Institute of Statistics and Computerized Information Systems
Faculty of Business Administration

Report on assessment of SICI outcomes
(January – May 2011)

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Revised by SICI ABET Committee and SICI Faculty on September 27, 2011

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Introduction

During last semester (January – May 2011) we assessed all of the ten student outcomes in our major. This achievement was possible due to several factors, among which we want to emphasize the use of course-embedded assessment methods, as well as the use of an automated tool to support the assessment process.

Since we use Project Based Learning as an important educational strategy, the main assessment method used is a course project at the end of each one of several courses. Some projects are done individually and others are group projects. The course project method falls under the category of "Performance assessment/simulation". Most projects are presented by students in front of the professor, therefore, to some extent this method also falls under the category of "Locally developed test".

Other assessment methods used were short essays, a graduating senior survey, a COOP employer survey and exit interviews. These interviews were conducted by a committee of at least two professors to several graduating students individually. Except for the graduating senior survey, the COOP employer survey, and the exit interviews, all other methods were embedded within courses, specifically in the following: SICI 3245, 3255, 4025, 4266, 4275, 4278, 4285, and 4998.

This semester we added two methods to assess all student outcomes: a graduating senior survey and a COOP employer survey. Besides providing assessment data by themselves, these additional methods should allow us to validate results produced by other assessment methods.

Unlike the previous two semesters, which were atypical due to class interruptions, this one did not have major interruptions.

Assessment process for the semester

As usual, during the first half of the semester we worked with the recommendations made in the assessment report for the previous semester (August – December 2010). Specifically, we worked with the following:

1. **Logical systems design (Outcome #1).** Although the results obtained in the project for SICI 4025 in the semester of August – December 2010 showed a significant improvement over the previous semester, the professor in charge of this course (Prof. María del R. Rodríguez-Orellana) continued emphasizing logical systems design in this course, through the following measures:

    a. Reviewing preliminary versions of the projects and providing feedback to

students. (She calculated some statistics which evidence a positive correlation between the number of project revisions and student performance in the project.)

b. Allocating more time to the logical design topic in SICI 4025, and starting its discussion earlier in the semester.

c. Providing individual attention to students regarding the project.

d. Assigning more exercises and homework to students.

e. Analyzing more carefully the aspects in which students showed more difficulty and paying more attention to these aspects, both in the classroom and individually.

We still have not implement a way to expose students to some of the components of a system (like screens, reports, and databases) earlier in the course sequence, using a user-oriented database management system. In the past we identified this as an additional measure that could be implemented in the very first course that our students take (SICI 3211).

2. **Dropouts in SICI 3255.** We continued addressing the dropout issue in SICI 3255 through several quizzes throughout the semester, and also by promoting student interaction among themselves.

   a. We also had several discussions in the ABET Committee regarding the student behavior that may be having an influence in the dropout rate, like study habits and delays in acquiring course materials.

   b. Additional support to students through tutoring was not possible due to lack of funds.

   c. We started using quizzes and promoting more student interaction in the August – December 2010 semester. But that semester was atypical due to class interruptions, so we decided to wait for the assessment results from the January – May 2011 semester, before making a definite conclusion regarding the effectiveness of the two measures.

3. **Dropouts in SICI 4266.** Regarding the high number of dropouts we had in SICI 4266 for the August – December 2010 semester, we decided to wait and see if this high dropout rate was due to the student strike or to other reasons. (As we will see later, this problem did not show up in the current semester.)

4. **Realigning courses and outcomes.** SICI 4465 was assigned to support outcome #9 (To communicate effectively with a range of audiences.), besides supporting outcome #5 (To understand the impact that organizational, local and global environments have

in the implementation and management of information systems.) and outcome # 8 (To recognize the importance of ethical values and interpersonal relationships in an information systems professional.), as recommended in the assessment report for the previous semester.

5. **Logistics.** The ABET Committee continued promoting the following logistic matters, particularly through the instructions provided to all professors participating in the assessment process:

   a. That project descriptions that are still in Spanish be translated to English (SICI 4025, and 4275).

   b. That all professors fill the remarks column in the rubrics. This column should be used to enter student feedback regarding the score assigned to the corresponding characteristic, particularly when the student did not get the highest score.

   c. That all the assessment related documents be electronically stored in a central location. This will allow to electronically store the whole package (projects, project descriptions and rubric) used in the assessment process as evidence of the assessment results.

   d. That all professors deliver the project descriptions, together with the corresponding rubric.

   e. That students orally present their projects so that the evaluator can better assess it. Because projects are take-home tasks, it is important for the evaluator to validate the extent to which the student really prepared the project himself. In the case of group projects, presentations will help the evaluator assess the individual contribution of group members to the project. Project presentations also constitute an additional opportunity to provide feedback to students.

   f. That management takes affirmative actions to ensure that all professors fulfill their assessment responsibilities. (Regarding this issue, it was recommended to the Department Head that the course SICI 4015 be assigned to a different professor next time it is offered.)

6. **Additional assessment methods.** We added two methods to assess all student outcomes: a graduating senior survey and a COOP employer survey. Besides providing assessment data by themselves, these additional methods will also allow us to validate results produced by other assessment methods.

7. **Mapping of courses and methods to outcomes.** The tables where student outcomes are mapped to SICI courses, both requisites and electives, were updated based on the recommendations.

8. **Other.** We prepared a separate table presenting the outcomes and the methods used to assess each one of them. Please, see Appendix 6. We also prepared a graph illustrating the trend for the attainment of all outcomes along several semesters. Please, see Appendix 7.

On March 24, 2011, I emailed the most recent version of the corresponding rubrics for courses SICI 3245, 3255, 4025, 4266, 4278 and 4998, together with a memo from the ABET Committee, to SICI professors emphasizing the instructions and remarks regarding the assessment process. The rubrics for SICI 4285 and SICI 4275 were sent in separate emails on March 25 and May 17 respectively.

By mid June, I received all the rubrics already completed by the professors, together with remarks from some of the professors regarding their experience with the process. The results of the individual rubrics were integrated into a summary table by outcome (see Appendix 1), based on the outcomes supported by each rubric. Finally, I analyzed the data, prepared this report and presented it to the ABET Committee[1].

Assessment results

The following remarks are derived from the data in the summary table in Appendix 1, together with the feedback received from some of the professors involved in the assessment.

1. **Overall performance.** Most students did very well on the assessment of student outcomes. See Appendix 1 for attainment percentages for each outcome assessed, both by method and overall.

   a. The percentage of students that obtained an attainment score ranged from 75.00% to 100% throughout the individual outcomes.

2. **Outcome #2 (Logical systems design).** This outcome (To select or design a system to solve the problems identified in an operation) increased its percentage from 87.50 to 89.5.

   a. The particular contribution of the project in SICI 4025 to this outcome, which we have been watching for several semesters, increased its percentage from 85.71 to 87.50. This result clearly evidences the effect of the improvements implemented by Prof. María del R. Rodríguez-Orellana in course contents and educational strategies. Two semesters ago, the particular contribution of the project in this course to the achievement of outcome # 2 was only 42.86.

3. **Dropouts in SICI 3255.** Again, there was a high number of dropouts, incompletes and failures in SICI 3255 (nine students out of twenty one, for approximately 42.9%).

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[1] I want to acknowledge the support and the contributions received from the members of the ABET Committee (Dr. Katherine Franceschi-Diaz, Prof. María del R. Rodríguez-Orellana, and Dr. Rosarito Sánchez-Morcilio), as well as the support and contributions received from the SICI professors.

As usual, most students that stayed in the course did very well in the assessment (nine out of twelve, for a 75%). Although we consider dropouts to be out of the scope of the outcome assessment process, since these students are not included in the assessment sample, it is an issue that we need to address anyway.

