A ROBUST AND COST-EFFECTIVE DATABASE APPROACH TO MANAGING AND REPORTING ASSESSMENT DATA

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ABSTRACT

Schools of Business are diverse in their approach to meeting the Association to Advance Collegiate Schools of Business (AACSB) standards for assurance of learning. Developing a comprehensive assessment plan that includes a process for managing, collecting, analyzing, and reporting student-level assessment data is a daunting task. Assuring the process is faculty driven is even more difficult. Through the creation and evolution of a relatively simple Microsoft Access database, this University was able to develop, implement and manage an assessment plan that meets the AACSB assurance of learning standards, engages the majority of faculty, facilitates the data collection process, generates real-time student-outcome data and trends curriculum improvements over time.

JEL: C44, C81, C88, D78, M00, M10, Y1

KEYWORDS: Accreditation, Assessment, Assurance of Learning, Outcomes Data

INTRODUCTION

Continuous quality improvement has been at the forefront of businesses for decades. Business leaders track industry trends, organizational outcomes, customer preferences, financial indicators and more, in search of information demonstrating organization performance and identifying improvement opportunities. Historically, academia has been removed from such self-analysis; that is, until the recent decade when accrediting bodies began to change their focus from process based data to outcome based data (Gardiner, et al., 2010).

In 2005, the Association to Advance Collegiate Schools of Business (AACSB), in accrediting colleges of business, required schools of business to demonstrate student learning. These 'assurance of learning' (AOL) standards are comprised of two primary objectives. The first objective includes defining and measuring outcome goals for each degree program offered by the school. To meet these requirements the use of direct measures, such as course-embedded assignments, projects, and exam questions, is required (AASCB, 2011a). Course-embedded measures, because of their ease and usefulness, ranked very highly among department chairs (Miles et al., 2004) and are one of the top knowledge acquisition assessments reported being used by colleges of business (Pringle & Michel, 2007). "CEA (course embedded assessment) investigations provide one of the most specific, targeted methods of assessing student learning, and the results can lead to changes in course materials, presentations, assignments, pedagogies, examination questions, required prerequisites, reading materials, or course structure" (McConnell, Hoover & Miller, 2008).

The second objective of the AOL standards includes the identification and continuous improvement of the learning process. Establishing a culture of continuous improvement of learning is as a top issue facing academic professionals (Campbell, Olinger, & Colleagues, 2007). AACSB refers to this process as 'closing the loop'. Betters-Reed et al. (2008) have argued that closing the loop is one of the biggest problems in institutionalizing AACSB AOL programs. They discuss the need for faculty work collectively and frequently to review and react to the assessment outcomes. LaFleur et. al. (2009) describe

the AOL process as one that focuses on an in-depth and reflective analyses of the curriculum which can lead to a cultural shift about learning. Kilpatrick et al. (2008) point to the AOL challenge of creating uniformity across courses, both in content and delivery, and across professors who bring different teaching and thinking styles to the business school curriculum. Clearly, closing the loop requires a new approach to faculty collaboration - an approach that fosters the collective review of assessment outcome data by multiple faculty members. A review that will inevitably lead to improved teaching methods and enhanced student learning.

This article describes the development of a database to house, analyze, and report assessment data that is easy to use and does not burden faculty. The first two sections describe the state of affairs and the AOL developmental process at the study University. The next section describes the database structure followed by a description of the analyses and report capability of the system. Finally, we discuss how the described database meets the six best practices for achieving a sustainable AOL assessment program.

LITERATURE REVIEW

Designing a successful assessment plan to meet the AACSB requirements is multi-faceted. Stivers and Phillips (2009) outline the necessary components of successful assessment plans that include identifying assessment procedures, including multiple measures, describing the people, committees, and processes involved, and specifying plans for using assessment data. This manuscript details the rationale, development, implementation, and success of using a school-wide database as the platform for developing and sustaining a successful assessment plan. With curriculum committees, student workers and a designated faculty volunteer, a comprehensive and robust Microsoft database evolved to meet and sustain the ever-changing demands of the school's assessment plan.

Harper and Harder (2009), in developing an AOL system for a MIS program, created a database to track student progression in four competency areas: technical, analytical, communicative, and managerial. "A simple, web-enabled database has been developed for data entry and tracking. At the end of each semester, each faculty member enters the credits for each student on each KLA (key learning activity) in his or her course" (Harper & Harder, 2009, p. 498). Moskal et al., (2008) discuss their university's current efforts at developing a database for assessing student learning. These authors discuss a database application for entering, organizing and maintaining student assessments. The use of database applications for collecting data is not novel; however the development of a database structure that is robust enough to both collect the required data and also provide useful reports which facilitate the assurance of learning seems to be quite innovative. The purpose of this article is to present the development of our University's AOL database management system in enough detail that others can both learn from our successes and (potentially) adapt our methodologies.

METHODS

The study University consists of 62 School of Business faculty teaching 1260 undergraduate and 1000 graduate students. There are eight undergraduate business degree programs and seven graduate business degree programs. Approximately 8% of undergraduates are seeking a degree in general business, while 51% of graduates are pursuing an MBA or joint degree MBA. Prior to 2005, the Dean's office handled most of the AACSB assessment requirements with some input from the University-level planning and assessment office. The Southern Association of Colleges and Schools (SACS) accredit the University; required SACS assessment data is handled at the University level. Direct faculty involvement in AACSB and/or SACS assessment was minimal, that is until 2005.

AACSB's 2005 implementation of the AOL goals marked a period of cultural change within the faculty. Our University was not alone in its reaction to the AOL focus on faculty collaboration, data

collection/analysis, and improved student outcomes. Betters-Reed et al. (2008) reported the programmatic view required by program-level assessment is "truly a cultural shift for faculty". The authors assert that "programmatic review requires faculty to share ownership of the program offering of their institutions and to be responsible for the quality of the program as a whole, not just their courses P. 238)".

