**Agriculture Students' Language Needs in General Education Courses: A Case Study**

by

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## Abstract

This study was designed to explore the language needs of Spanish speaking Agriculture Students in general education courses at the University of Puerto Rico Mayaguez (UPRM). The participants were 17 students who were chosen by convenience sampling for gender, major within the College of Agriculture and College Entrance Examination Board scores of 469 or less in English. These students formed part of a 2007 pilot study conducted to analyze if Content Based Instruction would help Agriculture students to be successful English language learners. Data were collected by three research assistants, including myself. We observed focal students in all of their general education courses, interviewed focal participants including students and professors and conducted a *Perceptions of Language Use Survey.* In order to provide a better understanding of the context of this study, I provide an analysis of the institutional language policy of UPRM. Although all of the professors who participated in the study believe that English is essential for future success, most do not take it as a responsibility to deal with language issues within their general education classroom. While most believe that students are able to understand and use English easily and correctly; students presented difficulty regarding language use in all of the courses that they took that were offered in English or included an English component.

**Resumen**

Este estudio fue diseñado para investigar las necesidades lingüísticas de estudiantes de habla español del Colegio de Agricultura de la Universidad de Puerto Rico en Mayagüez. Los participantes fueron 17 estudiantes que fueron escogidos como muestra de conveniencia por género, concentración dentro del Colegio de Agricultura, y su puntuación en la sección de inglés del College Entrance Examination Board que debía ser 469 o menos. Estos participantes formaron parte de un estudio piloto en el 2007 realizado para determinar si la instrucción basada en contenido o CBI (por sus siglas en inglés) ayudaría a los estudiantes de Agricultura a tener éxito en el aprendizaje del inglés. La data fue recolectada por tres asistentes de investigación, yo misma incluida. Se observó a los estudiantes en todos sus cursos de educación general, se entrevistó a los participantes focales incluyendo a estudiantes y profesores y se realizó una encuesta de *Percepciones de uso del lenguaje.* Con el fin de proporcionar una mejor comprensión del contexto de este estudio, proporcioné un análisis de la política institucional del idioma de instrucción de la UPRM. A pesar de que todos los profesores que participaron del estudio creen que el inglés es esencial para el éxito futuro de los estudiantes, no toman como su responsabilidad el responder a las necesidades lingüísticas en el aula de educación general. Si bien la mayoría de los profesores cree que los estudiantes son capaces de entender y utilizar el inglés fácil y correctamente, los estudiantes presentaron dificultades relacionadas al uso del lenguaje en todos los cursos que tomaron en inglés o que incluían algún componente en inglés.

## Dedication

This thesis is dedicated to my mother Migdalia Vega Serrano who somehow managed to proclaim herself as an unofficial member of my committee, always making sure I got things done when they needed to be; to my father Jose L. Santiago who provided his unconditional support and to my brother Jonathan Santiago, who has always stood by my side in the happiest and hardest moments of this journey despite the distance.

## Acknowledgments

To Dr. Rosita L. Rivera, Dr. Catherine M. Mazak and Dr. Kevin S. Carroll: for your support, your guidance and for believing in me when I wouldn't. To my family and friends. To Lisa Ortiz, for your advice, friendship and support.

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## Chapter 1: Introduction

According to professors from various general education courses, students at the University of Puerto Rico Mayaguez, have the ability to read and understand materials in English. But, many agriculture students claim quite the contrary.

> I went to the class; he began to say everything in English so the next day I withdrew from the course. (Jonathan, Agriculture Student, 03/24/11)

As the following study demonstrates, there is a great disparity between professors' assumptions and what students are capable of doing. This situation, combined with faulty language policies and undefined institutional requirements creates an environment of confusion for students, often affecting their outcome and time to degree. The following chapters describe the actual situation at the University of Puerto Rico Mayaguez (UPRM) regarding language choice, student experiences and institutional language policies and requirements.

Under a proposal of the USDA and with funding from a Hispanic Serving Institutions Grant provided by the USDA, the program *Advancing English Language Learning for Food and Agricultural Science Majors* was developed with the purpose of creating Pre-Basic and Basic English courses that satisfy the needs of students from the College of Agricultural Sciences (CAS). As an initiative of Dr. Catherine M. Mazak and Dr. Rosita Rivera, the program was offered to these students as a venue for learning basic skills that may not have been acquired at previous language levels. According to studies conducted by the English Department at UPRM, 7% of students on campus are Agriculture majors and 14% of students in pre-basic English are Agriculture majors which translate into an over-representation of Agriculture students in pre-basic courses compared to other majors (www.oiip.com). The basic track requires two years for

completion and is composed of four courses (12 credits): Basic English 3101 and 3102 followed by English Reading and Composition I and II, 3201 and 3202 respectively. If students enter through the pre-basic level they must take a pre-requisite remedial course that has no credit value. After evaluating the various English courses at the university, we noticed that these were catalogued into a one-size-fits all ESL curriculum and that this ultimately led to a high failure rate, lengthening the time to complete a students' degree. Moreover, at The University of Puerto Rico Mayaguez, agriculture students take general education courses that may be taught in English. This creates a set of issues because students who enter Pre-basic English are still struggling with language learning.

***Context of the Problem***

English is assumed to be the international language of science and technology (Tonkin, 2011), making it necessary for educators and policy makers to understand the importance of language in content based learning. This project sought to identify the language needs of Spanish speaking Agriculture students in general education courses such as science, math and engineering at UPRM. One of the major problems in these general education courses is that there is no specific policy that establishes the language to be used in content instruction, resulting in the use of a variety of different linguistic combinations to present course material.

Similar to all students at the University, Agriculture students are required to study four semesters of English, but the curriculum of these courses is not aligned with activities pertaining to their discipline such as reading an agricultural economy textbook. Sixty percent (60%) of first-year agriculture students entering the UPRM in 2008-2009 had college board scores lower than 569, placing them into the English "basic track," compared with the overall average of 37% for students entering science, technology, engineering, and math majors. Consequently,

agriculture students enter the university under-prepared in English. This project sought to remedy this situation for food and agriculture majors by studying how these students are required to use English in their university academic work outside of the English classroom with the goal of creating courses that prepared them for these uses of English.

***The Pilot Study***

This study commenced with a grant from the United States Department of Agriculture awarded to Drs. Catherine Mazak and Rosita Rivera, professors in the English Department at UPRM. This grant began in 2009 and will run through 2012. The main purpose of the grant is to conduct a needs analysis of students' language needs and to design Content based curriculum for this particular population based on the needs analysis. In order to examine this issue, we studied a pilot group of 17 students who were chosen by maximal variation for gender, major within agriculture and whose College Entrance Examination Board (CEEB) Scores were of 469 or lower on the English portion. These students were placed in a technology enhanced classroom, four hours a day for three weeks during an intensive summer program the June before their freshman year. The technology enhanced classroom included a whiteboard, a projector, a speaker system, wireless internet access and 30 laptop computers, one for each student who belonged to the program. This cohort of students moved together through intensive summer, fall, and spring courses. Inside the classroom, students were taught English through agricultural content. The readings/articles that were assigned to the students all pertained to their field of study, guest speakers informed the students of job and internship opportunities while stressing the importance that English had in the field and students were expected to write about their personal experiences and interests within their area of study.

The program was a success with 100% of the students who entered passing the intensive summer course. As a result the group of students passed to the next level of Basic English (INGL 3101). After going through the process of participating in the pilot course and having the opportunity to experiment what studying the various fields of agriculture entailed, some students made the decision of changing to other fields within agriculture and others became even more enthusiastic and acquired greater interest about their specialized area while the remaining students simply decided that Agriculture was not what they had expected and decided to change majors. Part of the needs analysis portion of the aforementioned USDA grant was fulfilled with the completion of this study.

***Research Questions***

In order to ensure that the analysis was effective in determining the language needs of agriculture students, the following questions guided the study:

1. What are the English language needs of students in the Faculty of Agriculture at UPRM?
2. What institutional and academic guidelines can be suggested to the university and the professors teaching general education courses at UPRM in order to deal with language of instruction issues based on content, language needs and current policy?

***Objectives***

The following objectives guided this study:

1. To describe the use of English in agriculture majors' undergraduate courses by analyzing the listening, speaking, reading, and writing skills necessary to understand the content being delivered in English;

2. To design a set of guidelines for the university and the professors teaching general education courses at UPRM based on the needs of the students of the Faculty of Agriculture.

## Chapter 2: Review of the Literature

This study explored the uses of English in general education courses at UPRM. It also drew from the data and data analysis to create a set of strategies that could serve as a guideline for professors as they create course materials, curriculum, and syllabi. The following literature review includes relevant research and information in the areas of Curriculum Design, Bilingual Education, Content Based Instruction and Needs Analysis conducted in other bilingual contexts.

### *Language Policy at UPRM*

In order to gain a better understanding of the context of this project, I provide an overview of the university policy on language of instruction.

According to the historical sketch included in the Undergraduate Academic Catalogue of the University of Puerto Rico – Mayaguez, the campus is a:

> co-educational, bilingual, and non-sectarian school comprising the Colleges of Agricultural Sciences, Arts and Sciences, Business Administration, Engineering, and the Division of Continuing Education and Professional Studies (2010, p.1).

This claim could lead prospective students to believe that the courses offered at the university are offered either in Spanish or in English and that a formal system or method exists in order to identify the language that specific courses are offered in. This is not the case. There is nothing in the academic or online catalogue that identifies any given course as being offered in English or Spanish. The Language of Instruction Policy which also appears in the academic catalogue, states that:

> Spanish is the language of instruction in most courses, but students are required to have a working knowledge of the English language as well. The professor decides the language used in his or her lectures and student evaluation activities.

Being aware of the fact that the university was founded as a Land Grant Institution in 1911 under the Morrill-Nelson Act which intended to provide the majority of the population with education in an area more directly related to the daily lives of its individuals with specializations in areas such as agriculture, home economics, and mechanic arts; one would wonder if this would require the institution to be classified as bilingual. After determining that Land Grant Institutions were created for the sole purpose of "donating Public Lands to the several States and Territories which may provide Colleges for the Benefit of Agriculture and Mechanic Arts" (Act of July 2, 1862, ch.130, 12 Stat.503, 7 U.S.C.301 et.seq.), the aforementioned hypothesis becomes invalid.

### *Bilingual Education*

According to Halliday (1975), in order for students to be able to read and comprehend content area textbooks and perform cognitively demanding tasks, such as writing and presenting research papers, students need Academic language skills which include informational, transactional, and referential functions and social language skills which include interactional uses of language. Academic language refers to the ability to understand context reduced texts such as social studies, science or math texts while social language refers to the English that ESL students need in order to have face-to-face conversations in social settings. Based on this, we must question whether basic social language skills are necessary in order to acquire academic proficiency in a second language. This would be equivalent to arguing that "having a working knowledge of English" would ensure academic success in an institution that claims to be

bilingual. However, Seville-Troike (1984) maintains that communicative competence in social interaction does not guarantee communicative competence in academic situations.

