Communicative Competence in a Biology Course at the UPRM: A Case Study

by:

Fiorelys Mendoza Morales

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Approved by:

_____   _____
Kevin S. Carroll, PhD   Date
Director, Department of English

_____   _____
Betsy Morales Caro, PhD   Date
Member, Graduate Committee

_____   _____
Catherine Mazak, PhD   Date
Member, Graduate Committee

_____   _____
Kevin S. Carroll, PhD   Date
Director, Department of English

_____   _____
Dimaris Acosta, PhD   Date
Graduate Studies Representative

ABSTRACT

Although Spanish is the official language in Puerto Rico (PR), the use of English medium courses, which are focused on specialized content areas, is very common at the University of Puerto Rico. This is due to the fact that the historical context is intrinsically related to language policy established by the government, creating a diversified environment where both, English and Spanish, can be used to teach classes. As a result, the faculty at the University of Puerto Rico at Mayaguez (UPRM) is a culturally diverse group where both Spanish and English can be used for instruction. The dual use of language could represent a problem for some students who consider their communicative skills in their second language are not adequate, resulting in anxiety to actively participate in class discussion. This case study used classroom observations, a questionnaire distributed to students, and interviews for its data collection. The purpose was to analyze the techniques used by a predominantly English-speaking professor from the Biology Department at UPRM. The most salient techniques found were: native language reinforcement, use of visual aids for comprehension, and culturally relevant examples to demonstrate concepts. Students identified how, the use of these strategies, worked towards lowering their linguistic anxiety in order to create a learning community ready, and instill confidence in students' learning the course content. This thesis highlights the teaching strategies that may impact both, the acquisition and learning of the course content.

RESUMEN

Aunque el español es el idioma oficial en Puerto Rico (PR), el uso del inglés en cursos enfocados en contenido especializado es muy común en la Universidad de Puerto Rico. Esto es así, ya que el contexto histórico de PR está íntimamente ligado a la política pública establecida por el gobierno sobre el uso del idioma, creando un ambiente diversificado donde ambos, inglés y español pueden ser usados como idiomas para dar clase. Esto podría representar un problema para algunos estudiantes que consideran que sus destrezas comunicativas en su segundo idioma no son adecuadas, resultando en miedo de participar activamente en la interacción y discusión en clase. Como parte del proceso de recolección de datos se utilizaron : observaciones durante el periodo de clase, un cuestionario distribuido a los estudiantes y entrevistas para analizar las técnicas usadas por un profesor del departamento de biología que dictaba su clase en inglés en la UPRM. Las técnicas identificadas como las más sobresalientes a través de los datos recopilados fueron: refuerzo del lenguaje nativo del estudiante, uso de ayudas visuales para comprensión y ejemplos culturales relevantes para demostrar conceptos e ideas. Los estudiantes identificaron que cuando se usaban estas estrategias pedagógicas, los conceptos presentados en la clase hacían que disminuyera la ansiedad lingüística en los estudiantes haciéndolos sentir: parte de una comunidad de aprendizaje y confiados de aprender el contenido del curso ya que el mismo propiciaba un ambiente de interacción positivo entre profesor-alumno. Esta tesis enfatiza las estrategias pedagógicas que pueden impactar significativamente la adquisición y el aprendizaje del contenido de la clase.

TABLE OF CONTENTS

LIST OF TABLES

ACKNOWLEDGMENTS

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CHAPTER I: INTRODUCTION

Language is a vehicle with which one legitimizes thoughts and actions through concrete verbal communication (González et. al, 2005). Language also unites communities or populations to create bonds. Ralph Waldo Emerson said, "Language is a city to the building of which every human being brought a stone (Emerson, 1876)." This only denotes how we all have an inner network that connects our linguistic competence with actual actions, which in turn influences our surroundings, and others. However, individuals face an inevitable internal struggle when the language of instruction, used for educational purposes is significantly different to the learner's native language. This is the case in many university level courses on the island of Puerto Rico (PR), predominantly a Spanish-speaking territory of the United States (US).

Within a second language context, English is not simply limited to language courses aimed towards improving writing, pronunciation, and comprehension skills. In English-medium course, the content is the focal point in class, not language. In the case of an English-medium course, the subject holds sole importance as opposed to the teaching of language. Yet, through their understanding of the content, students are also reinforcing language learned inside and outside of the classroom. Teaching English-medium courses is very common in PR the eleven campuses of the University of Puerto Rico, the only public university on the island. This could be attributed to either PR's historical context as it supports a policy of Spanish and English as official languages or the fact that many faculty members come from countries all over the world and the common language that could be used to communicate is English. This alleged linguistic flexibility has provided an academic setting that allows for many non-Spanish speaking professors to teach their subject courses in English. As a result of the dual language use in PR and the fact that the UPRM faculty is composed of a culturally diverse group of scholars who come from all over the world,

both Spanish and English can be used for instruction. This creates a problem for students who feel communicatively unskilled to use English to participate and communicate in class. Given this situation, the purpose of this study is to better understand what types of strategies are currently being used that may impact the learning of content in a science course taught by a native speaker of English. Furthermore, this study looks to identify and emphasize the ways by which professors intend to lower students' language anxiety and consequently help them retain the content taught.