Our Beginning

The School of Business Dean asked the 'CORE' curriculum committee and MBA committee to take ownership for the collection, analysis and reporting of student level outcomes data. The use of embedded measures at the course-level was encouraged. The CORE Committee represented the undergraduate degrees, while the MBA committee represented the MBA and joint MBA degrees. The Committees accepted this challenge and designed a faculty-driven system that maximizes faculty input on data utilization, collaboration, and improvements, while minimizing faculty time spent on data collection. The initial assessment program design predominately focused on input from the defined group of MBA and CORE committee members; this was imperative to the long-term success of our assessment program because "leadership and the formation of a powerful coalition to create the vision are important. The members of the coalition can make or break the effort" (Betters-Reed, et al., 2008). Thus, for MBA level courses, the MBA committee spearheaded the efforts and for undergraduate courses, the CORE committee took a lead role. The MBA committee consists of six professors who together represent all of the required disciplines. Many of the MBA committee members are responsible for teaching multiple sections of the required core courses. Similarly, the CORE committee is comprised of eight faculty members with representation from all disciplines, and with many of the faculty members responsible for teaching a large portion of the undergraduate core courses. At the committee level, the general competencies required of graduate and undergraduate students were deliberated. Each committee member was responsible for working with their respective discipline-level faculty to finalize the competency statements and to get buy-in for the use of embedded measures within individual courses. Once the competencies and use of embedded measured was discussed within each discipline, the MBA and CORE committee took responsibility for assuring the assessment plan was comprehensive; that is, that it included multiple courses, all disciplines, and a majority of students. The goal of the assessment plan was to consider the achievement of all students so that "insight can be gained into how well the curriculum is facilitating intellectual growth and actual ability" (Harper & Harder, 2009).

As the MBA committee and CORE committee set forth to devise a comprehensive assessment plan, many concerns became apparent. Course embedded measures required course-level and student-level data collection. Although all of the embedded measures would be a graded part of the course, it was clear that only some assignments or exam questions would be included in the formal AOL assessment. Faculty members were concerned with both the collection process itself, as well as, the workload for analyzing and disseminating the assessment results. Who will be responsible for reporting the data? How will the results be analyzed and reported? Where will the mounds of student assessments be stored? Could different faculty use different measures to assess the same concepts? To whom will assessment results be given? How will specialized degrees such as the Masters in Healthcare or joint MHA-MBA be handled? As these questions arose, it became apparent that the assessment planning process was complex and; therefore, needed to start with a defined plan that included a robust archive and reporting structure.

The second challenge for the School of Business faculty was the AOL requirement to 'close the loop'. This requirement entailed faculty working together to review assessment outcome data and to make improvements in student learning and/or the assessment process. This was a fundamental change in the current state of affairs where faculty were solely responsible for the content within their course and only informal, if any, communication existed for sharing teaching methods and identifying improvement opportunities across the curriculum. The 2005 culture was not conducive to collection, analyzing and sharing student-level data, all of which are needed to successfully meet the AOL standards (Pritchard, et

al., 2010). In fact, faculty expressed concern regarding how assessment outcomes would be reported and communicated. Who will use the outcome data? How will outcomes be reported back to faculty? Will individual courses (faculty) be assessed or will it be aggregated? What will be the process for closing the loop? Who will be responsible for assuring the 'loop' is closed? How will teaching/course improvements be tracked? These questions, coupled with the Dean's office request to have real-time access to the assessment results and improvements, reinforced the need for a defined assessment plan with a robust archive and reporting structure.

Defining the Plan, Creating the Structure

Initially, the MBA and CORE committees worked independently to define an assessment plan at the graduate and undergraduate level, respectively. The MBA committee approached the task by assigning various committee members the responsibility of working with their faculty to assess and report the agreed set of core competencies. The CORE committee established a comprehensive exam, covering multiple topical areas, administered during the capstone class. The CORE committee also included a writing and technical competency course in their assessment approach. Table 1 describes the initial assessment plan and faculty involvement.

Although a few of the faculty took ownership for collecting the assessment data, analyzing these data, and creating summary reports, the majority of these faculty were committee members with few other faculty engaged in the process. The assessment results were shared among MBA and CORE committee members, with most of the AOL improvements being made by the committee members themselves. This was a good start; and because the committees were cross-functional it afforded a number of short term gains for the assessment plan while keeping the necessary momentum. However, it became clear that a defined data collection, analysis, and reporting plan was needed and that it should include the majority of faculty. It was within the MBA committee that a solution evolved.

Table 1: Initial Assessment Plan

Core Competency	**Faculty Involvement**
MBA: General Knowledge	4-5 MBA Committee members, independently
MBA: Team Building	1 MBA Committee member
MBA: Global Awareness	1 MBA Committee member
MBA: Critical Thinking	3 MBA Committee members, collectively
CORE: Common Body of Knowledge	4-5 CORE Committee members, independently
CORE: Written Communication	Non-business writing faculty
CORE: Technical Competency	1 CORE Committee member
CORE: Ethics	1-2 CORE Committee members

This table shows the initial assessment plan developed to begin the AOL process and describes faculty and committee involvement.

Database Solution

The MBA committee agreed to participate in the development of an 'assessment' database that would house all of the assessment data, at the course and student-level. This assessment database would eliminate the need for years of student-level assessments to be stored. It would include a feature that allowed for easily uploading assessment data, again at the course and student-level, which would encourage the participation of multiple faculty members. The assessment database would include a reporting function that was flexible, allowing assessment goals to easily be changed and/or embedded measures to be updated at the request of faculty and/or departments. This would allow for individual faculty teaching the same course to use similar, but unique, assessment measures. In essence, the assessment database was expected to standardize both the data collection process and the analysis and reporting process, while remaining adaptable to faculty and administrator requests. Access to the assessment database would be restrictive, so that exam questions, assignments, and student results were

only accessible to authorized users. Assessment database access would be given to the faculty assessment coordinator, the Dean's office, and departmental chairs, with the departmental chairs having limited access to their respective disciplines. Assessment reports were to be generated in real-time, allowing data to be added throughout the semester. If thoughtfully designed the assessment database should provide the needed impetus to increase faculty involvement (due to ease of use), facilitate assurance of learning (through better analysis and reporting) and encourage course/curriculum improvements (by tracking actions and results over time). The assessment database should allow all disciplines to gather data, in different formats, and generate reports for multiple accrediting agencies such as AACSB and SACS. There was only one caveat; there was little funding for this initiative.

Developing the Database

The first step towards the development of a robust assessment database was to find a developer. A member of the MBA committee (and lead author of this paper) agreed to hire a student worker who was versed in database programming and to take responsibility for the database development. The student needed to come from outside the School of Business because they would be privy to (presumably) exam questions and other graded course materials.

