Information Technology Program Assessment at Cameron University

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Abstract

This paper highlights the experience of planning a Program Quality Improvement Report for the new Information Technology Program at Cameron University. The authors discuss using Deming’s Quality Cycle to implement assessment control points, as well as exit and external evaluations. A double feedback loop is also proposed. Program goals, course objectives, and teaching strategies are used to increase student learning. Outcome assessment results then feed these goals, objectives, and strategies. Thus, a dynamic system is created to assure quality centered in student learning experiences.

1. Introduction

Universities are currently challenged to demonstrate effectiveness through assessment of academic programs in order to authenticate quality standards for accreditation, or reports to governing boards, state boards, and regional accrediting agencies. Assessment then is a process that allows critical evaluation in the pursuit of program goals, course objectives, and teaching strategies. It is an integral part of the ongoing improvement process to enhance student learning and support.

The Program Quality Improvement Report (PQIR) [1] is a tool utilized to implement program assessment at Cameron University, following the four steps outlined by Deming [2]: planning, doing, evaluating and acting as shown in Figure 1.

![Figure 1. Cycle for learning and improvement [2]](image)

The planning step is initiated when an academic program is submitted for approval: alignment of program goals with the University Mission, the courses to be offered, and the resources needed. The doing step is the implementation of the academic program that should include a program assessment plan. The evaluating step is the implementation of the program assessment plan during which the actual assessment takes place. As a result of the evaluating step, new strategies may need to be adopted or changes may need to be made. The acting step is the implementation of new strategies identified in the evaluation step. It should be noted that program quality improvement is a continuous process which needs to be repeated, at least yearly, in order to improve student learning. A PQIR is Cameron University’s documentation of this process. James O. Nichols was brought in as a consultant when Cameron University created its first version of an institutional effectiveness system, closely aligned with Nichols’ recommended structure. Cameron University continues to use the reference, “A Road Map for Improvement of Student Learning and Support Services Through Assessment” [3].

In order to conduct program assessment, the following items should be defined: program goals, student learning outcomes, assessment strategies, and evaluation measures. Program goals and student learning outcomes are the foundation of program quality assessment. Program goals provide direction for program and course design and are broader in scope. In contrast, student learning outcomes are focused measurable end results and aligned with the underlying theme of program goals. Assessment strategies are roadmaps to indentify action plans for program improvement.

This paper details the assessment plan which culminated with the creation of the PQIR for the new BS in Information Technology (IT) program at Cameron University. It describes the process utilized to create the plan and its initial implementation phase, taking into account the characteristics of a typical IT program using the SIGITE/ACM (Special Interest Group for Information Technology Education/Association for Computing Machinery) model curriculum [4].

With the PQIR, a top down design takes place in planning program assessment. First, the goals of the program are stated. For each goal, one or more outcomes are defined [5]. The second step is the creation and interrelation of academic courses that support outcomes. In this step, it is important to define control points of program assessment by using course assessment. Finally, after students graduate, the program is evaluated using
assessment points defined according to the program goals and outcomes. Again, this process should be continual, in order to assure quality improvement.

2. The Academic Assessment Process at Cameron University

At Cameron University, academic programs are assessed each year. For each academic program, a Program Quality Improvement Report, or PQIR, is created documenting the assessment process and assessment results for that program. A PQIR contains:

- information concerning the assessment plan;
- the assessment measurements;
- an analysis of information gleaned from the measurements;
- a proposal for suggested academic changes;
- a proposal for suggested assessment changes;
- a follow-up for the suggested changes and action plan made in the previous year’s PQIR; and
- an action plan providing operational details and deadlines for each proposed change in this year’s plan.

In the fall of each year, the faculty shareholders for each program construct a PQIR to document the assessment process and results of the assessment for the previous academic year. Faculty are responsible for:

1. planning the assessment process;
2. performing assessment activities and measurements;
3. collecting and organizing assessment data;
4. performing an analysis utilizing collected data and information from previous assessments;
5. making suggestions for academic and assessment changes; and
6. the creation of the action plan.