Lowering language users' anxiety and making them feel comfortable is essential in acquiring any language and it is necessary to understand content as well (Cruz-Jiménez, 2009). Nevertheless, throughout my experiences as an undergraduate and graduate student at UPRM, I have witnessed how some professors have not been very successful in lowering their students' language anxiety. In reflecting on my own experiences, both as an instructor and a student in this institution, is the fact that students' language anxiety is aggravated when lessons are presented to the students by professors (Cruz-Jiménez, 2009). In traditional educational systems, teachers tend to be impersonal with students and lessons are not aimed toward delivering lectures that motivate students to make connections and stimulate inquiry. While I have witnessed professors who have not been as successful in lowering students' "language anxiety," there are English speaking professors who seem to be very effective in providing a learning environment that is not only conducive, but enhances the learning of English in a specific content area (Zhan, 2004). Professors do so by providing a space where students' language skills are not criticized or judged, but rather, reassured by building on students' confidence to participate despite an initial hesitancy.
For the purpose of this particular study, I focused on a Biology course taught by a native speaker of English. As part of the evaluation, the professor prodded students to participate, answer questions, and make comments during the discussion. As will be discussed throughout this case study, the

professor created a safe space where class material was relatable, and where students could use English to display their knowledge of the subject area, but where content knowledge always superseded language output. This idea of a place where content is allusive to students' lives is mentioned by Carroll (2008a) when commenting how "By using the environment around the school and inviting students to play an active role in their own education, students are more likely to learn because they are motivated to do so (p. 17)." However, in order to better understand the Biology classroom used in the research, I will first explain the socio-cultural and socio linguistic context in which this course is taught on the island of PR.

Sociocultural Underpinnings

Spanish has historically been the native language on the island of PR, which is located in the Caribbean between the US Virgin Islands and the Dominican Republic. Shortly after Christopher Columbus' arrival on the island on November 19, 1493, the settlement, on the part of the Spaniards began to take place. This event was followed by the Spaniard colonization in the island. Four hundred and five years later, the Spanish–American War unfolded. The conflict resulted in PR being ceded to the US in 1898. Under the Treaty of Paris, which came to effect that same year, the contact between Spanish and English in schools intensified. For the government, English was a priority rather than Spanish, although the majority of the illiterate population spoke Spanish (Pousada, 1999).

After the Spanish-American War, the island held different political relationships with the US. Since 1898, PR has been a colony of the US and in 1952, held commonwealth status with the US government. Mandatory English instruction came along with being part of the US, which started with strong implementation measures, in the early years of US colonization. Since 1949, Spanish has been the language of instruction in the public schools of the island and English is

taught as a preferred subject from first to twelfth grade (Algren de Gutierrez, 1987). Apart from public school education, the private sector in Puerto Rico has experienced great increase in large school systems with varying degrees of importance put on English instruction (Algren de Gutierrez, 1987). Some private schools are total immersion schools, others are balanced bilingual schools, while others pattern the language teaching setup of the public school system. Regardless of whether students come from public or private schools, the overwhelming majority has received at least one hour of English per day during 1st to 12 grades. Nevertheless, according to the 2010 US Census, 83.3% of the population ranging from 18 to 64 years old speaks less than very good English. In fact, although people do admit their struggle with English, it was labeled in the past as *el difícil*, literally translating to, "the difficult one" (Mazak, 2008). Although they find it difficult, one often listens to individuals speaking in both English and Spanish (Mazak, 2008). It must be pointed out, how puzzling it is that although they term it *el difícil*, many fluent and non-fluent speakers of English choose to use code switching between the two languages during informal communication settings such as their Facebook and MySpace accounts, and even in casual conversation with other Spanish-speaking individuals (Carroll, 2008b). Witnesses to such language use often raise questions regarding whether or not code switching is becoming more and more common on this Caribbean island where the American influence has prevailed throughout the years (Blau & Dayton, 1997).

This situation makes one question how individuals are in consistent contact with a second language and successfully try to incorporate it into their informal communicative contexts, yet feel uncomfortable and anxious in a formal language classroom setting. This creates a disconnection between the material presented to the students and the use of English for the teaching of such lessons. In other words, students might not understand what is being explained due to lack of

academic language proficiency; vocabulary is limited to informal communication and there is no familiarity with specialized vocabulary in academic subject areas. To examine strategies that an English-speaking professor uses to provide a classroom environment where students learn the content without feeling language anxiety is vital.

Studies that focus on the process of second language acquisition, suggest that teachers can greatly influence the effectiveness of their students' learning of a target language. Two such studies, Gonzalez et al., (2005) and Wheeler (2008) agree that students learn better when engaging the course content with their own cultural background. They highlight how this particular teaching method helps transfer the previously acquired understanding, while releasing some of the anxiety that the classroom setting can cause if it promotes detachment or separation from the student's cultural-social values as opposed to its preservation and valuing them (González, 2005). Both González (2005) and Wheeler (2008) similarly found that when students saw teachers, who understood, acknowledged, respected and tried to learn about their identity while simultaneously complying with the course objectives, students were more receptive and confident towards the class environment. Student- participants also demonstrated improvement in their linguistic competence, the implicit language knowledge, and how they use this knowledge in actual speech production, known as linguistic performance (Fromkin, Rodman, Hyams, 2005). Similarly, Kramsch and Sullivan (1996) argued how "…we may want to view an appropriate pedagogy as a multilingual, multicultural, pedagogic exchange (p. 201)", reinforcing the conception of language and language education as a compromise between two sides, the teacher and student.

Despite the previous research done in *Funds of Knowledge* (González, 2005) and the current teaching techniques which promote English learning in diverse communities, there is still a need for exploring educational strategies which may be more effective than others,

5

especially when teaching in the unique linguistic context of PR. The political and global realities demonstrate the relevance of acquiring basic communicative skills and cognitive academic linguistic proficiency to succeed in integrative (social interaction) and instrumental (workplace, school) settings. Therefore, educational entities in PR must explore ways to trigger a higher development of fluent communication skills in English and Spanish.