The second step in the development of assessment database included defining the requirements and expected outcomes of the database. The faculty developer, programmer and MBA committee worked together to list the assessment database requirements and create a proto-type report. The assessment database fields needed to include a unique identifier that would link records. The unique identifier chosen was the individual student ID. Similarly, the course number and section was used to differentiate between classes. Adjunct faculty taught some of the MBA and CORE course, some at night, and some online. The committees agreed that analysis between these dimensions might be necessary and including the course section permitted this level of analysis. A number of the department chairs expressed an interest in using the data collected in the core level courses as part of their degree-level assessment. Thus, it was necessary to extract specific majors from the overall assessment results. Adding a field for student major was necessary. Last, faculty did not want to keep all of the hard copies that were part of the assessment process, so it was decided that a 'detailed' level report would be available which included an exact replica of the assessment questions/assignments. Thus, if the Dean's office or assessment advisors wanted to view copies of student results this was possible by using the 'detailed' level report and/or selecting various student IDs. Table 2 shows a summary of the database fields and rationale for inclusion.

Table 2: Database requirements

Data Variables	**Rationale**
Student ID	Eliminate the need to keep volumes of hard copy assessment data.
Course ID/Section	Ability to analyze data by professor/adjunct/modality (face-to-face, web-enhanced, online)
Student Major	Ability to compare and report data at the major level (major level analysis is required by SACS)
Assessment detail/description (i.e. Exam question/project description)	Ability to track assessment questions/projects over time; eliminate the need to keep hard copies of assessment questions; allow for assessments to be changed over time
Student answer/outcome	Ability to analyze students performing poorly by analyzing incorrect answer choices

This table shows a summary of the database fields and the rationale for their inclusion.

Outcomes Reporting

The assessment reports needed to serve two functions. First, the reports needed to aggregate all of the data across students, classes and majors, thus providing the assessment outcome results at a high level. These 'overall' reports would be used for reporting assessment data to AACSB, as well as other accrediting programs. Second, reports were needed to identify opportunities for improvement and/or deficiencies in learning. These 'detail' level reports needed to include item (measure) level data so that faculty could identify poor measures, learning deficiencies, and opportunities for course/curriculum improvement.

Two proto-type reports were created and reviewed by the MBA committee. The first report, 'Overall', included the course number and name, the overall high-level assessment objective and results, and the 'content-specific' objectives. The overall objective included all of the embedded assessment measures, such as "Eighty percent of students will successfully pass eighty percent of the assessment measures (exam questions)". The content specific objectives further defined the overall objective by grouping the assessment measures (exam questions) based on content. Typically, the content specific objective was similar to the overall objective; however, the overall objective included the total number of embedded measures (exam questions) while the content specific objective included a subset. Figures 1 and 2 show the Overall and Detail-level proto-type reports for an MBA level accounting course.

Figure 1: Proto-type assessment report: Overall

EXCERPT FROM: Assessment Report: ACCT 5131/Accounting for Administration Fall 2006

	# in Sample	# Achieving Goal	Overall Assessment Goal:	Percentage
Overall Assessment Objective: *Students will demonstrate knowledge of Product Costing, Planning and Decision Making, and Performance Measures.*	53	49	80% of students will score 80% or higher across the 15 ACCT questions representing the 3 key areas	92
Content-Specific Assessment Objective: Recognize managerial cost terms and concepts, their definitions, conceptual application, and/or examples; specifically with respect to Performance Measures	53	45	**Content-Specific Assessment Goal:** 80% of the students will score 80% or higher on questions pertaining to Performance Measures	85
Content-Specific Assessment Objective: Recognize managerial cost terms and concepts, their definitions, or conceptual application, and/or examples; specifically with respect to Planning and Decision Making	53	51	**Content-Specific Assessment Goal:** 80% of the students will score 80% higher on questions pertaining to Planning and Decision Making	96
Content-Specific Assessment Objective: Recognize managerial cost terms and concepts, their definitions, conceptual application, and/or examples; specifically with respect to Product Costing	53	52	**Content-Specific Assessment Goal:** 80% of the students will score 80% or higher on questions pertaining to Product Costing	98

Figure 1 shows the overall assessment report for one course. It reports the assessment objectives – both overall and content-specific - in the first column and the assessment goal in the second column. Under each is the number of students assessed, the number achieving the goal, and the percentage achieving the goal.

The initial proto-type reports included the course number and semester, but not course section. This was subsequently added so that assessment data could be compared between full-time/adjunct faculty, night/daytime students, and online/face-to-face courses. The Committee also added a field for 'remarks' to the reports so that faculty members could document any changes and/or improvements to the measures (questions) directly on the assessment reports.

RESULTS

Database Structure

It took approximately one year for the initial database to be developed, which included obtaining faculty agreement on the content-level objectives and actual assessment measures. This initial database included the assessment data from seven MBA-level courses. (At this time the CORE committee was using a single exam to assess student learning and one faculty member was responsible for collecting, analyzing,

and reporting the data). As the database evolved, so did its ability to handle a variety of assessment measures. In the beginning, most of the courses used multiple choice assessment questions for the embedded measures, which were easily handled by the database. Over time, multiple courses decided to use projects for assessment. These projects were graded using a 0 to 100 scale, a 1 to 10 scale and/or using a rubric scale. With minor programming changes, the database was able to handle all of the faculty requests. Moreover, as assessment measures (presumably) evolve to include behavioral instruments, performance skill indicators and higher order thinking tasks, the assessment database will easily adapt. For example, business faculty are now exploring many innovative pedagogical methods such as class projects (Weldy & Turnipseed, 2010), role-playing (Libin et. al., 2010), action research (Raelin, 2006), business games (Anderson & Lawton, 2009; Eduardo et. al., 2009), and service projects and internships (Narayanan et. al., 2010) which incorporate behavioral and performance skills as well as enhance higher-order learning. The assessment database is prepared to accommodate this evolution.

Figure 2: Proto-type assessment report: Detail

Excerpt from Assessment Measures Detail: ACCT 5131 Accounting for Administration Fall 2006			
Content –specific Objective		**Content-specific Criteria**	
Recognize managerial cost terms and concepts, their definition, conceptual application, and/or example; specifically with respect to Product Costing		80% of the students will score 80% or higher on questions pertaining to Product Costing	
# in Sample	**# Achieving Goal**	**Percentage**	**# in Sample**
53	**52**	**98**	
Content Specific Measure	**# in Sample**	**# Answered Correctly**	**Percentage**
What is cost of goods sold given the data below?	53	51	96
What is operating income using the variable product costing method?	53	52	98
What is operating income using the absorption product costing method?	53	52	98
Before disposing of the manufacturing overhead variance, the current period	53	41	77
Saturn produces several products, one of which is Product Q…	53	48	91

Figure 2 is the detailed report for the same class presented in Figure 1. For each content-specific objective, the objective and goal are stated across the top of the report. The number of students assessed, number achieving the goal, and the percentage achieving the goal are stated in the next row. The next section of the report is the specific measure or test question used for assessment. This section includes the number of students who received/ answered the assessment question, the number who answered each question correct and the percentage of students successfully answering each question.