This activity is carefully documented by constructing a PQIR. The faculty presents a draft of the PQIR to the department chair, who provides comments and criticisms. After edits, another draft of the PQIR is presented to the Dean. The Dean offers comments and criticisms and returns the document to the faculty. Subsequently, a final draft is presented to the Dean.

The final stage of the process is the presentation of the assessment results to an evaluating body, the Institutional Assessment Committee (IAC), consisting of Cameron University non-departmental faculty and members of administration. Department faculty members create a PowerPoint presentation containing a standard set of slides. One or more of the faculty utilize the slides to assist in presenting assessment results to the evaluating body.

In addition to the assessment information, the presentation includes indicators of general faculty participation in the process, such as minutes of faculty meetings and correspondence concerning the assessment process. There is an “Assessment Activity Matrix” that documents all assessment measurements made each assessment cycle. Also, there is a “Faculty Participation Document” which documents faculty members that were responsible for assessment activities during the process. The committee examines these documents to verify a high level of faculty participation in the process.

The IAC utilizes a standard rubric that rates the assessment measurements and processes according to a Likert scale. These evaluations and any other comments from the committee are returned to the faculty as feedback. This feedback is used by the faculty to assist in planning improvements for future assessments – thus completing the loop mentioned in Figure 1.

3. Information Technology Assessment at Cameron University.

As a case study for this paper, the assessment process for the Bachelor of Science in IT at Cameron University is briefly presented. The BS in IT is framed in the Cameron University strategic plan goal of ensuring an active, student-centered learning environment by offering high quality, challenging academic programs that include a global perspective and respond to student and employer needs [6]. The goal of the program is to produce graduates with skills and knowledge to take on appropriate professional positions in information technology and grow into management or leadership positions in the field. This goal is divided among the following program outcomes:

- Outcome 1: Students can analyze and apply appropriate information technologies and employ appropriate methodologies to help an organization achieve its goals and objectives;
- Outcome 2: Students can manage the information technology resources of an organization;
- Outcome 3: Students can anticipate the changing direction of information technology and evaluate and communicate the likely utility of new technologies to an organization;
- Outcome 4: Students live and work as contributing members of society.

The IT curriculum was structured to meet the stated outcomes of the program; the State Regents’ standards; and the credit-hour requirement of liberal arts, sciences, general education, and area of specialization. The IT program at Cameron University is a 2+2 program, i.e., it offers the possibility for students to acquire an Associate in Applied Sciences (AAS) degree in two years and a BS with two more years of study. The BS in IT offers areas of specialization in computer information systems (CIS), management information systems (MIS), and information assurance/security (IAS) [7].
As outlined in the introduction and graphically displayed in Figure 2 below, strategic course assessment points were defined in order to evaluate the results of student outcomes.

At program entry, assessment measures are performed in the course CIS 1013 – Introduction to Computer Information Systems. Exit assessment measurements for the AAS in IT also provide the mid-level assessment for the BS in IT. These measurements are made during the second year of study (2000-level courses). Exit measurements for the BS in IT are made during the fourth year of study (4000-level courses) and in the IT 4444 capstone course. Follow up assessment measurements are made through external evaluation, such as advisory council input and graduate/employer surveys.

As the design of the BS in IT allows students to choose among three options, this adds an extra level of difficulty in the assessment process. A block of three courses, one from each option, has been selected as the option assessment point. This block, CIS 4063 – Applied problems in CIS, MIS 4533 – Applied problems in MIS, and IAS 4063 – Current Topics in Information Assurance and Network Security, is used in order to assess each specialty, depending on which one a student has chosen.

It should be noted that if a BS program has no 2+2 option, an assessment point in the second year is still an important mid-level control point. This is especially true in case student remediation is necessary. At Cameron University, a major goal of the rubric assessment, performed by the evaluating body, involves diagnosing student learning weaknesses early enough that remediation can be employed prior to graduation. For this reason, intermediate control points are imperative so student learning weaknesses can be discovered in time for such remediation.