The proposed research specifically stems from a genuine interest and desire as a second language learner (SLL) of English and teacher of the language to explore how teachers can use students' first language as a resource. Identifying these strategies could lead to a change in the attitudes and educational attainment of ESL in Puerto Rican students' courses and English-medium courses.

Nevertheless, this study will not only provide a research on language use among Spanish and English speakers but will also examine the importance of Spanish linguistic and communicative competence on behalf of the professors in content classrooms where the language of instruction is not the students' mother tongue. It will help shed light on how students release the language anxiety when coming into a course taught in their second language. Furthermore, members of the academic community will also benefit from this study because it will divulge language guidance and strategies that potentially facilitate professors to assist students in learning course content while simultaneously acquiring specific linguistic registers necessary in their specific academic fields. For this reason, special attention will be paid to the professor's ability to provide a classroom setting which allows second language learners to develop deep knowledge on the course and engage in challenging academic activities to achieve their potential (Moll, 1999).

The research questions for the study were:

1. Does the use of specific teaching strategies in English-medium courses increase students' language and content comprehension?

2. How do a Biology professor's linguistic and strategic communicative competencies (in students' native language) help or impede the learning of content?

3. How do a professor's linguistic and strategic communicative competencies affect students' language anxiety?

This study is divided into six chapters. The following section focuses on the relevant information of PR historical background, second language acquisition (SLA) and a general description of the theoretical framework. The third chapter includes the multiple data collection methods and an in-depth description of the sampling strategies. The data analysis on the three data collection methods is presented in Chapter 4. The fifth and sixth chapters focus on the discussion of the research questions and the conclusions, respectively.

CHAPTER II: REVIEW OF LITERATURE

For more than a century, Puerto Rico (PR) has battled with core issues regarding language policy and how these policies have changed and shaped the island throughout history. Constant changes in government, including modifications and contradictions to policies regarding the language of instruction, have provided an environment where the language controversy has become synonymous with the issue of political status. Thus, what seems to be a never ending debate regarding the future status of the island, be it independence, statehood, or maintaining the status quo, has impacted educational policy. This chapter will provide an overview of the key historical points that have influenced the language of instruction in PR and an explanation of the theoretical underpinnings that guide the study.

History of Puerto Rico

PR is an island that stretches approximately 100 miles wide and 35 miles long. It is strategically located in the Antilles archipelago of the Caribbean roughly 1,000 miles southeast of Miami, Florida and north of Venezuela (Ballard, 2002). Puerto Rico is the smallest island in the Greater Antilles, which interestingly, is an archipelago within itself composed of a group of other smaller islands throughout the Caribbean (Ballard, 2002). Besides the mainland, also known as Isla Grande, the Commonwealth includes smaller islands: Vieques, Culebra, Culebrita, Palomino, La Mona, among others. PR is relatively small, yet it has experienced a considerable amount of change regarding its political, ethnic, and racial makeup since Christopher Columbus arrived to the island on November 19, 1493. These social changes regarding traditions, culture, and even language can be witnessed on a daily basis in the ever-changing political and social debates of Puerto Ricans.

Although there were various indigenous tribes who spread throughout the West Indies, the Pre-Taíno Indians were the ones who prevailed on the island. They were the tribe who reached their maximum development in the Dominican Republic and Puerto Rico (Morales, 1983). Their name for the island was *Boriquén*, which meant "land of the valiant lord," a word that many Puerto Ricans choose to use to refer to the island (Morales, 1983). Both, the Spanish crown and Christopher Columbus were interested in the resources and economic profit that the unknown territory could bring Spain and showed no regards towards the Taíno Indians who first inhabited the island (Morales, 1983).

As the Spanish colonization process was fully underway, the life of the indigenous tribes was severely altered by the Spaniards, in fact, women were even raped; an event that contributed to Puerto Rican racial mix. Spaniards reigned over Indigenous tribes who worked nonstop either in the fields and/or scavenging for gold. Eventually, the remainder of the population began suffering work-related diseases and high incidence of suicides resulting in massive death rates. Despite the fact that with most of the indigenous population died, and along with them died their language, Spaniards borrowed many words pertaining to certain items (i.e. maracas), food (i.e. *guanabana* for soursop) and even events (i.e. *huracán* for hurricane). These were adopted into our own variety of Spanish.

Since the natives died early in the colonization process, the Spaniards needed more working hands and decided to turn to Africa for their labor. For this reason in 1501, the Spanish crown allowed African slaves into the island. Due to the close relationship of the domestic slaves with the landowners, many had the benefit of getting an education, which later helped them climb up the social ladder.

The history of Puerto Ricans society has allowed for the racial mixture of primarily three races: Spanish, Taíno Indian and African. Children, who were the product of the union between Spaniards and Taínos, were known as *mestizos* and, those from Africans and Spaniards were known as *mulatos* (Morales, 1999). Interracial marriage impacted communication in the island. The language mix was a highlight in their relationship as well. Although Spanish predominated as the lingua franca among inhabitants of the island, it was not the Spanish variety used in Spain. This variety was mixed with borrowings from the Taíno Indians and the African slaves, which prevails up to this day. Puerto Rico's variety of Spanish includes word borrowings to refer to objects, food, and situations. Some of these words are: *tambor* (drum), *bemba* (lips), *gandúl* (pigeon pea), *huracán* (hurricane), *Tabaco* (tobacco), and *hamaca* (hammock). This was not, however, the only linguistic change to be experienced by the Puerto Rican society.