Total enrollment, dropouts and attainment rate for SICI 3255				
Semester	Total students	Dropouts	Dropouts (%)	Attainment (%)
Aug – Dec 09	25	13	52%	100.00%
Jan – May 10	31	17	55%	100.00%
Aug – Dec 10	24	11	46%	92.31%
Jan – May 11	21	9	43%	75.00%

a. In the last two semesters (August – December 2010, January – May 2011) we have addressed the dropout issue in SICI 3255 by incorporating several quizzes throughout the semester, and also by promoting student interaction among themselves. Although students agreed that these actions were very helpful, it was very difficult to confirm this in the semester of August-December 2010, because we had several interruptions during that semester. These interruptions may have offset whatever positive influence the implemented measures had (if any). But last semester (January – May 2011) we did not have such interruptions, and we did not see major improvements in the dropout rate.

b. We must continue analyzing this situation in order to find explanations and to take additional corrective actions to improve it. For example, the need for more support to students through tutoring, or changing study habits and delays in acquiring course materials.

4. **Dropouts in SICI 4266.** The number of dropouts was significantly reduced in SICI 4266. Of the eighteen students that were originally registered, only two of them (11%) "disappeared", this way confirming that once students pass the first course, they usually go successfully through all SICI courses.

a. The previous semester (August – December 2010) this course had a total of six students and three of them (50%) "disappeared". That situation was very unusual for this course and most probably it was due to the interruptions caused by the student strike we had in that semester.

5. **Outcome # 4 (To use current techniques, skills, tools and best practices to design, implement and manage information systems.):** Overall this outcome had an attainment rate of 85.94, which is very good. The following assessment methods contributed to this rate:

Results for outcome #4				
Course/Method	Attained	%	Not Attained	%
SICI 3245 project	14	100.00%	0	0.00%

SICI 3255 project	9	75.00%	3	25.00%
SICI 4266 project	16	100.00%	0	0.00%
SICI 4285 project	8	57.14%	6	42.86%
COOP Survey	2	100.00%	0	0%
SENIOR Survey	6	100.00%	0	0.00%
	55	**85.94%**	**9**	**14.06%**

a. As can be seen from the table, although the overall attainment percentage was high (85.94) the contribution from the SICI 4285 project was only 57.14%.

6. **Outcome # 8 (To recognize the importance of ethical values and interpersonal relationships in an information systems professional).** Overall this outcome had an attainment rate of 75, which is good. The following assessment methods contributed to this rate:

Results for outcome #8				
Course/Method	**Attained**	**%**	**Not Attained**	**%**
SICI 4275 project	0	0.00%	4	100.00%
SICI 4998 short essay	4	100.00%	0	0%
Exit interview	6	100.00%	0	0%
COOP Survey	4	100.00%	0	0%
SENIOR Survey	4	66.67%	2	33.33%
	18	**75.00%**	**6**	**25.00%**

a. As can be seen from the table, although the overall attainment percentage was high (75.00) the contribution from the SICI 4275 project was 0%.

Logistic considerations

1. All professors used the remarks column in the rubrics to enter student feedback regarding the score assigned to the corresponding characteristic, particularly when the student did not get the highest score.

2. Although the logistics for the assessment process improved, there are some issues that we still have to refine:

    a. Some project descriptions are still in Spanish (SICI 4025, and 4275). They have to be translated to English.

    b. Two professors emailed the projects, essays, etc., used for assessment. This allowed me to electronically store the whole package (projects, project descriptions and rubric) used in the assessment process as evidence of the assessment results.

Recommendations (improvements)

1. **Outcome #2 (Logical systems design).** The results obtained in SICI 4025 for the last two semesters have shown a high level of attainment (87.50 and 89.5).

   a. We recommend that the professor continues emphasizing the measures she has already implemented successfully (reviewing preliminary versions of the projects and providing feedback to students, allocating more time to logical design topic in SICI 4025, starting the discussion of this topic earlier in the semester, etc.).

   b. We also recommend exposing students to some of the components of a system (like screens, reports, and databases) earlier in the course sequence, using a user-oriented database management system. This could be done in the very first course that our students take (SICI 3211).

2. **Dropouts in SICI 3255.** The dropout issue on SICI 3255 should be more thoroughly addressed to find out its causes and to take whatever actions are necessary. Besides the strategies already implemented (using quizzes and promoting student interaction), the following strategies must be implemented, and we should measure their effect on dropouts:

   a. Provide more support to students through tutoring (A senior student has already been hired to provide tutoring.).

   b. Analyze student behavior that may be having an influence in the dropout rate, like study habits and delays in acquiring course materials. Next time the course is offered, the professor in charge of this course (Prof. Katherine Franceschi) will be performing a student survey in order to more specifically identify the causes for this problem.

3. **Dropouts in SICI 4266.** Although this issue did not show up this semester, the ABET Committee should examine the dropout rate next time the course is offered, before definitely concluding it was due to external factor, like the student strike.

4. **Contribution of project in SICI 4285 to outcome 4.** The professor in charge of this course has already identified possible causes for this low level of attainment, like the fact that this was the first time this project was assigned in this course, that students waited until the very end to work on the project and that the rubric has fewer characteristics (detailed performance criteria) than others, therefore the impact of not attaining one of them is higher. The professor plans to assign the project earlier in the course, to follow up more closely on student performance and to provide more student feedback. He also proposes to split some of the characteristics currently used in the rubric into two or more so that the individual weight of each one is reduced. This situation should be closely watched in the assessment method for this outcome next time the course is offered.

5. **Contribution of project in SICI 4275 to outcome 8.** The professor of this course stated that students did not explicitly address ethics in the project, although implicitly they did it. This situation should be closely watched in the assessment method for this outcome next time the course is offered.

6. **Mapping of courses and methods to outcomes.** No changes in the mapping of courses and methods to outcomes are recommended.

7. **Logistics.** The ABET Committee should continue promoting the following logistic matters:

   a. That project descriptions that are still in Spanish be translated to English (SICI 4025, and 4275).

   b. That all professors fill the remarks column in the rubrics. This column should be used to enter student feedback regarding the score assigned to the corresponding characteristic, particularly when the student did not get the highest score.

   c. That all the assessment related documents be electronically stored in a central location. This will allow to electronically store the whole package (projects, project descriptions and rubric) used in the assessment process as evidence of the assessment results.

   d. That all professors deliver the project descriptions, together with the corresponding rubric.

   e. That students orally present their projects so that the evaluator can better assess it. Because projects are take-home tasks, it is important for the evaluator to validate the extent to which the student really prepared the project himself. In the case of group projects, presentations will help the evaluator to assess the individual contribution of group members to the project. Project presentations also constitute an additional opportunity to provide feedback to students.

   f. That management continues affirmative actions to ensure that all professors fulfill their assessment responsibilities.

   Besides continuing promoting the previous logistics matters, the ABET Committee should promote the following new logistic matters:

   a. Conduct informative sessions to stakeholders on program design, constitutional table, assessment methodology, and educational strategies (like project based learning), to make sure all constituents understand the approaches being used in our program.

b. Conduct alumni focus groups to validate the assessment of educational objectives already performed through the alumni survey. We must keep in mind that through the alumni survey we cannot control that all respondents are really graduates from our program.

Additional remarks

1. Rubrics continue to be a useful tool to facilitate the assessment process. They are easy to use, and reduce the probability of data entry and calculation errors. They simplify the data collection, the calculation of student scores, as well as the calculation of scores related to the specific outcomes being assessed.

2. The use of course-embedded assessment allowed assessing student outcomes without an additional burden on students and professors. All that professors had to do was to make sure that the method requirements support the characteristics contained in the corresponding rubric.