After the first year, the MBA committee was able to report the assessment results using the assessment database. These reports were given to individual committee members to share within their respective disciplines. The results were also shared in a general faculty meeting. Overall, faculty members were impressed with the reporting capabilities and the Dean's office was excited about the prospect of having real-time assessment data easily retrievable. The CORE committee became interested in using the database for collecting and reporting data on the undergraduate common body of knowledge measures. Their decision to eliminate the single exam assessment and move to embedded measures within numerous required courses helped this decision. During the second year of implementation, departmental chairs were beginning to consider using the database for assessment data collection and reporting. The accounting program was the first to begin to submit data, followed by management, marketing, finance, and economics. By year three, the assessment database had become fully integrated into the School of Business and even the specialized degrees were beginning to use it. There were eight required MBA level courses, 11 required undergraduate courses, and approximately 20 program specific courses submitting data for inclusion in the database. Figures 3 and 4 depict the complexity of the ever-evolving database.

Inputting Student Level Data

In the beginning, the embedded measures were extracted from various assignments/exams and manually entered into the database. With numerous courses submitting data, it was labor intensive. Most faculty members involved in the MBA assessment process used student assistants to assist with inputting the data, but it was clear a better solution was needed. Working with the (student worker) database developer,

an import feature was added to the database. To successfully import student level data required a universal format. Microsoft excel was selected as the preferred format and faculty were given specific instructions on how to format the submitted data (Figure 5).

Figure 3: Database Structure – First Level with Homepage and Direct Links

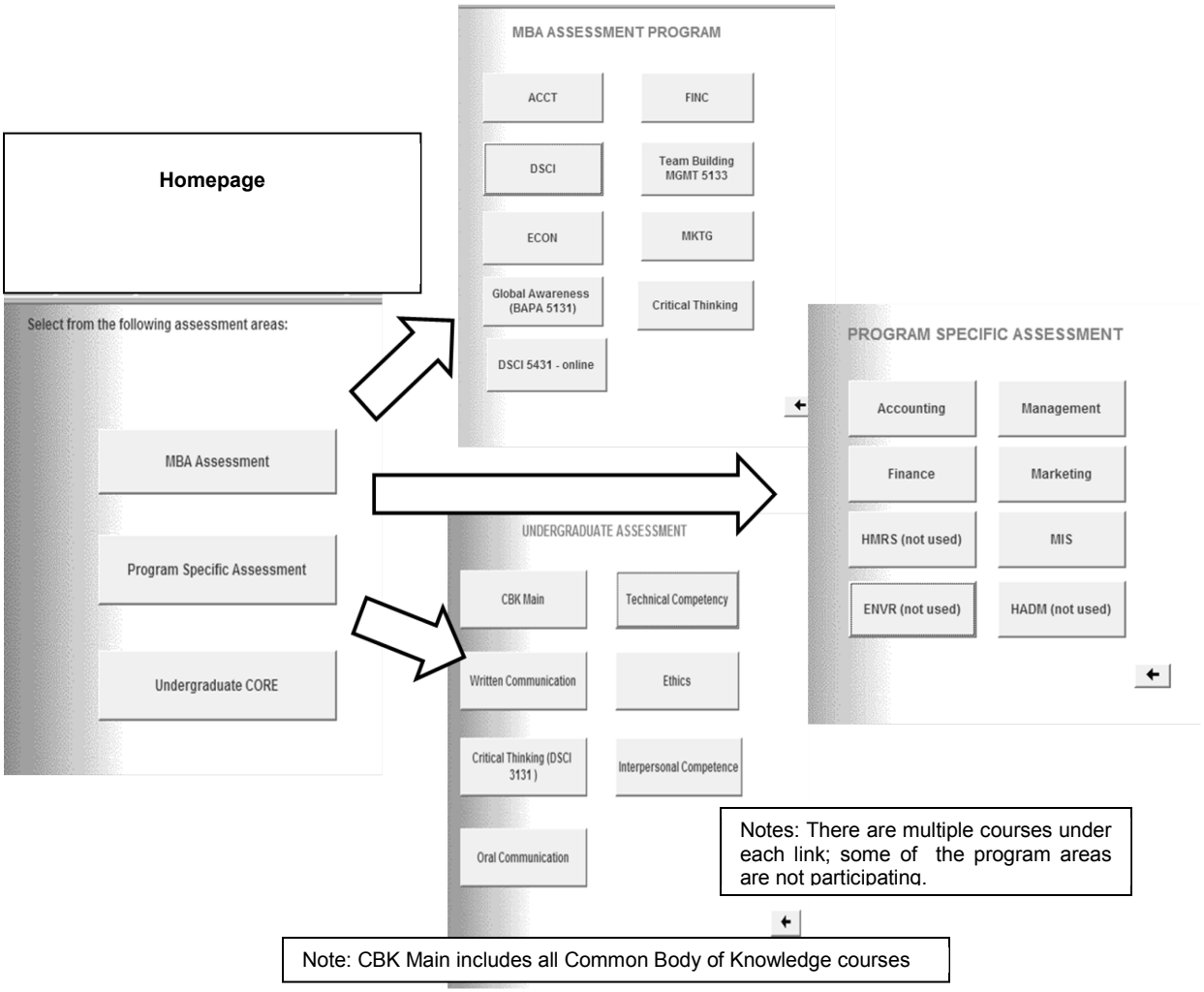

Figure 3 shows the structure of the database. The left part of the figure is the initial homepage shown. The arrows depict where each button will take the user: the MBA assessment data by objective, the undergraduate assessment data by objective, or data by program.

