Assessment of Learning Outcomes at the Institutional Level

Assessment of undergraduate student learning at the institutional level focused on the following outcomes: (1) effective communication in Spanish, (2) effective communication in English, (3) logical-mathematical reasoning, (4) information literacy, and (5) critical thinking skills.

Assessment results for the aforementioned learning outcome skills:

1. _Effective Written Communication Skills in Spanish_

   The OEAE evaluated the writing competencies of the 2007-08 freshman class; a milestone campus-wide effort. For this project, a writing test was administered to students enrolled in the first nine academic programs approved under the restructured undergraduate degrees (i.e., Physics, Mathematics, General Science, Biology, Journalism and Information, Audiovisual Communication, Public Relations and Advertising, Fine Arts, and Interdisciplinary Studies). A total of 409 newly accepted students (58% of the total who enrolled in the aforementioned programs) participated. The areas assessed were: theme and structure, lexical competency, domain of syntactical structures, and grammatical correctness. The College Board was in charge of the rubric used to grade the essays produced. The results indicated that 79% of students met expectations, while 21% showed limited writing skills. The main difficulties identified for those who scored below expectations concerned basic essay structure and limited use of vocabulary. Results were presented and discussed among the Deans, Associate Deans, and Student Learning Assessment Coordinators so that appropriate actions could be taken early on in the undergraduate careers of those students who did not meet expectations. The students were referred to the Center for Linguistic Competencies at the College of General Studies, a place where they can turn to for support from trained tutors. Results of the exam were shared with the leadership of the College of General Studies given that most of those students who performed poorly enrolled in Spanish courses during their first semester. Appropriate course placement was verified and the faculty was able to address the weaknesses identified in the exam.

   Collaborative efforts with the College Board continued in 2008-09. A writing test was administered to a sample of 1,604 newly admitted students (82% of those accepted under new undergraduate degree requirements). The areas assessed were: Theme and Structure; Morphosyntactic structures; Lexical competency and Grammatical correctness. Results indicated that 88% of students displayed limited writing skills. Assessment results can be seen at the OEAE webpage (oeae.uprrp.edu). Areas of weakness were similar to the ones found during the first year of the project, although a much higher incidence of limited skills was documented. This difference appears to be due to a more diverse group of participating students and the apparently uneven distribution of writing skills across majors.

   The following table presents results from the competency areas assessed in the test in 2007 and 2008 academic years. It should be noted that students assessed in 2007 are from academic programs with the higher entrance academic indexes.

Table 1: *Assessment Results of the Test to Assess Written Communication Skills Administered   to Freshman Students during the 2007 – 2008 and 2008 – 2009 Academic Years*

Criteria	October10, 2007 (N=409)		August 7, 2008 (N=1599)	
	Average [20, 80]	Percent	Average [20, 80]	Percent
Theme and Structure	61.5	76.9%	52.1	65.1%
Domain of syntactical structures	53.2	66.4%	50.9	63.6%
Lexical Competency	57.1	71.4%	46.3	57.9%
Grammatical correctness	54.9	68.6%	56.2	70.3%
Total Essay Score	60.0	75.0%	**41.0**	**51.2%**

In light of the findings from the 2008-09 College Board test, the following transforming actions were implemented: coordination of writing workshops with the Center for Linguistic Competencies; development of a writing program called Writing Zones in the College of Education, for students with mandatory attendance to the workshops; offering writing skills workshops in Spanish and English at the College of Business Administration and the creation of a writing seminar in the School of Communications.

During the academic year 2011-12, OEAE personnel planned the second instance of institutional assessment of student learning for effective written communication in Spanish. Spanish professors from UPR-RP, who are experts in the Spanish language, designed a similar test. Unlike the previous initiatives in this area, the UPR-RP was in charge of all aspects of this effort. This dramatically increased cost effectiveness. A total of 1,686 students, 80% of the incoming freshmen class, took the test. Test results show that lexical competency was a strength (84.8%) and grammatical correctness the most challenging area (62.5%). Assessment results can be seen at the OEAE webpage (oeae.uprrp.edu). Test results were also discussed with the leadership of pertinent academic units and faculty. The results were sent to students via their institutional email along with recommendations of courses in which to enroll, upcoming workshops, and information about programs and offices that could provide them with academic counseling and support. A total of 73% of the students assessed met the expected outcome. Results of this effort are included in the following tables. (Tables 2 and 3)

It was expected that 70% of the students assessed would obtain an expected outcome of 3.0 points or more in each test criteria in the 5.0 scale rubric used. Although the average performance percentage of all areas was higher than 70%, two of the assessed criteria (Morphosyntactic Structures Mastery and Orthography) did not meet the expected outcome.