3. The main contributors to the assessment results obtained are the contents of the courses and the educational strategies used by professors. But we believe these results can also be attributed to other factors, like the following:

    a. By the time the assessment was performed, most students not performing well in the course had already abandoned it.

    b. Students knew beforehand all the characteristics to be assessed in the particular method used.

    c. The methods used were mostly take-home projects, with reasonable time for preparation. Projects usually raise student interest and performance.

    d. Projects used resemble the work performed by IS professionals in industry and government, which probably contributed additionally to raise student interest.

    e. All students assessed belong to the SICI major, so it is reasonable to assume that they put a special interest in the courses, as well as the assessment methods.

Mapping of student outcomes to SICI courses, exit interview and ABET outcomes

As part of our continuous improvement process, Appendixes 2 and 3 present the most recent version of the tables mapping student outcomes to SICI courses, exit interview and ABET outcomes. The assessment results for this semester as well as the recommendations we are making in this report did not produce any changes to this table.

Mapping objectives, outcomes and performance criteria ("Constitutional table")

As part of our continuous improvement process, Appendix 4 contains the most recent version of the SICI Constitutional Table, specifically in the column containing the SICI courses that will support each outcome. The assessment results for this semester as well as the recommendations we are making in this report did not produce any changes to this table.

Graph of all outcomes (attained vs. not attained)

Appendix 5 presents graphs showing the relationship between the number of students attaining and not attaining each outcome.

Mapping of assessment methods to student outcomes

Appendix 6 presents a table mapping student outcomes to assessment methods used. Although this information is presented, to some extent, in other tables, we believe it is appropriate to present it in this new table.

Graph of outcome attainment along several semesters

Appendix 7 presents a graph illustrating the trend for the attainment of all outcomes along several semesters.

Appendix 1
Summary of assessment results

Institute of Statistics and Information Systems
Faculty of Business Administration
University of Puerto Rico - Rio Piedras
Major in Computer Information Systems
Assessment of Student Outcomes

January - May 2011

Assessment results

O #	Student outcomes	Assessment methods			Attained		Not attained	
		Rubric	Level	Ref.	Total	Percent	Total	Percent
1	To analyze an operation within an organization, identify problems and make recommendations to solve these problems.	COIS 4025	Medium		16	100.00%	0	0.00%
		Coop Survey	High	Ref.	3	100.00%	0	0.00%
		Senior survey	High	Ref.	6	100.00%	0	0.00%
		Totals for this outcome			*25*	*100.00%*	*0*	*0.00%*
2	To select or design a system to solve the problems identified in an operation.	COIS 4015	Medium					
		COIS 4025	Medium		14	87.50%	2	12.50%
		COIS 4266	Medium	Ref.	15	93.75%	1	6.25%
		COIS 4405 (E)	Medium					
		Coop Survey	High	Ref.	1	100.00%	0	0.00%
		Senior survey	High	Ref.	5	83.33%	1	16.67%
		Totals for this outcome			*35*	*89.74%*	*4*	*10.26%*
3	To plan and supervise the implementation of a system that solves the problems identified in an operation.	COIS 4278(1)	High	Ref.	7	100.00%	0	0.00%
		Coop Survey	High	Ref.	1	100.00%	0	0%
		Senior survey	High	Ref.	6	100.00%	0	0.00%
		Totals for this outcome			*14*	*100.00%*	*0*	*0.00%*
4	To use current techniques, skills, tools and best practices to design, implement and manage information systems.	COIS 3245	Low	Ref.?	14	100.00%	0	0.00%
		COIS 3255	Low	Ref.?	9	75.00%	3	25.00%
		COIS 4015	Medium					
		COIS 4266	Medium	Ref.	16	100.00%	0	0.00%
		COIS 4285(E)	Medium	Ref.?	8	57.14%	6	42.86%
		COIS 4286	Medium					
		COIS 4405(E)	Medium					
		COIS XXX2	High					
		Coop Survey	High	Ref.	2	100.00%	0	0%
		Senior survey	High	Ref.	6	100.00%	0	0.00%
		Totals for this outcome			*55*	*85.94%*	*9*	*14.06%*

		Assessment methods			Attained		Not attained	
O #	Student outcomes	Rubric	Level	Ref.	Total	Percent	Total	Percent
5	To understand the impact that organizational, local and global environments have in the implementation and management of information systems.	COIS 4266	Medium	Ref.	15	93.75%	1	6.25%
		COIS 4278(1)	High	Ref.	7	100.00%	0	0.00%
		COIS 4278(2)	High	Ref.	8	100.00%	0	0.00%
		COIS 4405(E)	Medium					
		COIS 4465(E)	Low					
		Coop Survey	High	Ref.	3	100.00%	0	0%
		Senior survey	High	Ref.	5	83.33%	1	16.67%
	Totals for this outcome				38	95.00%	2	5.00%
6	To value the protection of information system resources in an organization, and to identify ways in which this protection can be achieved.	COIS 4275	High	Ref.?	4	100.00%	0	0.00%
		Coop Survey	High	Ref.	2	100.00%	0	0%
		Senior survey	High	Ref.	5	83.33%	1	16.67%
	Totals for this outcome				11	91.67%	1	8.33%
7	To be aware of the high level of change in the Information Systems field, and the need to use different mechanisms to update his knowledge.	COIS 4278(2)	High	Ref.	6	75.00%	2	25.00%
		Exit interview	All	Ref.	6	100.00%	0	0.00%
		Coop Survey	High	Ref.	3	100.00%	0	0%
		Senior survey	High	Ref.	6	100.00%	0	0.00%
	Totals for this outcome				21	91.30%	2	8.70%
8	To recognize the importance of ethical values and interpersonal relationships in an information systems professional.	COIS 4275	High	Ref.?	0	0.00%	4	100.00%
		COIS 4465(E)	Low					
		COIS 4998(E)	High	Ref.	4	100.00%	0	0.00%
		Exit interview	All	Ref.	6	100.00%	0	0.00%
		Coop Survey	High	Ref.	4	100.00%	0	0%
		Senior survey	High	Ref.	4	66.67%	2	33.33%
	Totals for this outcome				18	75.00%	6	25.00%
9	To communicate effectively with a range of audiences.	COIS 3245	Low	Ref?.	14	100.00%	0	0.00%
		COIS 4275	High	Ref.?	4	100.00%	0	0.00%
		COIS 4278(2)	High	Ref.	6	75.00%	2	25.00%
		COIS 4465(E)	Low					
		COIS 4998(E)	High	Ref.	3	75.00%	1	25.00%
		Coop Survey	High	Ref.	4	100.00%	0	0%
		Senior survey	High	Ref.	4	66.67%	2	33.33%
	Totals for this outcome				35	87.50%	5	12.50%

Assessment results

Assessment results

O #	Student outcomes	Assessment methods			Attained		Not attained	
		Rubric	Level	Ref.	Total	Percent	Total	Percent
10	To function effectively in teams seeking to accomplish a common goal.	COIS 4025	Medium		16	100.00%	0	0.00%
		COIS 4278(1)	High	Ref.	7	100.00%	0	0.00%
		COIS 4998(E)	High	Ref.	4	100.00%	0	0.00%
		Exit interview	All	Ref.	6	100.00%	0	0.00%
		Coop Survey	High	Ref.	4	100.00%	0	0%
		Senior survey	High	Ref.	6	100.00%	0	0.00%
		Totals for this outcome			43	100.00%	0	0.00%

	Institute of Statistics and Information Systems Faculty of Business Administration University of Puerto Rico - Rio Piedras Major in Computer Information Systems Assessment of Student Outcomes January - May 2011

	Corrective actions

O #	Action items	Responsible person(s)	Dates
1	Great improvement over previous semesters! Great results!		
2	Course not offered this semester. Great improvement over last semester! (18 students in total.) Course not offered this semester. Great results!		
3			
4	Four students did not prepare the project. There were 21 students in the course. 9 dropouts/dissappearences. (Prof. Katherine Franceschi) will be performing a student survey in order to more specifically identify the causes for this problem. Course not offered this semester. Great improvement over last semester! (18 students in total.) Meet with professor to get his reaction on this. Course not offered this semester. Course not offered this semester. Course not offered this semester. Great results!		

