

# North Carolina Central University

## School of Business

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### *Assessment of Student Learning*

### *2006 – 2011*

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## ASSESSMENT OF STUDENT LEARNING

North Carolina Central University's strategic plan for 2010-2020 established "Student Success" as the first goal of the University. The goal states, "North Carolina Central University will create and sustain an environment of accountability and engagement that will facilitate and promote access, persistence and success for all enrolled students." The first objective under this goal includes eight measures which are focused on accountability. The fourth objective seeks to ensure that ". . . university personnel understand and implement policies and procedures related to student success and persistence." At most meetings with faculty, Chancellor Nelms stresses the faculty's responsibility in achieving student success. Similarly, with students the Chancellor stresses "Graduation is your destination." At North Carolina Central University students, faculty and staff are regularly reminded of the primacy of student success.

Of course, the faculty plays a key role in assuring student success including developing and delivering the curriculum and assessing student learning. The faculty develops program-level learning goals and objectives and assesses student learning at both the course and program levels. The results from assessing student learning are used to improve curriculum development, curriculum delivery, and most importantly, student learning.

More than a decade ago, the faculty began using an internally developed instrument, the Student Learning Assessment Exam (SLAE), to assess undergraduate students' knowledge in core business disciplines. Exam items were submitted by discipline faculty. The items have been reviewed and revised several times since the initial use of the SLAE. The test was administered to students in Management 4740, the undergraduate capstone course, in the last semester of their senior year. Student received course credit based on their scores. Concern with the validity and reliability of the SLAE led to the use of ETS Major Field Test for some of the years during the last decade. Since this test did not carry course credit, students evidently did not make a serious effort to do well on the test. Currently, the faculty is rethinking the use of these exams with the focus on selecting the best method for assessing student learning.

In Fall 2006, the faculty began to plan for Fifth Year Maintenance of Accreditation review under the Assurance of Learning standards. The school received initial accreditation under the old standards. Given this, and as a part of its normal planning and review process, the faculty reviewed and revised program-level goals, objectives, and core competencies. The School's Assessment Committee began to design and implement a course-embedded assessment plan. (See Appendix 1.) Of particular note: (a) Independent raters were used for course-embedded assessment in written communications, ethics, and information technology (ACCT 2500); (b) In CIS 1100 (information technology), over the six semester time space for that assessment, the number of measures increased from 10 to 20, four objectives that met the standard in all previous semesters were removed, and 14 new objectives were added; and (c) In MGT 5565, Management Strategy and Policy Analysis, the business simulation game used allows for benchmarking our students' performance against the performance of students from around the world. Assessment methods for each learning goal are shown in Appendix 2.

## **Undergraduate Student Learning Assessment Exam**

During spring semester of the 2006-2007 academic year, the Student Learning Assessment Exam (SLAE) was administered to 94 students in Business Policy, the undergraduate capstone course. One student with a double major increased the number of records to 95 after a record was created for each major, thereby allowing compilation of results by majors to account for this student's performance in both areas. The exam was administered to 145 students in 2007-2008 with three additional records created for students having double concentrations and/or majors. Senior standing was a pre-requisite for enrolling in Business Policy (MGT 4740).

### **Instrument**

The instrument administered during spring semester 2007 was developed internally by discipline faculty within the School of Business. Test items were tied directly to student learning outcomes derived from program level learning goals and objectives. The test included 79 questions from all subjects covered in the core courses for all business students, independent of whether a degree is offered in that area.

Potentially problematic questions identified on the 2006-07 version of the test in the Computer Information Systems, Statistics, Operations Management, Management, and Marketing sections of the test were revised for clarity or replaced with new questions. These changes were made as a result of observations provided to lead faculty for the respective areas who in turn reviewed the questions with appropriate faculty members in the various disciplines. Problematic questions in the areas of Legal Environment, Economics, and Finance were not changed for the 2007-2008 administration of the test.

### **Variable**

One variable was constructed for each subject area to allow a trend analysis by majors and concentration areas. This variable represents the fraction of correct responses in each subject area. It was constructed by adding the number of correct responses to each question for each student in a given section, then dividing this sum by the number of questions in that section. This variable allows a limited assessment of relative proficiency in each of the content areas.

### **Overall Results**

As shown in Table 1, the overall mean for 2006-2007 was 48.28 with a standard deviation of 7.37. This mean suggests that on average, students provided correct responses to about sixty percent of questions included on the SLAE. The high score was 69 with a low score of 32.

The overall mean for 2007-2008 was 45.71 with a standard deviation of 7.225. The results indicate student performance on the SLAE declined over the year. The high score was 66 with a low score of 27 correct responses.

**Table 1. Composite Results (Mean and Standard Deviation)**

	2006-2007		2007-2008	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Overall	<b><u>48.28</u></b> (n=95)	7.37	<b><u>45.71</u></b> (n=148)	7.225
Accounting	<b><u>49.82</u></b> (n=11)	5.65	51.14 (n=14)	9.518
Computer Information Systems	<b><u>46.36</u></b> (n=11)	6.50	<b><u>43.63</u></b> (n=24)	7.347
General Business	<b><u>48.17</u></b> (n=6)	11.21	<b><u>48.67</u></b> (n=3)	5.033
Finance	<b><u>49.89</u></b> (n=19)	8.28	<b><u>44.46</u></b> (n=24)	8.086
Management	<b><u>48.28</u></b> (n=32)	8.22	<b><u>44.61</u></b> (n=54)	5.557
Marketing	<b><u>47.07</u></b> (n=15)	3.90	<b><u>46.44</u></b> (n=25)	6.021
Business Information Technology	<b><u>41.00</u></b> (n=1)	0.00	57.67 (n=3)	7.234

Given the variations in numbers of questions on the SLAE administered during two successive academic years, coefficient of variation was calculated to provide a more meaningful representation of the trend analysis. Coefficient of variation is the ratio of the mean to standard deviation. During 2007-2008, this value was 6.327 compared to 6.582 during spring semester 2007. This pattern suggests a slight mathematical decrease in performance over the two years; however, the magnitude of the decrease is small. The results by major and concentration are presented in Appendix 3.

There were 25 questions (26 for 2007-2008) which 50 percent or more of the students answered incorrectly. Of the 25 questions, two questions were in Accounting, three questions were in Legal Environment of Business I, two were in Computer Information Systems, two in Statistics, three in Decision Sciences, none in Operations Management, three in Economics, three in Finance, three in Management and four in Marketing. Similarly, of the 26 questions answered incorrectly for 2007-2008, three questions were in Accounting, three were in Legal Environment of Business I, two were in Computer Information Systems, two in Statistics, one in Operations Management, four in Economics, five in Finance, three in Management and three in Marketing. For both time periods, lead faculty for the respective areas received specific text of all of the questions and the answers provided for further review.

The standard of proficiency used throughout this trend analysis is 50 percent or more correct responses. Fifty percent was set after consultation with in-house statistician. The score defines what is reasonable performance to expect for an exam that is given in the last semester of the student's senior year for coursework taken beginning in the freshman year. Of course, some of

the material is utilized in coursework taken later in the student's course of study. In an environment of continuous improvement, we expect student performance to show an upward trend over time due to increased admission and retention requirements, better alignment of SLAE with curriculum, and improved delivery mechanisms (in-class and online).

### **Closing the Loop**

Strategies being employed to improve performance following the 2006-2007 administration of the test are summarized below.

- Better alignment of the SLAE with the curriculum.
- Continuation of the practice of discipline faculty conducting review sessions identifying pertinent concepts students should understand upon graduation.
- Re-evaluation and revision, as necessary, of all questions answered incorrectly by at least three-quarters of the students taking the SLAE during 2006-2007. Asking faculty to re-emphasize these topics.
- Providing more guided practice for students during class.
- Continuing to require labs in accounting where there was some discussion of eliminating the labs. Providing more guided practice during labs and scheduling short quizzes during labs to increase student attendance.
- Requiring students to use on-line learning tools identified by discipline faculty.

### **Course-embedded Undergraduate Assessment Results**

Undergraduate students in the School of Business, including students in the BBA program with concentrations, and students majoring in Accounting and Computer Information Systems, were assessed on five undergraduate learning goals. School of Business faculty simplified the undergraduate goals during the Fall 2010 semester resulting in the following: (a) Effective Communication Skills, (b) Application of Information Technology, (c) Recognition of Ethical Dilemmas, (d) Acquisition of Discipline Specific Knowledge, and (e) Global Awareness. These five goals are a distillation of what the faculty believe students should know or be able to do. Students majoring in Accounting and CIS were also assessed on two additional goals specifically related to those two majors. In general, at least 70 percent of the students should meet or exceed expectations on each of the learning measures specified for the learning goals. The results of the assessments are presented in the sections which follow.

#### **Goal 1: Effective Communication Skills**

Written and oral communication skills were assessed under this goal. Written communication skills were assessed in Accounting 3100 using seven learning measures. Oral communication skill was assessed in Management 2100. The expectation was that 70 percent of the students would meet or exceed standard.

The objective for written communication skills was met for six of the seven learning measures but was missed by one percentage point on the organization and ideas measured in Spring 2009.

To improve performance, students were required to write course briefs for every class and were instructed on how to write direct sentences. Students were provided with written evaluation. Additional instruction and practice were provided on organizing and presenting ideas. As Table 2 indicates, students' performance on two of the seven measures (clarity and readability and organization and ideas) declined in Fall 2009.

**Table 2. Written Communication Skills**

<b>Goal 1:</b> Effective communication Skills – Demonstrate effective communication skills.			
<b>Objective 1:</b> Demonstrate effective written communication skills.			
	<b>Learning Measure</b>	<b>Met Expectation (70%)</b>	
		<b>Spring 2009</b>	<b>Fall 2009</b>
<b>ACCT 3100</b>	Vocabulary & Spelling	81	93
	Sentence Construction	87	79
	Grammar & Punctuation	83	88
	Clarity & Readability	73	55
	Organization & Ideas	69	61
	Sentences & Paragraphs	90	74
	Audience Focus	100	78

Oral communication skills were assessed in MGT 2100 using four learning measures. The results as shown in Table 3 indicate that at least 70 percent of the students met or exceeded expectations on all of the learning measures in Fall 2009 and improved significantly on each of these measures in Fall 2010.

**Table 3. Oral Communication Skills**

<b>Goal 1:</b> Effective communication Skills – Demonstrate effective communication skills.			
<b>Objective 2:</b> Demonstrate effective oral communication skills.			
	<b>Learning Measure</b>	<b>Met Expectation (70%)</b>	
		<b>Fall 2009</b>	<b>Fall 2010</b>
<b>MGT 1100 &amp; 2100</b>	Eye Contact	75	96
	Visual Aid	94	100
	Completeness of Content	100	100
	Professionalism of Presentation	75	100
	Physical Appearance	87	98

## **Goal 2: Information Technology**

Student performance on Goal 2, the application of appropriate information technology, was measured in CIS 1100 and in ACCT 2500. Two learning objectives were identified for this goal.

The learning objective implemented in CIS 1100 was accompanied by ten learning measures. Six learning measures were used In ACCT 2500. See Appendix 4 for a complete listing of the 10 learning measures used in CIS 1100.