According to Garcia (2008), many people may have a misconception about what bilingual education is. Baker (2001), argues that bilingual education is a "simplistic label for a complex phenomenon" (p. 213). He defines bilingual education as an ambiguous umbrella term that refers to both (1) a classroom where formal instruction fosters bilingualism and (2) a classroom where bilinguals are present, but bilingualism is not fostered in the curriculum (Baker, 2001). According to Baker (2001), there are three major types of bilingual education:

**Transitional** – aims to shift from the home, minority language to the dominant, majority language.

**Maintenance** – fosters the minority language while it strengthens the sense of cultural identity and rights in a nation.

**Enrichment** – aims to extend individual and group use of minority languages.

UPRM does not clearly articulate what they mean by claiming to be a bilingual institution. There is no committee or sector within the university dedicated to systematically create or foster this type of program. Other than this, there is no special policy that establishes the language of instruction of the institution. Although there exist many studies on bilingual education and language policy in school education (grades k-12), language policy is underexplored in higher education institutions. According to Phillipson (2009), "The expansion of English in Universities worldwide needs to be explicitly related to globalization past and present, to current language policy trends, and to the implications for other languages (pp. 30). He questions the continued use of English in postcolonial contexts and its increasing use in

European higher education (particularly Denmark) as being a universal remedy for language related issues or a threat for other languages and cultures. In his paper Phillipson argues for the maintenance of multilingualism and the use of English in balance with other languages in higher education.

In recent years, China has progressed in the study of bilingual language policy at the higher education level. According to Jiazhen (2007), the higher education department of the Ministry of Education in China created a special committee to coordinate bilingual education in higher education institutions across the country. This committee has the tasks of overseeing curriculum, planning and teaching, managing resources, coordinating text-book compiling or importation from internationally famous universities, and developing teaching methodology. The Ministry of Education of China issued a document in 2001 that would require universities to provide 5-10% language instruction in English or another foreign language at the undergraduate level. Although this might not seem quite clear at an initial glance, the Chinese are acutely specific in the type of education that subject teachers receive in different language contexts and the resources that are used to reach the goals of the bilingual education committee. While many universities in China are teaching content courses in English, there are institutions where this may be difficult. In the occasion that an institution is not able to offer courses in English due to the lack of linguistic knowledge that a student may have in English, authentic English textbooks are used with Chinese as the language of instruction. This should move gradually, eventually shifting into the use of English as the language of instruction (Jiazhen, 2007).

### *The Teaching of English in Puerto Rico*

According to the Department of Education of Puerto Rico (1997), the teaching of English on the Island has not been successful. There have been many changes in language use and

policies throughout history with no one policy proving to incentivize positive change. Under the Spanish government and up to 1898, English was taught to a select group of people with a high socio economic status for the purposes of international travel and diplomacy (Pousada, 1999). In 1898 when the United States government took over the Island under the treaty of Paris and the Spanish American War, language policies underwent a vast transformation. Schools changed from being completely in Spanish to being completely in English. In 1899, General John Eaton, former Commissioner of Education of the United States, proposed that all teachers were required to learn English, that there would be preference in the hiring of English speaking teachers, and that normal and high-school candidates would be examined in English (Pousada, 1999).

According to Algren de Gutierrez (1987), in 1901, Dr. Martin G. Brumbaugh the first Commissioner of Education of Puerto Rico, established English as the language of instruction with Spanish as a special subject. Children were encouraged to celebrate American holidays; they were taught how to salute the flag, and to sing the National Anthem. In 1916, Paul G. Miller became Commissioner of Education and enacted a policy that established Spanish as the language of instruction from grades 1 – 4, both English and Spanish as languages of instruction in grade 5, and English only in grades 6 and up (Gomez Tejera and Cruz Lopez, 1970 in Pousada, 1999). In 1930, Jose Padin was appointed as Commissioner and as former assistant to Commissioner Miller; he carried out a study on the teaching of English on the Island. The results demonstrated that after eight years of English instruction in school, students did not master its basic skills.

The policy was then changed in 1946 by Commissioner Mariano Villaronga. Villaronga established Spanish as the language of instruction with English taught as a required subject for 50 minutes. He was forced to resign due to his "Anti-American" views. He was then reinstituted

in 1949, enforcing the same policy he had suggested in 1946 (Pousada, 1999). This same policy is still in effect today. The Department of Education stresses that this policy or any of those that were established before have not proven to be advantageous in facilitating English language learning.

In 1993, Pedro Rossello, Puerto Rico's governor at the time, approved a law that established both English and Spanish as the official languages of the Island. In 1997, under Rossello's government, the secretary of education Victor Fajardo created the Project for Developing a Bilingual Citizen. According to Pousada (1999), this plan proposed to:

- Initiate reading in English by the second semester of the first grade.
- Assign 90 minute blocks of time for Spanish and English classes at the intermediate level.
- Utilize English for the teaching of science and math (on a voluntary basis).
- Provide an English immersion program for high school students, along with writing clinics in Spanish for seniors.
- Provide opportunities and incentives for English teachers to become certified.
- Create a teacher exchange program to allow Puerto Rican English teachers to improve their language skills by teaching in the states and bring U.S. teachers to Puerto Rico to aid Island teachers in improving their English.
- Provide technical assistance under the direction of district English and Spanish supervisors who would work with superintendents and teachers to facilitate professional development and multidisciplinary integration.

As the aforementioned history of the teaching of English in Puerto Rico suggests, the language status of the Island has been flooded by political partisanship and cultural clashes. Consequently, all administrations have failed to create a realistic language policy that would favor English instruction.

### *Language vs. Content Courses*

When content is added to language courses it poses an additional challenge. According to Mora (2012), all learners have three main academic needs: content, literacy, and language. According to Leki (2003), literacy at the college level, other than focusing on the ability to read and write, should focus on discipline-specific reading and writing, teaching students how to communicate effectively in their field of study (Leki, 2003). Language courses are focused on key vocabulary, language functions, language skills, grammar or language structures, lesson tasks, language learning strategies and academic language. Content courses focus on factual knowledge and information about a topic; simple or complex contexts; concrete or abstract concepts; processes, dynamics, and systems; and critical thinking about content (Mora, 2012). Mora (2012), presents the Language-Concept Connection Instructional Model which can be summarized as using known language to teach an unknown concept and using known concepts to teach unknown language. Content Based Instruction classrooms focus on content and language.

## Content Based Instruction

Content Based Instruction or CBI began in the early 1980's, aiming to reinforce vocabulary, grammar, and discourse structures common in a specific discipline (Brinton, Snow & Wesche, 1989). Content Based Instruction is a dual commitment between language and content-learning objectives (Stoller, 2004). Cummins (1996) made a distinction between academic and social English, demonstrating that the latter was not sufficient for academic

success. Although Cummins made this distinction and students are now commonly taught academic writing, it is often used in irrelevant contexts that provide no true benefit for students in courses of specific disciplines.

One of the most successful bilingual models that promote this sort of academic writing and language use in context are two way immersion programs (Brown, 2004). In these programs, English speakers learn subject matter such as social studies in a second language and non-English speakers learn English through subject matter such as science. In 2002, Barbara Senesac studied the two-way bilingual immersion program at the Inter-American Magnet School in Chicago, the oldest program in the Midwest. From her study she concluded that the students who participated in said program obtained equal or higher scores on all subject tests compared to students in regular programs.

Researchers of second language acquisition have shown that studying language in context facilitates language acquisition. In addition, the study of language in a context in which the student is interested increases student motivation as well as the knowledge of field-specific vocabulary and rhetorical structures that will play a central role in their development as young scholars and professionals (Brinton, Wesche, and Snow, 2003; Leki, 2007). Students who share the same interests have the tendency to form communities of practice inside the ESL classroom which facilitates language acquisition because these are able to complement each other through the Zone of Proximal Development (ZPD); where students are able to perform at higher levels by interacting amongst themselves (Vygotsky, 1978). In the following sections I will highlight the benefits and importance of Content Based Language Learning and the impact that it has had here at UPRM.

## Communities of Practice inside the CBI Classroom

Wenger, McDermott and Snyder (1981), stipulate that education usually has a beginning and an end, starting with the entrance into the classroom and ending just when students walk out with what they learned having no applications outside of the educational environment. By observing that learning is a social process and that anything learned inside the classroom must have some sort of application in nonacademic settings such as the workplace; they suggest that it would be most effective for learning to occur in a community of practice.

Using the cohort of agriculture students in the pilot program of this study as an example, Content Based Instruction courses should be divided into field specific content matter, therefore creating groups of students that move together through various stages of language acquisition. Students inside the Content Based Instruction classroom can be empowered to create their own communities of practice depending on the individual skills and abilities that they possess in and outside of the language classroom. According to Artemeva (2006), Wenger (1998) defines community of practice (COP) as a group of people who:

> (a) have a sustainable history of mutual engagement; (b) negotiate with one another about what they are doing, how they should behave, their relation with a larger institution, and the meanings and artifacts they use; (c) have developed local routines and artifacts to support their work together; (d) know who to ask when they need help; and (e) introduce into their community new trainees who want to become proficient at their practice (p.123).

The creation of COPs inside of the CBI classroom is increasingly important because one of its main goals is to provide a school-to-work transition which is also facilitated by the learning of field specific content that will later be applied in field courses and future employments.

In order to create effective COPs students must be aware of the personal skills and abilities they possess. This recognition of skills and abilities is known as self perception which is defined as the composite view of oneself, and is influenced by certain factors such as reflected appraisals from significant others and life experiences (Bong and Skaalvik, 2003). Self-perception determines an individual's growth and development, giving the study of self-perception an important role in educational research. What individuals believe that they can do with whatever skills and abilities they may possess is defined by Bong and Skaalvik (2003) as self-efficacy. If vocational career and academic choice are determined by self efficacy and if students believe that they have the necessary skills and abilities to learn a language through a subject of interest then they may also be able to gain these skills just as easily (Gushue, Clarke, Pantzer and Scanlan, 2006).

If students perceive themselves to excel in a certain subject and/or receive appraisal for excelling, will they not be more motivated to learn this same material in a content based language learning course? Being part of a COP means that learning is social participation and that students must be active participants in the practices of the social community they belong to and construct identities in relation to these communities (Wenger, 2007).

## Zone of Proximal Development and CBI

Vygotsky's (1978) socio-cultural theory claims that higher order thinking skills are first acquired with the help of others through interaction. ZPD and scaffolding relate to creating communities of practice inside the CBI classroom through the development of skills and abilities based on prior knowledge and second language learning. According to Moll (1990), Vygotsky emphasized that what individuals can perform collaboratively or with assistance today they can perform independently and completely tomorrow. When creating communities of practice

students often evaluate themselves according to the skills they possess and how they may therefore assign tasks to each individual within the group. Often students will work collaboratively in order to perform said tasks until they are able to so by themselves.

The teacher is who primarily facilitates tasks by providing a supporting framework for the acquisition of new abilities providing that the student can build on previous knowledge. By using the ZPD the teacher may be able to determine what is necessary in order for the child to be able to acquire the necessary knowledge to be able to complete tasks that were once performed under guidance. In communities of practice students may often go through the process in collaboration with another member. In a study conducted by Taylor, King, Pinsent-Johnson, & Lothian (2003), literacy events and reading and writing skill improvement were observed in a formal literacy classroom program. They found that learners first incurred in collaborative practices of reading to then move on to independent learning practices (Taylor and Abasi, 2005). This is a clear example of what Wenger, McDermott and Snyder (1981) refer to when they say that learning is a social process.