Changes in Puerto Rico Language Policy

Unlike the colonization practices of other Caribbean colonizers, like the Dutch and the English, interracial relations in Puerto Rico were the norm and created the diverse population that is still the case today (Carroll, 2008b). Thus, race has not played as major of a factor in language use as it has on other islands. Instead, political wrangling has more directly impacted language use and language polices. At the end of the 19th century, the Spanish American War threatened PR's social and political situation. The Spanish-American War ended on August 12, 1898 due to an armistice and that same year the Treaty of Paris was signed. The document established how Cuba was given independence, but Philippines, Guam, and PR were ceded to the US. From October 15 1898, the US administered the island and raised the American flag from coast to coast. It meant the beginning of a new military government in the island. Americans occupied most of the municipalities in PR and began a reform to educate islanders in the American ways. The island's

economical situation worsened during the US military government. The naval blockage during the war severely affected PR commerce while the price for essential commodities and unemployment increased dramatically in this period (Méndez, 1977). This chain of events caused certain uneasiness in PR citizens.

Another major change was the frequent contact between the Spanish and English language on the island. During the war, many Americans established communication with some of the locals; the English language was mainly spoken by a small percentage of the population. The high illiteracy rate, coupled with the goal of Americanization, allowed policy makers in Washington, DC the justification to implement a system of public education using English as the sole medium of instruction (Algren de Gutierrez, 1987). As for the general population in PR, Spain had scarcely developed a public school system and illiteracy on the island was extremely high when Americans took over. It was usually islanders with financial resources who were the ones with access to higher education and mastery of both languages. From that moment on, the islanders and their culture began a political and cultural battle as they were threatened and forced to rally against these forces to Americanize.

English Language in Puerto Rico

The goal of the first Commissioner of Education, General John Eaton, was to create American citizens through the use of English (Algren de Gutierrez, 1987). Since the population was expected to learn English, educators had to be knowledgeable of the language as well. Although Eaton resigned after a year, he led the way for Victor Clark who also classified Spanish as an inferior language and pushed English to encourage an "American spirit" in the islanders (Pousada, 1999, p. 37). In 1900, the Foraker Act was put into effect and a civil government was created. The Department of Instruction was established under this law and Martin Brumbargh

became the new Commissioner of Education. Brumbargh recognized it was virtually impossible to change the vernacular from Spanish to English, especially for children. Therefore, his ideology consisted of continuing the use of Spanish, but keeping English for domestic and commercial use. The plan to "Americanize" included the imposition of, "the celebration of American holidays, named schools after American patriots, and instituted the raising and salutation of the American flag and the singing of the national anthem in the schools" (Pousada, 1999, p. 38).   This decision brought general discomfort in the population, especially among teachers who avidly expressed the unfairness and irrationality behind the decision and as a result, created a union. For this reason, in 1902, The Language Act was endowed and English held a co-official language status with Spanish (Muñiz-Arguelles, 1988). The act provided a solid justification for the use and teaching of English in schools. Samuel McCune Lindsay became the commissioner. Among his accomplishments were the training of 540 teachers at Cornell and Harvard University to work with Puerto Rican students. He also founded the University of Puerto Rico at Río Piedras and developed an English test for teachers to determine "hiring priorities" (Pousada, 1999, p. 38). In 1904, Roland Falkner preceded the Commission of Education and his plan to suppress Spanish was put underway immediately.

With the new language policy taking effect, teachers in PR were the center of attention. Mandatory English classes for educators, aptitude examinations, and even a ten-dollar raise was offered to those members of the faculty who were qualified to teach their respective classes in the English language (Pousada, 1999). The government had the absolute power to suspend teachers from their instructional duties if found unfit for the teaching of classes in English. With their jobs in jeopardy, teachers were forced to water-down the curriculum (Pousada, 1999). They were unable to transmit the class content in English, which resulted in an educational obstacle for both

the instructor and pupil. Although at first, everyone was quite calm, by 1911 parents and teachers fought against this imposition. In their eyes, this attempt was seen as "cultural colonization" (Pousada, 1999, p. 39).

The year's 1910-1920 brought new changes for education on the island. The recently founded Puerto Rican Teachers Association petitioned Commissioner Edward M. Bainter, the new head of the Commission of Education, to change the policy. Since the association was pro-vernacular, teachers united and demanded Spanish to be included as the official language of instruction in the first grade succeeded by courses in Spanish and English until eighth grade, and high school was to remain taught in English. In 1913, the House of Representatives passed a bill to institute Spanish as the main language of instruction for all courses and English was to be taught as a preferred subject. Although the Puerto Rican Senate vetoed the bill, it sent a strong message on language and identity in the island (Pousada, 1999). It was clear that islanders viewed the imposition of English as the language of instruction as a clear manifestation of US imperialism and shredding of the traditional social values instilled in the islanders (Algren de Gutierrez, 1987). This also proved how, from early on, political ends closely guided the educational policies in the island.

In 1915, a new bill presented by the House of Representatives, established the use of Spanish in every school and court. However, the bill was also vetoed and there was general discontent among the population. This caused the recently appointed Commissioner of Education, W.A. Barlow to resign and Paul G. Miller took over the position in 1916. Miller had been a teacher for the Education Department of PR during the American takeover. Therefore, he was aware of the needs and concerns of the teaching of English among the faculty, students, and community in general (Pousada, 1999). His ideology focused on having students preserve their

native tongue, yet were given the opportunity to acquire a second language. He believed kids learn

content in Spanish from first to fourth grade. In fifth grade, students were taught in both English

and Spanish and from sixth grade on, it would be an English-only policy (Gomez-Tejera and Cruz

Lopez as cited in Pousada, 1999). However, the Teacher's Association wanted Spanish as the sole

medium of instruction. The issue resulted in the language policy in PR to become the target of

heated debate, again.

