Design of Assessment Information System for Program Accreditation

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ABSTRACT

Academic programs seek accreditation to raise their profile. Establishment of program assessment and continuous improvements processes is required to gain and maintain accreditation. Assessment processes are about defining course learning outcomes, student outcomes, and program educational objectives; collect course assessment data, perform statistical evaluations and derive meaningful conclusions to improve the program. Web-based technologies can be used to improve communication, collaboration, coordination and flow control among different entities involved in the processes. This paper presents a web-based system that was designed to assist in assessment and continuous improvement processes with objective to meet the requirements of two accreditation bodies in a program that has academically diverse faculty.

KEYWORDS


INTRODUCTION

Academic programs seeking accreditation from an international accreditation body such as Accreditation Board of Engineering and Technology (ABET) (ABET, 2015) or a national accreditation body such as National Commission for Academic Accreditation & Assessment (NCAAA) (NCAAA, 2015), are required to standardize their program and course offerings with clear objectives and outcomes. Each program is required to define verifiable objectives with reference to their graduates. The program must also define the skills and traits that students will have by the time of graduation. All courses in the program must clearly define the skills that a student will acquire by completing the courses, and how these skills contribute to the skills that a student must have by the time of graduation. In every academic period, programs are required to collect data from different sources to ensure that objective and outcomes at the program level and course level are being met and how achievement level of these objectives and outcomes can be improved.

In an established program with faculty members from similar academic background, it is easier to maintain quality of a program, and perform data collection, analysis and interpretation activities. However, for newer programs that have faculty from diverse academic background, it becomes difficult to maintain program quality without continuous monitoring and making sure that all faculty members are following the same standards. A side effect of faculty diversity is that standards for everything have to be defined, instructors’ ability to make the changes in course contents is limited...
and monitoring processes are required to ensure that all faculty members are following approved standards and teach according to the approved courses (Bhatti & Ahmed, 2015).

Program assessment is about producing high quality and competent graduates armed with skills to succeed in real life as productive employees, entrepreneurs, self-learner or motivated, and ready for further studies. Program educational objectives (PEO) are the goals and expectation from the graduates of the program (ABET Board of Directors, 2015). Program assessment is about quantitatively measuring the achievement of these goals. If achievement level is lower, then a review of this program is needed to find out and rectify the reasons for lower achievement levels. If achievement levels are satisfactory then maybe it is time to review the goals and set the bar higher.

Student outcomes (SO) are the skills that a graduate must have by the time of graduations (ABET Board of Directors, 2015). These skills are related to the competence, self-learning, understanding of social impacts and ability to apply knowledge gained in the area of studies to the real life problems. In addition, a graduate is expected to have understanding of ethical and moral issues, have ability to work with others and able to communicate effectively. For ABET accreditation, student outcomes are defined as a-k and programs seeking accreditation are expected to adopt these SOs as it is or with some modification to suit their needs. Programs are required to set acceptable achievement levels for SOs. Program assessment process quantitatively measures the achievement levels. For program components that do not meet the acceptable achievement levels, a review is required to find out the reasons and actions to rectify the problem.

Course learning outcomes (CLO) are micro level skills that students acquire from studying a course (Felder & Brent, 2003). It is expected that if a student successfully completes a course then he should have the skills listed in the course CLOs. These skills contribute to the program level skills defined by SOs. All courses does not contribute equally to the SOs, this mean a subset of courses in the program can be selected to compute the achievement levels of SOs from achievement levels of CLOs.

Tools used to compute the achievement level of PEOs and SOs are: students’ performance in the courses, student surveys, employee surveys, opinion from stake holders and comments from advisory council. Data collected from these sources is divided into direct evidence, and subjective opinion based on experience and perceptions. Based on this distinction, assessment is classified as direct and indirect assessment. Figure 1 shows sources of data for direct as well as indirect assessment and how these assessments contribute in computing achievement levels of SOs and PEOs at program level.

Use of templates, based on Microsoft office tools such as Excel and Word, is popular among academic community for data collection. Macro-enabled spreadsheets can be used to perform quantitative analysis. Even though this approach serves well but it has its shortcomings. Quality and quantity of data may not be good enough and it is time consuming to compile meaningful information from these assessment documents. A source of problem is the liberty that instructors have in filling in the information that could result in in-consistent course learning outcomes (CLO) among different sections of the same course, un-approved course contents, and inconsistent data from semester to semester.

This paper presents a system that uses database and web technologies to automate assessment process, manage approved course repositories, collect data for offered courses, perform statistical computations and analysis (Ahmed & Bhatti, 2015), provide flow control among process entities, and act as a single source of all information needed for continuous improvement.

Assessment Information System (AIS) is designed and developed to ensure homogeneous learning, assessment, and evaluation experience, even if the faculty members have diverse academic background. Unlike many other web-based assessment systems, AIS can maintain course syllabuses; collect direct assessment data, perform quantitative and qualitative data processing at course and program levels, and generate documents and reports to assist in the assessment process (Bhatti & Ahmed, 2015). The
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