Figure 2 also shows that program assessment is a feedback process. Through the PQIR – program goals, course objectives, and teaching strategies are re-evaluated each academic year. Those results feed the curriculum (up-dashed arrows). Results of program outcome assessment at the beginning of the program and at intermediate points are then used in order to align program goals, course objectives, and teaching strategies (down-dashed arrows).

* Assessment is performed in only one course depending on the option.
An example of how to assess the earlier mentioned Outcome 1 is shown below in Table 1, using the IT 4444 capstone course.

**Table 1. IT capstone program outcome**

<table>
<thead>
<tr>
<th>Program Outcome 1</th>
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<td>Students can analyze and apply appropriate information technologies and employ appropriate methodologies to help an organization achieve its goals and objectives.</td>
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<tr>
<th>Student Performance Objective (CIS-MIS-IAS)</th>
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<td>Students will demonstrate knowledge of usable IT-based solutions in order to design and integrate them into the user environment.</td>
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<tr>
<th>Teaching Strategies</th>
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<td>IT 4444 is a capstone course that integrates outcomes from previous courses (Bloom – Synthesis).</td>
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<tr>
<th>Student Learning Assessment Strategies</th>
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<tr>
<td>Students will work in teams and will be able to design effective and usable IT-based solutions through different projects assigned in IT 4444. If possible, teams are structured so that each team has at least one student belonging to a different option.</td>
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<tr>
<th>Assessment Item</th>
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<tr>
<td>A final project in the IT 4444 course will be part of the portfolio. Evaluation of the portfolio will be done by a team of professors utilizing a published rubric (employers’ report or advisory council evaluation).</td>
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It should be noted that consideration of certain non-academic activities and services is important. In addition to assessing students’ learning, other needed assessments include:

- students’ attitudes and perceptions about program aspects such as advising, campus facilities, curriculum, teaching, and student services; and
- departmental processes such as new-student orientation, computer assistance, financial aid, and so forth [5].

However, these assessment activities are not academic assessments and are not performed as part of program assessment at Cameron University.

### 4. PQIR Feedback and Conclusions

Two separate PQIR presentations for the IT AAS and BS degrees took place in January 2009. There were three IAC members evaluating the new IT program. Members were made up of Cameron University administration and non-departmental faculty. The committee followed a standard rubric checklist with the following Likert ranking...

- 0 – does not meet standard
- 1 – needs improvement
- 2 – is not consistent with standard
- 3 – improving
- 4 – meets standards

The evaluating rubric used by committee members contained seven questions. Since the IT program at Cameron University is new, several of the rubric measurement questions were not quite applicable for ranking. All three IAC members for the AAS program, and two members for the BS program, listed five of the measurement questions as N/A (although, one committee member for the BS program listed the same questions as “1 – needs improvement”).

Applicable measures included the following two out of seven questions (with sub-parts)...

**Question 1:** How are your stated student learning outcomes appropriate to your mission, programs, degrees, and students?

a. Learning outcomes are clearly stated in measurable terms.

b. Bloom’s Taxonomy has been used in the development of the learning outcomes.

c. Learning outcomes align well with the mission statement and/or strategic plan.

**Question 4:** How do you ensure shared responsibility for student learning and for assessment of student learning?

a. Evidence of faculty member participation completed

i. Faculty member participation document

ii. Assessment Activity Matrix

iii. Department Faculty meeting minutes on assessment

b. Presentation clearly indicates program faculty members were active in all aspects of assessment process

The IT AAS program consistently ranked with “4 – meets standards” in the areas indicated above with a., b., and c. The BS program consistently ranked with either “3 – improving” or “4 – meets standards” with the exception of a single committee member (mentioned earlier) ranking portions of Question 4 with “1 – needs improvement.”

The IAC members also asked questions and offered advice on such issues as academic/industry collaboration, the use of standardized tests and rubrics for measurement purposes (as available), and asking about department plans for data collection and analysis concerning improvement of student learning. These were all issues that the department currently implements in other programs or has thoroughly investigated.

Therefore, it appears the new Cameron University IT program is off to a good start. The committee critiques will be further analyzed to aid in moving forward with an
action plan to help design and implement the best IT program possible.

5. References