A pretest and posttest design was implemented in CIS 1100. Assessment data were collected for each semester from Fall 2008 to Spring 2011. Table 4 shows the percentage of skills for which 70 percent or more of the students met or exceeded expectations.

**Table 4. Information Technology**

<b>Goal 2: INFORMATION TECHNOLOGY</b> —Demonstrate effective application of appropriate information technology.							
<b>Objective 1:</b> Use spreadsheets to solve business problems.							
<b>CIS 1100</b>		<b>Met Expectation (70%)</b>					
	<b>Learning Measure*</b>	<b>Fall 2008</b>	<b>Spring 2009</b>	<b>Fall 2009</b>	<b>Spring 2010</b>	<b>Fall 2010</b>	<b>Spring 2011</b>
	Pretest	10	10	20	10	0	0
	Posttest	<u>50</u>	<u>60</u>	70	80	90	100
<b>Objective 2:</b> Students will use spreadsheets to solve business problems.							
<b>ACCT 2500</b>	Headings		100			10	
	Format Cells		77			<u>60</u>	
	Enter Data		96			100	
	Create Formulas		<u>58</u>			87	
	Label		96			93	
	Print		<u>46</u>			87	

\*See Learning Measures Table in Appendix 4.

As can be seen from the table, students entered CIS 1100 in Fall 2008 with only one of the skills but left the class having reached or exceeded acceptable performance on five of the required skills. To improve student performance, the skills were demonstrated in class at least three times in areas where the average was less than 70 percent. Additionally, there were ten trainings and four exams. In Spring 2009, application projects were added as a test in one section. The roll out of application projects in sections continued in Fall 2009. In Fall 2010 seven (7) projects were introduced in selected sections in the pretest with projects in all sections before the posttest. As the results indicate, steady progress was made in achieving the goal and getting at least 70 percent of the students to meet or exceed the standards. Improvements were at the rate of one additional skill each semester until 70 percent of the students met or exceeded expectation on each of the 10 skills in Spring 2011.

In Fall 2010 and Spring 2011, the number of measures increased from 10 to 20. Four objectives that met the standard in all previous semesters were removed and 14 new objectives were added. New objectives were added because of a review of “what students should know.” Objectives that



continued to meet standard were removed in order to keep the assessment within a reasonable time frame. The standard was met for all original objectives by Spring 2011. For the purposes of this report only the original objectives are included. See Appendix 5 for a more complete description of the process, measures, and results.

Students used spreadsheets to solve accounting problems in ACCT 2500, Principles of Accounting II. Using formulas was one of the most difficult of the six learning measures. Students did not meet expectations in Spring 2009 on the “Create formula” measure but exceed the expectation for that measure in Fall 2010 with an 87 percent proficiency score. Unfortunately, the score for format cells dropped from 77 percent to 60 percent for the same time period. Surprisingly, students experienced difficulty printing selected areas of the spreadsheet. To close the loop, one lab session was devoted to a refresher of spreadsheet fundamentals. Also, a graduate assistant was available for several weeks to tutor students on spreadsheets.

### Goal 3: Ethics

Ethics was assessed in ACCT 3100, Legal Environment of Business I using two learning objectives: (a) identification of ethical dilemmas, and (b) analysis of ethical issues. Assessments were made at two points during the semester as shown in Table 5. Examinations I and II represent these two different points of measurement. Data are presented for four semesters from Spring 2007 through Spring 2011. The results for the first examination indicate that students met the expectations on two of the three learning measures for all semesters. Students were less adept at identifying risks. The data also show a pattern of a decline for this measure, followed by an improvement, followed by a decline, ending with a 15 percentage point increase over the first assessment on Examination I. Similarly, a consistent pattern was not observed for risks on the second examination.

**Table 5. Ethics**

<b>Goal 3: ETHICS</b> —Recognize ethical dilemmas in business and professional environments.					
<b>ACCT 3100 Exam 1</b>	<b>Learning Measure</b>	<b>Met Expectation (70%)</b>			
		<b>Spring 2007</b>	<b>Spring 2009</b>	<b>Fall 2009</b>	<b>Spring 2011</b>
	Ethical Issue	75	91	90	80
	Stakeholders	72	91	86	76
	Risks	<b><u>44</u></b>	<b><u>38</u></b>	<b><u>66</u></b>	<b><u>59</u></b>
<b>ACCT 3100 Exam 2</b>	Ethical Issue	80	92	91	75
	Stakeholders	73	87	87	<b><u>65</u></b>
	Risks	<b><u>49</u></b>	<b><u>60</u></b>	70	<b><u>56</u></b>

To close the loop, ethical dilemmas were embedded throughout the course. Almost all of the chapters include two or three ethical problems. Students were required to read these ethical

problems and to be prepared to discuss the problems in class. Emphasis was placed on techniques and practices in analyzing ethical dilemmas. Additionally, ethical questions, including one essay question, were included on all examinations.

#### Goal 4: Discipline-specific Knowledge

The acquisition and application of discipline specific knowledge are hallmarks of the educated person. Students were assessed in Accounting, Decision Science, Management, and Marketing.

##### Accounting

As shown in Table 6, students clearly performed below expectations on two of the accounting learning measures for Summer 2007. Additional time spent on problematic topics, online assignments and labs were utilized to improve students' performance. The Fall 2009 results show that the students met and exceeded expectations on all of the accounting learning measures.

**Table 6. Discipline-specific Knowledge**

<b>GOAL 4: Discipline-specific Knowledge—Students will demonstrate command of knowledge base in specific disciplines.</b>						
	Learning Measure	Met Expectation (70%)				
		Summer 2007	Fall 2008	Spring 2009	Fall 2009	Spring 2011
<b>ACCT 2500</b>	Identify horizontal analysis	82.6			91	
	Identify vertical analysis	<u>58.1</u>			70	
	Apply horizontal analysis	<u>61.3</u>			95	
	Apply vertical analysis	<u>69.6</u>			95	
<b>DSC 3000</b>	Apply appropriate model			88	86.5	
<b>MGT 4740</b>	SWOT Analysis		<u>50</u>	<u>65</u>	74	
<b>MKT 3210</b>	Analysis			73		82.76
	Planning			<u>53</u>		<u>44.82</u>

##### Decision Sciences

Students met or exceeded expectations in their ability to identify and apply appropriate decision sciences models in both reporting periods.

## Management

Management (MGT) 4740 is the capstone course in the School of Business curriculum. Pre-requisite courses prepare the students to actively engage in case-based classroom discussions. Students analyze cases for approximately every other class meeting. Students choose two cases and prepare written submissions which are graded. To assess students' abilities to comprehend relevant facts and use this perspective to anticipate the firm's future strategy, students answer four essay questions using facts from the two cases submitted.

During Fall Semester 2008, essay exam questions were developed and administered to students in three sections of the course. An electronic version of the entire essay exam for each student was archived and uploaded into the Blackboard database during Summer 2009 to maintain integrity of future essay exams. In addition, more than 50 percent of the cases used during the 2009-2010 academic year were different from those used during 2008-2009. This design change is important because the case facts provide the foundation for students' essay responses to the exam questions.

As indicated in Table 6, only one-half of the students met or exceeded expectations in Fall 2008. This number improved to 65 percent by Spring 2009. By Fall 2009, 74 percent of the students met or exceeded expectations, effectively closing the loop. In order to improve student learning, during the 2008-2009 year the textbook was changed to create a higher level of student engagement. The 17th edition of the textbook was adopted during the 2009-2010 academic year, and students were required to complete assurance of learning exercises for each of the twelve (12) chapters in the textbook. In addition, students evaluated their own submissions plus those of two peers. The requirement to read the text and prepare a coherent response to a pertinent question seemed to increase the level of student engagement, which is reflected in the higher average scores. The electronic archives of essay exams and the infusion of new cases eliminate the opportunity for students to resubmit work from prior semesters.

## Marketing

Instruction in the Principles of Marketing course works toward assuring that our graduates are capable of undertaking marketing responsibility. Achieving this goal requires that they possess the ability to do appropriate marketing analyses (Analysis) and to choose appropriate marketing tactics (Planning).

Models, based on 47 questions from four course-embedded, in-class examinations, were used to determine the degree to which students possess the two traits identified above. The variables are the percentages of correct answers to questions related to the components of the Analysis or Planning traits. See Appendix 6 for the models, scoring mechanism, results, and statistical tests related to this learning objective.

A summary of student outcomes by trait is presented in Table 6. As the table indicates, students met expectations on the analysis measure but not on the planning measure for Spring 2009. An examination of the learning outcomes data indicated that the primary reason for the unacceptable outcome in Spring 2009 was that students lacked sufficient quantitative skills. Twelve of the 47

questions used to measure student learning were quantitative in nature; the remaining 35 were conceptual. Students correctly answered 63.14 percent of the conceptual questions but only 41.67 percent of quantitative questions. The difference in these rates is statistically significant by chi-square. It is expected that students who performed well on quantitative questions were likely to also perform well on conceptual questions. This expectation was tested by calculating the correlation between students' scores on the two types of questions. The results showed a statistically significant ( $p = 0.0016$ ) positive correlation of 0.551, supporting the expectation. Because students' key need was to improve their quantitative skills, which the data suggested would also improve their performance on conceptual questions, more emphasis was placed on basic marketing quantitative methods in the following semesters. This added time was used to work through examples of: (a) a mathematical model used to estimate customer attitudes toward a firm's products, (b) derivation of demand, revenue, and profit functions, (c) using a derived profit function to solve for the profit-maximizing price, and (d) a family of models using the logic of break-even analysis.

Once again, 47 questions taken from four course-embedded exams were used to measure student learning in Spring 2011. The only change from the previous assessment was an increase in the number of quantitative questions which increased from 12 to 16. The results indicate a 10 percentage point increase in the analysis score but an eight percentage point decrease in the planning score. Statistical analysis reveals that students were less successful with quantitative questions. Yet, the data also reveal that outcomes *did* improve. Specifically, while student performance on conceptual questions remained unchanged (62.85 percent correct answers in 2011 versus 63.14 percent in 2009), the percentage of correct answers to quantitative questions increased to 47.52 percent in 2011 from 41.67 percent in 2009. This difference is (marginally) statistically significant by chi-square. Hence, the actions taken to improve students' quantitative skills seem to have been successful. The reason that this success is not apparent in the overall learning outcome results is simple – the 33 percent increase in the number of quantitative questions used to assess student learning (from 12 to 16) exceeds the 14 percent increase in student facility with such questions (from 41.67 percent to 47.52 percent).

Regression analysis was used to understand the reasons that students, on average, lack sufficient quantitative skills. The best-fitting regression reveals that two variables predict a student's ability to handle quantitative questions: (a) the student's cumulative GPA when he or she enters the course, and (b) whether he or she has successfully completed calculus by the time he or she takes the course.

In as much as the additional time spent on quantitative instruction appears to have been a net benefit for student learning, we will do more of the same going forward. Specifically, lectures on quantitative methods that use applications with which the students are familiar and/or can relate are effective. Hence, we will again shift more attention toward such instructional methods.

### **Goal 5: Global Awareness**

Global awareness was assessed in MGT 4740, Strategic Management, the capstone course for undergraduate business students. Students answer essay questions using facts from two cases they have submitted.