Table 2. Distribution by criteria assessed and the level of performance in the effective written communication test (Spanish) administered in August 16, 2012 to all incoming students.

DISTRIBUTION OF RESULTS OF THE TEST TO EVALUATE EFFECTIVE WRITTEN COMMUNICATION SKILLS IN INCOMING FRESHMEN (AUGUST 16, 2012)					
Criteria	**Levels**				
	Novice (1)	**In Progress (2)**	**Satisfactory (3)**	**Very Good (4)**	**Excellent (5)**
Theme and Structure	136	260	998	153	139
	8.1%	15.4%	59.2%	9.1%	8.2%
Mastery of Morphosyntactic Structures	326	210	996	99	55
	19.3%	12.5%	59.1%	5.9%	3.3%
Lexical Mastery	120	136	1155	149	126
	7.1%	8.1%	68.5%	8.8%	7.5%
Orthography	395	237	753	158	143
	23.4%	14.1%	44.7%	9.4%	8.5%
TOTAL	**14.5%**	**12.5%**	**57.9%**	**8.3%**	**6.9%**

Table 3. Group Performance by criteria in the effective written communication test (Spanish) administered in August 2012 to all incoming students.

DISTRIBUTION OF GROUPED RESULTS OF THE TEST TO EVALUATE EFFECTIVE WRITTEN COMMUNICATION SKILLS IN INCOMING FRESHMEN (AUGUST 16, 2012)		
Criteria	**Categories**	
	Less than 3 points	**3 points or more**
Theme and Structure	396	1290
	23.5%	76.5%
Mastery of Morphosyntactic Structures	536	1150
	31.8%	68.2%
Lexical Mastery	256	1430
	15.2%	84.8%
Orthography	632	1054
	37.5%	62.5%
TOTAL	**27.0%**	**73.0%**

The above results were sent to the Spanish Departments of the Colleges of General Studies and Humanities in order to implement transforming actions to enforce these language areas. Assessment results can be accessed at the OEAE webpage http://oeae.uprrp.edu/?page_id=744

During the second semester of the 2014-15 academic year, the OEAE administered a test to a sample of 800 students near completion of their undergraduate degrees. This was done in order to assess their effective Spanish communication skills in advanced courses as an exit measure and to obtain information to be used in establishing what areas tend to improve over the course of the degree. Table 4 presents the number of students who obtained a score 66.25% or more in each criterion assessed and in the overall test.

Table 4. Group Performance by criteria in the effective written communication test (Spanish) administered in April 2015 to a sample of students near completion of their undergraduate degrees.

	Students participating	Theme and Structure	Morphosyntactic Structure	Lexical Mastery	Orthography	Global
UPR – Río Piedras	**800**	473	606	698	329	601
		59%	76%	87%	**41%**	75%

A fourth institutional test in effective written communication skills in Spanish, similar to the one administered in August 2012, was planned and designed by Spanish professors from UPR-RP, experts in the Spanish language, and administered to the incoming 2015-16 class. A total of 2258 students, (77%), of the incoming freshmen class, took the test. Results are pending.

2. *Effective Communication Skills in English*

   As part of institutional efforts to assess writing skills in English, and in coordination with the College Board, an English Language Assessment Test (ELASH II-English Language Assessment System for Hispanics II) was administered to a sample of 819 newly admitted students in the first semester of the 2008-09 academic year. The ELASH II test evaluates the following skills: listening comprehension, reading comprehension, and language use. The scores were categorized according to four levels: advanced, high intermediate, low intermediate, and novice.