Many faculty members used Scantrons to collect assessment data, so the computer services department developed a solution to provide the Scantron results on a USB. These data were imported into Microsoft Excel and reformatted per the instructions shown in Figure 5. Instructors using hardcopy exams, or projects, for collecting assessment data were instructed how to appropriately format a Microsoft Excel spreadsheet with their assessment data. Because student ID and major were needed by the database, a process for downloading class rosters from the University-wide system was identified. The final obstacle was collecting assessment data from the online course management system, Blackboard. Blackboard itself has two purchasable solutions for collecting and reporting assessment data: Blackboard Learn™ for Outcomes Assessment and Blackboard Analytics™ (Blackboard, 2011). However, our University has not purchased these components, thus the faculty faced the challenge of extracting assessment data from Blackboard's primary system. Using downloadable reports from the grade book area, faculty extracted

individual user and assessment measure data in a Microsoft Excel format. At present, the process for submitting data requires faculty to either provide a USB drive or Microsoft Excel file with all of the student level assessment data, as well as a soft copy of the class roster. The database developer is responsible for importing this data. The import feature has dramatically reduced the workload for getting data into the database, while the use of Microsoft Excel for data collection has been well received by most faculty members.

Figure 4: Database Structure – Second Level under Undergraduate Assessment

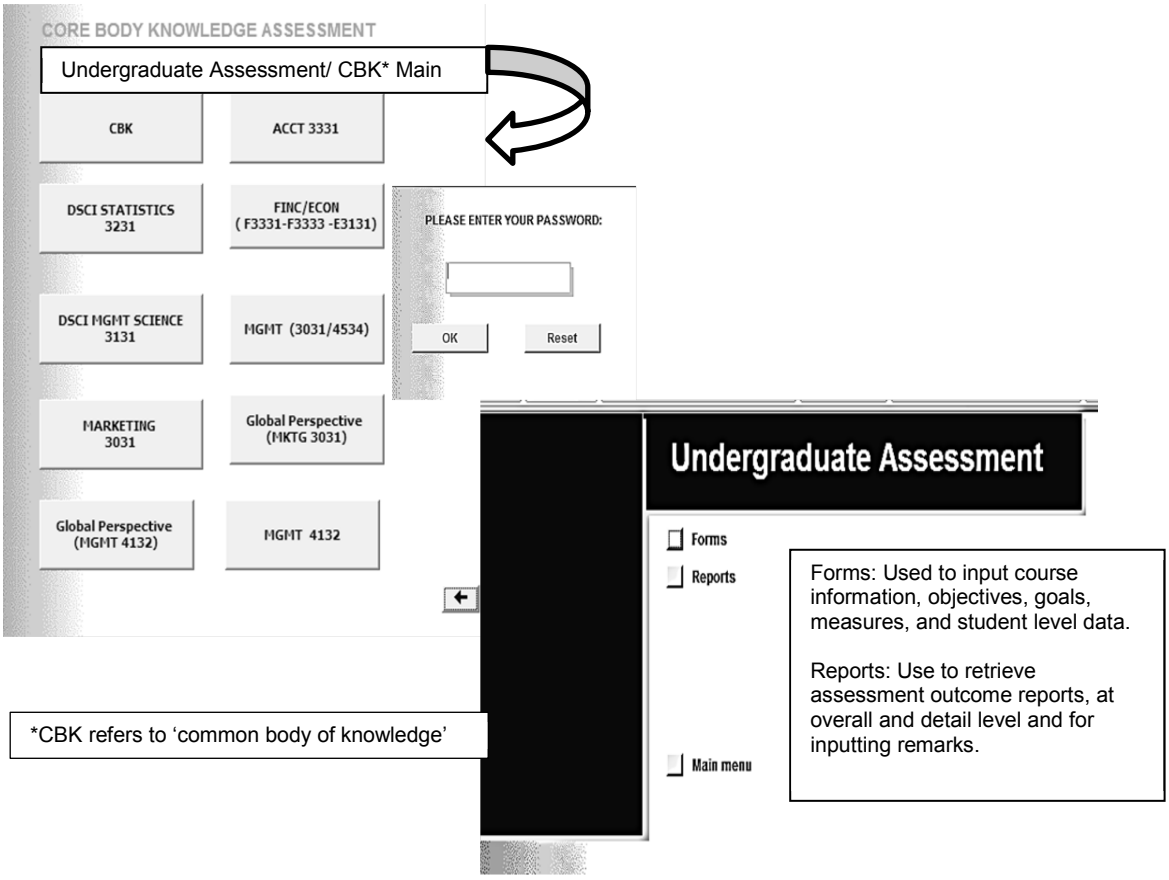

Figure 4 shows the structure of the database at the second next level. It assumes one went to the undergraduate assessment page shown in Figure 3 and selected CBK Main. The left part of the figure is a list of all the undergraduate common body of knowledge assessments. Once a course is selected, the user is prompted to log in; after logging in, the user selects either forms (inputting data) or reports (retrieving outcomes).

Reports

The database produces two types of reports; Overall and Detail. Remarks for the overall assessment objective and/or the content specific objective can be added (optional feature) and tracked using the database. These remarks are printed on both the Overall and Detail-level reports. Figure 6 depicts the input tool for selecting assessment outcome reports, while Figure 7 shows the resulting output. The 'Overall' report shown in Figure 7 is for the fall 2010 undergraduate statistics course and only includes students with a general business major. Had the Detailed report been run, the embedded assessment measures (in this case exam questions) would appear with the percent of students mastering each question given.

Figure 5: Faculty Directions for Submitting Assessment Data

For Multiple-Choice Exams:

ID	Student ID	Major ID	Section	Answer 1	Answer 2	Answer 3	Answer 4
	1000	ACCTNGMS	1	A	B	C	D
	1111	ACCTNGMS	2	A	C	C	A
	2222	FINANCEMS	3	B	B	C	A
	3333	FINANCEMS	2	B	C	C	D
	4444	ACCTNGBS	3	A	B	C	A
	5555	ACCTNGBS	2	B	C	C	A
	6666	ACCTNGBS	2	A	B	C	A
	7777	ACCTNGBS	2	C	C	C	D

For non Multiple-Choice Exams:

ID	Student ID	Major ID	Section	Answer 1	Answer 2	Answer 3	Answer 4
	1000	ACCTNGMS	1	2	2	2	1
	1111	ACCTNGMS	2	1	2	1	2
	2222	FINANCEMS	3	3	2	2	2
	3333	FINANCEMS	2	3	3	2	3
	4444	ACCTNGBS	3	2	3	3	3
	5555	ACCTNGBS	2	2	3	2	3
	6666	ACCTNGBS	2	1	3	1	3
	7777	ACCTNGBS	2	2	2	2	3

If you are using a Scantron: You will need to 'map' certain scantron fields to the data that are needed.