As indicated in Table 7, only 40 percent of the students met or exceeded expectations in Fall 2008. This number moved slightly to 41 percent by Spring 2009. By Fall 2009, 57 percent of the students met or exceeded expectations. The interventions used for Goal 4 (Discipline Specific Knowledge) were also implemented for this goal since the two goals were implemented in the same class. These activities included changing the textbook, requiring students to complete publisher provided assurance of learning exercises for each chapter, and other measures enumerated under Goal 4. The results indicate a 17 percentage point increase from Fall 2008 to Fall 2009.

**Table 7. Global Awareness**

<b>Goal 5: GLOBAL AWARENESS</b> – Demonstrate global awareness in a business context.				
<b>Objective:</b> Modify the focal firm’s strategy to ensure the firm maintains a competitive advantage.				
<b>MGT 4740</b>	<b>Learning Measure</b>	<b>Meets Expectations (70%)</b>		
		<b>Fall 2008</b>	<b>Spring 2009</b>	<b>Fall 2009</b>
	Modify the focal firm’s strategy to ensure firm maintains a competitive advantage.	<u>40</u>	<u>41</u>	<u>57</u>

### **BBA in Accounting**

Two specifically accounting degree-related assessments are reported in Table 8.

**Table 8. Accounting Degree-related Assessments**

<b>Goal 1:</b> Demonstrate command of the knowledge base in Accounting.			
<b>Objective:</b> Demonstrate accounting knowledge and the ability to apply the knowledge.			
<b>ACCT 3600</b>	<b>Learning Measure</b>	<b>Met Expectation (70%)</b>	
		<b>Spring 2010</b>	<b>Spring 2011</b>
	Retail inventory method	27	<u>29</u>
	Cash Flows	55	71
<b>ACCT 4400</b>	Calculate AMT income	<u>88</u>	78
	Calculate regular taxable income and tax liability	25	<u>11</u>
	Determine if there is an AMT liability	44	72

Students exceeded expectations on one of the five measures for Spring 2010. In ACCT 3600, Intermediate Accounting I, the time spent on the retail inventory method was increased from one day to two days. Closing the loop activities for the future will include online homework and quizzes related to the topic. For the statement of cash flows, different kinds of problems were introduced to the class, ones that involved looking at balance sheets and income statements to determine cash flows. In Accounting 4400, Principles of Individual Taxation, additional practice was given in computing regular tax liability throughout the Fall 2010 and Spring 2011 semesters. In addition, more time was devoted to discussing the use of Alternative Minimum Tax Liability (AMT) and the need to compare with regular tax liability to determine whether or not, AMT is due. As a result, expectations were met for two of the three measures.

### **CIS Degree Program**

#### **Goal 1: Our students will demonstrate effective communication skills.**

CIS Goal 1 was implemented in CIS 3440. As seen in Table 9, students did not meet expectations for three of the learning measures. Strategies undertaken to improve student performance on these measures included a mid-semester presentation, a video of students, and a self-assessment. As shown in Table 9, for the Fall 2010 the students met expectations on all of the learning measures, effectively closing the loop.

**Table 9. CIS Goal 1: Effective Communication Skills**

<b>Goal 1:</b> Demonstrate effective communication skills.			
<b>Objective:</b> Make an effective oral presentation.			
		<b>Met or Exceeded Expectations (70%)</b>	
<b>Learning Measure</b>		<b>Spring 2010</b>	<b>Fall 2010</b>
<b>CIS 3440</b>	Clear and Singular Objective	71	100
	Prepared	64	86
	Knowledge of Material	78	80
	Clearly Conveyed to Audience	68	80
	Speaking	71	80
	Eye Contact	78	78
	Appropriate Mannerisms	70	82
	Time Limit	59	80
	PowerPoint	73	92
	PowerPoint Quality	79	80
	Color and Font	84	80
Cues and Bullets	74	78	

#### **Goal 2: Enhance student business computer skills and productivity.**

CIS Goal 2 was implemented in CIS 2200, Information Technology and System Software. A hands-on-computer skills assessment method was used. As seen in Table 10, students met or exceeded expectations for both assessment periods.

**Table 10. CIS Goal 2: Business Computer Skills and Productivity**

<b>Goal 2:</b> Enhance student business computer skills and productivity.			
<b>Objective:</b> Perform assembly, setup, troubleshooting, and component identification functions.			
<b>CIS 2200</b>	<b>Learning Measure</b>	<b>Met or Exceeded Expectation (70%)</b>	
		<b>Fall 2009</b>	<b>Fall 2010</b>
	Composite Score	100	73

### MBA Degree-embedded Coursework Assessment Results

#### Goal 1: Problem Solving

MBA students' ability to solve complex and ambiguous managerial problems was assessed in FIN 5550 and in Management 5565, the capstone course for the MBA program.

The assessment tools used in FIN 5550 included homework, midterm and final exams, a research project and presentation of the research. The five learning measures employed are shown in Table 11. As is evident from the table, the weakest area was mechanics, e.g. analyzing and applying the skills and knowledge to actually solve the problem.

As a result of this assessment and as part of continuous assessment in order to close the loop, additional time was spent on the methods of applying the knowledge and skills to problem solution. Additional problems were given and the number of practice problems was increased. The Spring 2011 results for mechanics improved significantly, effectively closing the loop. There were also significant increases in each of the other measures.

Goal 1 was assessed on four learning measures in MGT 5565. The assessment tool used was The Business Strategy Game, a game simulation which is played by students around the world.

The results show student performance as a percentile score based on the total population of students worldwide playing the game. Students met the expectation if they scored at the 50<sup>th</sup> percentile or above. The results for Fall 2008 (Table 11) show that students met the goal for only one of the four measures (Human Resource Management) but were within three to four percentage points of the goal for the other three measures.

Several steps were taken to improve student performance. First, more time was spent on each of the four topics. Second, faculty teaching the required production, marketing, and management classes were requested to spend more time on application than on concepts. Third, time in the computer lab was increased. For Fall 2010, the students again met expectations for one of the four measures (Strategic Analysis and Planning), showed no change in Marketing Management,

improved by one percentage point in Operations Management, but declined to the 49<sup>th</sup> percentile in Human Resource Management.

**Table 11. Problem Solving**

<b>Goal 1: Problem Solving - Solve complex and ambiguous managerial problems.</b>					
<b>Objective:</b> Employ statistical methods and appropriate information technology to solve complex and ambiguous managerial problems.					
	<b>Learning Measure</b>	<b>Met Expectation (%)</b>			
		<b>Fall 2008</b>	<b>Fall 2010</b>	<b>Spring 2009</b>	<b>Spring 2011</b>
<b>FIN 5550*</b>	Identifying the problem			89	95
	Identifying the methods to solve the problem			78	95
	Identifying the appropriate information technology to solve the problem			83	95
	Mechanics of solving the problem			<u>61</u>	79
	Ability to reach a conclusion			94	100
<b>MGT 5565**</b>	Operations Management	<u>47</u>	<u>48</u>		
	Marketing Management	<u>46</u>	<u>46</u>		
	Human Resource Management	50	<u>49</u>		
	Strategic Analysis & Planning	<u>47</u>	50		

\*Acceptable performance for these course-developed assessments was set at 70 percent of students meeting or exceeding the expectations.

\*\*Acceptable performance was set at the 50th percentile based on the total population of students worldwide playing The Business Strategy Game over the past twelve months.

## **Goal 2: Financial Knowledge**

Students' command of finance was assessed in the required graduate finance course, FIN 5550 where the knowledge base is acquired, and in MGT 5565, Managerial Strategy and Policy Analysis where the student has to demonstrate command of the application of the knowledge in a complex planning and decision making environment.

The assessment tools used in FIN 5550 included homework problems and a research project with presentation of results. Acceptable performance was set at 70 percent of the students performing at or above expectations. As Table 12 shows, 89 percent of the students met expectations. Despite that very good result, in the spirit of continuous improvement, extra time on skills and extra sessions were conducted for those in need. As a result, for Spring 2011, all students met expectation.



The assessment tool used to measure financial analysis and financial management in MGT 5565 was The Business Strategy Game. Financial Analysis assesses the students' skills in analyzing financial ratios and financial statements. Financial Management measures the students' ability to apply financial management principles and is based on the company's return on equity (ROE), credit rating, and stock price performance. The results for Fall 2008 indicate that the students came within five percentage points of reaching the goal for financial analysis and within eight percentage points for financial management. Students improved their performance for Fall 2010 by two and three percentage points respectively. The strategies employed following the Fall 2008 semester included spending more time with the students on financial statements and ratio analysis, company analysis, and industry reports. School of Business faculty teaching quantitative courses were requested to focus more on calculations, analysis, and application to financial statements. Also, finance faculty members were requested to spend more time on financial management and stock price performance. As indicated, these efforts resulted in modest improvements in students' performance.

**Table 12. Financial Knowledge**

<b>GOAL 2: Financial Knowledge - Students will demonstrate command of the knowledge base in Finance.</b>					
<b>Objective:</b> Students will demonstrate financial management knowledge and the ability to apply the knowledge.					
FIN 5550*	Learning Measure	Met Expectation (70%)			
		Fall 2008	Spring 2009	Fall 2010	Spring 2011
	Financial Knowledge		89		100
MGT 5565**	Financial Analysis	<u>45</u>		<u>47</u>	
	Financial Management	<u>42</u>		<u>45</u>	

\*Acceptable performance for these course-developed assessments is set at 70 percent of students meeting or exceeding expectations.

\*\*Acceptable performance was set at the 50th percentile based on the total population of students playing The Business Strategy Game over the past twelve months.

### Goal 3: Analytical Skills

The students' ability to employ analytical skills when making business decisions was assessed in two required MBA courses, ACCT 5510 and FIN 5550.

Using a net present value (NPV) problem, the students in ACCT 5510 were required to demonstrate their understanding of the time value of money, the effects of income taxes on cash flow, and their ability to use NPV to choose among investment alternatives. As is evident from Table 13, the results for Fall 2009 show the weakest area was Measure 3, namely, a comparison of time zero cash flow with the discounted future cash flows for a net present value analysis. As a result of this assessment and as part of continuous improvement, an additional class period was spent on the NPV topic. Additional instruction was given on how to compare a time zero cash outlay (including working capital) with the future discounted cash flows. An analysis of Table 13 reveals a significant improvement from Fall 2009 to Fall 2010 on measures 1 and 2 but a one

percentage point shortfall on Measure 3. Students were still having trouble making a final comparison of cash outflows at time zero with discounted future cash flows. Students may not clearly comprehend the concept of NPV. Additional class time will be spent on the final analysis to explain the meaning of NPV and its importance in choosing among alternative investments. Homework, research project, midterm and final exams were used to assess analytical skills in FIN 5550, Financial Policies. The expectation was that 70 percent of the students would meet or exceed expectations. As the Table shows, this goal was achieved in Spring 2009 and improved upon in Spring 2011.

