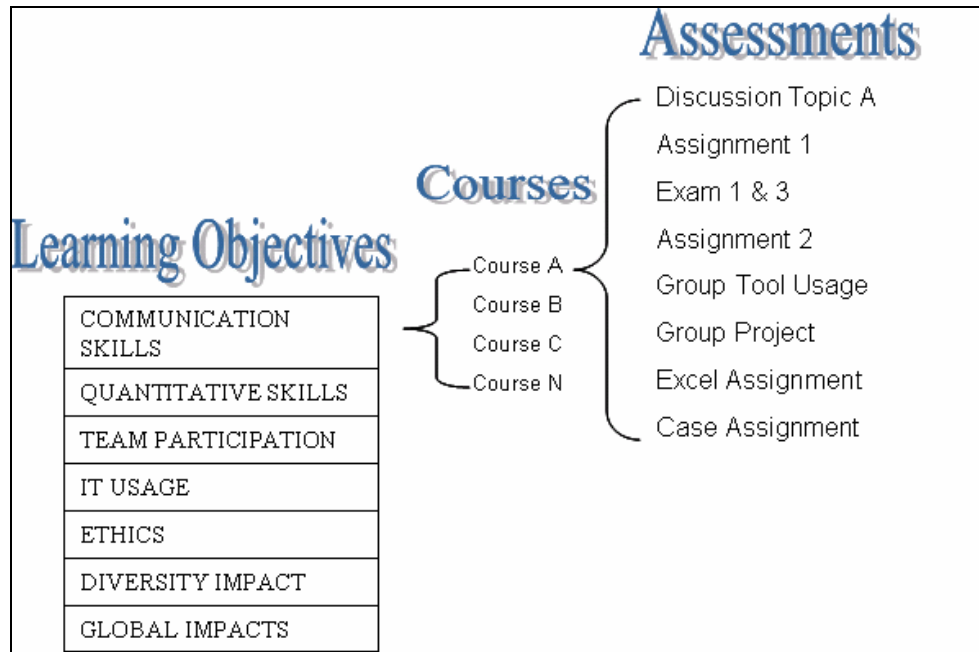





Figure 1: Tracking Outcomes by Learning Objectives

### E-Learning System

As mentioned before, this project will use the WebCT e-learning system which uses a learning object model for course design as shown below. However, the learning objects do not provide any tracking ability for in regard to making progress towards meeting learning objectives. This project will introduce customizations that will incorporate the tracking ability of learning objectives. A description of learning objects is shown in Table 2 below.

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WebCT Learning Objects	Description
 <b>Assessment Tool</b>	Quizzes/exams, surveys, self-tests Multiple question types Timed/manual release, Auto-grade, feedback, grade book
 <b>Assignment Tool</b>	Individual/group assignments Instructions, attachments, due dates Timed/manual release, feedback
 <b>Discussion Tool</b>	Grable discussions Individual or teams, attachments, Timed/manual release, edit/lock Individual or peer review




 <b>Grade Book Tool</b>	Auto-created for all students Entries linked to assessments, assignments, discussion Control release of grades/comments Import/export function
 <b>Groups Tool</b>	Student teams w/ private group workspaces Instructor assigned or student selected Student activities in discussion or chat/whiteboard
 <b>Chat Tool</b>	Live IRC Chat facility for live interactions Logs available for instructors and students Individual or peer review

Table 2: WebCT Learning Objects

## PROJECT PLAN

We are currently developing an electronic learning assessment process for the Bachelor of Business Administration (BSBA) program at our university. The program is multi-disciplinary with courses from business and non-business disciplines. The outcomes from this pilot project are:

- Development of a learning-outcomes and assessment training program for a multi-disciplinary faculty,
- Execute a summer training program to assist 12 multi-disciplinary faculty in integrating learning outcomes and assessment procedures,
- Development of 12 course websites in WebCT that integrate course learning outcomes and electronic assessment procedures, and
- Integration of an electronic reporting process into the University's WebCT installation to facilitate reporting across disciplines.