1 Use 'Identification Number' to map to student ID.
2 Use 'Birthdate' (the Day) to map to your section.
3 Use 'special codes' to map to the students major (see below for major id#s)

DON'T FORGET TO TAKE A JUMP DRIVE WITH YOU WHEN YOU DROP OFF THE SCANTRONS

Major ID	Description
1	ACCTNGMS
2	BPANONDEGR
3	FINANCEMS
4	HLTCRADMHA

Figure 5 shows the instructions to faculty for preparing assessment data for ease of uploading into the database.

Changing Assessment Measures

Over time, faculty have made changes to (improved/replaced) many of the embedded assessment measures. This includes altering the courses in which learning goals are assessed, changing assessment questions, adding content-specific objectives, increasing goals, adding/removing assessment criteria, and updating projects/assignments. The database is robust and able to handle all of these changes. Under the 'Forms' area of the database, the user is able to input a new course or assessment tool (i.e., new project, rubric), input a new objective for an existing course/goal or for a new course/goal, and enter a new assessment measure (Figure 8). The existing course, goals, and measures remain a permanent part of the database; older questions or assignments are simply 'ended' or no longer in use. This is typically noted in the Remarks section of the report, but can also be found under the 'New Measure (Question)' function.

Closing the Loop

A strong focus of AACSB's AOL standards is on 'closing the loop'. "Measures of learning have little value in and of themselves. They should make a difference in the operations of the school. Schools should show how (AOL) results impact the life of the school. Such demonstration can include uses to inform and motivate individual students and uses to generate changes in curricula, pedagogy, and teaching and learning materials" (AACSB, 2011b). In summary, AACSB expects Schools of Business to use their assessment data to improve learning. As discussed previously, the assessment database has a report generation feature that shows the percent of students achieving the stated learning outcomes. These reports are shared within the CORE and MBA committee, as well as with the department chairs. Learning goal outcomes that measure topic/content specific knowledge are predominately discussed at the department level, with each department working to close the loop. Close the loop activities have been described by Martell (2007) as including, but not limited to, offering new or modified courses, creating a

Figure 6: Input Screen for Report Selection

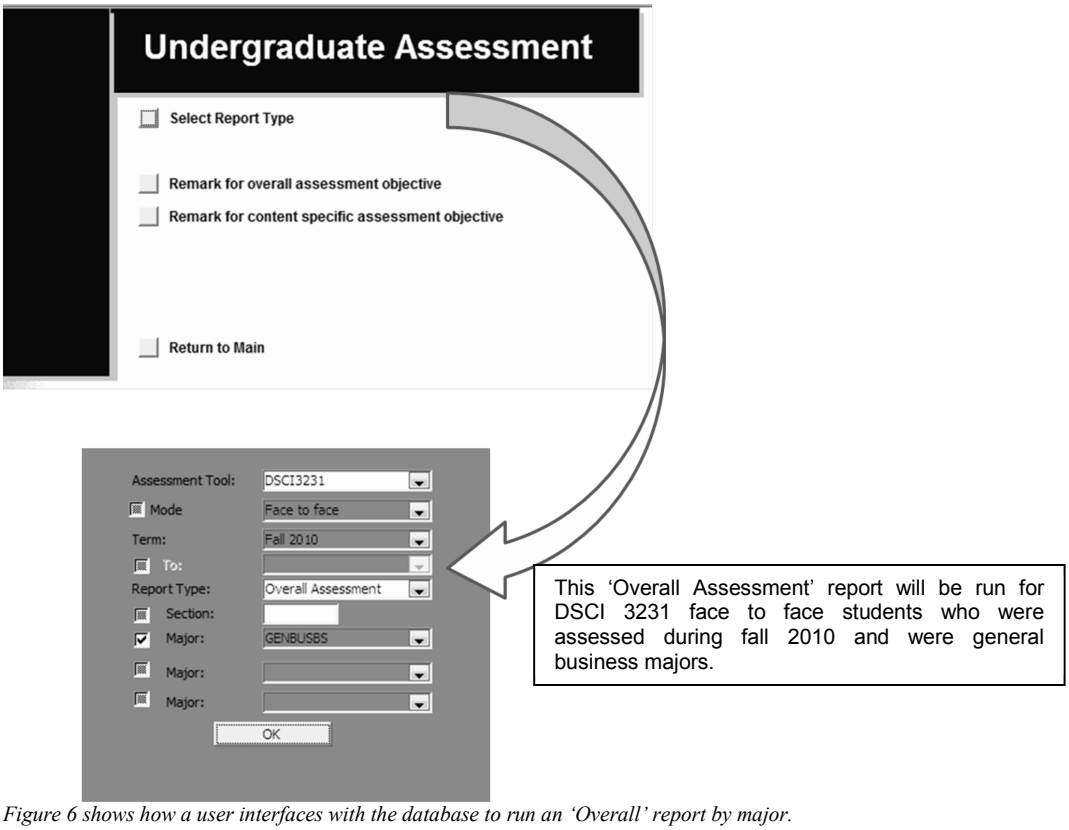

Figure 6 shows how a user interfaces with the database to run an 'Overall' report by major.

Figure 7: Overall Report Output

Overall Assessment Objective:			**Overall Assessment Goal:**
The students will be able to determine the appropriate level of measurement for given data, apply the empirical rule, use a p-value to make a decision in hypothesis testing, understand the concepts of type I and type II error, and write null and alternative hypotheses.			75 % students get 6 out 9 questions correct
Objective	**# in Sample**	**# Achieving Goal**	**Percentage**
	131	86	66
Remark: 2007: The CBK assessment questions were discussed in the area meeting on 09/27/07. Consensus was reached to continue using these measures. Assessment will occur in selected DSCI 3231 this academic year. 2008: Focus will be on assessing in additional sections, including those taught by adjuncts. We will then revisit content areas that show deficiencies. The stronger emphasis was placed when teaching Type I and II errors, more attention was given to p-values, additional assignments were given in these areas.2009 : The area met to evaluate specific content objective (see detailed report) and two questions will be added… critical value and confidence intervals. FY 09: The exam includes two questions on ethics. Students are assessed on ethics in management classes and that is not the focus of Statistics, so the question were removed from assessment to make room for a new question on confidence intervals. One question on data measurement was deemed confusing and reworded. The two questions on the empirical rule are likely giving students with weak algebra skills difficulty. Algebra is a prerequisite for Statistics but it was not stated in the catalogue. Algebra will be listed in the catalogue as a prerequisite and this will be enforced more carefully by faculty. The question on p-value is consistently missed by students; however, it is not clear if they are missing it due to a lack of understanding on hypothesis testing or on critical values. The question will be reworded to test their understanding of hypothesis testing and a second question on critical value will be added.			

