

Web-Enhanced Course Evaluation: A Whole New Look

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Abstract

This paper describes the history, development, and implementation of a web-based course evaluation system at a major university. The reasons for creating a flexible process that allows for survey customization at the course level are discussed. The benefits and challenges of implementing the system are presented.

I. Introduction

Course evaluation processes have been in existence since the 1920's, with some of the earliest examples reported by Harvard University in their publication, "Confidential Guide to Courses" [1]. The use of course evaluations has instigated much controversy over the years, with many researchers questioning the overall effectiveness and validity of results [2]. Now, with a new emphasis in outcome-based assessment, course evaluation processes are being viewed as a potential vehicle for collecting student feedback on both course objectives and student perceptions of learning outcomes. With the potential for course evaluation processes to take on several new uses, the need for technology-mediated procedures to administer these surveys has become evident. The traditional paper-and-pencil versions no longer provide the degree of flexibility required for course specific customization. The purpose of this paper is to describe the implementation of an online course evaluation system in The Fu Foundation School of Engineering and Applied Science (SEAS) at Columbia University. The School has utilized online evaluation for the past three years so this paper will discuss specific strategies, implementation, and results.

The objective of transforming the School's traditional paper-and-pencil course evaluation system to an online application was to dramatically improve the assessment, feedback, and actions taken to advance the quality of academic programs offered. To accomplish this, a team comprised of assessment and information technology researchers and administrators worked to create a flexible, web-enhanced system that would meet the requirements of the School. The long-term goal was to build the system with enough flexibility so that all Columbia University Schools and programs could benefit. The vision was that this new system would enhance communication among all constituents regarding the efficacy of the academic offerings and would focus attention on objectives and learning outcomes in a timely manner.

In today's competitive environment, higher education is being forced to focus on outcome assessment. The pressure comes from industry, academic accreditation entities and government agencies to incorporate broader student learning outcomes and sound assessment techniques into education programs and courses. The most relevant example is the incorporation by the Accreditation Board of Engineering and Technology (ABET) of eleven student learning outcomes and assessment in its Engineering Criteria 2000 (EC2000) that is now required of over

1,600 undergraduate US engineering programs at more than 300 institutions [3]. As a result, there has been an increased interest in assessment methodologies and research. One of the major assessment processes to come under scrutiny is the traditional course evaluation survey and the role it can play in this outcome-based environment. New directions in course evaluation have placed this method in the forefront of outcome-based assessment activities. As validated assessment methods begin to appear, there is a strong need to integrate them into a comprehensive, adaptable and accessible system that can be an important component of a learning environment.

Information technology makes such a task feasible. However, while many activities have attempted to use technology for knowledge transfer, increased communication, and administrative productivity [4], there are only a few systems available that provide administrators and faculty with the technology and processes necessary to measure learning outcomes in a comprehensive manner [5]. Many of the full-fledged web-authoring tools that integrate testing are proprietary in nature and not available to instructors who want to integrate outcome assessment without using these embedded tools. Scantron's *E-Listen* application is such an example. Other existing web-based assessment sites that are free for instructor use are not secure sites. For example, *SurveySuite*, a site hosted by the University of Virginia, clearly warns the user not to collect sensitive data. Several commercial testing sites have opened over the past two years, including *Perseus*, *elisten.com*, and *askget.com*, but their focus is primarily on the business user. While these sites have several useful features, they do not take into account many of the issues faced in the academic environment. Many of these sites allow an instructor to create a survey for use in a specific classroom, but have no system to create a core survey that can be customized by multiple instructors. This translates to a duplication of effort by administrators and faculty.

Institutions face formidable challenges when implementing outcome-based assessment processes, including finding the resources for collecting, tabulating and disseminating information in a useful format. The integration of emerging information technologies and outcome-based assessment methodologies offers administrators and faculty an opportunity to improve engineering programs while it offers students detailed information that can be used to develop technically and professionally.

II. System History and Development

Over the past three years, SEAS has worked with student groups and faculty to develop a comprehensive web-enhanced course evaluation system to improve academic programs and courses as well as to measure learning outcomes. The genesis of the system began three years ago with a student project, funded by NSF Gateway Coalition, that allowed faculty evaluation data to be uploaded to a website for student review. The website, known as *Oracle* (Figure 1), allowed students to review evaluation data by course or professor to guide them in course selection. The introduction of public ratings had a profound impact on the culture of the School. While cause and effect are always difficult to ascertain in these conditions, there is little doubt that by making the ratings public, the process increased the awareness of teaching and course quality for both students and faculty. Today, *Oracle's* public rating system is an integral

part of a student’s decision process for selecting courses. In December 2001 alone, students went to the Oracle website for course evaluation information more than 12,000 times.

