

**Institute of Statistics and Computerized Information Systems
Faculty of Business Administration**



**Report on assessment of SICI outcomes
(August – December 2010)**

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Revised by SICI ABET Committee on February 23, 2011:

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February 22, 2011

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Prof. A. Ramos**

Introduction

During last semester (August – December 2010) we assessed eight 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. Outcomes number three and six were not assessed because the courses which support them (SICI 4278 and 4275, respectively) were not offered in that semester.

Most outcomes were assessed using course capstone projects, following our educational strategy of “Project-based learning”. Other assessment methods used were short essays, and exit interviews. These interviews were conducted by a committee of at least two professors to several graduating students individually. Except for the exit interviews, all other methods were assessed within courses, specifically in the following: SICI 3245, 3255, 4015, 4025, 4266, 4286, 4465, and 4998.

The semester was very particular because classes were interrupted several times, due to a student strike. The semester started by mid August and finished by the end of January.

Assessment process for the semester

During the first half of the semester we worked with the recommendations made in the assessment report for the previous semester (January – May 2010). Specifically, we worked with the following:

1. In order to improve assessment results for outcome #2, we emphasized logical systems design in SICI 4025 by changing some teaching strategies, allocating more time to this topic, reviewing preliminary versions of the projects and providing feedback to students.
 - a. We are still in the process of 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 should be done in the very first course that our students take (SICI 3211).
2. We addressed the dropout issue on SICI 3255 by incorporating several quizzes throughout the semester, and also by promoting student interaction among themselves.
 - a. Additional support to students through tutoring was not possible due to lack of funds.

3. The project description for SICI 4998 was translated to English, but the project descriptions for SICI 4025 and 4275 are still in Spanish.
4. We emphasized in the assessment instructions emailed to professors that the remarks column be used to enter student feedback, particularly when the student did not get the highest score.
5. Dr. Rosarito Sánchez was assigned to keep the assessment documentation properly stored, including the assessment reports, the rubrics (properly filled-out), the description of the particular assessment projects used, and evidence of the student work.
6. We also emphasized in the assessment instructions emailed to professors that students should orally present their projects so that the evaluator can better assess them. Because projects are take-home, it is important for the evaluator to validate the extent to which the student really prepared the project himself. Also, in the case of group projects, presentations will help the evaluator assessing the individual contribution of group members to the project.
7. SICI 4025 was assigned to support outcome #10 (Teamwork) instead of outcome #9 (Communication). This way the number of courses supporting these outcomes will be better balanced. Originally, outcome #10 (Teamwork) was supported only by SICI 4278, while outcome #9 (Communication) was supported by SICI 3245, SICI 4025, SICI 4275 and SICI 4278.
8. SICI 4998 was assigned to support outcomes #9 (Communication) and #10 (Teamwork). The short essay that students are preparing at the end of the course provides for assessing both outcomes.
9. The tables where student outcomes are mapped to SICI courses, both requisites and electives, were updated based on the recommendations.

On October 28, we emailed the most recent version of the corresponding rubrics, together with some instructions and remarks regarding the assessment process, to all professors involved in this process. The rubric for SICI 4465 was sent in a separate email on December 4. A memo was sent by the ABET Committee to SICI professors on October 28, further emphasizing the instructions and remarks emailed regarding the assessment process.

By mid February, I received all the rubrics already completed by the professors, except for one, 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 Committee¹.

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

I consider appropriate to emphasize an important point regarding faculty involvement in our assessment process. By the date of this report we still have not received the completed rubric for the assessment in the course SICI 4015. This is the third semester that this course has to be left out of this report: the first time (August – December 2009) we received the rubric more than a month after we had finished the assessment report, the second time (January – May 2010) we did not receive the rubric and the third time (August – December 2010) we also did not receive the rubric. The ABET Committee has provided follow-up to the professor in charge of the course, and the situation has been raised to the Department Head, but it has not been corrected.