Puerto Rican political leaders continued to battle Americanization efforts and particularly

the use of English as the medium of instruction until President Franklin Delano Roosevelt

appointed José M. Gallardo as Secretary of Education in 1937. The former US president thought

all Puerto Ricans should be bilingual. After much deliberation, it was established how the main

language in elementary schools would be Spanish, yet English would be the main language in

junior and high school. The plan backfired, thus the Teacher's Association and the US Senate did

not approve of the policy. Sometime later, Gallardo resigned and President Harry Truman

appointed Mariano Villaronga as Commissioner of Education in 1946. Villaronga suggested

Spanish as the first language of schooling but English was to be appointed a "preferred" second

language (Algren de Gutierrez, 1987). In the end, this idea cost him the position.

In 1948, Luis Muñoz Marín became the first Puerto Rican governor after the military

regime imposed by the US. Villaronga was reinstalled as the Commissioner of Education and

under his administration; he immediately established Spanish as the medium of instruction and

English as a special subject. This policy is still in place to this day.

PR Contemporary Language Use

Interestingly enough, after 114 years of colonial status with the US, and despite mandatory

English courses on a daily basis, most Puerto Ricans do not feel confident with their English skills

and are not bilingual (Census, 2010). Sure, they utter occasional words in English and are surrounded by American culture, when talking about the weekend, or going on vacation, and many local businesses use an English name, but many islanders are still not confident in their use of English. Despite the constant use of English jargon and the mandatory English course from first grade to senior year in high school, less than 30% of the population feels that they can accurately and confidently articulate in English (Alvarez, 2001). In fact, according to the 2010 US census statistics, only 16.7% Puerto Ricans between the ages of 18 and 64 answered that felt they communicated "very good" in English. Even though the numbers show how a small percentage of the population feels confident in their ability to communicate effectively, there is no doubt that English has indisputably influenced our culture and our way of speaking.

Researchers (e.g. Zentella, 1997 and Algren de Gutierrez, 1987) agree that language is intrinsically embedded in culture, and education simultaneously transmits those values, ideas, and common knowledge. In the case of PR, since1949, educational policies have required public schools on the island to provide an English course to their students as part of the requisites from first to twelfth grade, while every other subject is taught in Spanish (Algren de Gutierrez, 1987). And indeed, Spanish is used for most educational and professional duties. However, nowadays, English has positioned itself as a global language and it is highly valued among islanders and often linked with social advancement and success (Blau and Dayton, 1997). It is also greatly associated with the domains of higher education, tourism, business, and technology (Blau and Dayton, 1997). Some time after PR's intent of political "Americanization," private schools created and have continued to develop bilingual private schools. Even though they are thought of as bilingual, their curriculum focuses primarily on teaching the English language (Barreto, 2001).

Despite the boost of bilingual programs with English as the preferred language within private schools, the use of English in public schools is relegated to fifty minutes of English class per day. Nevertheless, one of the principal issues with language instruction is the fact that regardless of English being taught as a second language in schools, and PR has traditionally been an ESL focused island, English is not the main language of most familial and/or social interaction domains. English is learned and practiced in the majority of cases by formal instruction in the scholarly domain and is confined to less than an entire hour per day (Blau and Dayton, 1997). Therefore, many students, especially those in high school, do not have any real application for using the language and are consequently unskilled to withstand the challenges of English use in ESL classes and even more so in content courses which are taught solely in English. Some students remain with these linguistic gaps for their entire twelve years of basic education and bring these to the context of higher education.

As an English instructor at the University of Puerto Rico Mayaguez (UPRM) for two and a half years, I can say that although most of the students who studied at UPRM had taken English for at least twelve years in school, some had developed the idea that the English class was just a basic requirement that needs to be completed, yet it was not a priority when compared to other courses directly related to their respective fields of study. Ironically, the Department of English is not the only division of the UPRM where English is used as the language of instruction. Professors in other departments, especially professors from other countries, have decided to teach their class in English. This education system is known as "English-medium instruction", because in English-medium courses, English is used to transmit the information regarding the content of the class (Ibrahim, 2001). Other faculty members teach their courses in Spanish and others use a combination of both. In fact, many textbooks used in the Puerto Rican college classroom (inside

16

and outside of Mayaguez) are written in English even though the main medium of instruction is Spanish. This generates a complicated situation particularly for UPRM students whose campus has a high concentration of professors who have also studied in US universities, who often prefer to teach, and do their research in English. These students, and speakers of a second language, consequently find themselves in an environment that is different from the Spanish-only setting they are most familiar with. In addition to being exposed to English-only instruction, students are also learning content that they may have never studied before. In my own experience as a student, such changes to their traditional form of instruction might allow a certain degree of anxiety, which can be further exacerbated with a sink or swim disposition on the part of some professors.

Teaching Strategies

In order to incorporate students' second language in a class which focuses on specific content, educators must be aware of the need to implement certain teaching strategies that will allow communication between the professor and students to flow in a clear and fluent manner. Teaching strategies are methods devised by the professor to help students create meaning of the concepts posed (Gilani & Gilakjani, 2012). However, a teaching strategy is not necessarily effective, if the professor is not able to or does not discern which strategy is appropriate for his or her teaching context. Therefore, the measurement of students' needs is what will determine the incorporation of an inclusive curriculum for different learning styles, and further monitoring is necessary to assess the impact on student learning.