As a complement to the *Oracle* website, a second student group, partially funded by NSF Gateway, worked on a class project to develop a prototype web-based course evaluation system to link to *Oracle*. The result was the current web-enhanced course evaluation system (WCES) that allows faculty to customize course surveys reflecting relevant learning outcomes for every course they teach. Administratively, the system is linked to the Registrar’s Office to ensure that all course information matches University records and that security is maintained. One of the major benefits of WCES is its capacity to provide timely feedback to faculty, staff, and students. Reports are sent immediately at the close of the evaluation period.

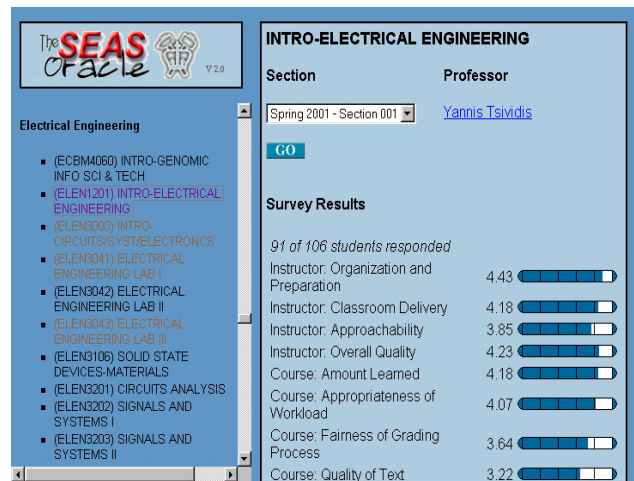


Figure 1. Student Web Site

The current WCES has several important features: providing a measurement of core questions on course and faculty quality; allowing faculty to add course-specific questions; and generating timely feedback reports to all constituents. First, WCES is designed to measure a core set of questions for all SEAS courses (Figure 2). These are questions that SEAS faculty and administration have agreed upon so the results can be reviewed each year and on a longitudinal basis. The system allows administrators to add or modify core questions if necessary. For example, an academic department may want its students to respond to questions regarding the objectives of its program on an annual basis. The system itself is completely flexible so changes to the core questions are easily made based on a department’s assessment strategies and goals.

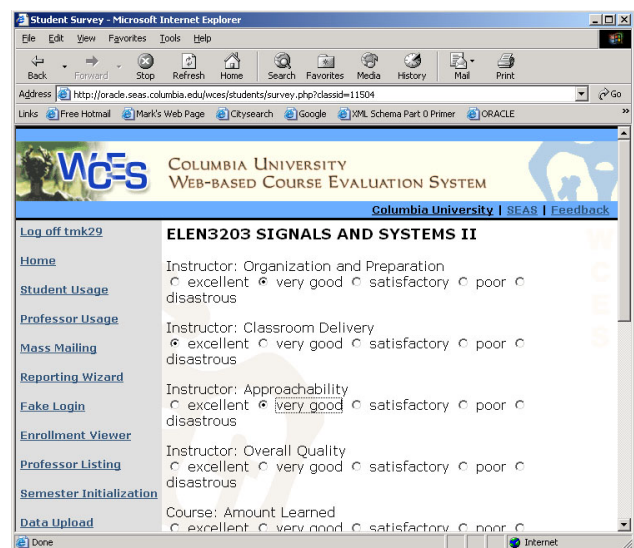


Figure 2. Sample Core Questions

A second important feature is the capacity for faculty to customize the survey to fit the needs of each course. This is a critical feature for measuring course objectives and learning outcomes as prescribed in EC2000 criteria. SEAS faculty can add an unlimited number of questions to the survey based on specific course learning objectives and intended outcomes. The system allows faculty to design different types of survey questions, including scaled items, open-ended questions, or multiple-choice items. If there is a concern for survey length, administrators can place a limit on the number of questions that can be added. While we have limited data on

faculty customization patterns, the typical professor adds about five questions. Currently, we do