**Table 13. Analytical Skills**

<b>Goal 3: Analytical Skills</b> —Demonstrate analytical skills in a problem-solving environment.					
<b>Objective:</b> Employ analytical skills and computing skills to solve business problems.					
	<b>Learning Measure</b>	<b>Met Expectation (70%)</b>			
		<b>Spring 2009</b>	<b>Fall 2009</b>	<b>Fall 2010</b>	<b>Spring 2011</b>
<b>ACCT 5510</b>	Analytical Skills - Time Value		74	97	
	Analytical Skills - Taxes & Cash Flow		87	97	
	Analytical Skills - NPV		<b>65</b>	<b>69</b>	
<b>FIN 5550</b>	Analytical skills	78			89
	Computing skills	72			79

#### **Goal 4: Information Technology**

The Information Technology goal assesses the students' understanding of the use of information systems to advance organizational goals and objectives. The learning measure included with this goal involving the identification of technical resources, organizational resources, and data resources. The results in Table 14 indicate that students met the goal for both assessment periods.

**Table 14. Information Technology**

<b>Goal 4: Information Technology</b> —Students will understand how organizations structure their information systems in order to meet their goals and objectives.			
<b>Objective:</b> Students will identify the technical resources, data resources, and organizational resources in a given corporation's information systems portfolio.			
	<b>Learning Measure</b>	<b>Met Expectation (70%)</b>	
		<b>Spring 2010</b>	<b>Spring 2011</b>
<b>CIS 5520</b>	Identify technical, data and organizational resources.	71	70

### Indirect Assessment Measures: MBA Survey Data Fall 2006 thru Spring 2011

The School collected indirect assessment data for the last 10 years from new, continuing, and graduating students. While the MBA Program values direct assessment over indirect assessment, the MBA Survey provides useful information to drive program improvement. A content analysis was conducted on the student comments provided in MBA survey data collected.

Opportunities for MBA curriculum improvements identified from the surveys include additional elective courses, online courses, and summer courses. As a result, two online MBA electives were offered Summer 2011 and a new Finance elective will be offered Spring 2012. Further, a two (2) year elective course planning process will begin Fall 2011.

Facilities enhancements identified include improvements to instructional technology, building WIFI, and computer lab. Actions taken include instructional technology upgrade and WIFI upgrade, summer of 2011. A request for Computer Lab upgrades has been submitted to Information Technology Services.

### Closing the Loop

A summary of AOL activities for which we closed the loop is presented in Table 15.

**Table 15. Closing the Loop Summary Table**

Course Embedded Assessments	Initial Assessment (%)	Final Assessment (%)
<b>Undergraduate BBA</b>		
Goal 2, Objective 1*	10	100
Goal 2, Objective 2**		
Create Formulas	58	87
Print	46	87
Goal 4***		
Identify Vertical Analysis	58.1	70
Apply Vertical Analysis	69.6	95
SWOT Analysis	50	74
<b>Accounting BBA**</b>		
Cash Flows	55	71
AMT Liability	44	72
<b>MBA</b>		
Mechanics**	61	79
Strategic Analysis & Planning***	47	50

\* Pretest and Posttest using 10 skills. Acceptable performance set at 70%.

\*\* Acceptable performance set at 70%.

\*\*\* Acceptable performance was set at the 50th percentile based on the total population of students playing The Business Strategy Game over the past twelve months.

### Assessment-driven Curricular Changes

- Improvement in instruction of CIS 1100/1200 – Implemented automated training software from Pearson (MyITLab) in CIS 1100 and 1200 designed to improve students' ability to use applications such as spreadsheet. Goal 2 – Information Technology.
- Changed the Common Body of Knowledge course from Business Computer Applications to Fundamentals of Information Systems. Adjusted this course from the junior level core CIS course to a sophomore course meeting the needs of all business majors. Content changed to management information systems to reflect marketplace demands. Goal 2 – Information Technology.
- Changed from a classic textbook to one more focused on crafting and executing strategy to achieve a competitive advantage. The book's approach and the assurance of learning materials supports a higher level of student engagement in the Strategic Management class – Goal 4 – Discipline Specific Knowledge and Goal 5 - Global Awareness.
- Refocused marketing class to a more quantitative approach after analysis assessment data revealed a significant difference on both quantitative and conceptual material resulted from improving students' quantitative skills. Goal 4 – Discipline Specific Knowledge.
- Added thirty percent Global Awareness content to MGT 2100 for Fall 2011.
- Global awareness improved significantly from Fall 2008 to Fall 2009 but still did not meet expectations. Nine (9) undergraduate courses were enhanced to include 25 percent or more content on globalization and international trends related to the respective subjects. Two of the nine courses are core courses—MGT 3000 and CIS 2400. Goal 5 – Global Awareness.
- Included two new Special Topics courses: Global Outsourcing, Spring 2010 and Management and International Entrepreneurship, Spring 2010; two study abroad programs in Management and International Entrepreneurship and Global Outsourcing; faculty/student travel to India and Vietnam; and Online Global Business Plan writing and competitions with SCMS College in Cochin, India and Vietnam National University. Goal 5 – Global Awareness.
- Approved a new graduate Finance elective Spring 2011 to be offered Spring 2012. Goal 2 – Financial Knowledge.
- Added tracks for five different career progressions: Business Analysis, Project Management, Quality Assurance, Mainframe Analyst and Network Analyst, as a result of review of CIS.
- Added new courses to support the CIS career progressions: Project Management; Introduction to Large Systems 1 and 2; IT Security and Risk Management; Introduction to Quality Assurance; Information Systems Management, Strategy and Sourcing; and Business Process Management and Six Sigma.
- Changed courses required for majors as follows: Ten (10) CIS courses required (8 prescribed, 2 electives); number of programming courses reduced from 3 to 2; added large systems and project management as required courses; moved Networking to an elective course; and revised prerequisites for all the CIS courses.

## **APPENDIX**

- APPENDIX 1**            **COURSE-EMBEDDED ASSESSMENT PLAN**
- APPENDIX 2**            **LEARNING GOALS AND ASSESSMENT METHODS BY DEGREE PROGRAM**
- APPENDIX 3**            **SENIOR LEARNING ASSESSMENT EXAM OVERALL RESULTS AND RESULTS BY MAJOR AND CONCENTRATION**
- APPENDIX 4**            **INFORMATION TECHNOLOGY LEARNING MEASURES**
- APPENDIX 5**            **INFORMATION TECHNOLOGY PROCESS, MEASURES, AND RESULTS**
- APPENDIX 6**            **MARKETING ANALYSIS MODELS, SCORING MECHANISMS, RESULTS, AND STATISTICAL TESTS**

## Appendix 1

### *Course-embedded Assessment Plan*

<b>Undergraduate PLLGs and Assessment Courses</b>	
PLLG 1	Our students will demonstrate effective communication skills.
	1. ACCT 3100: Legal Environment of Business
	2. MGT 4740: Strategic Management (Capstone)
	3. MKT 3210: Principles of Marketing
PLLG 2	Our students will function as professionals in their careers.
	1. MGT 1100: Professional Development I – Career Planning
	2. MGT 2100: Professional Development II – Business Protocol
	3. MGT 3100: Professional Development III – Business Communication
PLLG 3	Our students will be able to apply information technology effectively in a business and professional environment.
	1. ACCT 2500: Principles of Accounting II
	2. CIS 110: Business Computer Applications
	3. MGT 4740: Management Strategy Capstone
PLLG 4	Our graduates will be able to independently and collaboratively identify, manage, and resolve business issues.
	1. MGT 4740: Management (Capstone)
	2. MKT 3210: Principles of Marketing (rubric incomplete)
	3. DSC 2010: Elementary Statistics
	4. DSC 3020: Statistical Statistics
	5. ECON 2200/2300: Principles of Macroeconomics/Microeconomics
	6. FIN 3200: Principles of Finance
	7. MGT 3000: Organization and Management
	8. ACCT 2400: Principles of Accounting I
PLLG 5	Our students will be ethically and socially responsible and conscious with regard to the community and the environment.
	1. ACCT 3100: Legal Environment of Business
	2. MKT 3210: Principles of Marketing
	3. MGT 3000: Organization and Management
PLLG 6	Our students will understand and function successfully in a global business environment.
	1. MGT 4740: Strategic Management (Capstone)
	2. MKT 3210: Principles of Marketing
	3. ECON 2200/2300: Principles of Macroeconomics/Microeconomics

## Revised Undergraduate PLLG's and Objectives

**Goal 1:** Our students will demonstrate effective communication skills.

**Objectives:**

1. Students will write clearly and effectively.
2. Students will present clearly and effectively.

**Goal 2:** Our students will demonstrate effective application of appropriate information technology.

**Objectives:**

1. Students will use spreadsheets to solve business problems.
2. Students will create appropriate charts and graphs to present trend data.

**Goal 3:** Our students will recognize ethical dilemmas in business and professional environments.

**Objectives:**

1. Students will identify unethical behavior.
2. Students will analyze ethical dilemmas.

**Goal 4:** Our students will demonstrate command of the knowledge base in specific disciplines.

**Objectives:**

1. Students will use financial information to solve business problems.
2. Students will analyze supply and demand to evaluate market outcomes.
3. Students will apply quantitative models to support managerial decision making.
4. Students will develop a marketing plan.
5. Students will describe current trends in organizational behavior.

**Goal 5:** Our students will demonstrate global awareness in a business context.

**Objectives:**

1. Students will identify and describe the similarities and differences in business practices across cultural contexts.

<b>M.B.A. <i>PLLGs and Assessment Courses</i></b>	
<b>Educational Objective</b>	<b>Courses Emphasizing</b>
1. An integrated understanding of the global environment of business	The following courses address this objective: <b>ECON 5540, Economic Analysis</b> <b>CIS 5520, Management Information Systems</b> <b>MKT 5570, Marketing Strategy</b> <b>MGT 5565, Management Strategy and Policy Analysis</b>
	<b>Assessment Approaches</b>
	This objective is assessed through course-embedded assessments in the appropriate MBA core courses. In addition, it is assessed through the <b>Continuing Student Assessment Questionnaire (CSAQ), Graduating Student Assessment Questionnaire (GSAQ)</b> , the Student Ratings of Instruction (SRI), and semester Grade Distribution Reports (GDR).
2. An ability to bring structure to complex and ambiguous managerial problems, using information technology in a team-based environment	<b>Courses Emphasizing</b>
	The following courses address this objective: <b>MGT 5565, Management Strategy and Policy Analysis</b> <b>ACCT 5510, Managerial Accounting</b> <b>DSC 5530, Production and Systems Management</b> <b>FIN 5550, Financial Policies</b> <b>MKT 5570, Marketing Strategy</b> <b>DSC 5200, Managerial Statistics</b>
	<b>Assessment Approaches</b>
3. An ability to understand the changing business environment resulting from sociopolitical, economic, and technological developments	<b>Courses Emphasizing</b>
	The following courses address this objective: <b>ECON 5540, Economic Analysis</b> <b>FIN 5550, Financial Policies</b> <b>MGT 5560, Behavior Management Theory and Analysis</b> <b>CIS 5520, Management Information Systems</b> <b>MGT 5565, Management Strategy and Policy Analysis</b>
	<b>Assessment Approaches</b>
4. An understanding of the role of ethics considerations in business decision making	<b>Courses Emphasizing</b>
	The following courses address this objective: <b>CIS 5520, Management Information Systems</b> <b>MKT 5570, Marketing Strategy</b> <b>MGT 5565, Management Strategy and Policy Analysis</b> <b>ACCT 5510, Managerial Accounting</b>
	<b>Assessment Approaches</b>
5. Effective written, oral, and listening communication skills	<b>Courses Emphasizing</b>
	The following courses address this objective: <b>MGT 5560, Behavior Management Theory and Analysis</b> <b>CIS 5520, Management Information Systems</b> <b>MKT 5570, Marketing Strategy</b> <b>MGT 5565, Management Strategy and Policy Analysis</b>
	<b>Assessment Approaches</b>
	This objective is assessed through course-embedded assessments in the appropriate MBA core courses. In addition, it is assessed through the <b>CSAQ, GSAQ, SRI, and GDR.</b>