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. Most students did very well on the assessment of student outcomes. See Appendix 1 for approval percentages for each outcome assessed, both by method and overall.
 - a. The percentage of students that obtained a passing score ranged from 87.50% to 100% throughout the individual outcomes.
2. Outcome #2 (To select or design a system to solve the problems identified in an operation), which last semester got the lowest percentage of student performance, increased its percentage to 87.50. The two contributors to this percentage were SICI 4025, with 85.71, and SICI 4266, with 100.00.
 - a. The previous semester (January – May 2010), this outcome got the lowest percentage, with 64.29, with SICI 4025 having a percentage of 42.86 and SICI 4266 with 85.71.
 - b. The professor teaching this course (Prof. María del R. Rodríguez Orellana) put a lot of emphasis in reviewing preliminary versions of the logical design projects and providing feedback to students, which helped them understand what a logical design should accomplish. She also dedicated more time to logical design.
3. There was a high number of dropouts in SICI 3255 (approximately 50%). But the students that stayed in the course did very well in the assessment. Although we consider dropouts to be out of the scope of the assessment process, since these students are not included in the assessment sample, it is an issue that we need to address anyway.
 - a. The fact that the semester had several interruptions due to a student strike must have had an influence in the number of dropouts.

- b. We addressed the dropout issue on 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 find out to what extent this is so, because we faced another student strike that interrupted the semester several times.
 - c. Additional support to students through tutoring was not possible due to lack of funds.
 - d. We must continue analyzing this situation in order to find explanations and to take additional corrective actions to improve it.
4. The number of dropouts was also high in SICI 4266. Of the six students that were originally registered, three “disappeared” and one did not deliver the final project. This situation is unusual for this course, so probably the interruptions due to the student strike were the cause of this situation. Traditionally in our major, once students pass the first course, they usually go through all SICI courses.

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.
3. As mentioned before, the professor for SICI 4015 did not deliver the rubric. This is the third time that this course has to be left out of this report.

Recommendations

1. Although the results obtained in SICI 4025 this semester showed a significant improvement over the previous semester, we should continue emphasizing logical systems design in this course, through the measures previously mentioned:
 - a. Reviewing preliminary versions of the projects and providing feedback to students.

- b. Allocating more time to this topic in SICI 4025.
 - c. 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. The dropout issue on SICI 3255 should be addressed to find out its causes and to take whatever actions are necessary. The following strategies must be initiated, or continued, and we should measure their effect on dropouts:
 - a. Continue using quizzes.
 - b. Promote student interaction among them.
 - c. Provide more support to students through tutoring.
 - d. Analyze student characteristics that may be having an influence in the dropout rate, like student habits and time lag to acquire course materials.
3. SICI 4266 has to be closely observed regarding dropouts to see if the high dropout rate was due to the student strike or to other reasons.
4. SICI 4465 should be 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.). In this course students prepare a research paper on legal issues of computer technology, which is very suitable to assess written communication.
5. 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, it is important for the evaluator to validate the extent to which the student really prepared the project himself. Also, in the case of group projects, presentations will help the evaluator to assess the individual contribution of group members to the project.
- f. Management must take affirmative actions to ensure that all professors fulfill their assessment responsibilities.

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 a revised version of the tables mapping student outcomes to SICI courses, exit interview and ABET outcomes. The revision was based on the results obtained from the assessment process, as well as on the recommendations we are making in this report.

Table mapping objectives, outcomes and performance criteria (“Constitutional table”)

As part of our continuous improvement process, Appendix 4 contains a revised version of the SICI Constitutional Table, specifically in the column containing the SICI courses that will support each outcome. The revision was based on the recommendations we are making in this report.

Graph of all outcomes (approved vs. not approved)

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

Appendix 1
Summary of assessment results

	Institute of Statistics and Information Systems Faculty of Business Administration University of Puerto Rico - Rio Piedras Major in Computerized Information Systems Assessment of Student Outcomes August - December 2010	
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Assessment results

O #	Student outcomes	Assessment methods			Approved		Not approved	
		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	Ref.	14	100.00%	0	0%
		Totals for this outcome			14	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	Ref.	12	85.71%	2	14.29%
		COIS 4266	Medium	Ref.	2	100.00%	0	0.00%
		COIS 4405 (E)	Medium					
Totals for this outcome			14	87.50%	2	12.50%		
3	To plan and supervise the implementation of a system that solves the problems identified in an operation.	COIS 4278(1)	High					
		Totals for this outcome			0	0.00%	0	0.00%
4	To use current techniques, skills, tools and best practices to design, implement and manage information systems.	COIS 3245	Low	Ref.	17	89.47%	2	10.53%
		COIS 3255	Low	Ref.	12	92.31%	1	7.69%
		COIS 4015	Medium					
		COIS 4266	Medium	Ref.	1	50.00%	1	50.00%
		COIS 4285(E)	Medium					
		COIS 4286	Medium	Ref.	24	100.00%	0	0.00%
		COIS 4405(E)	Medium					
Totals for this outcome			54	93.10%	4	6.90%		
5	To understand the impact that organizational, local and global environments have in the implementation and management of information systems.	COIS 4266	Medium	Ref.	2	100.00%	0	0.00%
		COIS 4278(2)	High					
		COIS 4405(E)	Medium					
		COIS 4465(E)	Low	Ref.	11	100.00%	0	0.00%
Totals for this outcome			13	100.00%	0	0.00%		

