AC 2007-772: WEBCT IN ASSESSMENT: USING ON-LINE E-TOOLS TO AUTOMATE THE ASSESSMENT PROCESS

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WebCT in Assessment:
Using On-Line e-Tools to Automate the Assessment Process

Abstract

The authors will outline the automation of an Engineering Technology program assessment process. The program is located within the College of Engineering. The steps include development of the assessment tools, mapping the tools to the programs' goals and objectives, integration of the tools into WebCT®, the role of student participation, and finally the collection, manipulation, and interpretation of the data.

The authors have developed a unique approach to the continual process of an ABET[1] program assessment. This distinctive approach incorporates an innovative use of WebCT to automate the application of several assessment tools. The approach facilitates the academic program meeting the assessment requirements for accreditation[2]. This is accomplished by the automatic collection and manipulation of assessment data in addition to the documentation of the process and the data that is necessary for the purposes of assessing whether a program is meeting its stated goals and objectives. WebCT[3] is an industry leader in providing e-learning systems for educational institutions and many institutions currently use this software in on-line applications for providing course content and feedback from students in traditional classroom situations.

This new and unique concept of using an e-tool such as WebCT in the assessment process has the potential to become a major core assessment evaluation methodology component. The authors have found it to be beneficial, efficient, and economic as one of the foremost tools in assessing the students' acquired scholastic knowledge and skill sets. The process provides timely and valuable feedback to the faculty, program and institution. In addition, on-line e-tools can function as important integrated elements of the academic program's outcomes assessment strategy. This automated system clearly and concisely documents the programs methodology of assessment and the programs success at meeting its defined goals and objectives. The automated process facilitates continuous quality improvement of the program and is instrumental in fulfilling a major portion of standard accreditation or re-accreditation requirements.

Index Terms – Accreditation, WEBCT, Outcomes Assessment Strategy, e-Tools

Statement of Need

The new emphasis on assessment presents a challenging opportunity for those programs that need to develop an effective set of tools to implement the assessment requirements of their institution and/or accreditation agency. These tools, which should provide feedback that can be utilized to measure the program's effectiveness in meeting their stated goals and objectives, are often resource consuming and hard to design, implement, and maintain.

Introduction

Before any assessment tool can be designed, implemented, or even discussed, it is required that the academic program have a clearly defined mission, as well as explicit educational goals and objectives that are in concert with their accreditation requirements. This by itself is a difficult task but the authors must assume that the program has these in-place.

Typically, engineering and engineering technology program assessment tools are used to measure the success or failure of a particular defined goal or objective. Improving or declining trends in success or failure of these goals or objectives are also important assessment data. For example, a common goal might be that students graduate with a specific skill and knowledge set directly related to the academic course work. A tool that is often utilized to determine if the program is meeting this goal is to give an exam to those students near graduation – a senior competency exam. This competency exam, which may be developed in-house or externally generated, is designed to determine if students possess a specific set of knowledge and/or skills. Often, general program success is indicated by having a certain percentage of the students showing success on this senior comprehensive exam. For example, success might be stated that 75% of the students must score a minimum of 70% on the exam. The exam is a tool that determines if the program is meeting its stated goal of having its students graduate with a measurable portion of the desired skill and knowledge set.

However, additional information can be gleaned from an exam of this type. For example, if the average student score on the exam has been declining each time the exam is offered, then the program should recognize this trend and investigate the causes and remedies – closing the loop. Also, if the average scores are good or even rising over time – the definition of success - but specific question(s) on a specific topic has been consistently poor, then once again the program should recognize that this concept, which is part of the students desired skill set or it wouldn't be in the exam, needs to be investigated. Therefore, a tool such as the senior competency exam has a lot of potentially useful data which can be utilized for assessment but this information is often hard to gather and recognize within the large data set collected. Another problem is the resource intensive nature of this type of tool - time spend by faculty and staff to develop the exam, deliver the exam in various class periods (lost lectures), grading the exam, correlating and manipulating the exam results, tracking trends, generating statistics, documenting the process, and updating the material and repeating most of the above, etc.

Many common assessment tools, such as surveys and student course evaluations, are similar in the resource intensive natural of their methodologies and implementations. A method of automating these tools would seem beneficial in terms of savings of valuable resources and increasing faculty productivity.

Automating the Process

Our targeted program offers three different disciplines within the Bachelor of Science in Engineering Technology**:** Electronic and Computer (ECET), Mechanical (MET), and Civil (CET). Two of the three online tools assess students from all three programs**:** the end-of-semester student course evaluations and the senior exit survey. At this time, the senior competency exam has only been implemented for the ECET students. The course evaluations and senior exit survey have a very similar process; both use the survey module available in WebCT, which is an anonymous posting tool. Whereas the senior exam is administered using the quiz module in WebCT.   First we will describe the method for course evaluations and the senior exit survey.

Course evaluations have been used for many years in academia and our college is no different. Much time has been spent on the development of the evaluations. Not only do our questions focus on the instructor's skill but we developed questions with assessment of our goals and objectives in mind. Hence our evaluations consist of three parts; assessing the teaching skills, assessing the course objectives, and assessing the program goals. The development of the online evaluation took advantage of the three distinct parts. The teaching skills assessment questions were common to all courses therefore a common online template was formed for this part of the evaluation. The other two parts were done individually for each course. All parts of the evaluations were developed using Respondus®. Respondus is a tool that converts questions to a WebCT compatible format. The template for the teaching skills assessment as well as the individual course assessments developed with Respondus were uploaded to WebCT.