O #	Corrective actions		
	Action items	**Responsible person(s)**	**Dates**
5	Great improvement over last semester! (18 students in total.)		
	Course not offered this semester.		
	Course not offered this semester.		
	Great results!		
6			
	Great results!		
7			
	Interesting remarks from students.		
	Great results!		
8			
	Course not offered this semester.		
	Interesting remarks from students.		
	Great results!		
9	Four students did not prepare the project.		
	Course not offered this semester.		
	Great results!		

O #	Corrective actions		
	Action items	**Responsible person(s)**	**Dates**
10	Interesting remarks from students.		
	Great results!		

Appendix 2
Mapping of student outcomes to SICI (required) courses,
exit interview and ABET outcomes

		Required courses									Exit	ABET
#	Student outcomes	3211	3245	3255	4015	4025	4266	4275	4278	4286	interview	outcomes
1	To analyze an operation within an organization, identify problems and make recommendations to solve these problems.						X					A,B,J
2	To select or design a system to solve the problems identified in an operation.					X	X	X				A,C,J
3	To plan and supervise the implementation of a system that solves the problems identified in an operation.								X			A,C,J
4	To use current techniques, skills, tools and best practices to design, implement and manage information systems.		X	X	X		X			X		A,C,I
5	To understand the impact that organizational, local and global environments have in the implementation and management of information systems.						X		X			G,J
6	To value the protection of information system resources in an organization, and to identify ways in which this protection can be achieved.							X				E,J
7	To be aware of the high level of change in the Information Systems field, and the need to use different mechanisms to update his knowledge.								X		X	H
8	To recognize the importance of ethical values and interpersonal relationships in an information systems professional.							X			X	E
9	To communicate effectively with a range of audiences.		X					X	X			F
10	To function effectively in teams seeking to accomplish a common goal.					X			X		X	D

Note: We are trying to assess not more than three outcomes per rubric (or assessment method).

(A large **X** means "add to this outcome", and a small (X) means "remove from this outcome".)

Appendix 3
Mapping of student outcomes to SICI (elective) courses,
exit interview and ABET outcomes

#	Student outcomes	Elective courses									ABET outcomes
		4285	4405	4465	XXX2	4998					
1	To analyze an operation within an organization, identify problems and make recommendations to solve these problems.					(See notes)					A,B,J
2	To select or design a system to solve the problems identified in an operation.		X								A,C,J
3	To plan and supervise the implementation of a system that solves the problems identified in an operation.										A,C,J
4	To use current techniques, skills, tools and best practices to design, implement and manage information systems.	X	X		X						A,C,I
5	To understand the impact that organizational, local and global environments have in the implementation and management of information systems.		X	X							G,J
6	To value the protection of information system resources in an organization, and to identify ways in which this protection can be achieved.										E,J
7	To be aware of the high level of change in the Information Systems field, and the need to use different mechanisms to update his knowledge.										H
8	To recognize the importance of ethical values and interpersonal relationships in an information systems professional.			X		X					E
9	To communicate effectively with a range of audiences.			(X)		X					F
10	To function effectively in teams seeking to accomplish a common goal.					X					D

Mapping of student outcomes to SICI (elective) courses and ABET outcomes
Prof. A. Ramos, Revised Dec 2010

Notes: We are trying to assess not more than three outcomes per course.
SICI 4998 could support any of the outcomes, depending on the
particular job obtained by the student. But since students have to
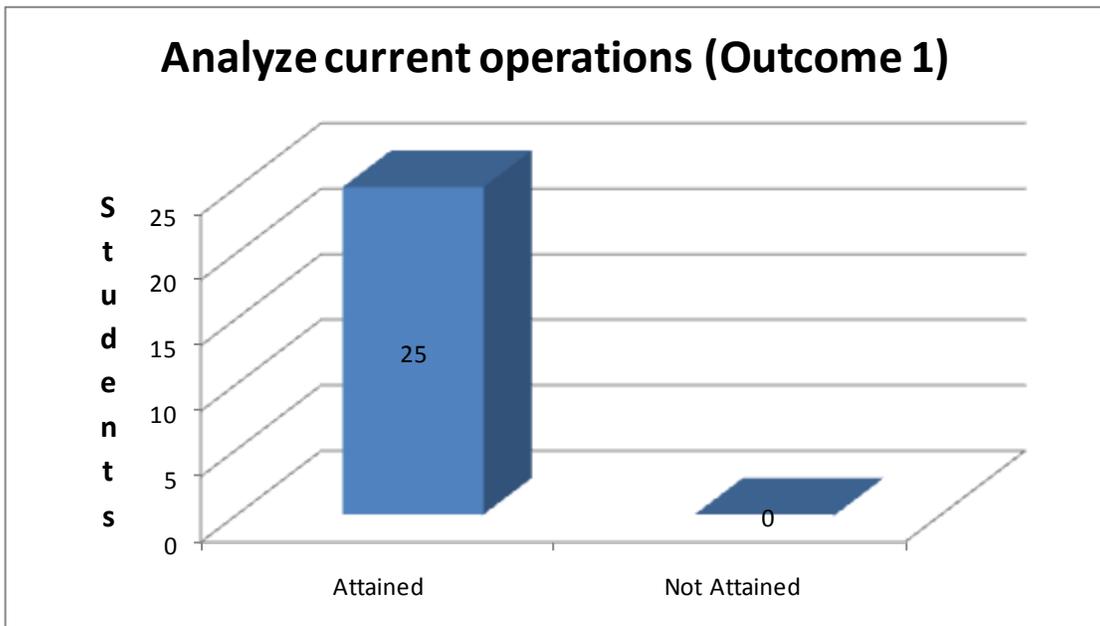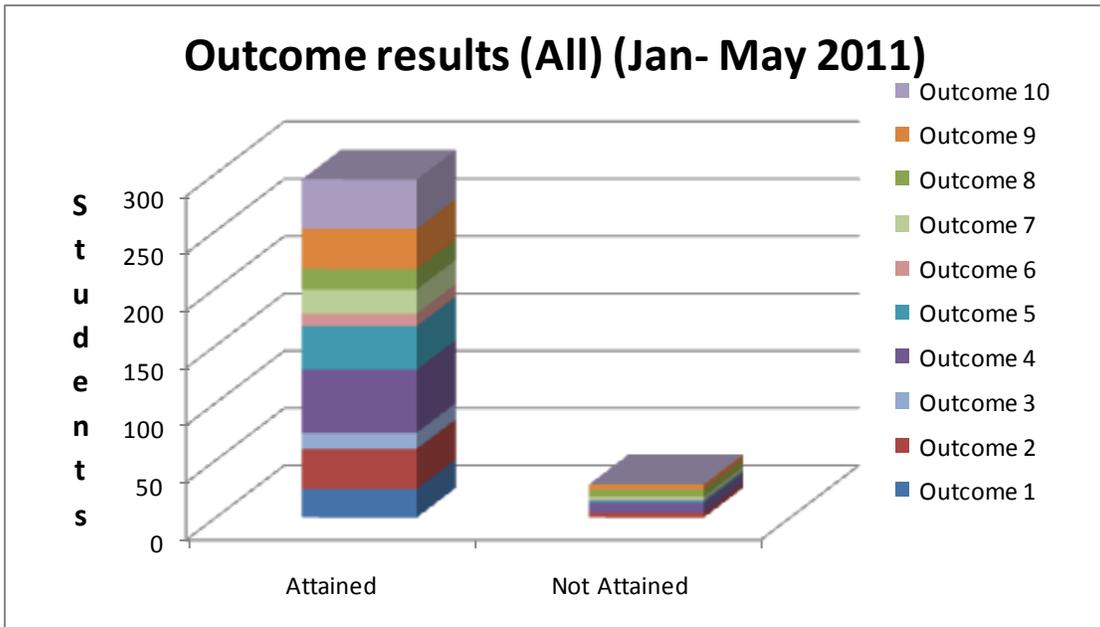prepare a paper, outcomes 8, 9 and 10 should be assessed here.