Assessment results								
O #	Student outcomes	Assessment methods			Approved		Not approved	
		Rubric	Level	Ref.	Total	Percent	Total	Percent
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					
		Totals for this outcome			0	0.00%	0	0.00%
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					
		Exit interview	All	Ref.	5	100.00%	0	0.00%
		Totals for this outcome			5	100.00%	0	0.00%
8	To recognize the importance of ethical values and interpersonal relationships in an information systems professional.	COIS 4275	High					
		COIS 4465(E)	Low	Ref.	10	90.91%	1	9.09%
		COIS 4998(E)	High	Ref.	1	50.00%	1	50.00%
		Exit interview	All	Ref.	5	100.00%	0	0.00%
Totals for this outcome			16	88.89%	2	11.11%		
9	To communicate effectively with a range of audiences.	COIS 3245	Low	Ref.	19	100.00%	0	0.00%
		COIS 4275	High					
		COIS 4278(2)	High					
		COIS 4465(E)	Low	Ref.	11	100.00%	0	0.00%
		COIS 4998(E)	High	Ref.	2	100.00%	0	0.00%
		Totals for this outcome			32	100.00%	0	0.00%
10	To function effectively in teams seeking to accomplish a common goal.	COIS 4025	Medium	Ref.	14	100.00%	0	0.00%
		COIS 4278(1)	High					
		COIS 4998(E)	High	Ref.	1	50.00%	1	50.00%
		Exit interview	All	Ref.	5	100.00%	0	0.00%
Totals for this outcome			20	95.24%	1	4.76%		
Tool developed by Prof. Arnaldo I. Ramos-Torres during Christmas vacation of 2008. All rights reserved.								

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Corrective actions

O #	Action items	Responsible person(s)	Dates
1	Big improvement from last semester!		
2	Rubric not yet received.	Department Head	March 15, 2011
	Three dropouts plus one incomplete. (Six students in total.) Course not offered this semester.	ABET Committee	April 30, 2011
3	Course not offered this semester.		
4	No dropouts nor incompletes. Old version of rubric used.		
	11 dropouts and/or incompletes, out of 24.. Attention required. No presentations. Rubric not yet received.	ABET Committee	April 30, 2011
	Three dropouts plus one incomplete. (Six students in total.) Course not offered this semester.	ABET Committee	April 30, 2011
	No dropouts nor incompletes.		
	Course not offered this semester.		
	Course not offered this semester.		
5	Three dropouts plus one incomplete. (Six students in total.) Course not offered this semester.	ABET Committee	April 30, 2011
	Course not offered this semester.		
	Course not offered this semester. 8 dropout or incompletes.		

Corrective actions			
O #	Action items	Responsible person(s)	Dates
6	Course not offered this semester.		
7	Course not offered this semester.		
	Interesting remarks from students.		
8	Course not offered this semester.		
	8 dropouts or incompletes		
	One student did not address ethics in short essay.		
	Interesting remarks from students.		
9	Old version of rubric used.		
	Course not offered this semester.		
	Course not offered this semester.		
	8 dropout or incompletes.		
10	Course not offered this semester.		
	Interesting remarks from students.		
Tool developed by Prof. Arnaldo I. Ramos-Torres during Christmas vacation of 2008. All rights reserved.			

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

Mapping of student outcomes to SICI (required) courses, Exit interview and ABET outcomes													
Prof. A. Ramos, Revised May 2010													
#	Student outcomes	Required courses									Exit interview	ABET outcomes	
		3211	3245	3255	4015	4025	4266	4275	4278	4286			
1	To analyze an operation within an organization, identify problems and make recommendations to solve these problems.					X							A,B,I
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

Mapping of student outcomes to SICI (elective) courses and ABET outcomes										
Prof. A. Ramos, Revised Dec 2010										
#	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
	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
Table 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)499 8(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