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As part of the outcomes assessment process, we plan to use WebCT Vista™ to standardize the process of measuring several common student-learning objectives across all courses participating in this project. WebCT Vista includes a sophisticated online assessment and reporting tool called PowerSight Kit™, which provides access to a wealth of data about student learning that is collected in real-time as learners interact in the e-learning environment. Our *digital dashboard* application will allow administrators to access student data with graphical-visual interface, aggregate data and conduct custom analysis for institutional reporting purposes, such as quality review by assessment and institutional research staff, e-learning program planning, or research on learning effectiveness.

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With the WebCT PowerSight Kit™, we will have visibility into every student interaction that takes place in WebCT through event-level tracking, automatically capturing the many steps that students take during their learning process. When these interactions are multiplied over many courses and the data are aggregated over multiple academic terms, the result is a powerful assessment data set that can be leveraged to answer an institution's questions about student learning behavior. In addition, we will use the roll-up reports provided by the PowerSight Kit or export the raw tracking data to external reporting packages like Cognos™ for custom analysis.

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In this project, we plan to setup an assessment environment for the multi-disciplinary courses on the WebCT™ system. Six of these courses will be from general education, liberal arts and sciences disciplines while the remaining six courses will be a range of foundation business courses available to students in all disciplines. This multidisciplinary faculty will be trained through summer workshops on developing online course content, assignment, discussion, team/group work, and assessment materials designed to measure stated learning objectives common to all courses. In addition, funding will be used to develop administrative modules to monitor, collect and report the learning outcomes from these courses and categorize them according to the learning objectives of each respective program.

The project will initially focus on the configuration and testing of our e-learning system and reporting tool along with the identification and selection of faculty from appropriate disciplines. Next, we will train and assist faculty participating in this grant to develop and deploy course learning content and assessment exercises in accordance with the common learning goals and objectives and e-learning system. Finally, we will customize and utilize the PowerSight toolkit to collect, aggregate and analyze learner outcomes and course and program effectiveness. The course development and deployment will be spread over two years. In Year 1, we plan to pilot and test four of the twelve courses and incorporate our feedback when adding the eight remaining courses to the study in Year 2. We will also ~~revise the Year 1 courses as deemed appropriate.~~

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### Examples of Outcome Data Analysis

A digital dashboard will provide a visual reporting system for feedback and analysis as shown in the Figures 2 and 3 below.