Appendix 4
Mapping objectives, outcomes and performance criteria
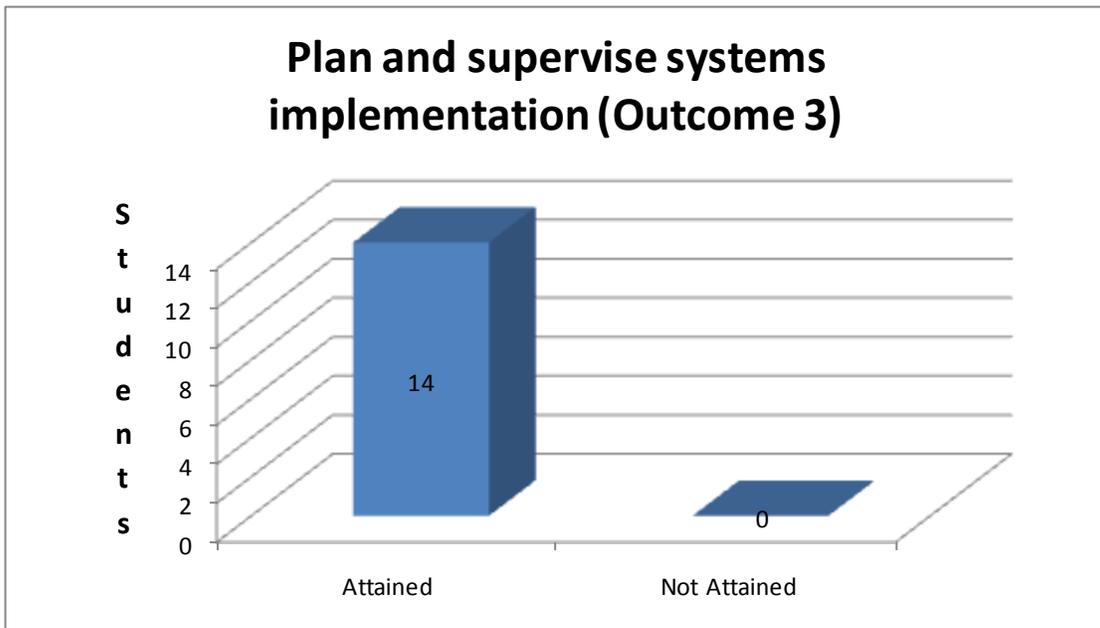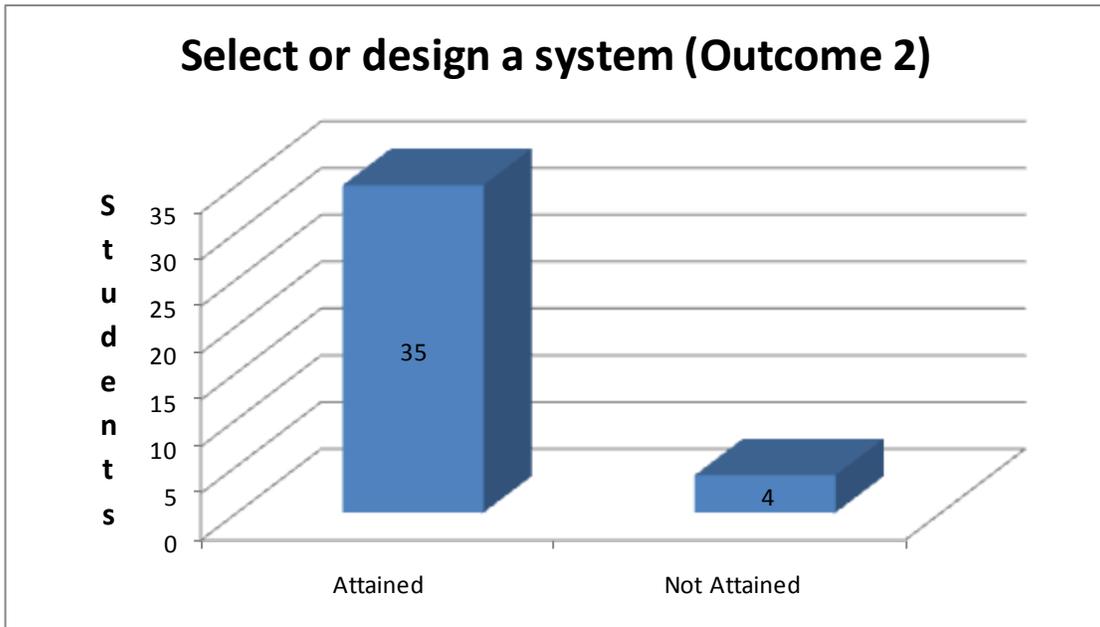**("SICI Constitutional Table")**