   Scores on the test indicate that 89% of the students scored in advanced and high intermediate levels in listening comprehension, while 11% percent scored in the low intermediate and novice levels. The low intermediate and novice categories indicate low performance in the skills measured. In the category of listening comprehension, 10.4% of the students performed in the novice and low intermediate categories. Forty-two percent scored low intermediate and novice in language use and 43% scored at the same levels in reading comprehension. Results reported by the College Board in the ELASH II can be seen in the following table:

   Frequency of ELASH 2 total scores by intervals in the scale

Scale	Frequency	Percentage
40 – 59	-	-
60 – 79	1	0.1
80 – 99	66	8.1
100 – 119	165	20.1
120 – 139	232	28.3
140 – 159	277	33.8
160 – 179	71	8.7
180 – 200	5	0.6
Average	132.6	**Std. Dev.** 21.6

Frequency of scores in Listening Comprehension, by stage

Stage	Scale	Frequency	Percentage
1	40 - 80	6	0.7
2	81 - 106	77	9.4
3	107 - 140	328	40.0
4	141 - 200	408	49.8
Average	137.9	**Std. Dev.**	22.2

Frequency of scores in Language Use and Indirect Writing, by stage

Stage	Scale	Frequency	Percentage
1	40 - 89	32	3.9
2	90 - 125	312	38.1
3	126 - 149	269	32.8
4	150 - 200	206	25.2
Average	131.7	**Std. Dev.**	26.4

Frequency of scores in Reading Comprehension and Idiomatic Phrases, by stage

Stage	Scale	Frequency	Percentage
1	40 - 89	45	5.5
2	90 - 125	307	37.6
3	126 - 149	340	41.6
4	150 - 200	125	15.3
Average	128.0	**Std. Dev.**	22.3

Frequency of scores in the three areas of the ELASH 2, by College

College	N	Auditory Comprehension	Language / Writing	Reading
Business Administration	215	134.4	126.0	122.1
Architecture	16	149.8	148.9	140.5
Natural Sciences	262	141.6	137.8	134.7
Social Sciences	135	132.7	125.8	121.7
Public Communication	66	137.1	132.0	129.1
General Studies	36	139.1	132.2	126.7
Humanities	87	141.9	134.0	129.2

At the same time, the English Department of the College of Humanities started an assessment process in Oral Communication Competencies for students who were taking English as a Second Language (ESL) in fulfillment of their second year English requirements. Rubrics were developed for use in the second semester of the 2009-10 academic year. These actions provided important information because they identified aspects of language fluency specific to the courses in question. Results of the test facilitated the placement of students in the appropriate sections according to their performance level. The

Humanities English Placement Test (HEPT) has played a primary role in the evaluation and placement of our undergraduate students into the most appropriate levels of competency. This placement test is offered twice per academic year and focuses on the evaluations of skills such as written and oral comprehension and composition. Analysis of the test results in the last two and a half academic years indicated that most of these students who took the College of Humanities English Department Placement Test are classified in the highest level courses. The next figure represents this result from March 2003 to March 2015.
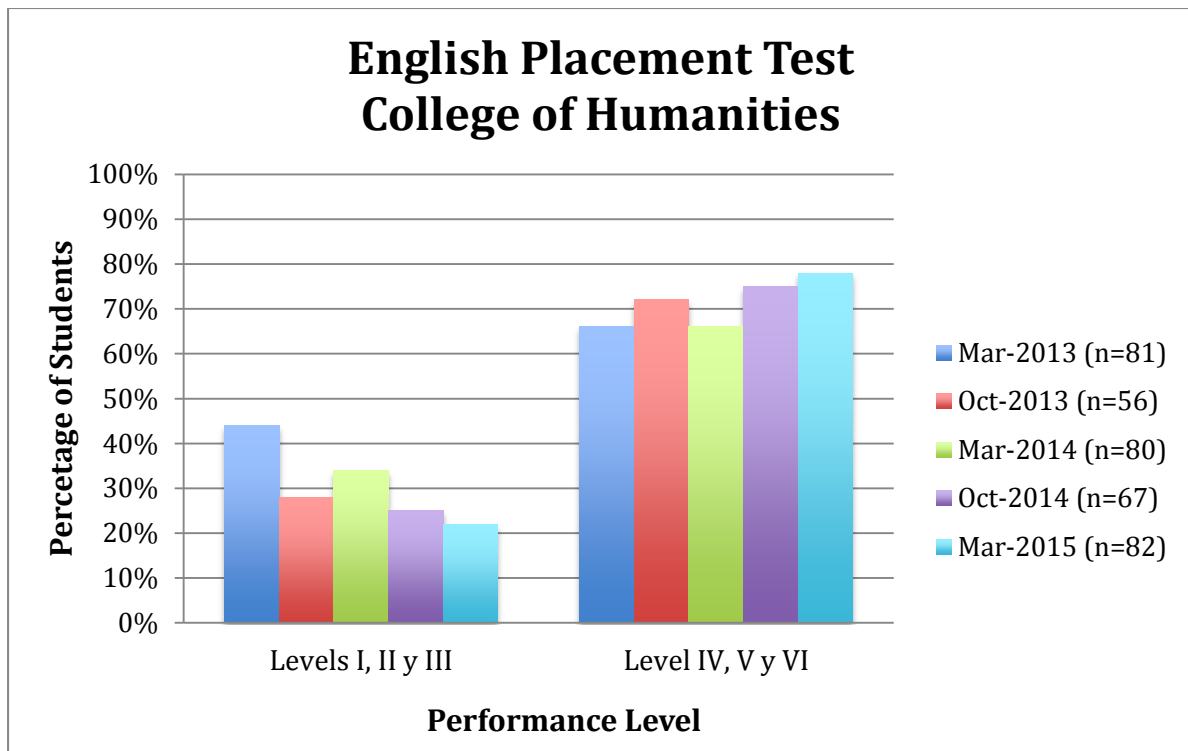
3. Logical-Mathematical Reasoning