## Technology and Learning in CBI Classrooms

Often students find themselves disconnected from the educational environment, finding no relationship between what they are being taught and the social and cultural life they have outside of the classroom. Using technology or media enhanced classrooms was often seen as a distraction for students attention that strayed them away from a true and meaningful learning experience. But, what better way to stray students than by "obligating" them to read texts or participate in activities that have nothing pertinent to their daily lives, activities or practices?

Newkirk (2006) explains how the idea of popular media and technology use in the classroom may be seen as "the problem" and not as a valuable resource by literacy teachers who

promote traditional book reading and writing. Newkirk argues that, "this anti-media stance… is ultimately self defeating" (p.63). Student interests or activities are resources that students can incorporate into their academic lives or work. Technology has inevitably become part of today's culture and therefore educators should work with, and not against, the cultural tools that students bring to school (Newkirk, 2006).

Currently many teachers are diverting from these ideas and are adopting technology and media practices. An excellent example that underlines the necessity of these implementations is Mazak's (2008) study, *Negotiating "El Difícil"* in which she investigates the use of English in the literacy practices of Puerto Rican students. Mazak found that when students had finished school for the day, they would go to the library; not to read books, but rather to participate in technology and media related activities such as social networking, gaming, and visiting movie or music related web pages, applying language skills and practices in order to learn or use English. One of the participants of the study understood that internet use was "a language learning experience."

Computer assisted language learning (CALL) is an approach to teaching in which the computer is used to supplement face-to-face language instruction using tools such as the internet. CALL is designed to integrate principals of language pedagogy such as cognitive or constructivist and second language learning (Levy, 1997). In order to facilitate learning with the integration of technology in the CBI classroom according to CALL, it would seem most effective to integrate the Cognitive Academic Language Learning Approach (CALLA) with Content Based Second Language Learning and technology or CALL. CALLA is an instructional model for second language learning that integrates instruction on content based topics from the curriculum of the institution where the model is used, development of the language skills needed

for learning, and instruction in using learning strategies for academic tasks (Chamot and Robbins, 2006).

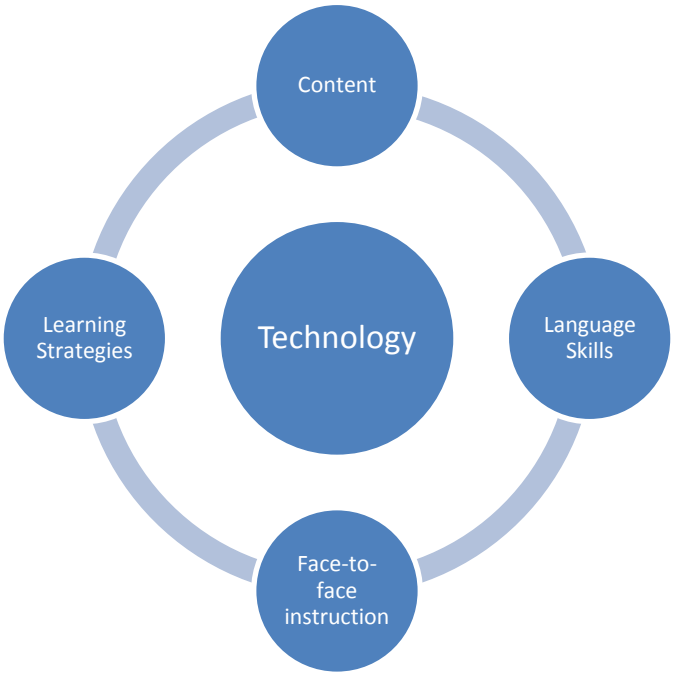



**Figure 1: Integrated CALL and CALLA Models – Model of a CBI classroom where technology facilitates the access to content, language skills such as reading, and learning strategies such as accessing information while supplementing face-to-face instruction.**

According to Chamot and Robbins (2006) the CALLA model has eight principal objectives which are to assist students in:

1. Valuing their own prior knowledge and cultural experiences, and relating this knowledge to academic learning in a new language and culture
2. Learning the content knowledge and the language skills that are most important for their future academic success;
3. Developing language awareness and critical literacy

4. Selecting and using appropriate learning strategies and study skills that will develop academic knowledge and processes
5. Developing abilities to work successfully with others in a social context
6. Learning through hands-on, inquiry-based, and cooperative learning tasks
7. Increasing motivation for academic learning and confidence in their ability to be successful in school
8. Evaluating their own learning and planning how to become more effective and independent learners (p.6).

The integration of technology in a Content Based Instruction classroom may enhance English language learning because computer software, applications and the documents and websites that are accessed online are in the target language. There may also exist an increased motivation in language learning, for according to Azzam (2006), a study conducted by The Kaiser Family Foundation and Stanford University titled *Generation M: Media in the Lives of 8-18 Year-Olds* demonstrated that teenagers spent approximately eight and one-half hours daily conducting media related activities. Therefore, access to technologies in CBI courses may also facilitate content based language teaching by helping students make a link between technology and its uses in general college courses such as preparing power point presentations, making graphs and tables, and using applications such as Word, Excel and InfoPath. Students may also find a link between technology and its applications in their particular field of study.

When implementing technology use in CBI teachers should have in mind that routine for its use should be established. If time and technology use is not balanced, students could depend

too much on technology use. Teachers should also take into consideration that modeling the use of certain technologies takes a substantial amount of time and that they must be fully capable of doing so. By using technology in the CBI classroom according to the CALLA model and its principal objectives, technology will promote the integration of strategy, content, and language learning in the classroom.

## Curriculum design for CBI Classrooms

The previous illustrates what Newkirk (2006) refers to in inspiring students to read and write using themes and materials that are appealing and relevant to their interests. At UPRM, all students must take two (2) years of English courses or 12 credits to satisfy their general education requirements regardless of their area of study. If students begin their English courses in the Pre-Basic track they must take an extra non-credit course which is also known as "remedial" in order to acquire the necessary skills to succeed in Basic English making it the equivalent of five classes or 15 credits in English. Nevertheless, these students are expected to complete their degree in the same amount of time as students who enter any other track of English courses.

One of the factors that may lead students to failure is that often times they are distracted and strayed away from a true and meaningful learning experience. They are required to read texts or use materials that have nothing pertinent to their lives, daily activities or practices.

Historically, the curriculum of the University of Puerto Rico has had students read mainstream texts that include topics unfamiliar to them such as those included in Jack London's *To Build a Fire* which speaks of snow, frostbite and survival in the wild, all of which may be ultimately unfamiliar to those who have always lived on a tropical island such as Puerto Rico and never had such regional experiences with snow. According to Simon (2008), Students should be

taught how to think critically and apply their knowledge of culture, life skills and field specific content in the courses they may take. This illustrates a way of inspiring students to read and write using themes that are appealing and relevant to their interests and that may serve as an important tool for their academic success. Students should be able to relate to subject matter, offer their opinions and participate in lively discussions, written or orally. Simon (2008) suggests that canonical texts might often be difficult to understand due to the unfamiliar contexts and relevance to students' lives. Simon proposes that in order to help students engage with texts, students should be taught to activate relevant prior knowledge. What better way to engage students in these classrooms than to offer specific materials that appeal to their interests and fields of study?

When designing curricula for CBI classrooms there are certain factors that should be taken into consideration in order to ensure an effective educational environment. In her article, *Content Based ESL Curriculum and Academic Language Proficiency,* Brown (2004) states that "it is critical for ESL teachers to move beyond the functional English syllabus and to start providing a content-rich, high-standards curriculum that prepares ESL students to become academically successful in content learning." When designing CBEC teachers should remember that a balance between content and language skill instruction is essential. Often times teachers focus too much on content, failing to provide proper language skill instruction and vise versa. It is also important to take into account that the teacher in charge of any content based course is responsible for teaching the content correctly and must be prepared to do so by providing complete instruction and being able to answer questions as they arise.

The purpose of designing content based curriculums is to advance ESL learning. Therefore, before implementing any type of content based course, student needs should be

assessed through the use of surveys that measure students' academic self perceptions and academic self efficacy, the observation of content courses, the assessment of technology and language skills, and performance. After these have been assessed a pilot curriculum to meet these needs should be implemented following with an evaluation of the implementation in order to measure success rates and overall effectiveness**.**

## STEM and CBI

According to the participating organizations of the STEM Education Coalition, there should be quality STEM education at all levels, which according to the coalition's mission could be defined as improving the content knowledge of STEM educators, improving the resources available in STEM subjects, and creating policies that favor STEM education for underrepresented or disadvantaged groups (STEM Education Coalition, 2011).

The STEM Education Coalition works to support teachers and students at various agencies that offer STEM related programs. The coalition advocates for policies to improve STEM education at all levels. Here at UPRM, there is an urgent need for more supportive programs that seek to promote student academic literacy in all areas. According to a 2010 study conducted by the Higher Education Research Institute of the University of California of Los Angeles, many students from STEM fields struggle to complete their degree in four years or drop out. According to Sylvia Hurtado, director of the Higher Education Research Institute, this can be attributed to poor scientific literacy. If this proves to be true for monolingual individuals who have studied in their L1 throughout the course of their academic careers, the impact of poor scientific literacy raises exponentially when combined with poor language policies which place students in a position where they do not know what to expect when they walk into a classroom in terms of language of instruction which could be Spanish, English, or a mix of the two.

When analyzing the needs of agriculture students in general education courses a great number of factors must be taken into account. The previous sections each represent the areas related to language policy, instructional practice, and student outcome at UPRM. As several studies have demonstrated, there is a lack of research in bilingual education at the tertiary level. The present study examines the use of English and Spanish in general education courses at UPRM. It will also explore how these uses can be managed in order to facilitate instruction and student performance. The following section describes the methodology employed in this study.

## Chapter 3: Methodology

Given the nature of my inquiry this project was guided by a qualitative research approach, specifically a convenience sample case study. The case study was based on the language needs of Agriculture students in general education courses. Stake (2005), establishes that case studies "draw attention to the question of what specifically can be learned about the single case […] to optimize understanding rather than to generalize beyond it" (p. 443). Having conducted my research as a case study allowed me to acquire knowledge with relation to the language needs of agriculture students in general education courses, language use in these courses and the role that professors played in this case. Other than conducting this needs analysis, I learned about these agriculture majors by becoming more familiarized with them through the data collection process followed for this project. Framing this proposed research project as a case study will "blend a description of events with the analysis of them…and will focus individual actors or groups of actors, and seek to understand their perceptions of events" (Cohen et al., 2007, p. 253).

### *Participants*

In the summer of 2007 at UPRM, after a year of research and data collection, a pilot group of new admission students was formed and an intensive pre-basic course was designed according to their needs. With an agricultural focus, reading, writing, listening and speaking, the basic skills of the English language, were reinforced. Students were aided with the use of technology and each one was supplied with a laptop and materials and was exempt of tuition. Throughout the summer, students were immersed in the English language. They were accompanied by guest speakers who shared their own experiences with English within the Agricultural field. It was an opportunity that allowed students to value the importance of English

in their daily lives and future careers. The purpose of the study was to analyze if CBI would aid agriculture students in being successful language learners. As a result of their hard work and dedication, the program was a complete success. Due to the nature of my study and the fact that the participants were already part of the aforementioned USDA funded project, I employed a convenience sample case study.