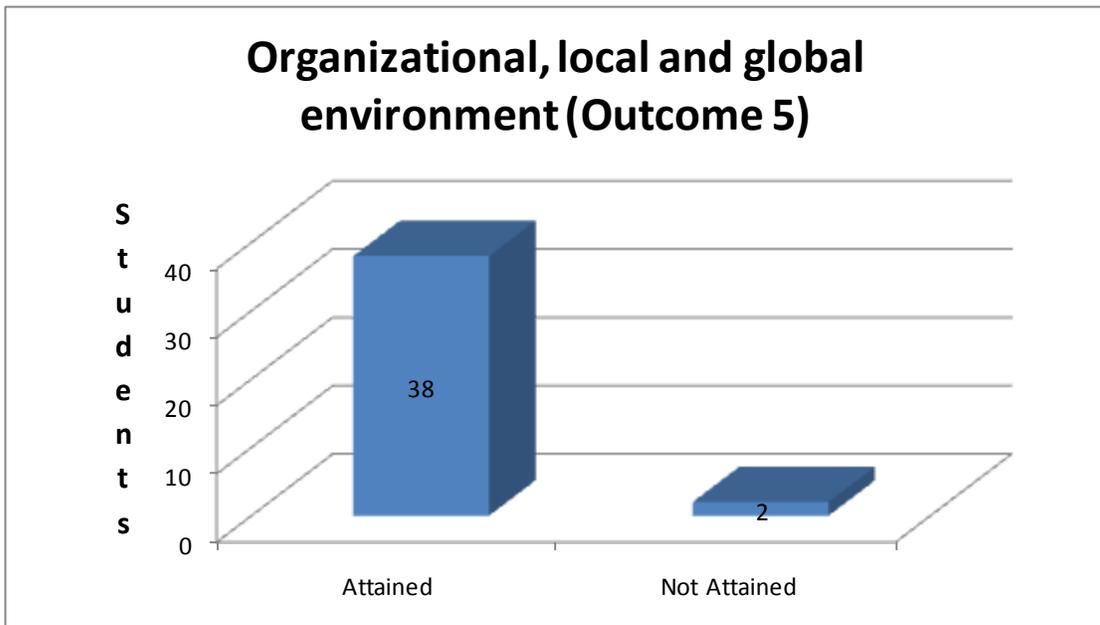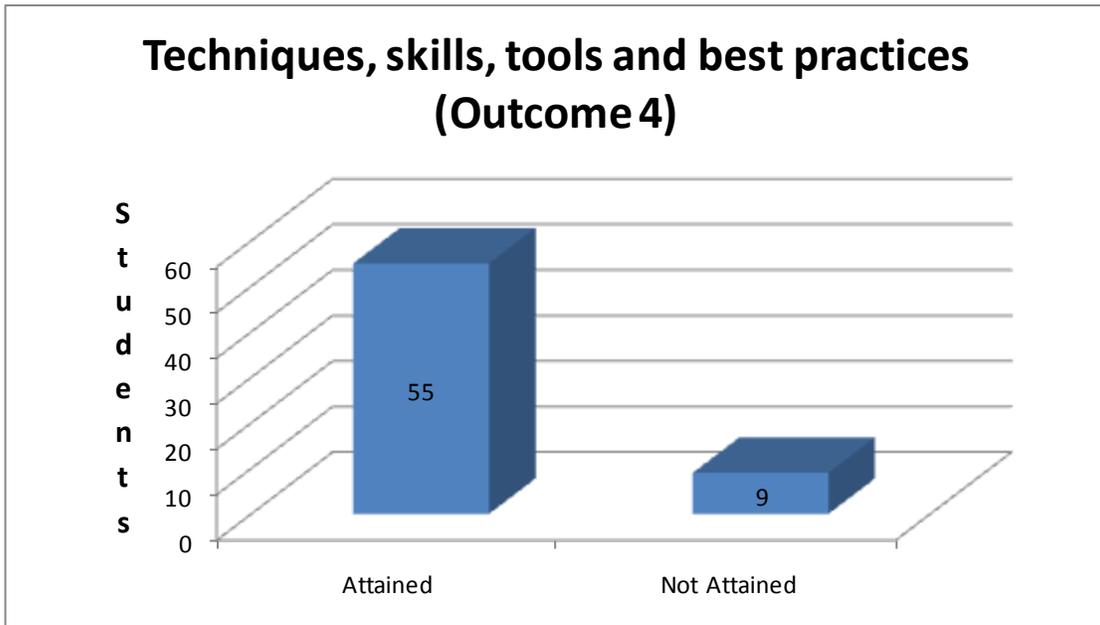| University of Puerto Rico Faculty of Business Administration, Information Systems Major "SICI Constitutional Table" Educational objectives, student outcomes and performance criteria (including modifications) Prof. A. Ramos, February 2011				
Educational objectives (What the graduate must accomplish in the first few years (3 to 5) of his professional career.)	**Student outcomes** (What the student must know, value, and be able to do, at the time of his graduation, which will enable him to achieve the educational objectives.)	**Performance criteria** (What the student must be able to do, or to produce, in order to show that he complies with the learning outcomes.)	**SICI Courses supporting the outcome**	**ABET Outcomes supported**
1. To implement and manage the development of information systems in an organization.	1. To analyze an operation within an organization, identify problems and make recommendations to solve these problems.	1. To prepare functional, technical, and other requirements for an information system that solves the problems identified in an operation.	4025	A, B, J
	2. To select or design a system to solve the problems identified in an operation.	2. To design the components of an information system based on the functional requirements prepared for that system.	4015,4025, 4266, 4405(E)	A, C, J
	3. To plan and supervise the implementation of a system that solves the problems identified in an operation.	3. To develop a plan to implement an information system, including the phases and activities that this process requires.	4278	A, C, J
2. To apply technological, analytical, and critical thinking skills in the solution of problems related to information systems in organizations.	4. To use current techniques, skills, tools and best practices to design, implement and manage information systems.	4. To identify the hardware, software and data communication components needed to operate an information system, and to integrate them in a technological solution.	3245	A, C, I
		5. To code, test, and document computer programs to perform the automated processes that compose a system, using modern programming tools.	3255, 4266, 4405(E), XXX2 (E)	
		6. To design a properly normalized database based on requirements prepared by systems analysts or by users.	4015	

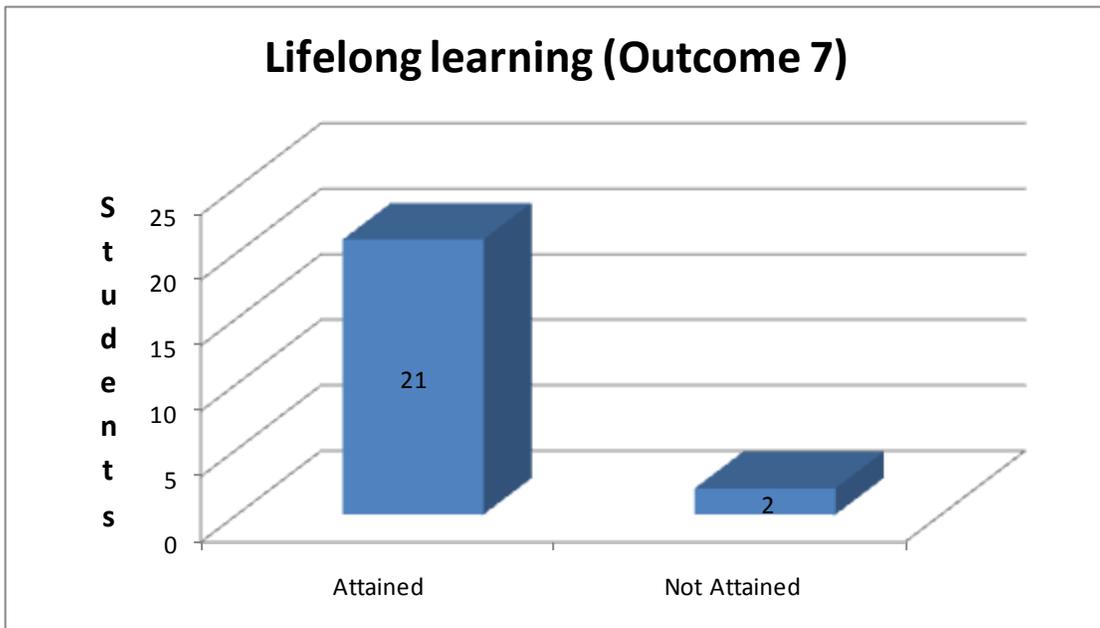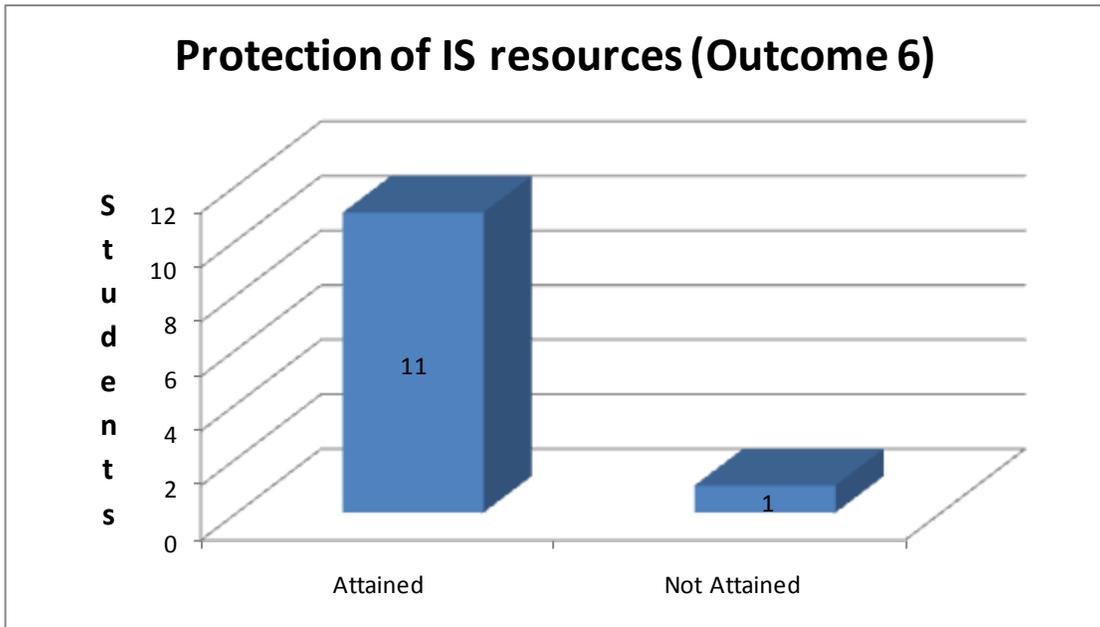| University of Puerto Rico Faculty of Business Administration, Information Systems Major "SICI Constitutional Table" Educational objectives, student outcomes and performance criteria (including modifications) Prof. A. Ramos, February 2011				
Educational objectives (What the graduate must accomplish in the first few years (3 to 5) of his professional career.)	**Student outcomes** (What the student must know, value, and be able to do, at the time of his graduation, which will enable him to achieve the educational objectives.)	**Performance criteria** (What the student must be able to do, or to produce, in order to show that he complies with the learning outcomes.)	**SICI Courses supporting the outcome**	**ABET Outcomes supported**
		7. To identify the components of a communications network, mention the main characteristics of these components, and to present the way they integrate into a network.	4286, 4285(E)	
3. To take into consideration the context in which information systems operate, when implementing and managing these systems.	5. To understand the impact that organizational, local and global environments have in the implementation and management of information systems.	8. To analyze administrative, organizational, local and global aspects that affect information systems, and to define strategies to deal with these aspects.	4278, 4266, 4405(E), 4465(E)	G, J
	6. To value the protection of information system resources in an organization, and to identify ways in which this protection can be achieved.	9. To prepare a disaster recovery plan for the information system operations of an organization.	4275	E, J
4. To maintain his professional expertise by updating his knowledge in technology and information systems.	7. To be aware of the high level of change in the Information Systems field, and the need to use different mechanisms to update his knowledge.	10. To get related with professional associations, publications and Continuing Education alternatives in the geographic area where he lives or works.	4278, Exit	H
5. To perform his functions showing respect and appreciation for ethical values, interpersonal relationships, communication, and team	8. To recognize the importance of ethical values and interpersonal relationships in an information systems professional.	11. To identify and evaluate ethical and interpersonal relationship aspects related to information system professionals.	4275, Exit, 4465(E)4998(E)	E