<b>M.B.A. <i>PLLGs and Assessment Courses</i></b>	
<b>Educational Objective</b>	<b>Courses Emphasizing</b>
6. Effective analytical and computing skills and financial management knowledge.	<b>Courses Emphasizing</b>
	The following courses address this objective: <b>CIS 5520, management information Systems</b> <b>Finance 5550, Financial Policies</b> <b>DSC 5200, Managerial Statistics</b>
	<b>Assessment Approaches</b>
	This objective is assessed through course-embedded assessments in the appropriate MBA core courses. In addition, it is assessed through the <b>CSAQ, GSAQ, SRI, and GDR.</b>
<b>Revised M.B.A. <i>PLLGs and Assessment Courses</i></b>	
<b>Educational Objective</b>	<b>Courses Emphasizing</b>
1. An ability to solve complex and ambiguous managerial problems.	<b>Courses Emphasizing</b>
	The following courses address this objective: <b>FIN 5550, Financial Policies</b>
	<b>Assessment Approaches</b>
	This objective is assessed through course-embedded assessments in the appropriate MBA core and elective courses. In addition, it is assessed through the <b>CSAQ, GSAQ, SRI, and GDR.</b>
2. A command of the knowledge base in Finance	<b>Courses Emphasizing</b>
	The following courses address this objective: <b>FIN 5550, Financial Policies</b> <b>MGT 5565, Management Strategy and Policy Analysis</b>
	<b>Assessment Approaches</b>
	This objective is assessed through course-embedded assessments in the appropriate MBA core courses. In addition, it is assessed through the <b>CSAQ, GSAQ, SRI, and GDR.</b>
3. An ability to demonstrate analytical skills in a problem solving environment.	<b>Courses Emphasizing</b>
	The following courses address this objective: <b>ACCT 5510, Managerial Accounting</b> <b>FIN 5550, Financial Policies</b>
	<b>Assessment Approaches</b>
	This objective is assessed through course-embedded assessments in the appropriate MBA core and elective courses. In addition, it is assessed through the <b>CSAQ, GSAQ, SRI, and GDR.</b>
4. An understanding of how organizations structure their information systems to meet their goals and objectives.	<b>Courses Emphasizing</b>
	The following courses address this objective: <b>CIS 5520, Management Information Systems</b>
	<b>Assessment Approaches</b>
	This objective is assessed through course-embedded assessments in the appropriate MBA core and elective courses. In addition, it is assessed through the <b>CSAQ, GSAQ, SRI, and GDR.</b>

## Appendix 2

### *Learning Goals and Assessment Methods by Degree Program*

Program	Learning Goal	Assessment Methods
<b><u>BBA</u></b>	Communication (Written) Communication (Oral) Information Technology Ethics Discipline-specific Knowledge: Accounting Decision Science Management Marketing Global Awareness	Case briefs and essay questions Oral presentation Skills Pretest and Posttest Problem solving using spreadsheets Exam essay questions Quizzes and exams Problem solving SWOT Analysis Quizzes and exams Case analysis
<b><u>Accounting</u></b>	Intermediate Accounting Knowledge Tax Accounting Knowledge	Quizzes and exams Problem solving
<b><u>CIS</u></b>	Communication Business computer skills and productivity	Oral presentation Install hardware, assemble components, perform specified actions, connect computers, perform specified functions, and problem solve
<b><u>MBA</u></b>	Problem Solving Financial Knowledge Analytical Skills Information Technology	Homework, exams, and research project The Business Strategy Game Homework and research project The Business Strategy Game Problem solution Project

### Appendix 3

#### *Senior Learning Assessment Exam Overall Results and Results by Major and Concentration*

See Table A for the overall percentage of correct responses by subject area. Students taking the test during the 2006-2007 academic year seem most proficient in Operations Management and least proficient in Decision Science and Legal Environment, correctly answering only 29.82 and 56.05 percent of the questions in these content areas. For 2007-2008, students were most proficient in Computer Information Systems and Decision Science, answering 67.50 and 66.67 percent of the questions correctly in these two content areas. The students seem least proficient in Finance and Accounting, correctly answering only 50.27 and 51.35 percent of the questions correctly in these two content areas.

**Table A. Percentage of Correct Responses Overall by Subject Area for Majors**

Subject Area	Overall		Accounting Majors		Computer Information Systems Majors	
	2006-2007 (n=95)	2007-2008 (n=148)	2006-2007 (n=11)	2007-2008 (n=14)	2006-2007 (n=11)	2007-2008 (n=24)
Accounting	58.62	51.35	72.73	72.86	61.82	50.83
Legal Environment	56.05	54.31	56.82	55.36	<b><u>47.73</u></b>	53.12
CIS	69.05	67.50	71.82	77.14	68.18	67.50
Decision Science	<b><u>29.82</u></b>	66.67	<b><u>30.30</u></b>	61.90	<b><u>21.21</u></b>	61.11
Economics	60.00	53.23	57.58	63.49	51.52	74.22
Finance	57.05	50.27	59.09	63.57	54.55	<b><u>45.83</u></b>
Management	64.21	62.23	68.18	62.14	61.82	57.08
Marketing	65.16	65.47	60.00	65.00	63.64	60.83
Operations Mgmt.	74.47	64.02	72.73	64.29	79.55	67.71
Statistics	62.32	58.28	61.82	62.50	61.82	59.38

Some of the patterns observed in proficiency explain the reduction in overall proficiency. The percentage of students proficient in Operations Management declined dramatically, 10.45 percentage points relative to a year ago. This trend is expected for Operations Management because that was the last graduating class with reasonable numbers of students who were required to take the Operations Management course, DSC 3750. There were numerical decreases in proficiency for Accounting, Legal Environment, Computer Information Systems, Statistics, Economics, Finance, and Management. This might be considered normal fluctuation, but the proficiency should be improved for all of these areas so that in an environment of continuous improvement the expectation is increased yearly until our students reach a 70 percent achievement level.

There were significant improvements in the percentage of students demonstrating proficiency in Decision Science, which was up 36.85 percentage points. This improvement is attributable to the

attention faculty members devoted to clarifying and/or replacing problematic questions and to the “closing the loop” strategies implemented by discipline faculty, including an emphasis on in-class guided practice.

The 50 percent proficiency standard translates to a “cut score” of 40 correct responses on the overall exam. Eighty-five (85 percent) of the students taking the test in 2006-2007 met the standard. The percentage declined to 80 percent in 2007-2008.

### Results by Major or Concentration

The results by major and concentration are presented in the paragraphs which follow. The percentages of correct responses provided in each subject area are summarized in Tables A for majors and in Table B for concentrations.

**Table B. Percentage of Correct Responses by Subject Area for Concentrations**

Subject Area	Business Information Technology		Finance		General Business		Management		Marketing	
	2006-2007 (n=1)	2007-2008 (n=3)	2006-2007 (n=19)	2007-2008 (n=24)	2006-2007 (n=6)	2007-2008 (n=3)	2006-2007 (n=32)	2007-2008 (n=54)	2006-2007 (n=15)	2007-2008 (n=25)
Accounting	50.00	66.67	55.79	51.67	70.00	63.33	53.75	<b>47.04</b>	56.00	<b>46.00</b>
Legal Environment	50.00	70.83	57.24	54.69	54.17	66.67	57.03	50.46	59.17	59.00
CIS	50.00	90.00	71.05	63.33	63.33	76.67	70.31	65.00	66.00	66.80
Decision Science	<b>33.33</b>	88.89	<b>35.09</b>	56.94	<b>27.78</b>	77.78	<b>34.38</b>	69.75	<b>20.00</b>	73.33
Economics	77.78	62.96	63.74	52.31	50.00	<b>44.44</b>	63.19	52.88	59.26	54.67
Finance	<b>30.00</b>	70.00	71.58	52.92	53.33	56.67	55.94	<b>45.74</b>	<b>44.67</b>	51.20
Management	<b>40.00</b>	83.33	61.58	59.58	70.00	73.33	63.44	63.52	67.33	63.60
Marketing	70.00	66.67	68.42	59.17	65.00	66.67	65.63	67.96	69.33	70.00
Operations Mgmt.	50.00	75.00	76.32	63.54	75.00	<b>41.67</b>	75.00	63.43	70.00	65.00
Statistics	60.00	75.00	60.00	61.46	66.67	<b>41.67</b>	61.88	56.48	65.33	56.00

#### Accounting

The eleven (11) Accounting students who took the examination in 2006-2007 provided 41 to 60 correct responses on the SLAE. Accounting students demonstrated proficiency in their major as well as in all other subject areas with the exception of Decision Science. Comparatively, the fourteen (14) Accounting students from the 2007-2008 test administration provided 31 to 66 correct responses on the SLAE, with all students performing above the cut score in every subject area. Accounting students demonstrated proficiency above the 70 percent mark in their major (72.86) and Computer Information Systems (77.14).

### Computer Information Systems (CIS)

The eleven (11) CIS students provided 32 to 55 correct responses on the SLAE. The CIS students demonstrated proficiency in all but two subject areas – Legal Environment and Decision Sciences. One year later, the twenty-four (24) Computer Information Systems students provided 28 to 56 correct responses on the SLAE. The Computer Information Systems students were proficient in their major (67.50) and in all other subject areas with the exception of Finance. Significantly, in Decision Science their percent correct increased from 21.21 to 61.11 percent.

### Business Information Technology (BIT)

Only one (1) Business Information Technology student took the SLAE in 2006-2007. The small sample precludes a meaningful trend analysis. The BIT student achieved 70 percent or more proficiency in Economics and Marketing and 60 percent in Statistics but was barely proficient in four other subject areas. The student was not proficient in Decision Science, Finance, and Management. The following year, three (3) Business Information Technology students provided 53 to 66 correct responses on the SLAE. All of these students exceeded the cut score. This small group was exceptionally well rounded, showing proficiency in Legal Environment (70.83), Computer Information Systems (90.00), Statistics (75.00), Decision Science (88.89), Operations Management (75.00), Finance (70.00), and Management (83.33). These students approached the 70 percent mark in both Accounting (66.67) and Marketing (66.67).

### Finance

The nineteen (19) Finance students provided 35 to 69 correct responses. Finance students demonstrated greater proficiency in their major as compared to other business students, and were proficient in every subject area except Decision Science, achieving only 35.09 percent correct. The twenty-four (24) Finance students in 2007-2008 provided 27 to 62 correct responses, and achieved proficiency in all subject areas.