The original purposive sample of 30 was a cohort of students from the College of Agriculture Sciences at UPRM who varied according to the following factors:

**Gender** – The participants varied by gender in order to achieve equal representativeness within the study. The original group consisted of 11 females and 19 males.

**Program** – The participants were chosen according to their concentrations in order to have at least one student from each major. These programs are: Horticulture (3), Animal Sciences (6), Agricultural Extension (1), Agronomy (6), Agricultural Engineering (6), Pre-veterinary, General Agriculture (4), Agricultural Economy (1), and Soil Sciences (2).

**CEEB Score** – The participants were chosen by their CEEB scores which had to range from 0 – 469, automatically placing them in the remedial course: Pre Basic English (INGL 0066).

According to Creswell (1998), a case study is an exploration of a "bounded system" or a case (or multiple cases) over time through detailed, in-depth data collection involving multiple sources of information rich in context" (62). The case of my study can be identified as the 17 students remaining from the original purposive sample. The other thirteen students left the program and the study for different reasons. Some of these reasons were internal department

transfers as well as external transfers to pursue studies at different institutions. Thus, 17 students remained part of the study at the time of data collection in 2009.

**Figure 2: Participant Demographics***

| Participant | Age | Gender | CEEB English Score | Major |
|---|---|---|---|---|
| Fernando | 19 | M | 336 | General Agriculture |
| Gabriel | 19 | M | 395 | Agronomy |
| Rodrigo | 19 | M | 293 | Agronomy |
| Kristina | 19 | F | 434 | Agricultural Extension |
| Eduardo | 18 | M | 421 | General Agriculture |
| Karina | 19 | F | 353 | Soil Sciences |
| Carmen | 18 | F | 353 | Horticulture |
| Christopher | 18 | M | 353 | Agricultural Engineering |
| Gladys | 19 | F | 353 | Agricultural Sciences |
| Lorenzo | 19 | M | 446 | Agronomy |
| Leroy | 18 | M | 395 | Agricultural Sciences |
| Roberto | 19 | M | 347 | Agricultural Engineering |
| Gloria | 19 | F | 353 | General Agriculture |
| Jonathan | 19 | M | 404 | Agricultural Sciences |
| Lissandra | 19 | F | 387 | Agronomy |
| Jesus | 18 | M | 361 | Horticulture |
| José | 18 | M | 385 | Soil Sciences |

The previous table represents the students that composed my case for this study. The group consisted of 11 females and 19 males. They had CEEB scores no lower than 293 and no higher than 446. The remaining 17 students did not represent all of the programs from the

College of Agriculture. Pre-veterinary, Agricultural Extension, and Agricultural Economy were not represented.

### Data Types

The data analyzed for this study was collected by three research assistants, including myself in the 2009 – 2010 academic year. It was collected by using multiple sources of information in data collection in order to provide an in-depth picture of the language needs of the participants. In order to analyze the uses of English in general education courses taken by agriculture students at UPRM, a series of data collection procedures were followed.

## Observations

We observed focal students in all of their general education courses in order to understand their English language needs. In order to observe these classes, the participants provided us with their course registration forms for the 2009-2010 academic year. We created a database of the courses that the students were enrolled in. The database included the course name, section number, time the course was offered and the name of the professor who taught the course. The professors were then contacted and informed of the purpose of the observations. They were told that the observation was of the student and how the students interacted in the classroom (with materials, language use, and performance). We attempted to observe each course at least once. If there was more than one student enrolled in any given course, an additional research assistant would observe for each additional student. If any course had more than one section we would observe every section that a participating student was enrolled in. At the time of the observation an observation protocol (Appendix A) was used to collect and organize specific information regarding the course and the focal student behavior.

## Interviews

The professors were aware that agreeing to allow us to observe their courses meant that they would also have to participate in an interview where they would explain their language choices (Spanish/English) for language of instruction and materials (handouts, references, textbook, PowerPoint presentations, evaluations, and syllabi), At the time of the interview a protocol was followed (Appendix B). This protocol included specific questions that also allowed the professor to provide any insight or opinions they might have in terms of language use and instruction. Although the interview protocol was in English, the interviews were conducted either in English or Spanish depending on the professor's preference.

Other than interviewing professors, we also interviewed focal student participants in order to understand their language needs and learning strategies. The purpose of these interviews was to discuss the students' language experiences in their general education courses and identify the learning strategies that they used in order to deal with language related situations. Student interviews were carried out in order to clarify any doubts that were left after observations were conducted and the survey was administered. Although the protocol was in English (Appendix C), interviews were done in the student's language of preference (English or Spanish).

## Survey

We also conducted the Perceptions of Language Use Survey (Appendix D). Seventeen computers were set up in a classroom with an internet connection. This allowed us to previously open the survey which was created and stored online on Survey Monkey. The survey included four quantitative questions and five open ended questions. It was offered to the students in Spanish. Students were asked to complete the survey at a specific date and time in the spring of

2010. Fourteen of the seventeen participating students answered the survey. It sought to gather information about language use in their courses and areas of study, the importance of English in their academic lives, the types of materials used in their courses, among other language related issues.

## Chapter 4: Data and Data Analysis

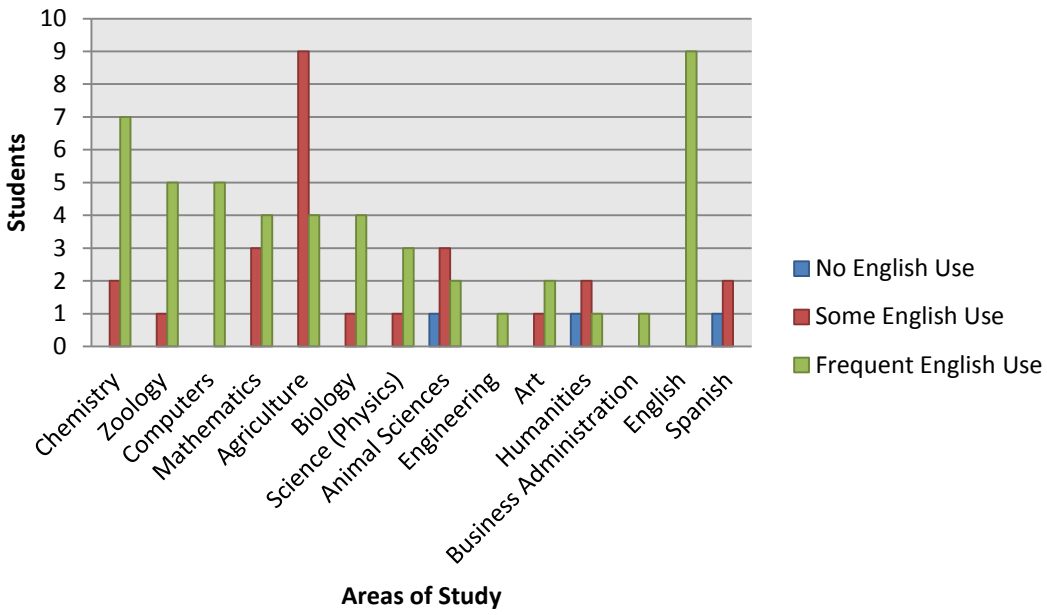
This chapter presents the data collected from the perception of language needs survey that was administered to 14 students from the College of Agriculture at UPRM, 23 professor observations and interviews, and focal and individual student interviews collected from the classes that were observed. The survey was written to clarify trends we were seeing in the observational data. It included quantitative and qualitative sections. The survey was offered to the participating 17 students from the study. Fourteen students completed the survey. It consisted of five quantitative questions and four open ended qualitative questions regarding the 2009 – 2010 academic year. These questions were focused on English use in various courses and contexts, the importance of English use regarding academic tasks and employment, and the effect of language use in a number of areas

### *Survey Results*

#### Quantitative Data

Question number one of the survey, which is represented by the following figure, asked students to measure the amount of English that they used in an array of areas of study. These areas included agriculture, business administration, art, biology, science, marine sciences, computers, Spanish, history, humanities, languages, animal sciences, engineering, English, literature, mathematics, chemistry, and zoology. The areas of study in which no students had participated were excluded from the graph as well as the cases in which only one student participated in the area of study but did not use English.

**Figure 3: Amount of English Used in Areas of Study**

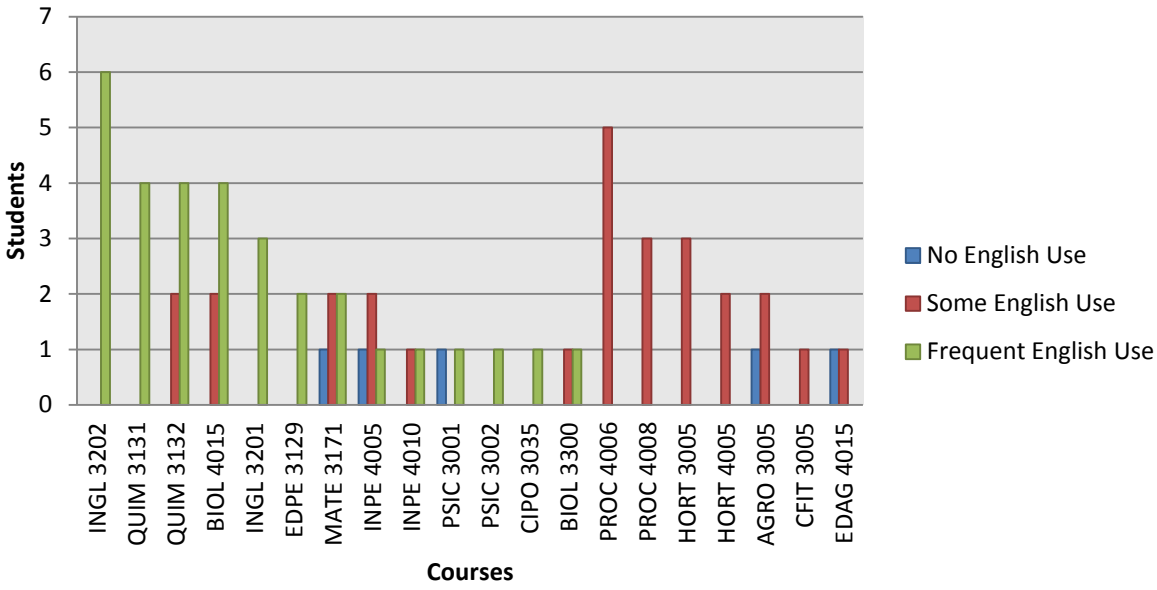



In figure 3, which asked students to measure how much English they used in different areas of study, English was used in 13 of the 18 areas, ranging from some English use to frequent English use. The areas in which English was used most frequently were English (9/9), biology (4/5), chemistry (7/9), art (2/3), zoology (5/6), computers (5/5), mathematics (4/7), Science (3/4), Business Administration (1/1), and Engineering (1/1); where the numerator represents the number of students that used English frequently and the denominator represents the number of students in the area of study. Thirty-one percent (31%) of students reported to use some English in areas related to agriculture while sixty-nine percent (69%) used English frequently. Fifty percent (50%) of students reported to have used some English in areas related to animal sciences and mathematics respectively. Seventy-eight percent (78%) of students used English frequently in Chemistry. One-hundred percent (100%) of the students that studied in areas related to computers used English frequently. According to these numbers it is evident that English is used in all areas of the curriculum mainly in STEM related areas. The percentages were calculated

based on the number of students in the area of study and not on the total amount of students who took the survey.