There are numerous teaching strategies that could be used in classrooms. However, teaching strategies for ESL students are different because students come to the English-medium course with varying proficiency levels and therefore, professors should implement these in a way where all students develop English-language learners' content knowledge, learn/reinforce the use

of the academic language associated with the course content, and basic interpersonal communication skills in their second language. Many studies have looked into approaches that will promote clear understanding of content in English-medium courses. Teaching within a strategic paradigm that challenges the sink or swim methodology of language teaching is the study conducted by Gonzalez, Moll, Amanti (2005). They coined the phrase "Funds of Knowledge" where instead of assuming the "either you fail or succeed attitude" with English as a Second Language students, teachers identify how and which social and historical factors from students' cultural background can be weaved into the curriculum so that education is more comprehensible (Gonzalez et al., 2005). They researched questions pertaining to the deficit model, which focuses on student performance, without considering environment or instructional practices. However, their study focused on the benefits of familial context, practices, first language and a learner's culture in order to establish how the ultimate goal for teachers is to learn and understand their students' everyday lives. Such understanding by the teacher can then allow the creation of relatable lessons to be incorporated into daily classroom instructional practices.

Similarly, through a socio-cultural lens, Moll (1992) worked with teachers who visited students' households to gain the community's trust and access to their interests and practices. The purpose of this exchange of ideas was to promote modification of teachers' approaches to their lessons by having them incorporate aspects of the children's local neighborhood into the lesson. By listening to the community's life narratives and observing their everyday environments, teachers became mediators that abandoned the standard teaching approach and encouraged creating meaning through the content rather than learning isolated facts and rules. At times, being introduced to new knowledge for the first time could cause anxiety, especially if it is explained in students' second language. Therefore incorporation of the affective domain (e.g. remember

18

students' names, encourages participation, sensitivity to students' cultural differences, among others), cultural practices which embrace aspects of the culture in class, and previous community based-knowledge in classroom dynamics helps students develop critical thinking and faster, self-assured linguistic and content attainment (Bloom, 1956 and Gonzalez et al., 2005). The encouragement on socially relevant educational activities, real life situations, and inclusion of their students make it possible for them to overcome linguistic and cultural barriers that restrain linguistic proficiency. Students' learning is most effective when there is cultural relevance because it provides a learning experience, which can be relatable to the real world. Knowing students linguistic and cultural backgrounds might allow educators and policy makers to analyze and develop learning experiences that go along with the diverse familial and cultural backgrounds of learners of English as a second and foreign language (Rosa, 2011). This type of approach focuses on making sense of the content by relating it to their own experiences and the world around them (Roxá, 2010). Kramsch and Sullivan (1996) also explain how the teaching of English should not be a classic and pre-established model. Adequate education is a "multilingual, multicultural, pedagogic exchange" (Kramsch & Sullivan, 1996, p. 201). Language is not a mere transfer of another country's language (and culture for that matter) but a negotiation between interlocutors striving to create meaning for effective communication, a notion supported by Rosa (2011) where educators agreed that students should "maintain their cultural background while becoming acclimated to the mainstream culture (p. 1859)." Cruz-Jiménez (2009) developed a study, which supports the importance of culturally relevant curriculum aimed towards Mexican children in the US. Interestingly, when about to discuss Robin Hood with students (often known as the folk hero who stole from the rich to give to the poor) they did not dare answer who he was. However, when asked if they knew who was "El Zorro", his Mexican equivalent, students engaged in conversation.

This example proves how it is not that students necessarily lack the capacity to understand the concept (in this case, stealing from the rich to give to the poor), but that they lack knowledge of certain aspects of the culture being discussed; in this case, who was Robin Hood.

In fact, dated models such as the audio-lingual method, grammar translation approach, total immersion, although effective in some cases, do not provide students with the adequate language and cultural experiences to prepare them for the real world and strategic communicative and linguistic performance. Vygotsky's Zone of Proximal Development theory also focused on the connections between people and the sociocultural context in which they interact and share experiences (Crawford, 1996). Thus, the research is couched within sociocultural theory, with the understanding and assumption that when students feel comfortable in their surrounding, and the professor or instructor understands their needs, that teacher can change his/her teaching to accommodate the needs of the students. Such accommodations can positively affect both the learning of content as well as language acquisition.

Unfortunately, instead of using students' funds of knowledge, many schools have traditionally held an "instructionist" standard model, which has served as a filter with the main purpose of passing knowledge on to students (Moll, 2005). In contrast, Vygotsky's theory promotes learning contexts in which students play an active role in their own learning process along with the people in their immediate surroundings. Roles of the teacher and student are therefore shifted from traditional modes of teaching. Thus, the teacher should collaborate with his or her students in order to help facilitate meaning construction in them (Brooks, 1968). Learning, consequently, becomes a reciprocal experience for both parts. This interaction and instructional trust amongst the two is vital since students inevitably feel self-conscious in a new core course in their specialization, let alone learning abstract concepts that are being taught in their second

language (Moll, 2005).