Results for this learning outcome originate from the test offered to all students from all Colleges and Schools that are not from the Colleges of Business Administration, Natural Sciences, and the School of Architecture, who enroll in MATH courses to comply with the general education requirement of this learning outcome. The test was administered for the first time in May 2011, again in May 2013 and in November 2014. As shown in Table 1 results have been stable across the three academic years that assessment has taken place.

Table 1. *Assessment results in the logical–mathematical reasoning test in Math courses*

LOGICAL-MATHEMATICAL REASONING TEST			
Competency Area	**2010 – 2011 (May, 2011)**	**2012 – 2013 (May, 2013)**	**2014 – 2015 (November, 2014)**
Computation	44.84%	43.90%	46.36%
Representation	62.92%	62.87%	64.37%
Evaluation	51.89%	52.21%	52.04%
General Average	**52.34%**	**52.09%**	**53.34%**

Discussions about how to improve teaching and learning in this area are currently underway. Future transforming actions may need to be strategically situated within the classroom. The OEAE personnel met with the Director of the Mathematics Department and with the Department Assessment Coordinator to discuss the need to design a learning experience geared towards reinforcing logical-mathematical reasoning skills in the students.

A comparable process was followed to design a test to measure logical-mathematical reasoning skills and to administer it to students from the College of Business Administration who take the Pre-Calculus (Quantitative Methods – MECU 3031) course to comply with the requirements for this learning outcome. During the first administration in 2010-2011, a similar test to the one given to the students who enroll in MATE courses was administered in the MECU course. After discussing the results with all faculty members who teach this course, it was decided that this test did not measure the logical-mathematical reasoning skills required of MECU students. A comparable process was followed to design a test with items that comply with the same content areas approved for the original test to assess logical-mathematical reasoning skills but in the context of the Pre-calculus (MECU 3031) course objectives. This test was designed and approved by the professors who teach this course. It was administered in December 2011 and again in May 2012. An improvement in students' achievement can be seen when these competencies are measured within the context of the discipline.

Table 2 Logical-Mathematical Reasoning Results in Business Administration MECU 3031 course

Competency Area	**2010-11**	**2011-12**		**2014-15**
	May 2011	**Dec. 2011**	**May 2012**	**Dec. 2014**
Computation	53.11%	74.06%	68.03%	77.68%
Representation	57.98%	70.55%	64.01%	70.05%
Evaluation	54.20%	77.30%	63.56%	75.59%
General Average	**54.86%**	**74.14%**	**65.39%**	**74.80%**

Results from all the administrations of the Logical-Mathematical Reasoning Test for Pre-Calculus Courses were discussed with faculty members. The discussion resulted in a major revision of all three Quantitative Methods Courses (MECU 3001, MECU 3031, and MECU 3032), which is currently underway. Some of the transforming actions proposed were: (1) a Summer Immersion program in the Quantitative Methods Courses during the 2012 Summer Session geared to recently admitted Business Administration freshmen students who obtained low scores in the Mathematics Achievement section of the College Board College Entrance Examination, (2) revise the content of the Quantitative Methods courses: MECU

3001 (General Mathematics), MECU 3031 (Pre-Calculus), and MECU 3032 (Calculus), (3) creation of a website geared to the students enrolled in Quantitative Methods courses to reinforce topics discussed in the classroom, and (4) strengthen the Quantitative Methods courses tutoring program.