Question two of the survey asked students to measure the amount of English that they used in their courses. The criterion for choosing the courses was based on student registration. The amount of courses listed was 28. These courses included AGRO 3005 (General Soils), BIOL 3300 (Genetics), BIOL 4015 (General Zoology), CIPO 3035 (The Government of Puerto Rico), CFIT 3005 (Fundamentals of Crop Production), EDAG 4015 (Youth Organizations and Programs), EDAG 4016 (Audiovisual Media in Vocational Agriculture Instruction), EDPE 3129 (Microcomputers in the Classroom), GEOL 3045 (Geology of the Planets), HORT 3005 (Crop Propagation), HORT 4005 (Ornamental Horticulture), HORT 4006 (Practice in Horticulture), HORT 4055 (Aromatic Plants), INAG 4990 (Special Topics in Agricultural Engineering), INGL 3201 (Reading and Composition 1), INGL 3202 (Reading and Composition II), INPE 4005 (Veterinary Physiology), INPE 4008 (Milk and its Products), INPE 4010 (Animal Feeding and Nutrition), INPE 4050 (Introduction to Aquiculture), MATE 0066 (Remedial Mathematics), MATE 3171 (Pre calculus I), PROC 4006 (Tropical Plant Pathology), PROC 4008 (Agricultural Entomology), PSIC 3001 (Principles of Psychology I), PSIC 3002 (Principles of Psychology II), QUIM 3131 (General Chemistry I), QUIM 3132 (General Chemistry II). Due to the fact that only 14 of the 17 participants answered the survey, seven courses did not receive a measurement. These were left out of the graph. Since only one student participated in INPE 4008 and did not use English in the course, it was also eliminated from the graph.

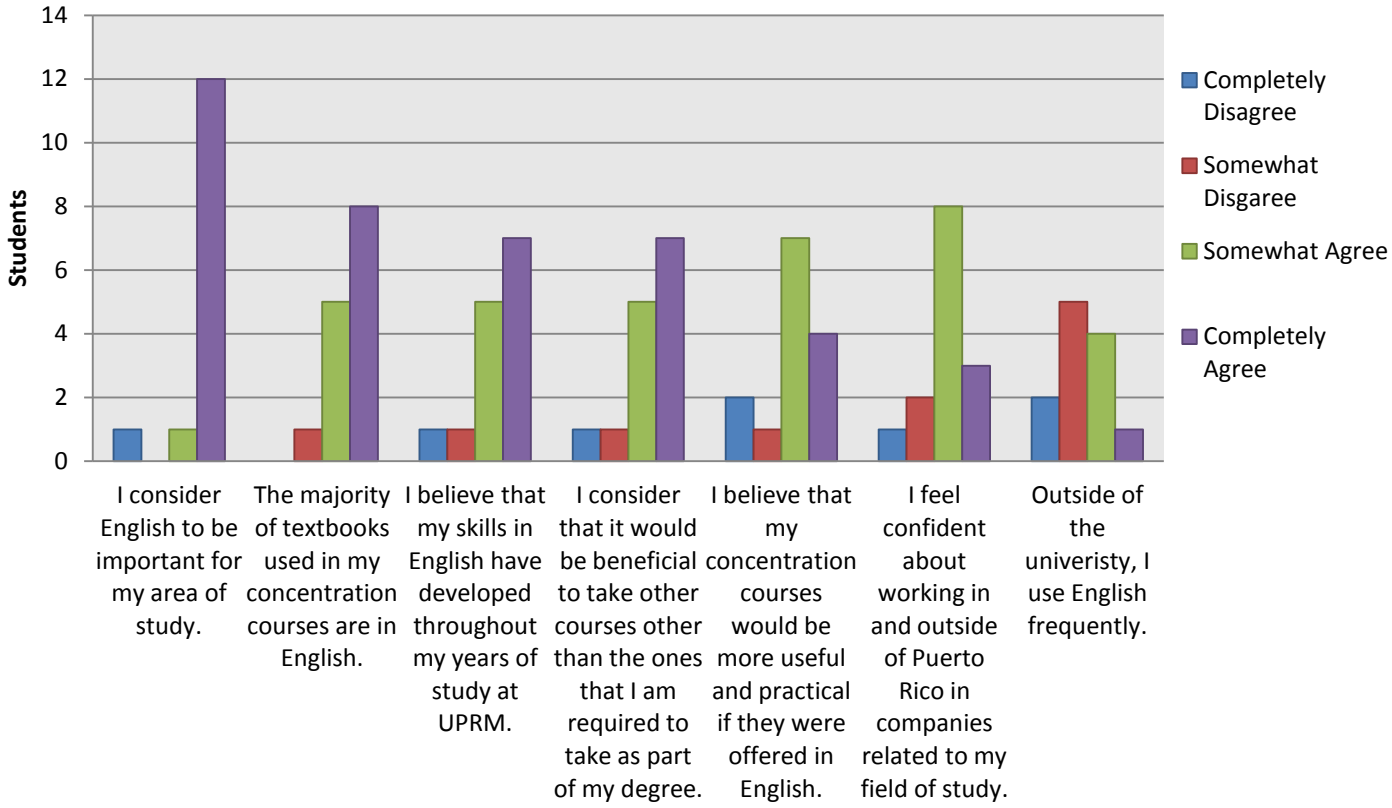
**Figure 4: Amount of English Used in Courses**




Question two is represented by figure 4 which demonstrates the amount of English used in registered courses. English was most frequently used in INGL 3202 (6/6), QUIM 3131 (4/4), QUIM 3132 (4/6), BIOL 4015 (4/6), INGL 3201 (3/3), EDPE 3129 (2/2), MATE 3171 (2/2), BIOL 3300 (1/2), and PSIC 3002 (1/1); where the numerator represents the number of students that used English frequently and the denominator represents the number of students that took the course. One-hundred percent (100%) of the students who took courses PROC 4006, PROC 4005, HORT 4005, HORT 3005, and CFIT 3005 used some English. One-hundred percent of the students who took courses QUIM 3131, PSIC 3001, PSIC 3002, INGL 3201, INGL 3202, EDPE 3129, and CIPO 3035 used English frequently in the course. Sixty-seven percent (67%) of the students who took courses QUIM 3132, BIOL 4015, MATE 3171, INPE 4005, and AGRO 3005 used some English. The aforementioned is also demonstrative of the extent to which English is used; especially in STEM areas with the most use in chemistry, biology, technology, and math courses.

In survey question number 3, students were able to agree or disagree with a series of statements. These statements focused on their perceptions of English use in various contexts.

**Figure 5: Uses of English**




Eighty-six percent (86%) of students that completed the survey considered English to be important for their area of study. Fifty-seven percent (57%) of students completely agreed that the majority of textbooks used in their concentration courses were in English. Thirty-six percent (36%) of students somewhat agreed with the previous statement. Although twenty-two percent (22%) of students completely agreed and fifty-seven percent (57%) of students somewhat agreed that they feel confident about working in and outside of Puerto Rico in companies related to their field of study; only eight percent (8%) of students completely agreed that they use English

frequently outside of the university. Twenty-nine percent (29%) of students completely agreed and fifty percent (50%) of students somewhat agreed that their concentration courses would be more useful and practical if they were offered in English. According to the quantitative date collected in the Perceptions of English Use Survey, students demonstrated to have a need for English language skills in a variety of courses, those mainly referred to as STEM (Science, Technology, Engineering, and Mathematics).

**Qualitative Data**

As part of the perceptions survey, students were also asked to answer a series of open ended questions. In question number four, students were asked if they considered the purpose of this study, which is to develop more English courses based on their area of study, would help them improve efficiency and competency at their workplace. Five students stated that these types of content based courses motivated them to learn English with more ease because the content in these types of courses is interesting and relevant to them.

> *Sería más eficiente aprender inglés aplicado a los estudios que uno está realizando dado a que esta en tu área de estudio, y como que es algo que te gusta, lo aprendes más rápido y le pones ganas de entenderlo*.
>
> It would be more efficient to learn English applied to the studies that we are taking underway because it is in your area of study and since it's something that you like you learn it faster and you try even harder to understand it. (Translated by author)

Two students answered that this would help and prepare them (the students) to work outside of Puerto Rico.

*Nos sería mucho más útil ya que practicamos más el inglés y nos envolvemos en él y de esta manera podemos desempeñarnos en nuestro campo y perder el miedo a trabajar fuera de Puerto Rico.*

It would be way more useful because we would practice more English and we would become more involved with it. In this way, we can perform in our areas and we lose our fear of working out of Puerto Rico. (Translated by author)

As Question # 5 demonstrates, there also exists a great need for English Language skills due to the materials that are used in general education courses. Ten of the fourteen students (71%) said that many of their textbooks were in English although they did not specify the specific courses that they were used in. Five students answered that they have had to do presentations in English. Four students have had to read articles in English and four students have taken exams in English although their courses were taught in Spanish. Three students mentioned that most of the English that they used was used in their veterinary classes (Pre-Vet is offered at the university but any student who wants to complete the degree must continue studies in the U.S.). Overall, most students use English textbooks and PPTs. They also read many articles in English and take exams in English.

According to Question # 6 of the survey, two of the fourteen students dropped one or more classes in the 2009 – 2010 academic school year due to language issues.

*Me di de baja de el curso de MATE 3171 (pre cálculo) ya que es un curso muy fuerte y su libro es en inglés y no podemos entender bien las explicaciones de los ejercicios.*

I withdrew from the MATE 3171 course (pre calculus) because it is a tough course and the textbook is in English and we can't understand the explanation of the problems. (Translated by author)

*Tuve dificultad en la clase de genética debido a que por la rapidez en la cual se hablaba no podía entender algunos detalles.*

I had difficulty in the genetics course due to how fast everything was spoken. I couldn't understand some details. (Translated by author)

In question number seven of the survey, students were asked if their grades had been affected positively or negatively by the language of instruction used in any of their courses. Some students responded in a positive manner, claiming that the English used by their professors was clear and they were able to use it in their favor.

*El efecto fue positivo, ya que vi dos formas de visualizar el material.*

The effect was positive. I had two ways of visualizing material. (Translated by author)

*Todos los cursos en los que tenía que utilizar aunque sea un poco de inglés me ayudo en ampliar mi conocimiento de esta lengua.*

All of the courses in which I had to use even a little English helped expand my knowledge of this language. (Translated by author)

While some students claimed that the English used in their general education courses had a positive effect, others were forced to withdraw from courses or risk getting a lower grade because of the language barrier.

> *No fracasé en la clase, pero la nota no fue la esperada. Además que cuando fui a reclamar la nota, me envió una evaluación vía email y no era igual a la que me había calificado. No me supo contestar y me habló muy rápido con motivo para que no la entendiera porque vio mi grado de dificultad en el inglés.*
>
> I did not fail the course but my grade wasn't what I had expected. When I went to make a claim, the professor sent me an evaluation via email and it wasn't the same one that had been graded before. The professor didn't respond to that. She/he spoke to me very fast, intentionally, so that I wouldn't understand because she/he saw that I had difficulty with English. (Translated by author)
>
> *Fracasé en la clase de HUMA 3272 por no entender el material claramente por el idioma.*
>
> I failed HUMA 3272 because I couldn't clearly understand the material because of the language. (Translated by author)

In question number eight, when asked if they had considered changing majors and if so, if it had to do with the language, four students said that they did consider changing but their decision was not affected or influenced by language issues. When asked if they had any additional comments, two students suggested that there be more courses created focused of speaking.