Education is not entirely based on explicit knowledge; therefore, instruction should focus on strategies that model students' critical thinking, cooperative skills, and even proper language skills and pronunciation. Incorporating first language (L1) linguistic and strategic competence (an aspect of communicative competence) is vital in the classroom and thus facilitates a different and more effective way to encourage learning. Moreover, when teachers trigger students to imitate a series of tasks and little by little give more responsibility to them, they will learn concepts effectively and accurately. Students also learn effectively by the repetition of modeled conducts so that in the end, they are more competent, qualified, and proficient in the tasks and concepts (Moll & Greenberg, 1990). If the teachers are not facilitators and do not model and encourage a recurrent practice of the objectives that they want the students to accomplish, it will be harder for them to obtain full competence and a higher and more efficient level of instruction. Moreover, if students do not receive feedback (positive reinforcement) and the professor fails to adequately describe and exemplifies the content (modeling), negative attitudes might flourish, creating, in turn, disruptiveness in their linguistic attainment.

Other factors that are key to learning a second language are the motivational and attitudinal elements attributed mostly by psychological factors in language learners, also known as language anxiety. Zhang (2004) describes the concept as "a type of shyness characterized by fear of or anxiety when communicating with people" (p. 1). He states how feelings of uneasiness when speaking in groups, in public, when listening or learning phrases in other language are displays of language anxiety.

Experiencing this anxiety can cause a severe barrier, which completely hinders second language acquisition, whether in the linguistic realm, or content realm, because the student feels

underpowered, isolated, linguistically incompetent and weak or they simply fail. Some of the

attitudinal factors attributed to the increase of this linguistic anxiety range from low self-esteem,

anxiety, fear of ridicule, lack of motivation, or not being given enough time to think and talk in

classes (some require more time thinking about the answers since they should be said in their

second language). This can impede the comprehensible input, or linguistic output necessary to

create understanding and acquire language skills. If students feel unable to formulate their ideas

into what they think is a proper statement, there might be feelings of incompetency towards the

second language. These feelings might be a distraction for students, one that eventually results in

lack of understanding and linguistic attainment of the content presented in the class.

There is plausible data supporting the importance of embracing students' native language

and cultural practices as a way to encourage second language (Cruz-Jiménez, 2009, González et.

al, 2005). Linguistically inclusive education could facilitate second language learning inside the

classroom.

According to Crawford (2004):

> … in the affective realm, that native-language instruction can supply an
>
> antidote to common problems in second-language teaching. A bilingual-
>
> bicultural curriculum, merely by recognizing the value of a minority
>
> language and culture, can enhance LEP (Linguistic English Proficiency)
>
> child's self-esteem and provide a more comfortable environment for
>
> English acquisition. (p. 192).

Students who are receiving instruction in languages other than their native tongue experience a

certain disconnection between the content and the language. For this reason, pupils need certified

personnel who possess certain degrees of knowledge and comprehension of the students' first

language, linguistic registers, and strategic competence of the cultural context, to become a liaison for linguistic and educational acquisition. In fact, feeling this comprehension even develops a sense of community between the teacher and students, they both compromise so that the students learn. Moll (1990) builds upon this idea by stating how there must be a relationship between thinking and the social aspects of instruction. For that reason, humans use cultural signs and tools to mediate interactions with each other and their surroundings while simultaneously encouraging interaction in academic settings (p. 8). Minick (1987) states how providing activities were students are in direct contact with the classroom elements, positively contributes to their communicative and academic formation. In other words, successful learning depends upon how much students are involved in the process of constructing meaning of the content. Moreover, social processes and psychological actions play a major role in understanding concepts, learning and human activity contextualizing students' background, and use of language in practice.

Regarding classroom environment and use of strategies, González (2005) comments how education is at times viewed as the process, which begins with the entrance of students into the classroom and ends when these go out without having learned something worthy of using outside the educational environment. When observing and analyzing classroom interactions, one can see how students demonstrate a disposition for learning when the content is realistic and usable in informal settings. Cummins (2000) is one of the pioneers who propelled the vision on how the mastery of the second language assured that there must be specific elements of the first to ensure attainment. To lower the effective realm of individuals in the classroom setting, he introduces a communication strategy known as the "common underlying proficiency" (CUP), which acknowledges how the skills in different languages are not isolated, but intertwined to one another (p. 91). This goes hand in hand with the "sheltered instruction approach" for lessons (Cummins,

23

2000). In the use of this teaching approach, the subject matter lessons are adjusted to the students'

proficiency in English and are accompanied by a series of communication aids such as "repetition,

limited vocabulary, sentence length, slower speech registers, and body language" (p. 192). This

approach allows comprehensive linguistic reinforcement for second language speakers. Just as

observing gestures help students acquire language, they also benefit from additional aids,

especially visual ones, thus when the professor uses them, the students tune into what the professor

is saying.

When analyzing students' performance and academic preferences, it may be true that they

tend to be more visual than generations past. Furthermore, given modern technology, many

students often prefer illustrative input to reinforce any other (such as hearing). Using visual aids

provide an environment where there is plenty of shared understanding, and where students can

decode information easily due to help from the concrete representation of the content that can be

seen through the images presented. These aids range from drawings, electronic presentations,

images, graphs, diagrams, and charts. Bas (2008) establishes how, depending on the student's

learning style, words might not be sufficient input for learning. Allowing students to see and

experience concepts with their eyesight triggers their ability to talk or write about it in a more

knowledgeable form (Bas, 2008).

Another strategy, which improves integration of information and real problem solving, is

the use of mnemonic devices. Mnemonic devices are memory-enhancing strategies that help

individuals' link new information to previously learned information. They are used "to improve

memory of key information by providing assistance needed to better encode information so that it

will be easier to retrieve from memory at later times" (Conroy and Collins, 2012, p. 47).