Figure 7 shows the resulting output obtained by the selection criteria given in Figure 6. The report also shows the Remark area which states the improvements and/ or changes made in the class.

different approach to teaching the content, improving coordination among sections of core courses, faculty development activities, and/or enhanced out-of classroom experiences. Cross-curriculum learning goals, such as those for teamwork, critical thinking, and written communication, are discussed both at the CORE and MBA committee level as well as at the department level. Activities designed to improve on

these learning goals are spearheaded with the committee, discussed within departmental meetings, and carried out by various faculty. Table 3 details a sample of some of the learning goals and the 'close the loop activities' that have resulted from the database's collecting and reporting processes.

Figure 8: Input Screen for Updating Assessment Tools, Objectives, and Measures

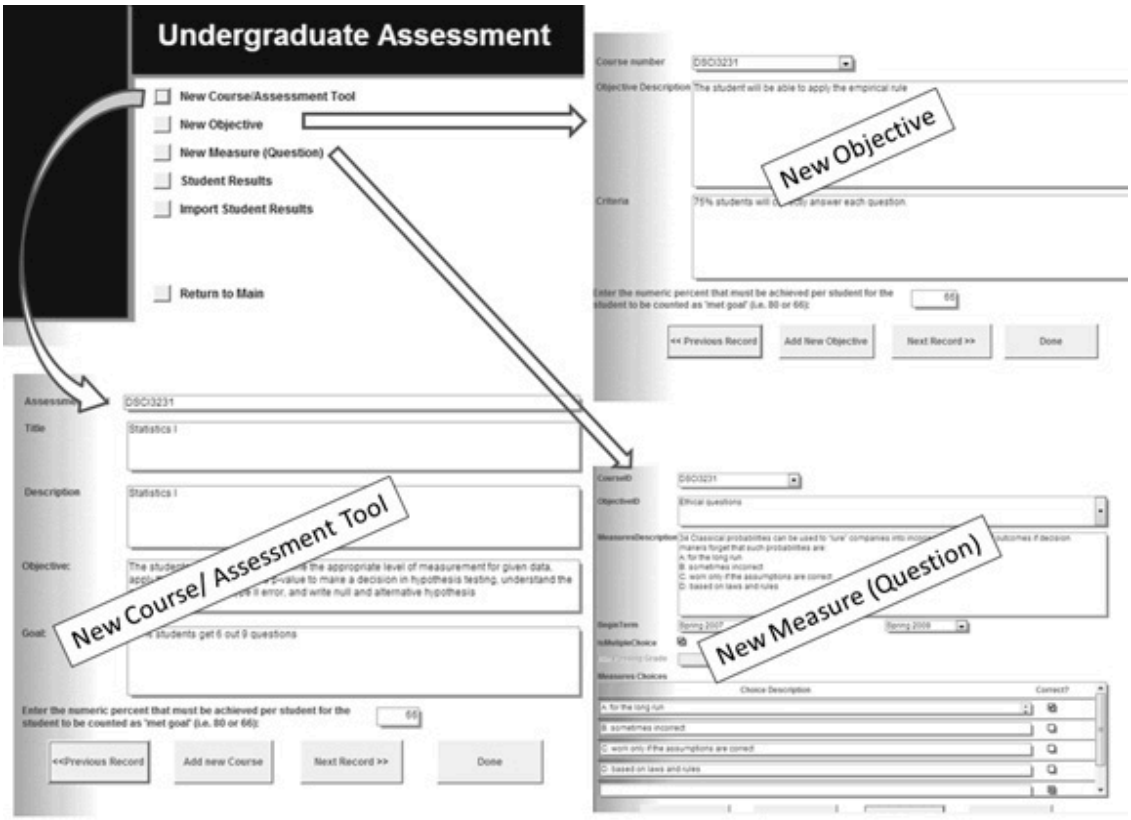

Figure 8 shows how a committee, program area, or faculty member would add a new objective, add a new course or a new assessment tool, or add a new measure or question to an objective.

Perhaps one of the most significant ways in which the assessment database is used to 'close the loop' is through its ease of integration with the University-wide assessment efforts. Campus-wide, our University uses an online portal, called AIM, for all academic (and non-academic) programs to report their efforts on assessment. The purpose of AIM is to aggregate all assessment data so that the Office of Assessment and Planning can effectively respond to accrediting bodies such as Southern Association of Colleges and Schools (SACS). The Office of Assessment and Planning, and individual Schools are required to meet the stated deadlines for reporting assessment activities. In developing the assessment database, consideration was given to the AIM requirements. The AIM system requires each program to develop learning goals, state the assessment methods, determine the criteria for success, report the results, and detail the use of the results. Table 4 shows an excerpt from the AIM system for our undergraduate business degree students.

In Table 4, the data inputs required by the AIM system are shown. These are directly in line with the School of Business' assessment database. The 'Learning Outcomes' are defined areas in the assessment database. The 'Assessment Methods' are the courses in which data are collected; the 'Criteria for Success' is used by the assessment database to generate the analytical reports. The 'Assessment Results' are taken directly from the assessment database reports, and the 'Use of Results' details the actions taken as a result of the database analysis.