*Me gustaría que el inglés se extendiera más en el aspecto de la práctica hablada, ya que uno entiende y lo sabe escribir.*

I would like it if English would be extended in spoken practice because we already understand it and know how to write. (Translated by author)

*Que pudiéramos tomar un curso de inglés enfocado más en lo conversacional, ya que de esta manera tendríamos un mayor desenvolvimiento en el área de entrevistas ya que la mayoría de estas son en inglés.*

That we could take an English course focused on the conversational. This way we would have a better development in the area of interviews since most of these are in English. (Translated by author)

As the previous data demonstrates, students use English throughout the curriculum in general education courses. Although students are generally not required to speak English in these courses they must know how to read, write, and listen in English. When students referred to spoken English it was mainly for job interview and work purposes. The following section presents the data collected through course observations.

### *Observation Results*

As part of the data collection, the courses that were offered by the participating professors were also observed. The following chart shows that STEM general education courses at UPRM include the use of English on some level. However, there is a need to define in this context what "quality STEM education" may include. For instance, how language is used to instruct students in these areas.

**Figure 6: Materials and Language of Instruction (STEM)***

| Professor | Course | Language of Instruction | Materials | Language of Materials |
|---|---|---|---|---|
| *Kane* | Biology<br>BIOL 3435 | Spanish | Text Book<br>PPT<br><br>Handouts | English<br>Spanish w/ English Captions (graphs, tables, illustrations)<br>Spanish w/English Captions (graphs, tables, illustrations) |
| *Long* | Agronomy<br>AGRO 3005 | Spanish | PPT | Spanish |
| *Trinidad* | Agricultural Science<br>CFIT 3005 | Spanish | PPT<br>Exam | Spanish<br>Spanish |
| *Alfonso* | Crops and Environmental Agriculture Science<br>CFIT 3005 | Spanish | PPT<br>References (Articles, Journals) | Spanish<br>English |
| *Collazo* | Technology in Education<br>EDPE 3129 | Spanish/English | Online Portfolio<br>Google Sites<br>Electronic Books<br>Online Laboratories | Spanish/English<br>English<br>English<br>Spanish/English |
| *Gonzalez* | Horticulture<br>HORT 3005 | Spanish w/English key words | Text Book<br>PPT | English<br>Spanish w/English information |
| *Martin* | Horticulture<br>HORT 4055 | Spanish w/ some English translations of key words. | References (Articles, Journals) | English/Spanish (very limited) |
| *Sanchez* | Agricultural Engineering<br>INAG 4990 | Mostly Spanish but many technical words in English. | PPT<br>Handout<br>References (Articles, Journals) | English/Spanish<br>English<br>English |
| *Caraballo* | Engineering Sciences and Materials<br>INGE 3011 | Spanish | Auto Cad Software<br>Text Book | English<br>English |
| *Richards* | Animal Sciences<br>INPE 4010 | Spanish | PPT<br>Exams | Spanish<br>Spanish |
| *Ramos* | Animal Sciences<br>INPE 4025 | Spanish | PPT<br><br>Exams<br>Laboratories | Spanish w/ vocabulary in English<br>Spanish<br>Spanish |
| *Thomas* | Mathematics<br>MATE 3031 | Spanish | Text Book<br>Quizzes | English<br>Spanish |
| *Edwards* | Crop Protection<br>PROC 4008 | Spanish w/some English explanations | Guides | English |
| *Vega* | Crop Protection<br>Proc 4006 | Spanish | Articles<br>PPT<br><br>Text Book | English<br>Spanish w/ various slides in English<br>English |
| *Ashton* | Crop Protection<br>PROC 4008 | Spanish/ Used some words in English such as 'outdoors', 'mist', 'spray', | Exam | Spanish |
| *Toro* | Chemistry<br>QUIM 3131 | Spanish | Text Book | English |



*All of the names included herein are pseudonyms

As the previous table demonstrates, English is widely used throughout all of the STEM courses that were observed. The language of instruction for these courses was mainly in Spanish with the use of key terms and vocabulary in English. Of the six professors who claimed to have a textbook, the six used it in English. Nine of the sixteen professors used PowerPoint presentations in the course that was observed. All of the presentations were in Spanish with technical jargon and captions in English. Those professors who provided references for their classes provided them in English, including journals and articles. Online laboratories and software were in English.

**Figure 7: Materials and Language of Instruction (Arts and Humanities)***

| **Professor** | **Course** | **Language of Instruction** | **Materials** | **Language of Materials** |
|---|---|---|---|---|
| *Martinez* | Physical Education<br>EDFI 3665 | Spanish | N/A | N/A |
| *Martin* | Humanities: Music<br>MUSI 3162 | Spanish/English | Text Book<br>PPT<br>References | English<br>Spanish<br>English |
| *Adams* | Principles of Psychology II<br>PSIC 3002 | Spanish | Text Book<br>PPT<br>Videos<br>Assessments | English<br>Spanish/English<br>English<br>Spanish (Although the professor prefers English) |

Three Arts and Humanities courses that were observed were Physical Education, Music, and Psychology. The three courses were taught in Spanish while the textbooks and materials (excluding the PowerPoint presentations) were in English.



*All of the names included herein are pseudonyms

**Figure 8: Materials and Language of Instruction (Language)***

| Professor | Course | Language of Instruction | Materials | Language of Materials |
|---|---|---|---|---|
| *Cummins* | Basic English I INGL 3201 | English | Blackboard notes | English |
| *Johnson* | Basic English I INGL 3201 | English | PPT | English |
| *Cruz* | Basic English I INGL 3201 | English | PPT | English |
| *Santiago* | Basic English I INGL 3201 | English | Videos | English |

All of the English courses that were observed were offered in English. Two of the courses that were observed were offered by bilingual professors while the other two were taught by English monolingual professors. In the courses taught by bilingual professors, students were able to ask questions in Spanish when they had difficulty asking in English. In all of the English courses the students interacted in Spanish when they had to work with their classmates although the work they did was in English.

### *Professor Interviews*

Through the use of the observation protocol (Appendix B) and the professor interview protocol (Appendix A) were able to collect the data included in figures 6, 7, and 8. While observing the courses we were able to determine the language of instruction used by the professor. We also collected materials that were used by the professor and the students on the day of the observation and listed them as being either in English, Spanish, or both.

Of the 23 professors interviewed, 15 professors did not indicate if they had a textbook or not. Of the eight professors that indicated that they do use a textbook, the preferred and used language was English. Three professors ceased to use a textbook because students failed to understand or had trouble understanding the English version, therefore the professor preferred not to have one.



*All of the names included herein are pseudonyms

> I don't have a textbook. I used to have one that was in English, but I gave up, many students didn't read and I was not sure if they were following the content of the book. Now they have my Power Point presentations and sometimes I give them some specific material. (Trinidad, Agriculture, 11/13/09)

> Only one student from 14 bought the book because it was in English. (Gonzalez, Agriculture, 03/03/10)

> The textbook and the software are in English. They have to become familiar with these terms, vocabulary. I didn't choose the textbook; it's the department that has to choose it.

> The same with the syllabus; all of these come top-down. (Caraballo, Engineering, 04/05/10)

A total of 13 professors used Power Point presentations as a resource in their classroom. Five professors developed and used Spanish only presentations. Six professors developed and used Spanish presentations with certain information in English such as captions, technical terms, and diagrams. Two professors prepared and used presentations that were solely in English. Only one professor used articles as in class materials (Crop protection) and these were in English. Out of the 23 professors, four mentioned having a list of references that include journals, articles, and other textbooks. Three of these professors have reference lists constituted by English-only materials, while one professor has a list that consists mainly of English materials with a very limited amount of Spanish references. As another resource in their courses (Principals of Psychology II and Basic English I), two professors used videos as supplementary materials. Both of these professors showed the videos in English. When using these types of

supplementary materials in English, it may be difficult for students to initiate or participate in discussions due to their lack of understanding. In one instance Dr. Adams presented a video clip from the popular television series The Big Bang Theory.

> I noticed that when the student was watching the video he didn't laugh at the jokes. I don't think he understood them (Adams, Psychology, 04/06/10).

In some cases, as that of music professor Dr. Martin, the quality of some courses is affected by having to offer them in Spanish:

> Everything was in English but here I have to do my class in Spanish. English terms are contrary to Spanish, for example in English its "movable do" and in Spanish its "fixed do". So students have the option to turn in their work either in Spanish or in English (Martin, Humanities, 03/25/10).

In a similar matter Dr. Edwards believes that students here (at UPRM) have the ability to read and understand English, also providing instruction in Spanish with numerous explanations in English.

> I don't have a specific textbook […]. I prefer to provide them with "guías" (guides); all of them are in English. From my understanding, students here have the ability to read and understand material in English. It's very important. In my field (entomology), literature varies quite a bit. The only way to keep track of those changes and stay well informed is if you know English (Edwards, Agriculture, 03/15/10).

### *Student Interview Data*

Following the data collection, analysis and careful review there were still a number of inquiries that had been left unanswered. In the spring of 2011, two research assistants interviewed five of the 17 students. We were unable to contact the other 12 students who had participated in the study. The interview included four questions regarding English use in and outside of the classroom. Students were asked to answer the questions in English or in Spanish, however they felt most comfortable. All of the interviews were recorded and transcribed.

Question 1 asked students how they felt when course text books were in English but the explanation or instruction was in Spanish. Four of the five students agreed that the situation is very confusing.

> *Me confunde, definitivamente confunde. La verdad que a veces ni leo los textos si están en inglés. Si quiero adelantar, me enfoco en las presentaciones en clases, mis notas o voy a la libreta.*
>
> It confuses me. It definitely confuses. To say the truth sometimes I don't even read the texts if they are in English. If I want to get ahead I focus on the presentations in class, my notes or I go to my notebook. (Translated by author)
>
> *Lo malo de eso es que hay cosas que no es lo mismo. No es que se contradigan, pero es confuso. A veces buscas las traducciones que son literales y te confundes. No aprendes.*
>
> The bad thing is that there are things that aren't the same. It's not that it's contradictory but it's confusing. Sometimes you look for translations, which are literal, and you get confused. You don't learn. (Translated by author)

Question 2 asked students how they dealt with English texts outside of the classroom. Some of the resources that the students used were to get together with people who dominate English, use dictionaries, look for someone who knows more English and use translators, Sometimes, when students couldn't find any peer help they would translate entire chapters word-by-word using a dictionary.

> *A veces se juntan muchos capítulos, seis, siete capítulos. Es imposible hacerlo sola, buscando palabra por palabra en el diccionario. Te falta tiempo.*
>
> Sometimes too many chapters accumulate; six, seven chapters. It's impossible to do it alone, searching word for word in the dictionary. You need more time. (Translated by author)

Question 3 asked students what on-campus or off-campus resources they used to understand English text books. Two of the five students used the on-campus English Writing Center. They only went to the writing center for help when they needed to edit essays for their English courses. Two other students went to relatives or friends for help. One student expressed the need for more open sections for the public speaking course in the English Department.