A WebCT "course" was created by the administrators of the tool, entitled "Engineering Technology Course Evaluations". This is our bucket for placement of all course evaluations. Using the survey module in WebCT each individual course evaluation was created by applying the templates. First, each course receives the teaching template then the group questions assessing course objectives and programs goals were added. Next, the proper settings were implemented to the survey; the current course instructor and the posting availability times – when students can actually do the evaluations. These evaluations were then "rolled" over semester to semester. Updates were implemented when needed, for example, changes to the course objectives.

The next step in the process was to make the surveys available to the students. This is where our system is unique. Many instructors that use WebCT have evaluations for their courses within their independent modules. To facilitate a more streamline method and assure an anonymous posting for the students we have removed the evaluation from the instructor hands. The student can login in to our "bucket" and post their evaluations to all their different ET courses. The trick was to ensure that the students are only able to post to their own course surveys. This was accomplished by a two step method. First was to gather a listing of each student in each course using their WebCT login names. A table was created, such as Table 1, that would mark the course in which each student was enrolled. Microsoft Excel® pivot table feature was used to implement this step.

userID	ET 182	ET 276	ET 398	ET 444
jsmith	1			
sfield		1	1	
mdoe				1

Table 1.

Using the import content feature in WebCT, the table was implemented. The second step was to set the survey modules selective release setting. The release is based on the presence of a 1 in the pertinent column; otherwise the evaluation was hidden from the student's view (see Table 2). This ensures that students only see their course evaluations and are unable to post to others.

Selective Release		
Release to:	[ ] [Select]	
Release based on:	ET 182 ∨ Contains ∨	1
Hide:	☑ Remove this survey from quiz/survey lists if students do not meet the selective release criteria.	

Table 2.

A very similar method was used to develop the senior exit surveys. Three surveys were developed for each option (ECET, CET, MET) in the ET program. The survey had similar questions querying their experience at the University, College and Department levels. A template was developed and implemented for each of these levels. Independent questions were developed at for each option by the respective faculty groups. A WebCT course was requested and entitled "ET Senior Exit Survey". The senior students were identified, the table imported and the selective release set.

The method used for the senior exam for the ECET students is a typical implementation of an exam in WebCT. The exam was developed by the ECET faculty. Respondus was used again to implement the exam in the WebCT format. The students were identified and added to WebCT.

Integrating the assessment tools into WebCT was the first step towards a complete cycle of evaluation. Once the integration method was developed it enabled us to automate the collection process and easily capture the data in an electronic format. At the end of each semester the data is collected using the download features in the WebCT survey and quiz modules.

The course evaluations are mapped to spreadsheets for each instructor and each course. Using Microsoft Excel's automated features, the information is merged with previous data. A summary of the teaching skills, course objectives, and programs goals are created. The data creates a continuity of information for which an instructor, a course, and the program can respond.

A spreadsheet is created from the senior exit surveys for each option and for the overall Bachelor program. The information from the senior exit survey provides us with assessment data on the options, the department, the college and university that then can be used to evaluate and document the program's stated goals and objectives.

The senior exam data is mapped from semester to semester in an Excel spreadsheet. This tool provides us with real-time data for each semester that can assess the students' knowledge and skill sets, identify specific trouble spots or deficiencies (should any exist) as they leave the program, and map historical trends in these skill sets. This feedback data is then utilized to "close the loop" via implementing required changes to the program curriculum addressing any identified problems or trends.

After data collection, every semester, we are able to "roll over" our assessments tools for the next group of students. Thus adding new information and creating a history of data. Because of the process we are spending less time on gathering information and more time on analyzing the results. This process also automatically provides the documentation required for the accreditation process that is often difficult and resource intensive to generate.

Conclusion

The authors have outlined the automation of parts of an assessment process including the development of the automated assessment tools, mapping the tools to the programs' goals and objectives, integration of the tools using the e-Tool WebCT, the required student participation, and finally the collection, manipulation, and interpretation of the data.

This unique approach to the continual process of ABET program assessment incorporates an innovative use of WebCT to automate the application of several assessment tools. Thusly, the process facilitates the academic program meeting the assessment requirements for accreditation in an efficient manner. This is accomplished by using the developed automated tools to collect and manipulate the assessment data. In addition the process provides the indispensable documentation of the process and the data that are obligatory for the purposes of accreditation and self-assessment.

This new and unique concept of using an e-tool such as WebCT in the assessment process has the potential to become a major methodology component in assessment evaluation. The authors have found it to be beneficial, effective, and economic as one of the foremost tools in assessing the students' acquired scholastic knowledge and skill sets. The process provides timely and valuable self-assessment feedback to the faculty, program, and institution. This automated system clearly and concisely documents the programs methodology of assessment and the programs success at meeting its defined goals and objectives. The automated process facilitates continuous quality improvement of the program in an efficient manner and is instrumental in fulfilling a major portion of standard accreditation or re-accreditation requirements.

Finally, the automated process permits easy enhancements. Future implementation ideas include web accessible reports using a Python backend. This will allow for up to the minute data and a more robust repository.

Bibliography

1. **ABET** – the recognized accreditor for college and university programs in applied science, computing, engineering, and technology - http://www.abet.org/

2. **Council for Higher Education Accreditation -** http://www.chea.org/

3. **WebCT -** http://www.webct.com/