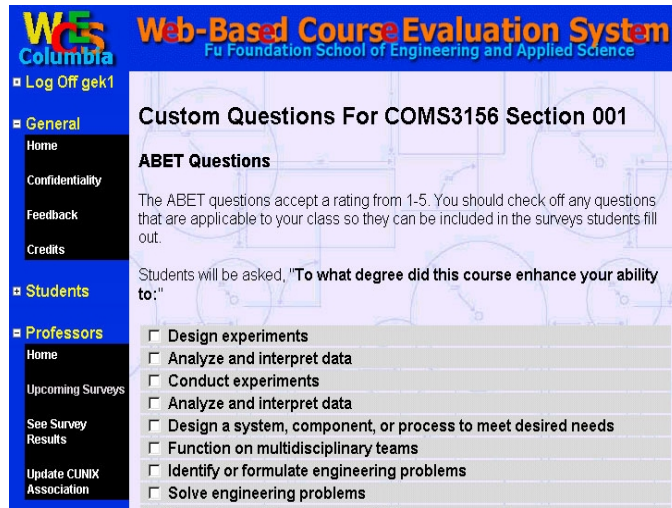


Figure 3. EC2000 Question Database

not place any restrictions on the number of items that can be added to the core survey. Additionally, the system has a survey item library that provides professors with ready-made questions that can be easily added to a specific course survey. While the system can accommodate any number of item libraries, we have focused on a database of items related to the ABET EC2000 learning outcomes. Based on work by a national group of researchers and supported by NSF, a database of survey items for each of the eleven ABET learning outcomes is available in this library [6, 7, 8]. Faculty can select various EC2000-related survey questions based on

the specific learning objectives of their course offering (Figure 3.). At any time during the survey design process, faculty can insert additional questions from the survey database or save a question to a customized database for future use. Question databases allow administrators and faculty to quickly build a survey using professionally developed items. In addition, they can import questions directly into the survey editor.

Third, once the evaluation period is over, survey results are immediately emailed to each faculty member, with summary information sent to department chairs and dean’s office. The faculty report includes the student response rate, quantitative ratings of core and custom questions, and qualitative comments. A new feature, just instituted this year, is a section of the professor’s report that allows faculty members to document what actions they will take to improve a specific course based on the student feedback. The screen (Figure 4) provides the professor with data from the current course and compares the ratings against the last time he or she offered the course. Both rating improvements and reductions are highlighted. This feature allows faculty and departments to document what actions are taken and review future results in light of these actions.

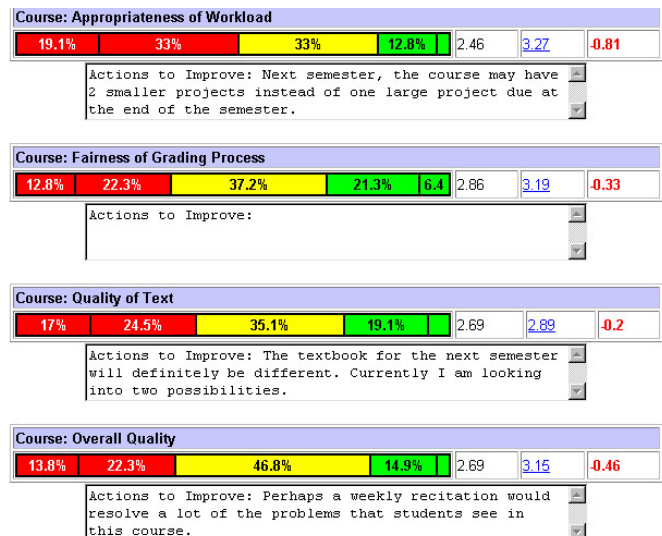


Figure 4. Documenting Course Improvement

The summary reports provide department chairs and deans with aggregate survey data by department and faculty member. In addition, the student’s *Oracle* website provides all students with final ratings for the course (not the comments). WCES is designed to provide all

constituents with feedback regarding the course in a very timely manner – a major benefit of the system. The report generation application offers several templates to report results. The user is guided by an active query system to develop the report that is appropriate for the institution. With this flexibility, administrators and faculty can easily customize reports for various survey constituents. For example, a detailed report can be provided to administrators, while survey highlights can go to students. This feature allows the user to design the required reports early in the process so that, once the target numbers of responses are collected, reports can be distributed immediately. In this totally automated system, the user makes a series of administrative decisions as he designs the survey, including such decisions as critical response rates, timing for report generation, and distribution channels.

III. Benefits and Results

The benefits of conducting online student evaluation are similar to the benefits of any web-based survey application: immediate availability of data for analysis and reporting and extensive qualitative responses from students to the open-ended questions. In addition, the online evaluation tools enforce uniformity for the evaluation of all courses while also providing faculty with the flexibility to add items specific to their courses to address ABET accreditation requirements [9].