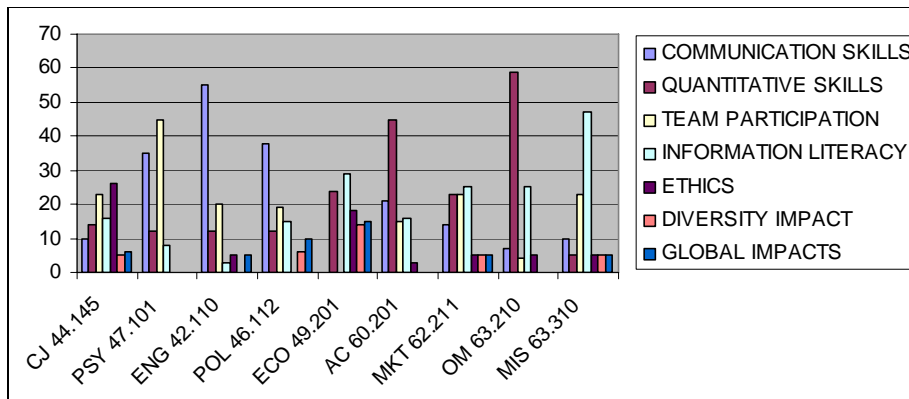


Figure 2: Coverage of Learning Objectives by Course

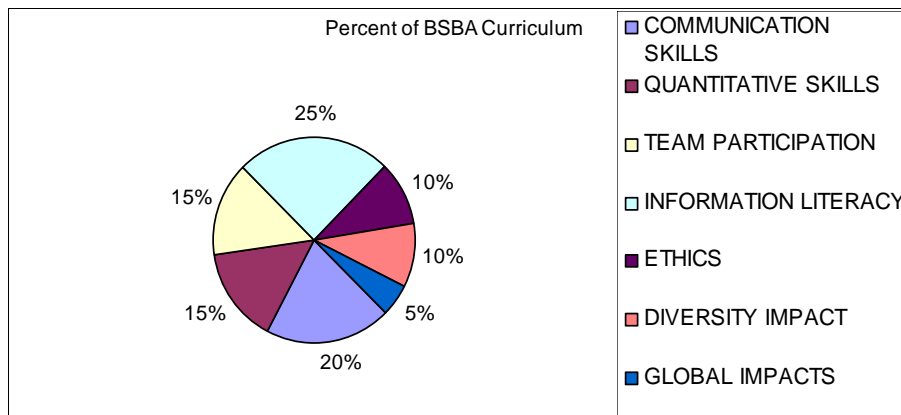


Figure 3: Coverage of Learning Objectives by Program

## CONCLUSION

This project will demonstrate how to develop and track student progress in meeting common learning outcomes across the courses. In addition, it will enable us to develop an electronic process for measuring learning outcomes and to develop a more consistent approach to the integration of learning outcomes and assessment activities into multidisciplinary courses. We expect several positive outcomes from this project, including the:

- Development, testing and refinement of cost effective outcomes assessment techniques using an electronic learning management system.
- Integration of these outcomes assessment techniques across courses in a range of disciplines using the electronic assessment platform.
- Development, testing and refinement of an electronic tracking and reporting process to assist in measuring the achievement of student learning outcomes.
- Development and testing of a multidisciplinary assessment model which can be shared with other colleges and universities and can be modified and used by a number of faculty in a range of courses to measure overall program outcomes.

The electronic assessment procedures developed during this grant will continue to be used after the duration of the grant for continued program assessment and improvement.

By the time of the AMCIS conference, we propose to share the following project data:

- The development process of the learning outcomes and assessment training curriculum
- Preliminary feedback regarding training curriculum from June 2006 training participants
- Detailed descriptions and illustrations of how course management system tools are used by on-campus faculty to present learning objectives and assessment activities
- Description of the electronic reporting process developed to facilitate the collection and reporting of course-level data across academic programs
- Illustrative schematic outlining linkages between program-level learning outcomes and course-level activities
- Project evaluation plan and progress toward project goals and objectives.

Furthermore, the authors will use the presentation as an opportunity to discuss the challenges associated with the outcomes assessment process with peers in attendance at the conference. Additional online resources and related references will be shared as well.

## ACKNOWLEDGMENTS

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## REFERENCES

1. AACSB. (2005) Overview of Assessment, Assessment Resource Center: AACSB International.  
[http://www.aacsb.edu/resource\\_centers/assessment/overview-why.asp](http://www.aacsb.edu/resource_centers/assessment/overview-why.asp). Retrieved online, Jan. 6, 2006.
2. Banta, T. W. 2005. How Much Have We Learned?, BizEd: 34-38.
3. Jarmoszko, A, Petkova, O. and Gendron, M. (2003) Towards Assessment of IS Programs: Evaluating Learning Outcomes in Systems Analysis and Design Courses, *Information Science*, June. v1,7.
4. Lovett, C. M. M., Robert T. (2004) We Need an Honest Conversation, *The Chronicle of Higher Education*, Vol. 51.  
<http://chronicle.com/weekly/v51/i02/02b00601.htm>. Retrieved online, Jan. 6, 2006.
5. NCATE. (2002) Professional Standards for the Accreditation of Schools, Colleges, and Departments of Education: 58. Washington, D.C.: National Council for the Accreditation of Teacher Education.
6. Palomba, C. A., & Banta, T. W. (1999) *Assessment Essentials*. San Francisco, CA: Jossey-Bass.
7. Shulock, N. (2004) No Less Than a Cultural Shift, *The Chronicle of Higher Education*, Vol. 51.  
<http://chronicle.com/weekly/v51/i02/02b00601.htm>. Retrieved online on Jan. 6, 2006.