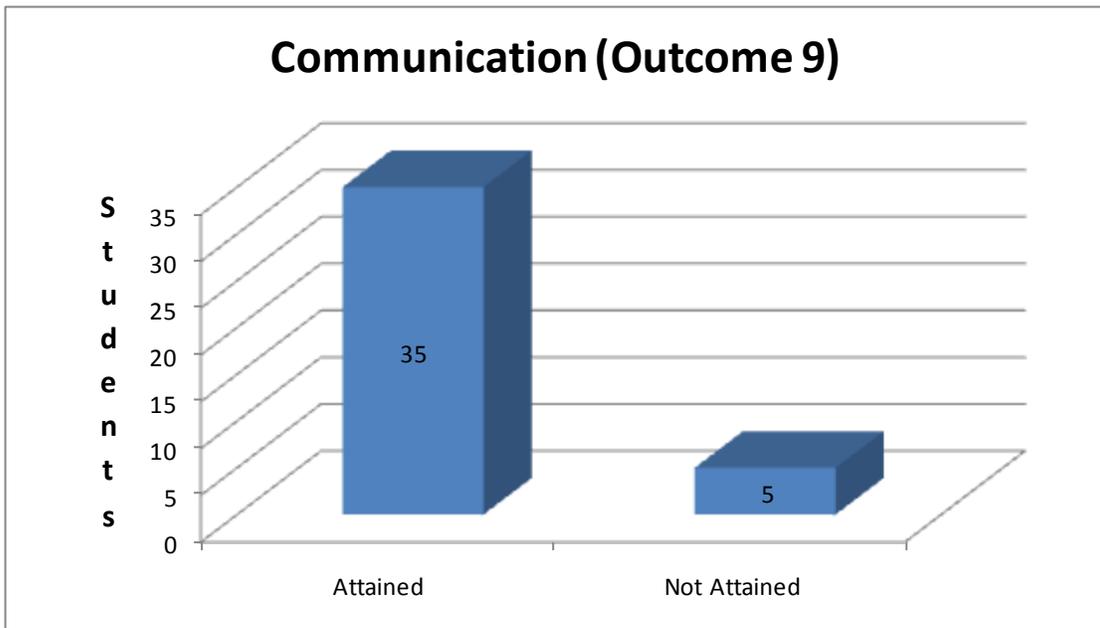| University of Puerto Rico Faculty of Business Administration, Information Systems Major "SICI Constitutional Table" Educational objectives, student outcomes and performance criteria (including modifications) Prof. A. Ramos, February 2011				
Educational objectives (What the graduate must accomplish in the first few years (3 to 5) of his professional career.)	**Student outcomes** (What the student must know, value, and be able to do, at the time of his graduation, which will enable him to achieve the educational objectives.)	**Performance criteria** (What the student must be able to do, or to produce, in order to show that he complies with the learning outcomes.)	**SICI Courses supporting the outcome**	**ABET Outcomes supported**
work.	9. To communicate effectively with a range of audiences.	12. To prepare written reports and oral presentations related to information system topics.	3245, 4275, 4278, 4465(E), 4998(E)	F
	10. To function effectively in teams seeking to accomplish a common goal.	13. To demonstrate ability to work effectively in task-oriented groups, like information system project teams.	4025, 4278, Exit4998(E)	D

Appendix 5
Graph of outcome results

Select or design a system (Outcome 2)

Plan and supervise systems implementation (Outcome 3)

Techniques, skills, tools and best practices (Outcome 4)

Organizational, local and global environment (Outcome 5)

Protection of IS resources (Outcome 6)

Lifelong learning (Outcome 7)

Ethical values/Interpersonal relationships (Outcome 8)
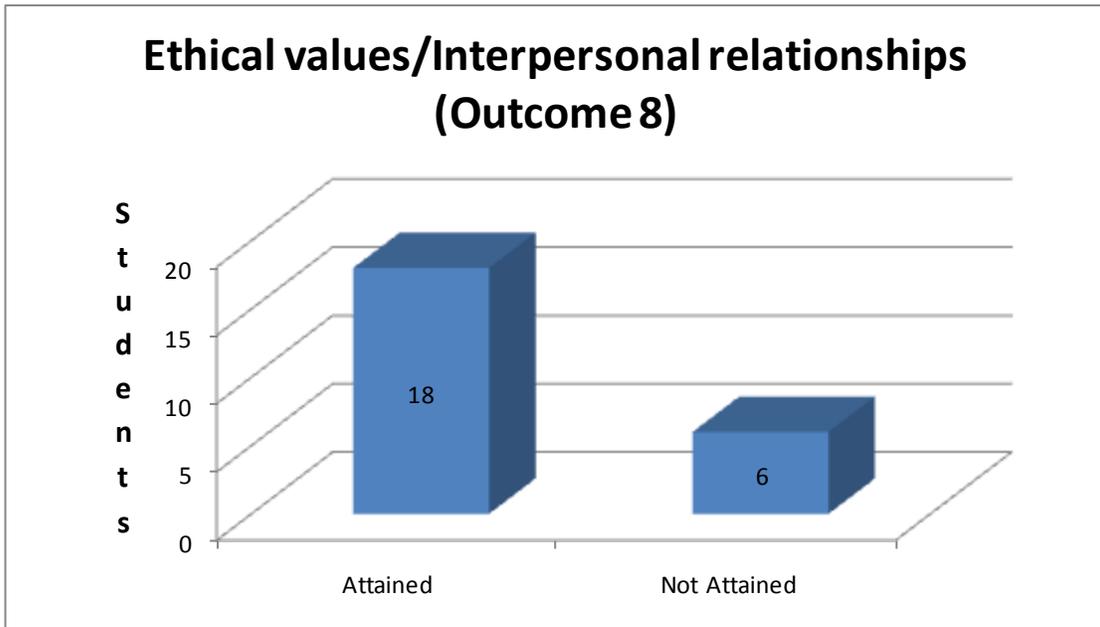