> *Una vez quería tomar ese curso de Public Speaking, pero se llena bien rápido. Dicen que es muy bueno. Yo quisiera tener más fluidez para hablarlo.*
>
> I once wanted to take the Public Speaking course, but it fills up too fast. They say it's really good. I would want to be more fluent when speaking. (Translated by author)

Question 4 asked students if they would feel confident studying a content course entirely in English. Four students expressed that that would be a problem. One of the students had already experienced this in a Genetics course and withdrew from the class on the second day. Other students worried about how taking a content course in English would lengthen their time to degree.

> *(No podría tomar una clase que sea completamente en inglés). Mi carrera es larga y no puedo darme el lujo de atrasarme o bajar mi promedio.*
>
> (I wouldn't be able to take a class that's entirely in English). My time to degree is long and I can't afford to fall behind or lower my (grade point) average. (Translated by author)

Only one of the students said that she would force herself to learn English, as learning something that interests and motivates you makes language learning easier.

> *Me fuerzo a entenderlo, además son temas que te interesan. Le echas ganas. O te tiras o te tiras.*
>
> I would force myself to learn. You give it all you've got. Either you do it or you do it. (Translated by author)

As is noted by the previous data from the interviews, observations, and survey there is a great disparity between what professors believe and assume and what students actually experience. The next chapter provides a discussion of the data. It also includes

strategies that can be adopted by professors and the institution in order to facilitate classroom instruction and learning.

# Chapter 5: Discussion and Conclusions

## Discussion

After analyzing the data from the survey, observations, materials and interviews; I created a set of codes in order to define the phenomena that were occurring within these settings. All of the themes emerged from the data itself. They were later defined and put into categories in order to provide a better understanding of English use within general education courses. The codes that were created represented reoccurring themes that emerged from the data. These were identified and defined as the data was analyzed. The definitions of these codes evolved as more examples or reoccurrences of the themes emerged. The following subheadings are each representative of a category.

### *Student Perceptions and Attitudes*

Although the language policy at UPRM establishes that a student is required to have a "working knowledge" of English in order to be admitted to the university, students often consider themselves to have little or no knowledge of English. For example, one of the students that was interviewed claimed that he had to take a genetics course as a requirement. He enrolled in the course, went to class the first day and then withdrew from the course the next day.

> *Una vez cogí un curso en genética, que lo tengo que coger algún rato, es requisito. Pero bueno, la clase era en inglés, el profesor yo creo era americano. Fui a la clase y empezó a hablar todo en inglés, al otro día me di de baja.*
>
> I once took a course in genetics, which I have to take some time because it's a requirement. Anyways, the course was in English, I think the professor was

American. I went to the class; he began to say everything in English so the next day I withdrew from the course. (Translated by author)

When students are not aware of the skills and abilities that they possess growth and development are affected (Bong and Skaalvik, 2003). In this case, I am attributing growth and development to the areas of language and content knowledge and skills. Student's perceptions and attitudes refer to what a student deems as accomplishable by him/herself or as Bong and Skaalvik (2003) would define it, "self efficacy".

Most of the 17 students that participated in the study believed that they lacked the necessary English language skills for success. Some students were optimistic, seeing English use in their general education courses as an opportunity to learn and grow. Other students had a very negative attitude and deemed English use in general education courses as the road to failure. Most students agreed that learning language through a subject of interest is the key to success, but only when the professor provides the means by which students learn key vocabulary and subject matter. When this does not occur, students must use external resources such as Google Translator or a dictionary, translating entire chapters word by word.

*Ahora mismo estoy llevando una clase que es Bioética, son casos y todos los casos están en inglés. Esta clase es en humanidades. Cuando me toca a mí el caso, lo traduzco, lo leo, y lo traduzco (con el Google Translator), pero no es eficiente.*

Right now, I'm taking a Bioethics course. There are cases and all of the cases are in English. This course is in humanities. When I have to discuss a case I translate

it, I read it, and I translate it (with Google Translator) but it's not efficient. (Translated by author)

After attempting to use the available resources that they have, students consider these unreliable, time consuming and ineffective. Some students prefer to employ certain strategies such as reading from their notes (Spanish) instead of reading the course text book which is in English**.** In order to facilitate this language use for themselves, students used a variety of strategies and resources such as translating entire textbook chapters word-by-word with a dictionary, using Google Translate, or going to the writing center. Some students claim to have been positively affected by the use of an L2 despite the difficulties they encountered while others either failed or withdrew from the course or lowered their grade.

Although the collected data might not be representative of all the campuses in the University of Puerto Rico system, it is an indication of the current situations that Agriculture students at the University of Puerto Rico Mayaguez currently face. I would not exclude the possibility of this being a situation that has occurred since UPRM first indicated that it is a bilingual institution in 1962. While this study highlights the language issues that students from the College of Agriculture face, we cannot exclude students from other faculties and departments throughout the university as these students are also required to take most of the same general education courses as part of their curriculum.

### *Professor Perceptions and Attitudes*

It is clear that the language policies at UPRM affect not only student outcome and time to degree, it also affects the way in which professors must prepare for their courses, the content of the courses due to language limitations (vocabulary in English vs. Spanish), and the quality of their courses. Although all of the professors who participated in the study believe that English is

essential for future success, especially in STEM areas, most do not take it as a responsibility to deal with language issues within their general education classroom. According to these professors, students are able to understand and use English easily and correctly. Students on the contrary, presented difficulty regarding language use in all of the courses that they took that were offered in English.

Some professors attempted to facilitate the use of an L2 for students. Being aware of the fact that the textbook is a major component of the course and that language affects the content of the text, professors decided to eliminate it entirely from the course and only provided it as a reference. Most of these professors substituted the textbook with authentic materials such as guides which included essential content, vocabulary lists in English with Spanish equivalents, and provided students with the opportunity to turn in whatever language they were most comfortable with.

## Conclusions

This section will provide guidelines for how to deal with language issues in general education courses at UPRM based on data collected and analyzed from students and professors in the Faculty of Agriculture at UPRM. It seeks to answer Research Question # 2 which reads, What institutional and academic guidelines can be suggested to the university and the professors teaching general education courses at UPRM in order to deal with language of instruction issues based on content, language needs and current policy?

### *Summary of Main Findings*

The following are the findings that served as a benchmark for the design of the suggested guidelines:

- Some professors are already making a conscious effort in order to help students with their language issues in these courses. For instance, Dr. Ashton provided a list of terms in Spanish and English with the idea of students being able to find the equivalence of terms when reading English texts. Other professors also gave students the opportunity to hand in assignments in their language of preference:

  > Everything was in English but here I have to do my class in Spanish. […]So students have the option to turn in their work either in Spanish or in English. (Martin, 03/25/10)

- Professors assume that students at UPRM do know English.

  > *[…] students here have the ability to read and understand materials in English* (Ashton, 04/06/10)

- There are no clear Institutional language policies.

  > *UPRM is a co-educational, bilingual, and non-sectarian school […]* (2009, p.1)
  >
  > *Spanish is the language of instruction in most courses at UPRM, but students are required to have a working knowledge of the English language. The individual professor decides the language used in class lectures and in student evaluation activities.* (2009, p.65)
  >
  > *By the time of their graduation, UPRM students will be able to:*
  >
  > *a. Communicate effectively* (2009, p.3)

- Language of instruction is determined in many cases by the content of the course. Such is the case of STEM courses which are usually in English.

*The textbook is in English: "Principles & Chemistry: A Molecular Approach". Before, the department was using a textbook in Spanish, many professors didn't agree, so we made a decision at the department level, we voted, and we decided to have the textbook in English. It's a very good book, mostly I liked how different themes are explained and how calculations are done, when you use a textbook in Spanish, something is lost in translation* (Toro, 03/01/10)

- Language affects the quality of the course.

  Everything was in English but here I have to do my class in Spanish. English terms are contrary to Spanish, for example in English its "movable do" and in Spanish its "fixed do". (Martin, 03/25/10).

- In some cases students' time to earn their degree is affected by the use of language, specifically in their English classrooms and in general education courses where English is the language of instruction .For instance, students decide to drop the course as soon as they hear the professor speaking in English the first day of class.

  *I once took a course in genetics, which I have to take some time because it's a requirement. Anyways, the course was in English, I think the professor was American. I went to the class; he began to say everything in English so the next day I withdrew from the course.* (Translated by author)

- Although the university catalogue indicates that "the individual professor decides the language used in class lectures and in student evaluation activities" (2009, p.65), most STEM courses are coordinated, meaning that they have a departmental syllabus, textbook, and exams.

> *The textbook and the software are in English. They have to become familiar with these terms, vocabulary. I didn't choose the textbook; it's the department that has to choose it. The same with the syllabus; all of these come top-down* (Caraballo, Engineering, 04/05/10).

### *Guidelines*

The following guidelines, which are based on the main findings of this study, are only provided as suggestions to improve both professors' ideas for how to use both English and Spanish in their courses and to align institutional language policy and classroom instruction. The guidelines are divided into (1) institutional and (2) academic guidelines. The rationale for such division is that the institutional guidelines will serve as strategies for improving the chances of student outcome by providing the students with clear policies, better description of institutional requirements, and changes in planning. The academic guidelines will serve as strategies that can be used at course level instruction and preparation by professors. The following are the suggested guidelines:

### Institutional Guidelines

- If UPRM defines itself as a "bilingual institution", there should exist conscious efforts to create a bilingual atmosphere throughout the institution as a whole, including collaboration between STEM, Humanities, and Arts departments and language departments (Department of English and Department of Hispanic Studies).
- Create a database that includes courses offered by the institution, professor, and language requirements (language of instruction and materials) for each course.

- Improve the Institutional Language Policy by defining what a "working knowledge of English" is.
- If the university *requires* students to have a working knowledge of English, this should be properly measured or assessed in order to determine admission to UPRM.
- Define the skills that students are required to have upon acceptance to UPRM.
- Based on the aforementioned, UPRM should modify the Institutional Language Policy in order to avoid ambiguity.

## Academic Guidelines

- Professors should be flexible with language use based on the student composition of the course because not all students have the same needs. They cannot be considered generic.
- Professors should not make assumptions about what students know or do not know.
- If a professor decides to use English (L2) as the language of instruction, he/she should assess the students in order to identify language needs before beginning the course.
- Professors should be very clear about the in class language policy and if they don't have one, it should be created. This policy should be on the syllabus in writing.
- If professors choose to use English in their courses, they should provide students with the necessary tools in order to understand class context. For example, as Dr. Ashton did, provide vocabulary lists with the equivalency of terms in Spanish (authentic materials).

### *Pedagogical Implications*

The results of this project can serve as a model for educators and institutions in order to measure or assess language use in bilingual classrooms and institutions. Besides music, psychology, and English, all of the other courses that were included in this study were STEM courses. This work highlights the necessity that English learners have when studying in STEM related fields. According to Hooper (2011), success for English learners in science, technology, engineering, and math involves collaboration between English language development and science learning. Through this study educators may find that there should be support for language acquisition and academic achievement equally and that the development of a second language is facilitated by using the L2 in content with a purpose.