### General Business

Six (6) General Business students took the SLAE. These students provided 37 to 64 correct responses. The small sample precludes a meaningful trend analysis. These students seemed most proficient in Accounting, Operations Management and Management. These students were not proficient in Decision Science, achieving only 27.78 percent correct responses. In 2007-2008, only three (3) General Business students took the SLAE. These students provided 44 to 54 correct responses. While the students were able to achieve proficiency in Decision Science with a 50 percentage point increase over the year, their scores declined significantly in operations Management (from 75 percent to 41.67 percent) and Statistics (from 66.67 percent to 41.67 percent). These students were most proficient in Computer Information Systems (76.67%), Decision Science (77.78%), and Management (73.33%).

### Management

The thirty-two (32) Management students who took the SLAE provided 33 to 64 correct responses. Management students demonstrated comparable proficiency to the general population taking the test, were most proficient in Operations Management (75%) and Computer Information Systems (70.31%), but failed to achieve proficiency in Decision Science (34.38%). Management had the largest number of students. For 2007-2008, the fifty-four (54) Management students who took the SLAE provided 32 to 55 correct responses. Management students were proficient in all subject areas except Accounting and Finance.

### Marketing

The fifteen (15) Marketing students who took the SLAE provided 40 to 55 correct responses. Marketing students demonstrated approximately the same proficiency in their major as did the general population taking the test, but were most proficient in Operations Management. However, these students were not proficient in Decision Science and Finance. For 2007-2008, the twenty-five (25) Marketing students who took the SLAE provided 34 to 57 correct responses. Interestingly, Marketing students were proficient in their major (70.00) but were most proficient in Decision Science (73.33), improving that score by 53 percentage points.

**Appendix 4*****Information Technology Learning Measures***

<b>Goal 2:</b> Information Technology
<b>Objective 1:</b> Use spreadsheets to solve business problems
<b>Learning Measures Table</b>
1. Compute gross pay
2. Create the macro
3. Use the IF Function
4. Sort and Filter with Conditional Formatting
5. Start Microsoft Office Excel
6. Define Cell names
7. Apply Number Formatting
8. Copy the Formulas with the Fill handle
9. Insert a Row and Compute Totals
10. Change the Chart Type

## Appendix 5

### *Information Technology Process, Measures, and Results*

#### Core Course Assessment Plan (2008-2011)

**Program level Learning Goal 2 (PLLG 2):** *“Our students will be able to apply information technology effectively in a business and professional environment.”*

**Course Coordinator:** Marianne Murphy **Type of Assessment:** Pre and Post Test

**Administration Date: Pretest:** 1<sup>st</sup> day of class **Posttest:** last day of class

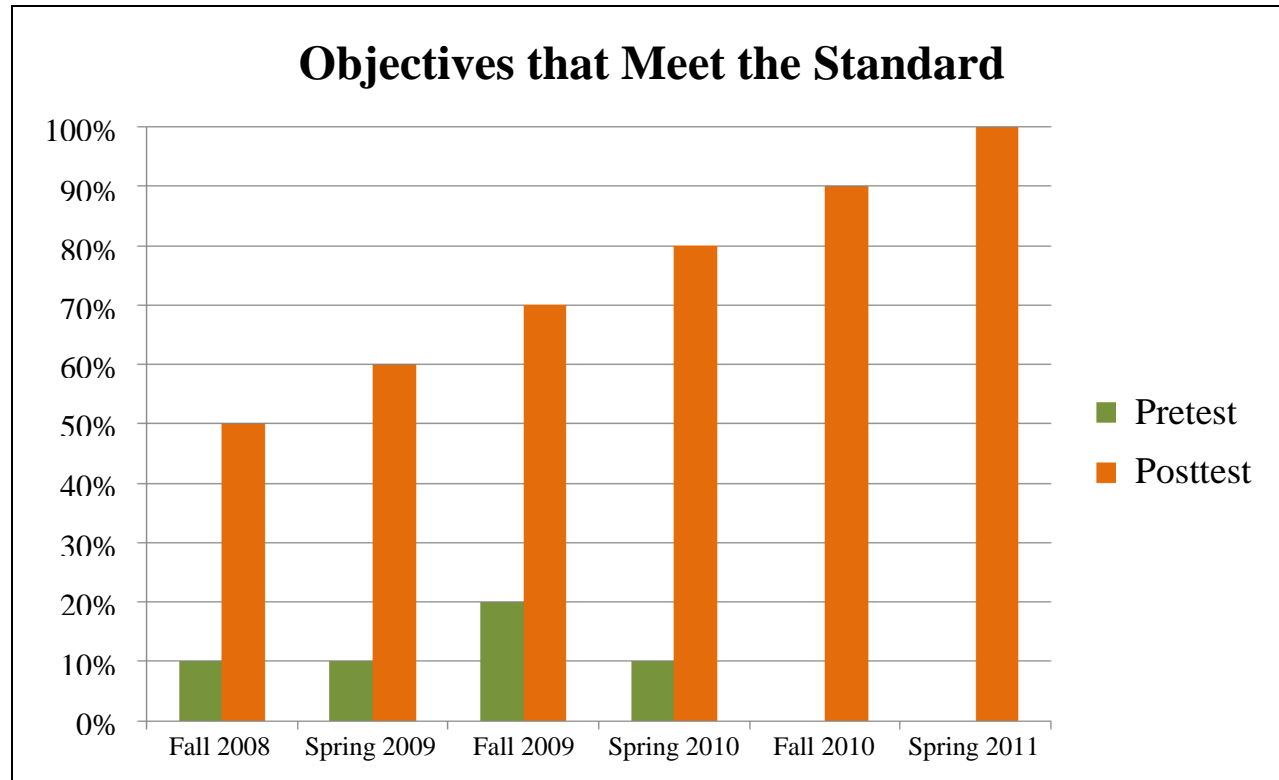
**Goal:** Students obtain the acceptable level of performance on 10 of 10 objectives (only original objectives included in summary)

**Selection of Students:** All students enrolled in the CIS 1100

Date	# of students enrolled	# of students assessed	Below standard	Closing the loop
<b>Fall 2008</b>	259			
<b>Pretest</b>		201	90%	Ten trainings, 4 exams.
<b>Posttest</b>		206	50%	Plan to demonstrate skills in class at least 3 times in areas where average is less than 70%.
<b>Spring 2009</b>	199			
<b>Pretest</b>		110	90%	Ten trainings, 4 exams.
<b>Posttest</b>		128	40%	Plan to demonstrate skills in class at least 3 times in areas where average is less than 70%. Introduce in the application projects in 1 section as a test.
<b>Fall 2009</b>	302			
<b>Pretest</b>		142	80%	Ten trainings, 4 exams.
<b>Posttest</b>		169	30%	Continue to roll out in the application projects in sections.
<b>Spring 2010</b>	248			
<b>Pretest</b>		158	90%	Ten trainings, 4 exams.
<b>Posttest</b>		175	20%	Projects in all sections and 10 additional objectives (tasks)
<b>Fall 2010</b>	139			
<b>Pretest</b>		51	100%	Ten trainings, 4 exams, 7 projects in select sections
<b>Posttest</b>		111	10%	Projects in all sections. For comparison on this report only original 10 objectives are included.
<b>Spring 2011</b>	122			
<b>Pretest</b>		80	100%	Ten trainings, 4 exams, 7 projects in all sections
<b>Posttest</b>		85	0%	Projects in all sections. For comparison on this report only original 10 objectives are included.

**Note:** Not all students are present on the first day of class to take the assessment and not all students finish the course to take the final assessment. The chart which follows summarizes the results over six semesters.





In Fall 2010 and Spring 2011, we began to test 20 objectives. Four objectives that met the standard in all previous semesters were removed and 14 new objectives were added. New objectives were added because of a review of “what students should know.” Objectives that continued to meet standard were removed in order to keep the assessment within a reasonable timeframe. All original objectives met the standard in Spring 2011. For the purposes of this chart only the original objectives are included.

## Detailed Results

*Fall 2008*

*Pre-Test*

<b>Teaching Objective</b>	<b>Application</b>	<b># Presented</b>	<b>% Correct</b>	<b># Correct</b>	<b># Incorrect</b>	<b># Skipped</b>
Compute the Gross Pay	Excel	201	0%	0	183	18
Create the Macro	Excel	201	0%	1	184	16
Use the IF Function	Excel	201	0%	0	181	20
Sort and Filter with Conditional Formatting	Excel	201	0%	0	160	41
Start Microsoft Office Excel 2007	Excel	201	90%	181	0	20
Define Cell Names	Excel	201	13%	27	124	50
Apply Number Formatting	Excel	201	11%	23	136	42
Copy the Formulas with the Fill Handle	Excel	201	23%	46	125	30
Insert a Row and Compute Totals	Excel	201	21%	43	137	21
Change the Chart Type	Excel	201	1%	2	169	30

*Fall 2008*

*Post Test*

<b>Teaching Objective</b>	<b>Application</b>	<b># Presented</b>	<b>% Correct</b>	<b># Correct</b>	<b># Incorrect</b>	<b># Skipped</b>
Compute the Gross Pay	Excel	206	51%	106	97	3
Create the Macro	Excel	206	83%	171	29	6
Use the IF Function	Excel	206	68%	140	61	5
Sort and Filter with Conditional Formatting	Excel	206	63%	130	66	10
Start Microsoft Office Excel 2007	Excel	206	96%	198	0	8
Define Cell Names	Excel	206	90%	186	11	9
Apply Number Formatting	Excel	206	90%	186	12	8
Copy the Formulas with the Fill Handle	Excel	206	86%	178	20	8
Insert a Row and Compute Totals	Excel	206	69%	143	56	7
Change the Chart Type	Excel	206	68%	140	59	7

NOTE: Areas below standard are gray highlighted.

**Instructors (Sections):**

Michael Cuellar (1, 2)

Marianne Murphy (3, 4, 01D)

Donna Grant (7, 8)

Aditiya Sharma (5, 6, 9)

*Spring 2009**Pre-Test*

<b>Learning Objective</b>	<b>Application</b>	<b># Presented</b>	<b>% Correct</b>	<b># Correct</b>	<b># Incorrect</b>	<b># Skipped</b>
Compute the Gross Pay	Excel	110	1.67%	2	95	13
Create the Macro	Excel	110	0.83%	1	93	16
Use the IF Function	Excel	110	1.67%	2	92	16
Sort and Filter with Conditional Formatting	Excel	110	3.51%	4	77	29
Start Microsoft Office Excel 2007	Excel	110	82.91%	92	1	17
Define Cell Names	Excel	110	13.05%	15	63	32
Apply Number Formatting	Excel	110	15.90%	19	63	28
Copy the Formulas with the Fill Handle	Excel	110	22.47%	27	62	21
Insert a Row and Compute Totals	Excel	110	24.10%	29	63	18
Change the Chart Type	Excel	110	3.21%	4	83	23

*Spring 2009**Post Test*

<b>Learning Objective</b>	<b>Application</b>	<b># Presented</b>	<b>% Correct</b>	<b># Correct</b>	<b># Incorrect</b>	<b># Skipped</b>
Compute the Gross Pay	Excel	128	58.98%	78	50	0
Create the Macro	Excel	128	72.23%	93	34	1
Use the IF Function	Excel	128	63.57%	83	44	1
Sort and Filter with Conditional Formatting	Excel	128	61.89%	78	46	4
Start Microsoft Office Excel 2008	Excel	128	99.12%	127	0	1
Define Cell Names	Excel	128	91.13%	117	7	4
Apply Number Formatting	Excel	128	91.82%	118	8	2
Copy the Formulas with the Fill Handle	Excel	128	85.06%	111	14	3
Insert a Row and Compute Totals	Excel	128	79.09%	102	25	1
Change the Chart Type	Excel	128	68.68%	88	39	1

NOTE: Areas below standard are gray highlighted.