Communication (Outcome 9)
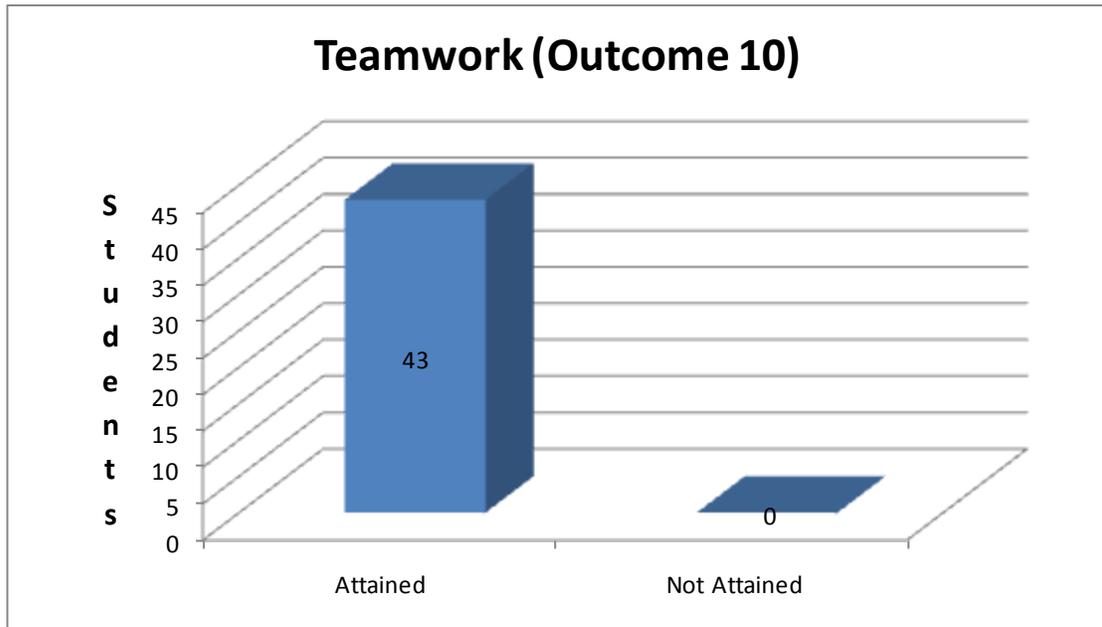
Teamwork (Outcome 10)

Appendix 6
Mapping of assessment methods to student outcomes

Institute of Statistics and Information Systems
Faculty of Business Administration
University of Puerto Rico - Rio Piedras
Major in Computer Information Systems

FAE

Mapping of Outcomes to Assessment Methods

O #	Student outcomes	Course/ Activity	Method description
1	To analyze an operation within an organization, identify problems and make recommendations to solve these problems.	COIS 4025	Project to define requirements for an information system
		Survey(E)	COOP Employer Survey
		Survey	Graduating Senior Survey
2	To select or design a system to solve the problems identified in an operation.	COIS 4015	Design and implementation of an information system using a DBMS
		COIS 4025	Project to define requirements for an information system
		COIS 4266	Design and implementation of an information system using emerging (non DBMS) tools
		COIS 4405 (E)	Design and implementation of an ecommerce system
		Survey(E)	COOP Employer Survey
		Survey	Graduating Senior Survey
3	To plan and supervise the implementation of a system that solves the problems identified in an operation.	COIS 4278(1)	Project to prepare a plan to implement an information system
		Survey(E)	COOP Employer Survey
		Survey	Graduating Senior Survey
4	To use current techniques, skills, tools and best practices to design, implement and manage information systems.	COIS 3245	Project on the design of a technological infrastructure for an IS
		COIS 3255	Program integrating several programming techniques, like text files, arrays, structures, menus, procedures, etc.
		COIS 4015	Design and implementation of an information system using a DBMS
		COIS 4266	Design and implementation of an information system using emerging (non DBMS) tools
		COIS 4285(E)	Design of a wide area network to support the operation of an information system
		COIS 4286	Design of a local area network to support the operation of an information system
		COIS 4405(E)	Design and implementation of an ecommerce system
		COIS XXX2	Project to prepare a data warehouse to support decision making
		Survey (E)	COOP Employer Survey
		Survey	Graduating Senior Survey

Mapping of Outcomes to Assessment Methods

O #	Student outcomes	Course/ Activity	Method description
5	To understand the impact that organizational, local and global environments have in the implementation and management of information systems.	COIS 4266	Design and implementation of an information system using emerging (non DBMS) tools
		COIS 4278(2)	Short essay on IS environment and IS profession
		COIS 4405(E)	Design and implementation of an ecommerce system
		COIS 4465(E)	Research paper on legal issues of computer technology
		Survey(E)	COOP Employer Survey
		Survey	Graduating Senior Survey
6	To value the protection of information system resources in an organization, and to identify ways in which this protection can be achieved.	COIS 4275	Project to prepare a disaster recovery plan
		Survey(E)	COOP Employer Survey
		Survey	Graduating Senior Survey
7	To be aware of the high level of change in the Information Systems field, and the need to use different mechanisms to update his knowledge.	COIS 4278(2)	Short essay on IS environment and IS profession
		Exit interview	Oral questions
		Survey(E)	COOP Employer Survey
		Survey	Graduating Senior Survey
8	To recognize the importance of ethical values and interpersonal relationships in an information systems professional.	COIS 4275	Project to prepare a disaster recovery plan
		COIS 4465(E)	Research paper on legal issues of computer technology
		COIS 4998(E)	Short essay
		Exit interview	Oral questions
		Survey(E)	COOP Employer Survey
		Survey	Graduating Senior Survey
9	To communicate effectively with a range of audiences.	COIS 3245	Project on the design of a technological infrastructure for an IS
		COIS 4275	Project to prepare a disaster recovery plan
		COIS 4278(2)	Short essay on IS environment and IS profession
		COIS 4465(E)	Research paper on legal issues of computer technology
		COIS 4998(E)	Short essay
		Survey(E)	COOP Employer Survey
		Survey	Graduating Senior Survey

Mapping of Outcomes to Assessment Methods

O #	Student outcomes	Course/ Activity	Method description
10	To function effectively in teams seeking to accomplish a common goal.	COIS 4025	Project to define requirements for an information system
		COIS 4278(1)	Project to prepare a plan to implement an information system
		COIS 4998(E)	Short essay
		Exit interview	Oral questions
		Survey(E)	COOP Employer Survey
		Survey	Graduating Senior Survey
Tool developed by Prof. Arnaldo I. Ramos-Torres during Christmas vacation of 2008. All rights reserved.			

Appendix 7
Trend for Outcome Attainment Along Several Semesters

Outcome attainment trends (All)