The guidelines provided in Chapter 5 can also serve as strategies for educators who are confronting similar challenges in other contexts. It is important to note that bilingual education is not only imperative at elementary and secondary levels it is also necessary in higher education. The Puerto Rican University System, Ana G. Mendez, created what they believe to be the first discipline based, dual language post-secondary degree program. Both English and Spanish are used equally in instruction and assignments in alternating weeks. The entire faculty is bilingual. While the program was not established in Puerto Rico the majority of students at the Orlando campus are from Puerto Rican heritage. According to Epstein (2010), the program helps ease native Spanish speakers into English while helping native English speakers ease into Spanish. Students aren't required to buy books and are offered authentic materials which include readings and assignments created by their professors.

### *Suggestions for Further Research*

Although a considerable amount of data was collected and analyzed for this study, there is much more need for bilingual education research in higher education nationwide. Researchers could conduct this study in other bilingual education contexts such as the other institutions in the UPR system and in areas where there are large minority populations. It can also be conducted with a focus on students from other departments such as psychology, humanities, and arts. Educators could also use this as a guide for assessing their students in particular courses in order to determine specific needs.

Seeing how other institutions have already identified and addressed these types of issues using different methods, it would be worth taking into consideration the guidelines that I have provided herein and assessing how they affect not only students, but educators and institutions as a whole. Another project that could be undertaken is that of creating collaboration between a group of professors between language departments and other content specific department professors. These professors could work together to create content and language based curriculum and offer these courses to particular case study groups. I believe that identifying the problem does not suffice. Action must be taken in order to provide better opportunities for second language learners.

### *Limitations of the Study*

One of the limitations encountered in the study was that when the survey was conducted the fourteen of seventeen students that participated, answered anonymously. Because of this, I was not able to identify what students provided which answers and therefore wasn't able to pair the results with pre or post interviews. Another limitation was that there were no records of the academic catalogues that dated before 1960. I found that bilingualism was claimed by the

institution in the 1962-1963 academic year, but I cannot assure that there were or were not any other language policies that differed from the existing ones.

### *Concluding Remarks*

In a developing world where globalization has caused cultures and societies to merge it is necessary to be at the forefront of top quality education that can provide students with opportunities for intellectual growth. English, as many researchers contend, is the language of this global scientific world. As educators and institutions of excellence we must provide our students with bilingual education that is rooted in grounded policies and the commitment to provide quality education.

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**Appendix A: Class Observation Protocol**

English for Academic and Career Success in Agriculture: A Needs Based Curriculum

**Class Observation Protocol**

Focal participant (pseudonym):_____

Researcher:_____

Date:_____ Time:_____

Course:_____ Department:_____

Instructor:_____

| **Classroom Activity (ex: lecture)** | **Language** | **Notes** |
|---|---|---|
| | [ ] Spanish [ ] English | |
| | [ ] Spanish [ ] English | |
| | [ ] Spanish [ ] English | |
| | [ ] Spanish [ ] English | |

| **Classroom Materials use (ex: textbook, PowerPoint)** | **Language** | **Notes** |
|---|---|---|
| | [ ] Spanish [ ] English | |
| | [ ] Spanish [ ] English | |
| | [ ] Spanish [ ] English | |
| | [ ] Spanish [ ] English | |

**Observation of Focal Student**

Student took notes in: [ ] Spanish [ ] English [ ] both

Notes:

Student asked questions in: [ ] Spanish [ ] English [ ] both

Notes:

Student interacted with other students in: [ ] Spanish [ ] English [ ] both

Notes:

**Other notes and Observations:**

**Follow-up with instructor:**

Interview scheduled for:_____

**Appendix B: Professor Interview Protocol**

English for Academic and Career Success in Agriculture: A Needs-based Curriculum

**Professor Interview Protocol**

[Interview will be given in Spanish or English, as the professor desires.]

Researcher:_____

Date:_____ Time:_____

Course:_____ Department:_____

Instructor:_____

1. What was the role of English in your academic preparation?

2. What do you believe the role of English should be in the academic preparation of students?

3. What language is the course textbook in? Why did you choose this textbook?

4. What language do you use to test/assess students? Why?

5. [Refer to observation protocol. Ask for each different activity.] Why did you deliver the lecture/activity/handouts in Spanish/English?

**Appendix C: Student Interview Protocol**

1. Are you confused by texts in English and discussions in Spanish?
2. How do you deal with English texts outside of the classroom? What methods do you use to understand the text?
3. What English resources on campus or off do you use to understand your English textbooks? (friends, family members, Writing Center)
4. Would you feel confident studying a content course entirely in English? For example, an agronomy course with English readings, class spoken in English, English tests, etc.

## Appendix D: Cuestionario de Percepciones sobre el uso del lenguaje

### Percepciones del uso de inglés durante el año 2009-2010

Este cuestionario tiene la intención de ayudar a entender tus percepciones sobre el uso del inglés y del español en los cursos que tomaste durante el año académico 2009-2010. Este cuestionario es anónimo y no afectara tu relación con los profesores o tu nota final. Si este cuestionario es publicado o presentado, los nombres de los participantes no se publicaran.

Tu participación en este estudio es voluntaria. Confirmaras tu deseo de participar al someter tus respuestas.

*Todas las preguntas con un asterisco son obligatorias.

1. ***En la siguiente sección, favor de medir cuanto inglés usaste en la siguiente lista de áreas de estudio. Si no tomaste cursos en una de las áreas mencionadas abajo durante al año académico 2009-10, favor de seleccionar la opción "NO APLICA".**

| | **No use inglés** | **Use algún inglés** | **Use mucho inglés** | **N/A** |
|---|---|---|---|---|
| Agricultura | ○ | ○ | ○ | ○ |
| Administración de Empresas | ○ | ○ | ○ | ○ |
| Arte | ○ | ○ | ○ | ○ |
| Biología | ○ | ○ | ○ | ○ |
| Ciencia | ○ | ○ | ○ | ○ |
| Ciencias Marinas | ○ | ○ | ○ | ○ |
| Computadoras | ○ | ○ | ○ | ○ |
| Español | ○ | ○ | ○ | ○ |
| Historia | ○ | ○ | ○ | ○ |
| Humanidades | ○ | ○ | ○ | ○ |
| Idiomas | ○ | ○ | ○ | ○ |
| Industrias Pecuarias | ○ | ○ | ○ | ○ |
| Ingeniería | ○ | ○ | ○ | ○ |
| Inglés | ○ | ○ | ○ | ○ |
| Literatura | ○ | ○ | ○ | ○ |

| | | | | |
|---|---|---|---|---|
| Matemáticas | ○ | ○ | ○ | ○ |
| Química | ○ | ○ | ○ | ○ |
| Zoología | ○ | ○ | ○ | ○ |

2. *** En la siguiente sección, favor de medir cuanto inglés usaste en la siguiente lista de clases. Si no tomaste uno de los cursos mencionadas abajo durante el año académico 2009-10, favor seleccionar la opción "No Aplica".**

| | **No use inglés** | **Use algún inglés** | **Use mucho inglés** | **N/A** |
|---|---|---|---|---|
| AGRO 3005 | ○ | ○ | ○ | ○ |
| BIOL 3300 | ○ | ○ | ○ | ○ |
| BIOL 4015 | ○ | ○ | ○ | ○ |
| CIPO 3035 | ○ | ○ | ○ | ○ |
| CFIT 3005 | ○ | ○ | ○ | ○ |
| EDAG 4015 | ○ | ○ | ○ | ○ |
| EDAG 4016 | ○ | ○ | ○ | ○ |
| EDPE 3129 | ○ | ○ | ○ | ○ |
| GEOL 3045 | ○ | ○ | ○ | ○ |
| HORT 3005 | ○ | ○ | ○ | ○ |
| HORT 4005 | ○ | ○ | ○ | ○ |
| HORT 4006 | ○ | ○ | ○ | ○ |
| HORT 4055 | ○ | ○ | ○ | ○ |
| INAG 4990 | ○ | ○ | ○ | ○ |
| INGL 3201 | ○ | ○ | ○ | ○ |
| INGL 3202 | ○ | ○ | ○ | ○ |
| INPE 4005 | ○ | ○ | ○ | ○ |

| | | | | |
|---|---|---|---|---|
| INPE 4008 | ○ | ○ | ○ | ○ |
| INPE 4010 | ○ | ○ | ○ | ○ |
| INPE 4050 | ○ | ○ | ○ | ○ |
| MATE 0065 | ○ | ○ | ○ | ○ |
| MATE 3171 | ○ | ○ | ○ | ○ |
| PROC 4006 | ○ | ○ | ○ | ○ |
| PROC 4008 | ○ | ○ | ○ | ○ |
| PSIC 3001 | ○ | ○ | ○ | ○ |
| PSIC 3002 | ○ | ○ | ○ | ○ |
| QUIM 3131 | ○ | ○ | ○ | ○ |
| QUIM 3132 | ○ | ○ | ○ | ○ |

3. *** Favor de indicar si estas muy a favor, a favor, en contra o muy en contra de los siguientes factores.**

| | **Completamente Desacuerdo** | **En desacuerdo** | **De acuerdo** | **Muy de acuerdo** |
|---|---|---|---|---|
| Considero que el inglés es importante para mi área de estudio. | ○ | ○ | ○ | ○ |
| Considero que mis clases de concentración serian más útiles y practicas si fueran ofrecidas en inglés. | ○ | ○ | ○ | ○ |
| Considero que la mayoría de mis libros de texto utilizados en mis clases de concentración son en inglés. | ○ | ○ | ○ | ○ |
| Considero que mis destrezas del uso de inglés han desarrollado en mis años de estudio | ○ | ○ | ○ | ○ |

| | | | | |
|---|---|---|---|---|
| en la UPRM. | | | | |
| Utilizo mucho el inglés fuera de la universidad. | ○ | ○ | ○ | ○ |
| Me siento seguro de poder trabajar dentro y fuera de Puerto Rico en compañías relacionadas a mi área de estudio. | ○ | ○ | ○ | ○ |
| Considero que sería beneficioso tomar otras clases de inglés, aparte de las que estoy obligado a tomar como requisito de mi grado. | ○ | ○ | ○ | ○ |

4. *** ¿Consideras que el propósito de esta investigación, que es desarrollar más cursos de inglés concentrados en su área de estudio, le ayudaría a ser más eficiente y competente en su área de trabajo? Explique.**

5. *** ¿Que tipo de materiales usaste en inglés este año académico y en que cursos? Por ejemplo, textos, artículos, presentaciones, exámenes, etc.**

6. *** ¿Te diste de baja de algún curso este semestre? Si la contestación es si, ¿tuvo que ver algo el idioma (español o inglés) o el nivel de dificultad del material del curso? Explique.**

| | |
|---|---|
| **Sí, me di de baja de uno o más cursos.** | ○ |
| **No me di de baja de ningún curso este semestre.** | ○ |

7. *** ¿Como afecto (de manera positiva o negativa) el uso del lenguaje tus notas en los cursos que tomaste durante este año? Por ejemplo, ¿fracasaste en alguna clase durante este semestre por no entender el lenguaje del curso?**

8. *** ¿Has considerado cambiarte de concentración? Si tu contestación es si, ¿el uso del lenguaje tiene algo que ver con tu decisión? Explique.**

9. **¿Tienes algún comentario o sugerencia adicional?**