One of the primary benefits of a web-enhanced course assessment system is the timely manner in which feedback is provided to all constituents. The Hmieleski report found that, at 90% of the institutions examined, faculty did not receive results from traditional paper-and-pencil assessments until two months after survey administration. In addition, the majority of the schools did not provide results to students at all [10]. Web systems allow for flexible dissemination of survey results. For example, faculty applying formative evaluations in the classroom can receive immediate feedback. At Columbia, the timing of reports depends on when the course evaluation is conducted in the term. For all interim or mid-term course evaluation, faculty results are sent immediately after the surveys have been completed or by a date specified by the professor. Reports for the end-of-term course evaluations are distributed after all final grades are submitted. This is a policy decision based on concerns of both faculty and students and is not based on any technical conditions.

A second benefit is the flexibility that online assessment systems provide in terms of survey design and development. The Columbia course evaluation system allows administrators to add customized questions to measure specific program objectives. Faculty also can provide questions to support the measurement of intended learning outcomes based on specific course objectives. We see this as a primary mechanism for gathering continuous improvement data for our academic programs. If learning outcomes for specific courses are to be evaluated, the system must have the flexibility to allow for customization based on specified boundaries and policies.

A third benefit is that students have the opportunity to complete assessments, such as course evaluations, on their own time, without the time constraints of in-class surveys. The urgency involved in completing surveys during class may cause students to fill them out in a cursory manner. Since much of the surveying must occur at the end of the course, in class data collection often cuts into valuable instructional time. In contrast, evaluations posted on the web may

generate more detailed and thoughtful responses from the students. For example, faculty members have observed a significant increase in written comments in web course evaluation surveys. In addition, administrators are able to organize, code, and analyze comments efficiently – a capacity that does not exist in a paper survey process.

There are pitfalls in implementing online course evaluation as well as strategies to overcome them. These issues include: achieving adequate response rates and the strategies to improve them, faculty buy-in, responding to student concerns for privacy, and changing the culture to support online student evaluation processes.

The most pervasive problem among institutions that have converted to web-based evaluation is a response rate of only 30 to 40% at best [11]. This issue has most strongly influenced schools' decisions to maintain their current paper-and-pencil systems. However, if administrators and faculty strongly encourage completion of web-based surveys, we find that the response rates will be comparable to the more traditional methods, and future research may prove that this should not be a barrier to online evaluation. For example, Columbia has experienced response rates of 85% and greater in recent web-based course evaluations. Success is due to a combination of technology-mediated communications, incentive packages, and internal marketing strategies. The Columbia system allows us to monitor response rates during the survey administration period and target emails to both faculty and students where incremental urging is required. The combination of monitoring and targeted communication is a primary reason for the high response rates. We also provide several types of incentives because no one incentive will motivate all potential respondents. Successful incentives include Palm Pilot give-aways and pizza parties associated with completing surveys in designated computer labs.

Some of the other challenges can be encompassed under the need to create a culture that enables online course evaluation. At Columbia, we are working hard to create a climate that motivates all constituents to participate in the evaluation of courses and instructions. One of the primary motivators is structuring the development and implementation of the system so that all constituents feel that they have input into the project. From a faculty perspective, one of the ways this is accomplished is through training seminars focusing on the rationale for course evaluation and how to best implement the system in the classroom. These training sessions also allow faculty to provide input into the design of the system and future features. One of the ways we measure faculty buy-in is the percentage of faculty that are using the system to customize their surveys and are conducting voluntary mid-term evaluations. We have experienced steady growth in both areas over the past two years, with up to 20% of our faculty using the system to either customize their surveys and/or administer interim, formative evaluations.

Through the *Oracle* website, the students have ample opportunity to provide administrators with feedback on the course evaluation system. We receive several hundred emails a year on how to improve the system or describing concerns. By broadcast email messages, the Dean has addressed several concerns, including the privacy of students, the relationship between evaluations and grades, and the timing of reports to the faculty.

IV. Summary

The outcome of the work to date is a fully flexible course evaluation system that can readily provide course evaluation data and feedback based on the needs of the individual School or program. This newly enhanced course evaluation system includes: a) basic survey development, b) data collection and database management capabilities, and c) multi-level report generation. The system allows administration and faculty to decide on specific parameters for survey questions, including the option of offering customized questions.

One of the current development activities is creating web-based tutorials to support effective course assessment. One tutorial will be for faculty, providing them with information on how best to communicate to students both the rationale of the process and the importance of completing the surveys for course improvement. When survey customization is applicable, faculty will receive tutorial support on how to translate course objectives and student learning outcomes into survey items. The second proposed tutorial is targeted for students. This will be a web tutorial that provides students with information regarding the rationale and importance of course evaluations and “rater” training modules to enhance the overall reliability and validity of the course evaluation data.

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