**Instructors (Sections):**Cuellar (9)Grant (5, 6)Murphy (7, 8)Sharma (1, 2, 3)

*Fall 2009**Pre-Test*

<b>Teaching Objective</b>	<b>Application</b>	<b># Presented</b>	<b>% Correct</b>	<b># Correct</b>	<b># Incorrect</b>	<b># Skipped</b>
Compute the Gross Pay	Excel	142	1%	1	114	27
Create the Macro	Excel	142	10%	14	125	3
Use the IF Function	Excel	142	22%	31	73	38
Sort and Filter with Conditional Formatting	Excel	142	1%	1	118	23
Start Microsoft Office Excel 2007	Excel	142	72%	102	35	5
Define Cell Names	Excel	142	1%	1	114	27
Apply Number Formatting	Excel	142	17%	23	85	34
Copy the Formulas with the Fill Handle	Excel	142	43%	62	71	9
Insert a Row and Compute Totals	Excel	142	72%	103	2	37
Change the Chart Type	Excel	142	0%	0	102	40

*Fall 2009**Post Test*

<b>Teaching Objective</b>	<b>Application</b>	<b># Presented</b>	<b>% Correct</b>	<b># Correct</b>	<b># Incorrect</b>	<b># Skipped</b>
Compute the Gross Pay	Excel	169	62%	105	63	1
Create the Macro	Excel	146	72%	101	44	1
Use the IF Function	Excel	169	68%	114	53	2
Sort and Filter with Conditional Formatting	Excel	169	67%	113	52	4
Start Microsoft Office Excel 2007	Excel	169	100%	169	0	0
Define Cell Names	Excel	169	93%	157	9	3
Apply Number Formatting	Excel	169	88%	150	16	3
Copy the Formulas with the Fill Handle	Excel	169	90%	151	17	1
Insert a Row and Compute Totals	Excel	169	79%	134	34	1
Change the Chart Type	Excel	169	73%	124	43	2

NOTE: Areas below standard are gray highlighted.

**Instructors (Sections):**

Cuellar (7, 9)  
Seay (5, 6)

Rosso (8)  
Murphy (1, 2)

Grant (10, 12)  
Sharma (3, 4, 11)

*Spring 2010*  
*Pre-Test*

<b>Learning Objective</b>	<b>Application</b>	<b># Presented</b>	<b>% Correct</b>	<b># Correct</b>	<b># Incorrect</b>	<b># Skipped</b>
Compute the Gross Pay	Excel	158	0.01%	1	129	28
Create the Macro	Excel	158	1.5%	2	130	26
Use the IF Function	Excel	158	0%	0	126	32
Sort and Filter with Conditional Formatting	Excel	158	2.7%	3	108	47
Start Microsoft Office Excel 2007	Excel	158	99%	128	1	29
Define Cell Names	Excel	158	16.3%	18	92	48
Apply Number Formatting	Excel	158	12.6%	13	90	55
Copy the Formulas with the Fill Handle	Excel	158	27.5%	33	87	38
Insert a Row and Compute Totals	Excel	158	16.4%	22	112	24
Change the Chart Type	Excel	158	10.6%	13	110	35

*Spring 2010*  
*Post Test*

<b>Learning Objective</b>	<b>Application</b>	<b># Presented</b>	<b>% Correct</b>	<b># Correct</b>	<b># Incorrect</b>	<b># Skipped</b>
Compute the Gross Pay	Excel	175	45%	79	96	0
Create the Macro	Excel	150	75%	113	37	0
Use the IF Function	Excel	175	51%	89	82	4
Sort and Filter with Conditional Formatting	Excel	175	70%	121	50	4
Start Microsoft Office Excel 2007	Excel	150	100%	150	0	0
Define Cell Names	Excel	175	93%	162	9	4
Apply Number Formatting	Excel	150	94%	141	8	1
Copy the Formulas with the Fill Handle	Excel	175	89%	155	20	0
Insert a Row and Compute Totals	Excel	175	82%	144	30	1
Change the Chart Type	Excel	175	70%	123	51	1

NOTE: Areas below standard are gray highlighted.

**Instructors (Sections):**

Cuellar (2)  
Donna Grant (7)

Rosso (8, 9)  
Seay (4, 5)

Melvin-Bryant (1)  
Sharma (3, 6)

Murphy (01D)

*Fall 2010**Pre-Test*

<b>Learning Objective</b>	<b>Application</b>	<b># Presented</b>	<b>% Correct</b>	<b># Correct</b>	<b># Incorrect</b>	<b># Skipped</b>
Compute the Gross Pay Total	Excel	51	6%	3	40	6
Compute the Totals Total	Excel	51	29%	15	17	17
Open an Existing Workbook Total	Excel	51	90%	46	1	4
Use the IF Function Total	Excel	51	2%	1	30	18
Use Functions and Formulas	Excel	51	0%	0	39	10
Create the Chart Total	Excel	51	8%	4	31	14
Use Other General Functions Total	Excel	51	6%	3	29	17
Use Save As to Save an Existing Workbook Total	Excel	51	76%	39	9	3
Apply Number Formatting Total	Excel	51	14%	7	23	19
Complete the Chart Total	Excel	51	8%	4	35	12
Copy the Formulas with the Fill Handle Total	Excel	51	24%	12	28	11
Format to Print the Worksheet Total	Excel	51	0%	0	26	23
Insert a Row and Compute Totals Total	Excel	51	18%	9	36	4
Save a Workbook in Different Formats Total	Excel	51	43%	22	5	22
Copy the Formulas Total	Excel	51	37%	19	29	3
Continue the Calculations Total	Excel	51	4%	2	33	14
Insert a Comment to Complete Total	Excel	51	12%	6	25	18
Copy Data to Word and PowerPoint Total	Excel	51	2%	1	26	22
Change the Chart Type	Excel	51	10%	5	31	15
Insert a Column Total	Excel	51	61%	31	13	7
New Objective						

NOTE: Areas below standard are gray highlighted.

*Fall 2010*  
*Post Test*

<b>Learning Objective</b>	<b>Application</b>	<b># Presented</b>	<b>% Correct</b>	<b># Correct</b>	<b># Incorrect</b>	<b># Skipped</b>
Compute the Gross Pay Total	Excel	111	70%	77	32	2
Compute the Totals Total	Excel	111	91%	101	6	4
Open an Existing Workbook Total	Excel	111	98%	109	0	2
Use the IF Function Total	Excel	111	49%	54	52	5
Use Functions and Formulas	Excel	111	41%	45	63	3
Create the Chart Total	Excel	111	93%	103	4	4
Use Other General Functions Total	Excel	111	76%	84	22	5
Use Save As to Save an Existing Workbook Total	Excel	111	98%	109	0	2
Apply Number Formatting Total	Excel	111	93%	103	3	5
Complete the Chart Total	Excel	111	89%	99	9	3
Copy the Formulas with the Fill Handle Total	Excel	111	92%	102	7	2
Format to Print the Worksheet Total	Excel	111	76%	84	21	6
Insert a Row and Compute Totals Total	Excel	111	87%	97	12	2
Save a Workbook in Different Formats Total	Excel	111	94%	104	1	6
Copy the Formulas Total	Excel	111	96%	107	2	2
Continue the Calculations Total	Excel	111	62%	69	30	12
Insert a Comment to Complete Total	Excel	111	90%	100	6	5
Copy Data to Word and PowerPoint Total	Excel	111	86%	95	10	6
Change the Chart Type	Excel	111	77%	85	24	2
Insert a Column Total	Excel	111	95%	105	5	1
New Objective						

NOTE: Areas below standard are gray highlighted.

**Instructors (Sections):**

Cuellar (1) \_\_\_\_\_

Takeda (4, 7, 8) \_\_\_\_\_

Marianne Murphy (3) \_\_\_\_\_

Malloy (2) \_\_\_\_\_

*Spring 2011*  
*Pre-Test*

<b>Learning Objective</b>	<b>Application</b>	<b># Presented</b>	<b>% Correct</b>	<b># Correct</b>	<b># Incorrect</b>	<b># Skipped</b>
Compute the Gross Pay Total	Excel	80	9%	7	60	13
Compute the Totals Total	Excel	80	41%	33	23	24
Open an Existing Workbook Total	Excel	80	81%	65	11	4
Use the IF Function Total	Excel	80	0%	0	56	24
Use Functions and Formulas	Excel	80	0%	0	64	16
Create the Chart Total	Excel	80	5%	4	57	19
Use Other General Functions Total	Excel	80	5%	4	47	29
Use Save As to Save an Existing Workbook Total	Excel	80	79%	63	14	3
Apply Number Formatting Total	Excel	80	30%	24	29	27
Complete the Chart Total	Excel	80	13%	10	54	16
Copy the Formulas with the Fill Handle Total	Excel	80	18%	14	54	12
Format to Print the Worksheet Total	Excel	80	3%	2	51	27
Insert a Row and Compute Totals Total	Excel	80	18%	14	60	6
Save a Workbook in Different Formats Total	Excel	80	55%	44	11	25
Copy the Formulas Total	Excel	80	39%	31	38	11
Continue the Calculations Total	Excel	80	0%	0	57	23
Insert a Comment to Complete Total	Excel	80	16%	13	42	25
Copy Data to Word and PowerPoint Total	Excel	80	4%	3	47	30
Change the Chart Type	Excel	80	13%	10	51	19
Insert a Column Total	Excel	80	69%	55	15	10
New Objective						

NOTE: Areas below standard are gray highlighted.



*Spring 2011*  
*Post Test*

<b>Learning Objective</b>	<b>Application</b>	<b># Presented</b>	<b>% Correct</b>	<b># Correct</b>	<b># Incorrect</b>	<b># Skipped</b>
Compute the Gross Pay Total	Excel	85	78%	66	17	2
Compute the Totals Total	Excel	85	94%	80	2	3
Open an Existing Workbook Total	Excel	85	94%	80	2	3
Use the IF Function Total	Excel	85	76%	65	18	2
Use Functions and Formulas	Excel	85	53%	45	39	1
Create the Chart Total	Excel	85	87%	74	9	2
Use Other General Functions Total	Excel	85	81%	69	15	1
Use Save As to Save an Existing Workbook Total	Excel	85	99%	84	0	1
Apply Number Formatting Total	Excel	85	95%	81	2	2
Complete the Chart Total	Excel	85	94%	80	3	2
Copy the Formulas with the Fill Handle Total	Excel	85	92%	78	5	2
Format to Print the Worksheet Total	Excel	85	76%	65	17	3
Insert a Row and Compute Totals Total	Excel	85	88%	75	9	1
Save a Workbook in Different Formats Total	Excel	85	96%	82	0	3
Copy the Formulas Total	Excel	85	96%	82	2	1
Continue the Calculations Total	Excel	85	62%	53	30	2
Insert a Comment to Complete Total	Excel	85	89%	76	7	2
Copy Data to Word and PowerPoint Total	Excel	85	78%	66	16	3
Change the Chart Type	Excel	85	76%	65	18	2
Insert a Column Total	Excel	85	96%	82	1	2
New Objective						

NOTE: Areas below standard are gray highlighted.

