

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



**Report on assessment of SICI outcomes
performed on December 2009**

Prepared by:

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Revised by SICI ABET Committee on February 10, 2010 and September 2010

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January 15, 2010, Revised September 2010

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Prof. A. Ramos**

Introduction

During the last semester (August – December 2009) we assessed the following five student outcomes in our SICI courses: #1, 2, 4, 5 and 9. These outcomes were assessed using capstone projects in the following courses: SICI 3245, 3255, 4015, 4025, 4266, 4286, and 4465. Students prepared these projects by the end of the corresponding courses.

During the first part of the previous semester, all professors involved in the assessment process received the most recent version of the corresponding rubrics. By mid semester they received a reminder, together with some instructions regarding this process.

Between the end of last semester and the beginning of this one (January – May 2010), I received the rubrics already completed by the professors¹, together with remarks from some of the professors regarding their experience with the rubrics. The results of the individual rubrics were integrated into a summary table by outcome (see table 1), based on the outcomes supported by each rubric. Finally, I analyzed the data, prepared this report and presented it to the ABET Committee².

Assessment results

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

1. Rubrics proved to be very simple to use. They simplified the data collection, the calculation of student scores, as well as the calculation of scores related to the 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 project requirements support the characteristics contained in the project rubric.
3. Most students did very well on the assessment of program outcomes. See Table 1.
 - a. The percentage of students that obtained a passing score ranged from 71.43% to

¹ By the date of this report we still have not received the completed rubric for the outcomes related to the course SICI 4015.

² I want to acknowledge the support and the contributions received from the members of the ABET Committee (Dr. Katherine Franceschi, Prof. María del R. Rodríguez, and Dr. Rosarito Sánchez), as well as the support and contributions received from our Department Head (Dr. Pedro Rodríguez) and the SICI professors.

100% throughout the individual outcomes, except for outcome number 2 where this percentage was 36.36.

- b. The percentages of students that did not obtain a passing score ranged from 0% to 28.57%, except for outcome number 2, where this percentage was 63.64.
4. We must analyze the results obtained for outcome number 2 to find explanations for those results and take whatever corrective actions are needed to improve them.
 5. The main contributors to the assessment results obtained are the contents of the courses and the educational strategies used by professors. But 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 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.
 6. The modifications performed to the rubrics as a result of the pilot test we conducted last semester worked out very well. This semester, for each assessment method, individual percentages were calculated per outcome, using only the characteristics associated to each outcome.³

Recommendations

1. The rubrics used for some of the courses, like SICI 3255 and SICI 4266, should be redesigned to make them more generic. That is, they should be redesigned to reduce the probability of having to change the rubric due to specific changes in the capstone project. Although this approach was followed when originally designing these rubrics, it still has to be emphasized a little further in these rubrics. This recommendation may apply to other rubrics as well.
2. The assessment performed in SICI 4015, SICI 4266 and SICI 4405 should also be

³ Last semester we discovered a problem with the way assessment results were being allocated to specific outcomes, when an assessment method was supporting more than one outcome. See last semester's report on pilot assessment.

- used to support outcome # 2, besides supporting outcome #4. Currently, outcome #4 is supported by five required courses plus three elective courses⁴. On the other hand, outcome # 2 is supported by only one required course (SICI 4025). Since both the contents and the assessment methods used in SICI 4015, SICI 4266 and SICI 4405 support very well outcome #2, there will be no need to modify neither the courses nor the corresponding rubrics, due to this recommendation.
3. Since SICI 3211 is a course taken by all faculty students, and this course is significantly loaded, the assessment in this course for ABET purposes should be minimized. Therefore, we recommend that:
 - a. Although most of the material related to outcome # 7 (Lifelong learning) is covered in SICI 3211, the assessment should be performed in SICI 4278, where this material is covered at a higher cognitive level.
 - b. The assessment of outcome # 8 (Ethical values and interpersonal relationships) should be performed in SICI 4275. The current assessment method used in this course already provides to assess this outcome.
 4. The assessment for outcome # 9 (To communicate effectively with a range of audiences) should also be performed in SICI 4278, using a short essay that students will prepare in this course.
 5. The ABET Committee has to prepare the rubric and define the logistics to assess the outcomes supported by the exit interview. (I will prepare and submit a draft for discussion.)
 6. The table “Summary of All Outcomes” should present the assessment methods classified by cognitive level. A proposed classification is included, subject to review by the ABET Committee.⁵

Additional remarks

1. Some professors did not fill the remarks column in the rubrics. This column should be used to enter an explanation for the score assigned to the corresponding characteristic, particularly when the student did not get the highest score.
2. Some professors did not provide the description for the project used to perform the assessment. A copy of this description is needed so that the ABET Committee can verify the correspondence between the project description and the rubric. The summary table now provides a link to these descriptions.

⁴ This situation was a result of the modifications we performed on SICI outcomes, where we consolidated several outcomes related to educational objective # 2 into one. See: “A. Ramos, *Proposed modifications to SICI educational objectives, learning outcomes, performance criteria and rubrics, August 2009*”

⁵ This classification is based on the course contents and prerequisites.

3. Professors are keeping by themselves the copies of the projects used for assessment. The ABET Committee has to evaluate if this is the best approach or if, instead, professors should deliver those projects to the Committee.

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

As part of our continuous improvement process, Tables 2 and 3 contain a revised version of the tables that map the student outcomes to SICI courses, exit interview and ABET outcomes, based on the results obtained from the assessment process.