4. *Information Literacy Skills*

An operational definition for these competencies adapted from the Association of College and Research Libraries (ACRL) was established and learning objectives were designed for the initial and developmental levels (see OEAE webpage http://oeae.uprrp.edu/?page_id=111). A series of workshops for faculty training in the assessment of these competencies was organized. These workshops, which were sponsored by various colleges and schools, focused on writing course syllabi learning objectives, selecting appropriate learning activities, and designing an assessment rubric.

The assessment of student learning outcomes in the area of information literacy is most evident in specific campus projects that target students in specific schools and colleges. The UPR-RP Library System has provided much of the support and vision needed for these initiatives. Four are highlighted: 1) the Information Literacy and Research Program; 2) the Pilot Program for Distance Education; 3) a project for the Integration of Information Literacy to Curriculum (PICIC by its Spanish acronym); 4) the Natural Sciences Information Literacy Project.

1) The Information Literacy and Research Program

Based in the Architecture Library, this program started in 2009 and caters to students and professors of the School of Architecture, at both the undergraduate and graduate levels. It led to the establishment of five instructional modules for the development of information literacy competencies, as established by ACRL/ALA guidelines. In addition, librarians offered workshops, conferences, and individual consultations on: identification of research topics, strategies for identifying and obtaining information, criteria for evaluating information, academic honesty and plagiarism, professional style manuals, and preparing theses and end-of-degree projects.

2) Pilot Program for Distance Education

This program has two instructional designers that support professors in the School of Architecture in creating distance education courses and help produce teaching and assessment tools. Special attention is given to the assessment of information literacy.

3) Project for the Integration of Information Literacy to Curriculum (PCIC Project)

Three librarians from the UPR-RP Library System participated in several tracks of the ACRL Information Literacy Immersion Program (i.e., teaching track 2009, assessment track 2010, and teaching with technology track 2013) as preparation for launching the PICIC Project. The project utilizes the "assessment as learning" philosophy developed by Alverno College. Three UPR-RP Colleges participated in the project: Business Administration, General Studies, and Education.

In the 2012-2013 academic year the College of Business Administration trained 60% of its undergraduate and 73% of its graduate student enrollment. The College of General Studies trained 100% of its undergraduates; and 93% of the faculty integrated information literacy into their syllabi and course content. These colleges adopted a common set of information literacy learning objectives, as approved by the campus committees (Appendix 5.9). As some familiar with this project have pointed out,

development of a standardized assessment instrument would facilitate making useful comparisons across colleges.

4) <u>Natural Sciences Information Literacy Project</u>

The Natural Sciences Information Literacy Project strives to ensure that students understand the importance of learning and mastering information literacy skills in ways that complement knowledge and skills in their area of study and the learning objectives at the campus level. They were incorporated into the course syllabi along with the learning objectives of the course material. The description of the activities used to assess these competencies and the learning objectives of said activities were also included.

For the first cycle, two exercises were developed for General Biology and General Chemistry labs, both in line with ACRL standards for academic programs in science, engineering, and technology. For the first exercise, which focused on the analysis of the parts of a scientific article, the expected outcome was that 70% of the students would achieve a score of 70% or more. The first semester that this exercise was implemented, a total 83% of students achieved the expected score. However, problems were noted in students' responses to questions relating to reference formats. The following semester, as a transforming action, students were provided with online resources that can be used in learning how to cite scientific articles. The amount of students that reached the expected outcome that year increased to 92%, but problems related to understanding citation persisted among those who did not.

For the second exercise, students completed a semester-long project that culminated with a written paper and an oral presentation. The expected outcome for this exercise was that 65% of the students would obtain a score of "good" or "excellent." The expected outcome was achieved by 63% of students. The main difficulties for students who scored in the lower ranges were: evaluation of the trustworthiness of the sources used, consistency between the references cited and the bibliography, and formatting errors in the bibliography. To provide students with additional support, librarians' presentations on information literacy were modified. In addition, librarians have worked with assessment coordinators to formulate more effective transforming actions in the classroom.