**Instructors (Sections)**

Weiss (6) \_\_\_\_\_

Takeda (1, 2,3) \_\_\_\_\_

Murphy (5) \_\_\_\_\_

Malloy (online) \_\_\_\_\_

## Appendix 6

### *Marketing Analysis Models, Scoring Mechanisms, Results, and Statistical Tests*

Instruction in the Principles of Marketing course works toward assuring that our graduates are capable of undertaking marketing responsibility. Specifically, those who successfully complete the course (i.e., with grades of “C” or better) are expected to emerge from it in compliance with Objective 4 (“Students will be able to develop basic marketing plans”) of Program Level Learning Goal 4 (“Our students will demonstrate command of the knowledge base in specific disciplines”). Achieving this requires that our graduates possess two traits.

**Trait 1.** *Students will demonstrate the ability to do appropriate marketing analyses.*

**Trait 2.** *Students will demonstrate the ability to choose appropriate marketing tactics.*

In the marketing discipline, Trait 1 is referred to as “Analysis,” and Trait 2 is referred to as “Planning.” Below, the elements that compose both are described briefly.

#### *Analysis*

Marketing analysis is referred to as the “4Cs.” It is the process of analyzing customers, channels of distribution, competitors, and the manager’s own company. Of these four, customer analysis is, by far, the most important because it provides context for each of the other three.

#### *Planning*

Marketing planning is known as the “4Ps.” It is the process of using the results of the 4Cs to choose the optimal products, prices, promotion, and place(s) of distribution. Each tactic must be chosen so that all four work seamlessly together.

A basic marketing plan comprises tactics (i.e., 4Ps) chosen on the basis of the results of the analyses (i.e., 4Cs).

### **The Assessment – Spring 2009**

The variables used to determine the degree to which students possess the two traits noted above were their answers to 47 questions included in four course-imbedded, in-class examinations. The examinations consisted of multiple choice and true/false questions. The following models were used to score student learning in the two traits.

$$\text{Analysis} = 0.6 \times (\text{Customer Analysis}) + 0.3 \times (\text{Competitor \& Company Analyses}) + 0.1 \times (\text{Channel Analysis}) \quad (1)$$

$$\text{Planning} = 0.25 \times (\text{Product}) + 0.25 \times (\text{Pricing}) + 0.25 \times (\text{Promotion}) + 0.25 \times (\text{Place}) \quad (2)$$

The models’ variables are the percentages of correct answers to questions related to the components of the *Analysis* or *Planning* traits. The coefficients by which the components are

multiplied are weights that the model assigns to each component. The weights sum to 1.0. For example, because customer analysis is the most important analytical component, its weight is 0.6. Note that the *Analysis* model combines students' performances on competitor and company analyses and assigns the combination a weight of 0.3. The reason these are combined is that these two analyses use very similar methods. In essence, a competitor analysis is a company analysis performed on a competitor, and vice versa. For each student, these models yield scores expressed as percentages.

### **The Analysis – Spring 2009**

We examined the learning outcomes data and found that the primary reason why student outcomes were unacceptable in Spring 2009 was that students lacked sufficient quantitative skills. Twelve of the 47 questions used to measure student learning were quantitative in nature; the remaining 35 were solely conceptual. Students correctly answered 63.14% of the conceptual questions. But they correctly answered only 41.67% of quantitative questions. The difference in these rates is statistically significant by chi-square. (See Table B.1.) We hypothesized that students who performed well on quantitative questions were likely to also perform well on conceptual questions. We tested this hypothesis by calculating the correlation between students' scores on the two types of questions and found a statistically significant ( $p = 0.0016$ ) positive correlation of 0.551, supporting our hypothesis.

**Table B.1. Right vs. Wrong Answers by Quantitative vs. Conceptual Question—Spring 2009**

		<b>Right</b>	<b>Wrong</b>	<b>Totals</b>
Quantitative	Observed	150	210	360
	Expected	207.6	152.4	
Conceptual	Observed	663	387	1,050
	Expected	605.4	444.6	
Totals		813	597	1,410

Chi-square = 50.648;  $p < 0.0001$

### **The Actions (“Closing the Loop”) – Spring 2009**

Because students' key need was to improve their quantitative skills, which the data suggested would also improve their performance on conceptual questions, we opted to place more focus on basic marketing quantitative methods in the following semesters. To do this, we increased the time spent in class discussions devoted to those methods. With this added time, we worked through examples of (1) a mathematical model used to estimate customer attitudes toward a firm's products, (2) derivation of demand, revenue, and profit functions, (3) using a derived

profit function to solve for the profit-maximizing price, and (4) a family of models using the logic of break-even analysis.

### The Analysis – Spring 2011

Statistical analysis reveals that the primary culprit for the unacceptable student learning outcomes again realized in Spring 2011 was the same as in Spring 2009, i.e., students were insufficiently capable of handling quantitative questions. Table B-2 provides details of the statistical analysis which reveals this result.

**Table B.2. Right vs. Wrong Answers by Quantitative vs. Conceptual Question—Spring 2011**

		Right	Wrong	Totals
Quantitative	Observed	441	487	928
	Expected	534.8	393.2	
Conceptual	Observed	1,130	668	1,798
	Expected	1036.2	761.8	
Totals		1,571	1,155	2,726

Chi-square = 58.880;  $p < 0.0001$

Yet, the data also reveal that outcomes *did* improve. Specifically, while student performance on conceptual questions remained unchanged (62.85% correct answers in 2011 versus 63.14% in 2009), the percentage of correct answers to quantitative questions increased to 47.52% in 2011 from 41.67% in 2009. This difference is (marginally) statistically significant by chi-square. (See Table B-3.) Hence, the actions taken to improve students' quantitative skills seem to have been successful.

**Table B.3. Right vs. Wrong Quantitative Answers by Semester-Year**

		Right	Wrong	Totals
Spring 2009	Observed	150	210	360
	Expected	165.2	194.8	
Spring 2011	Observed	441	487	928
	Expected	425.8	502.2	
Totals		591	697	1,288

Chi-square = 3.581;  $p = 0.0584$

The reason that this success is not apparent in the overall learning outcome results is simple – the 33% increase in the number of quantitative questions used to assess student learning (from 12 to 16) exceeds the 14% increase in student facility with such questions (from 41.67% to 47.52%). Hence, despite significant improvement, students' relatively poor quantitative skills remain the hurdle to acceptable learning outcomes in this course. It is thus the case that the most important issue before us in this course remains improving students' mastery of basic quantitative marketing methods.

To seek to understand the reasons why students, on average, lack sufficient quantitative skills, we used regression analysis. The dependent variable in these analyses was each of the Spring 2011 students' percentages of quantitative questions answered correctly. The covariates were specific courses taken prior to enrolling in Principles of Marketing and other variables designed to capture relevant personal characteristics of each student. The best-fitting regression reveals that only two things predict a student's ability to handle quantitative questions: (a) The student's cumulative GPA when he or she enters the course (the higher the better), and (b) whether he or she has successfully completed calculus (i.e., earned a grade of C or better) by the time he or she takes the course (if he or she has done so, he or she handles quantitative questions better). A more detailed discussion of the regression analysis is given in presented later in this appendix.

### **The Actions – Spring 2011**

Since “better” students (i.e., higher GPAs) possess characteristics likelier to yield trait success, we can move toward increasing the rate of acceptable learning outcomes by selecting better students. This is more of a program than course level action, and, fortunately, the school has already instituted higher GPA standards for continuing students. This change is expected to yield *substantial* improvements in student learning outcomes because, as discussed in the regression results, student performance on quantitative questions increases at an exponential rate as their GPAs increase. Since students who have successfully completed calculus perform better on quantitative questions than those who have not, insuring that students complete calculus according to their academic program plan is essential. (Students are scheduled to take Calculus in the first semester of the sophomore year and Marketing in their junior year.)

Inasmuch as the additional time spent on quantitative instruction appears to have been a net benefit for student learning, we will do more of the same going forward. Specifically, we have observed that lectures on quantitative methods that use applications with which the students are familiar and/or can relate are effective. Hence, we will again shift more attention toward such instructional methods. For example, we will use this approach to motivate the discussion about deriving demand functions by actually taking an item into class, e.g., a soft drink, and asking how many would accept one for their personal consumption if we “sold” it to them at a price of \$0.00. Then the same question if the price was \$0.10, then \$0.20, and so forth. From the derived demand function, we can then proceed to derive a revenue function and, ultimately, a profit function for our “soft drink business.”

## Regression Analysis

The covariates used in search of the model best able to predict student mastery of basic quantitative methods used in marketing were of two types. The first type considered statistics, mathematics, and accounting courses which students may have taken prior to taking Principles of Marketing. Such courses were hypothesized to help prepare them to handle the quantitative methods used in marketing. The courses considered were Elementary Statistics, Statistical Analysis, Introductory College Algebra, College Algebra & Trigonometry I, Finite Mathematics, Calculus, and Principles of Accounting I (or similar courses at other colleges).

The second type of covariate considered indicators of how “good” a student the individual was when he or she entered the Principles of Marketing course. Measures of this were the number of courses from which the student had withdrawn; this measure was separated into three covariates covering withdrawals earning grades of WC, NW, and NF. All else the same, “better” students are expected to have fewer withdrawals. We also used the students’ cumulative GPAs at the time they entered the course to measure their “goodness” as students. Finally, we considered whether the student was “non-traditional,” operationalized as any older than 24 when beginning NCCU’s undergraduate program, and those taking this undergraduate course despite being in one of our graduate or professional schools.

We found that the best-fitting model contains only two of the covariates, the student’s GPA and whether or not he or she successfully completed calculus. The GPA is, by far, the more predictive covariate. Further, the positive effect of GPAs on the student’s ability to master quantitative marketing methods increases at a squared rate. Moreover, it mediates the positive effect that successfully completing calculus has on student performance. That is, students who have completed calculus before taking Principles of Marketing are significantly better at mastering quantitative marketing methods, but *only to the extent that they are good students* (by GPA). Hence, the calculus covariate appears in the best-fitting model only as an interaction with the GPA-Squared covariate. The model is given below.

Regression Statistics	
Multiple R	0.562740238
R Square	0.316676575
Adjusted R Square	0.291828451
Standard Error	0.129560949
Observations	58

### ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2	0.427858889	0.213929	12.74449	2.83285E-05
Residual	55	0.923232167	0.016786		
Total	57	1.351091056			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	0.306539318	0.055636811	5.509649	9.83E-07	0.195040658	0.41803798
GPA-Squared	0.017864363	0.008155287	2.190525	0.032743	0.001520803	0.03420792
Calculus*GPA-Squared	0.009393246	0.004684373	2.00523	0.049869	5.526E-06	0.01878094