New version of the table mapping objectives, outcomes and performance criteria (“Constitutional table”)

Table 4 contains a revised version of the SICI Constitutional Table, which includes two additional columns: one for the SICI courses that will support each outcome and another one correlating ABET outcomes to ours. The revised table already reflects the effect of recommendations two, three and four in page two of this report.

Table 1
Summary of assessment results

	<p>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</p>	
<div style="border: 1px solid black; padding: 2px; display: inline-block;">August-09</div>		

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.	SICI 4025	Medium?		11	100.00%	0	0%	
		Totals for this outcome				11	100.00%	0	0.00%
2	To select or design a system to solve the problems identified in an operation.	SICI 4025	Medium?		4	36.36%	7	63.64%	
		SICI 4266?							
		SICI 4015?							
		SICI 4405 (E)							
Totals for this outcome				4	36.36%	7	63.64%		
3	To plan and supervise the implementation of a system that solves the problems identified in an operation.	SICI 4278	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.	SICI 3245	Low?		14	100.00%	0	0.00%	
		SICI 3255	Low?	Ref.	13	100.00%	0	0.00%	
		SICI 4015	Medium?						
		SICI 4266	Medium?	Ref.	6	100.00%	0	0.00%	
		SICI 4286	Medium?		13	92.88%	1	7.14%	
		SICI 4285 (E)	Medium?						
		SICI 4405 (E)	Medium?						
Totals for this outcome				46	97.87%	1	2.13%		

Assessment results								
O #	Student outcomes	Assessment methods			Approved		Not approved	
		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.	SICI 4266	Medium?	Ref.	6	100.00%	0	0.00%
		SICI 4275	High?					
		SICI 4278	High?					
		SICI 4405 (E)	Medium?					
		SICI 4465 (E)	Low?		5	71.43%	2	28.57%
Totals for this outcome					11	84.62%	2	15.38%
6	To value the protection of information system resources in an organization, and to identify ways in which this protection can be achieved.	SICI 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.	Exit interview	All?					
		SICI 4278?	Low?					
Totals for this outcome					0	0.00%	0	0.00%
8	To recognize the importance of ethical values and interpersonal relationships in an information systems professional.	Exit interview	All?					
		SICI 4465(E)	Low?		7	100.00%	0	0.00%
		SICI 4275?	High?					
Totals for this outcome					7	100.00%	0	0.00%
9	To communicate effectively with a range of audiences.	SICI 3245	Low?		14	100.00%	0	0.00%
		SICI 4025	Medium?		11	100.00%	0	0.00%
		SICI 4275	High?					
		SICI 4998 (E)	High?					
Totals for this outcome					25	100.00%	0	0.00%
10	To function effectively in teams seeking to accomplish a common goal.	Exit interview	All?					
		SICI 4278	High?					
Totals for this outcome					0	0.00%	0	0.00%
Tool developed by Prof. Arnaldo I. Ramos-Torres during Christmas vacation of 2008. All rights reserved.								

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-09
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Corrective actions

O #	Action items	Responsible person(s)	Dates
1	No actions needed.		
2	Interesting finding! Students ability to design needs to be improved.	ABET Committee	February 28, 2010
	Analyze if we should also use this course to support this outcome.	ABET Committee	February 28, 2010
	Analyze if we should also use this course to support this outcome.	ABET Committee	February 28, 2010
	Analyze if we should also use this course to support this outcome.	ABET Committee	February 28, 2010
3	Not assessed this semester.		
4	No actions needed.		
	No actions needed.		
	Assessment results not yet received. Situation referred to Department Head.	ABET Committee	February 28, 2010
	Analyze if we should move this course to outcome #2.	ABET Committee	February 28, 2010
	No actions needed.		
	Not assessed this semester.		
	Analyze if we should move this course to outcome #2.	ABET Committee	February 28, 2010
	Not assessed this semester.		

Corrective actions			
O #	Action items	Responsible person(s)	Dates
5	No actions needed.		
	Not assessed this semester.		
	Not assessed this semester.		
	Not assessed this semester.		
	No actions needed. Apparently due to attendance problems by two students.		
6	Not assessed this semester.		
7	Not assessed this semester.		
	Analyze if we should also use this course to support this outcome.	ABET Committee	February 28, 2010
8	Not assessed this semester.		
	No actions needed.		
	Analyze if we should also use this course to support this outcome.	ABET Committee	February 28, 2010
9	No actions needed.		
	No actions needed.		
	Not assessed this semester.		
	Not assessed this semester.		
10	Not assessed this semester.		
	Not assessed this semester.		
Tool developed by Prof. Arnaldo I. Ramos-Torres during Christmas vacation of 2008. All rights reserved.			

Table 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 January 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,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)	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		(X)			F
10	To function effectively in teams seeking to accomplish a common goal.								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".)											

Table 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 January 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					E
9	To communicate effectively with a range of audiences.					X			F
10	To function effectively in teams seeking to accomplish a common goal.								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, the outcome on communication should be assessed here.								

Table 4
Table mapping objectives, outcomes and performance criteria
(“Constitutional table”)

<p style="text-align: center;">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, January 15, 2010</p>				
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 <u>the development of</u> 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, January 15, 2010				
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

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, January 15, 2010				
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
5. To perform his functions showing respect and appreciation for ethical values, interpersonal relationships, communication, and team work.	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)	E
	9. To communicate effectively with a range of audiences.	12. To prepare written reports and oral presentations related to information system topics.	3245,4025, 4275, 4278, 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.	4278, Exit	D