Table 3: Closing the Loop Activities

Learning Goal	Database Analysis	Results: Close the Loop Activities
Teamwork	In Spring 2010, 92 students in Teams course (MGMT) were assessed with 75% scoring 70% or higher on 5 knowledge plans and individual development plan. Although the goal was met; faculty continue to report a deficient in the students' ability to perform well within a team.	The MBA committee formed an ad hoc committee of faculty to discuss teamwork across the curriculum. The ad hoc committee created online resources/activities which faculty can incorporate into any course to promote effective team. Rubrics for measuring team effectiveness and peer-to-peer assessment were also created and made accessible to the faculty at large.
Written Communication	In Spring 2009, 56 undergraduate business students were assessed. The percent of students meeting the established goal by content area was: Organization - 66%; Style/Tone - 71%, Mechanics - 66%; Critical Thinking Skills - 62%; Research Literacy Skills - 61%; Ability to Convey Business Information Through Visual Aids - 77%.	More short reports and written summaries of research materials were required which encouraged students to spend more time with library resources. An additional assessment of critical thinking was added to DSCI 3331.
Finance	In Fall 2009, 8 MBA students were assessed with 6 (75%) meeting the overall goal. For knowledge of derivatives, 88% met the goal, for knowledge or primary markets 50% met the goal, for knowledge of evaluating project risk 62% met the goal, for capital budgeting 100% met the goal and for knowledge of cost of capital 88% met the goal.	More focus was given to Primary Markets such as audiovisual presentations. In addition, cases were implemented with a stronger focus on project risk and the time allotted to teaching cost of capital increased by 33%.
Management Science	In Fall 2009, 47 MBA students were assessed with 81% meeting the overall goal of scoring 75% or higher on 21 multiple-choice questions. Analysis at the content specific level showed linear programming (LP) to be the lowest scoring area.	The DSCI faculty discussed student's limited knowledge of graphical LP solutions and integer LP and determined there was too much variation in time dedicated to each topic between teaching faculties. Consistency in topic coverage is sought.
Statistics	In Fall 2009, 111 undergraduate business students were assessed with 78% meeting the goal. Analysis at the content specific level showed deficiencies in Type I and II errors and p-values.	A stronger emphasis was placed when teaching Type I and II errors and more attention was given to p-values. Additional assignments, homework and test questions were given in these areas.

Table 3 is a sample of some of the learning goals and the 'close the loop activities' that have resulted from the database's collecting and reporting processes. The first column is the area of the learning goal, the second shows the analysis for the objective derived from the database, and the last column shows what activities were done to 'close the loop'.

CONCLUDING COMMENTS

The purpose of this article is to present the development of our University's AOL database management system in enough detail that others can both learn from our successes and (potentially) adapt our methodologies. The paper describes the design of a faculty-driven AOL system that maximizes faculty input on data utilization, collaboration, and improvements, while minimizing faculty time spent on data collection. We start by describing faculty concerns, requirements of AACSB, and constraints of data collection. The database devised to solve these problems is described in detail with sample reports for 'closing the loop' in the assessment process. The assessment database includes a reporting function that is flexible, allowing assessment goals to be easily changed and/or embedded measures to be updated at the request of faculty and/or departments. Access to the assessment database is somewhat restricted, yet the assessment database allows all disciplines to gather data, in different formats, and generate reports for multiple accrediting agencies such as AACSB and SACS. How the system handles faculty concerns, needed reports, closing the loop activities, cost constraints, and School-wide curriculum improvements is discussed.

A survey of 420 deans at AACSB accredited business schools was conducted and the results detail six best practices for achieving a sustainable assessment program (Kelly, Tong and Choi, 2010). These six best practices can all be found within our University; as a direct result of the efforts undertaken to develop the School's assessment database. The first best practice requires defining objectives of the assessment program. Through the CORE and MBA committees, and with the Dean's leadership, the assessment program was defined. The database provided a structure and required a defined approach to data

collection. The second best practice, assigning responsibility for the implementation, has been demonstrated by the unyielding commitment of the CORE and MBA committee to the development of a robust database. As assessment measures have evolved so too has the database. As closing the loop activities become more complex, the committees work to initiate and implement cross-curriculum improvements. Securing faculty commitment was the third best practice and continues to be demonstrated through both the data collection processes (which included a majority of the courses and faculty), as well as with the closing the loop activities which engage entire departments and foster collegiality. The fourth best practice is perhaps the largest achievement of the assessment database - allocating appropriate resources to assessment programs. The creation of the database has been relatively inexpensive (graduate student pay and faculty summer release), yet it has achieved assessment integration, faculty communication, and campus-wide acceptance. Designing the assessment program and closing the loop are the fifth and sixth best practices. The nature of the database required both the committees and individual departments to have a thoughtful and deliberate approach to assessment. It negated the subjective approach toward student learning assessment by requiring faculty to have defined assignments, rubrics and/or measures for student learning. The assessment database facilitates closing the loop through its detailed reports and ease of integration with the campus-wide AIM system.

Table 4: Campus-wide AIM System Inputs

Learning Outcomes Assessment **Learning Outcomes**	**Assessment Methods**	**Criteria for Success**	**Assessment Results**	**Use of Results**
Our students will have technical competence.	Students will demonstrate technical competence on an objective test over technical skills and concepts. Assessment will be done in ISAM 3033.	Students will demonstrate technical competence by scoring 70% or higher on exam	110 students were assessed in Fall 2009 with 86% of students meeting the goal. 138 students were assessed in Spring 2010 with 86% of students meeting the goal.	All sections of the technical competency course (including online) will be assessed, which significantly increases the number of faculty involved in assessment. A faculty discussion regarding the key topics that should be included in future assessments will commence. Questions will be evaluated for relevancy and alignment with identified key topic
Our students will demonstrate competency in oral communication	Students in MGMT 4132 will demonstrate oral communication skills on a project-based presentation	80% of students will have an average score of 'meets' or 'exceeds' expectations.	This assessment occurred in MGMT 4534. In Spring 2010, 92 students were assessed and 90 % achieved the goal.	This is the first semester that students have been assessed in oral communication. The results were remarkably good. Faculty will continue to assess using the same rubric to assure reliability of the results.
Our students will demonstrate critical thinking.	Students in DSCI 3131 will demonstrate critical thinking skills as evaluated by a case/project.	80% of students will have an average score of 'meets' or 'exceeds' expectations.	94 students were assessed in Spring 2010 with 52 % meeting the goal.	Critical thinking was piloted last semester. The faculty discussed the measures and results and agreed to continue to use the current measures in a larger number of sections.

Table 4 shows an excerpt from the University-wide assessment portal, called AIM, for our undergraduate business degree students. The purpose of AIM is to aggregate all assessment data of the University (academic and non-academic). The AIM system requires each program to develop learning goals, state the assessment methods, determine the criteria for success, report the results, and detail the use of the results.

The School of Business assessment database has not only shown to be a best practice approach to assurance of learning, but it also demonstrates how a common structure can make great strides in assessment. Using databases to collect and report data is not novel; however, using a cross-functional committee to develop a database for assurance of learning turned out to be novel for our School of Business. It allowed assessment to migrate throughout the faculty, in a seemingly unobtrusive way. It encouraged within and between-department communication. It provided an easy forum for faculty to become involved, even the faculty who initial objected to the idea of student assessment. The assessment database has quietly created a cultural shift; a shift away from independent faculty who rarely share

course knowledge to one of consistent communication aimed at advancing student knowledge. And best of all, this database is robust enough to tackle the future assessment demands – both from within the faculty and outside accrediting bodies.

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