Mnemonic devices are used to remember common lists, which, at times, students need to

memorize. For example, the order of operations in a mathematical expression is: parentheses, exponents, multiplication, division, addition, and subtraction. This operational order can be remembered with this phrase: "<u>P</u>lease <u>E</u>xcuse <u>M</u>y <u>D</u>ear <u>A</u>unt <u>S</u>ally." Mnemonic instruction "can facilitate performance in a number of higher order thinking and transfer tasks, where the success depends on remembering factual knowledge relevant to the task" (Goll, 2004, p. 310-311). A mnemonic device resembles a mental shortcut, which helps its user link a concept with a specific image or idea. These devices range from: acronyms, grouping, rhymes, the loci technique, and visual associations (http://www.usu.edu).

The main emphasis of this research is towards the importance of providing students with linguistic and contextual support in order to successfully attain language and the course material. For this reason, it is vital to stress practices that engage students in the class and incorporate their interests and activities might also increase student motivation toward using English, the target language in some content courses. In one particular study, Aleksandrowicz-Pędich, Draghicescu, Issaiass & Sabec (2003), establish the importance of teaching intercultural communicative competence to heterogeneous groups in order to avoid misunderstandings in classrooms. Likewise, in the case of PR's higher education, where most of the students come from the same background, the instructor should be held accountable for adapting to the country's intercultural communicative competence to deal with the daily communicative situations encountered in the classroom.

Therefore, strategic communicative competence plays a vital role in classroom interaction. This concept consists of a concrete and observable manner of eliminating communication obstacles, requires an enhancement not simply through the learning of vocabulary, but through intercultural awareness. Moreover, Robatjazi (2008) in his work,

"Language Education: Intercultural Communicative Competence and Curriculum" establishes how when dealing with individuals from other cultures in an educational context, understanding will highly depend on the recipient's "ability to de-center and take up the perspective of the listener or reader" (p. 251). In other words, mediation of meaning has to be equal. Both parts need to put themselves in the others shoes to develop effective exchange of ideas. All in all, communicative competence draws on how one foreign or second language learner uses his/her foreign/second language command and what he/she in different settings and interactions utters as appropriate; however, linguistic awareness may never be sufficient unless it is along with cultural awareness (Robatjazi, 2008).

Many factors come together while in a classroom learning a second language. Since communication is a two-way transaction, the teacher's disposition plays a vital role in the learning process. Noels, Clément & Pelletier (1999) also argue how at times the Self-Determination Theory drives students and impacts their attitudes towards courses. According to the study, motivational orientation is influenced by "those factors in the social environment that affect self-perceptions of competence" (Noels et. al., 1999, p. 26). In this case, strategic communicative competence is an aspect of communicative competence, which aims to explain, "the ability to solve communication problems despite an inadequate command of the linguistic and sociocultural code contributing to the development of an overall communicative competence" (Mariani, 1994, p. 1). The way in which a teacher learns, and adds bits of his/her linguistic repertoire in the students' first language and intercultural bodily movements in an English-medium course to mediate meaning, might send a positive message and flourish positive attitudes from students towards the class.

More often than not, within language learning context, the teacher has a major impact on

students' attitudes toward the target language. Although this might seem vague or irrelevant, many messages are conveyed through non-verbal communication such as gestures, tone of voice, among others (Morales, 1999). Therefore, the way in which instructors interact and deal with students' communicative style; personality (individual and cultural) values, self-constructs, and how these influence one's way of communicating, correlate to how motivated students are to learn the second language (Cruz-Jiménez, 2009). Unfortunately, most of the research on teacher behavior and its effect on student motivation are limited to US classrooms. Thus, there has been an increasing concern in the field of instructional communication because most classrooms, especially in higher education are becoming more culturally diverse amongst teachers and students (Carroll, 2008a). Due to the increasing mix in all realms of higher education worldwide, it is necessary to expand our research base and location in order to deepen our understanding of strategic communicative competence in order to make students feel comfortable and consequently obtain a better education and academic proficiency in their target language.

After analyzing previous research done on language anxiety, linguistic and strategic communicative competence, and considering the political and educational situation in Puerto Rico, it is important to recognize and explore new techniques where teachers use students' first language as a resource to change the attitudes and educational attainment of students of courses taught in English. Conversely, although the literature presents interesting and plausible points, it seems to be very dispersedly disconnected from the entire linguistic phenomena in the island. Mediating and identifying the primary tools which unlock students' knowledge connections through 1) social and cultural values, 2) cognitive academic language proficiency,
3) oral fluency, 4) comprehensible instruction, and 5) a safe environment, will encourage socio-cultural empowerment and balanced literacy achievement.

Chapter Summary

The island of PR has undergone many sociocultural and sociopolitical changes, which have created the racially diverse society that we live in today. However, after being part of the United States for over 110 years and having been a Commonwealth of the US for over 60 years, the political and educational permutation and the interplay of English and Spanish on the island has not resulted in bilingual competency that is representative of the length of colonization. Nevertheless, some of the reasons that have been identified as a reason for this lack of language learning success have been the anxiety of language learners and the use of inadequate teaching strategies. The traditional use of language deficit education instead of more positive, funds of knowledge approach coupled with little to know scaffolding or building on one's previous language, has further made bilingualism more difficult. Chapter I provided the relevant historical background and language policies of PR and necessary framework of the teaching strategies often associated with the learning of English. In the subsequent chapters I will shift my focus from the conscious teaching of English in an English class, to the more unconscious learning of English through the use of English content in one section of a Biology course.

CHAPTER III: METHODOLOGY

Understanding the use of the English language outside the English classroom, within the context of higher education on the island of PR, has not been the focus of extensive research. Thus, this chapter will provide a detailed description of the research design, site, participants, methodology, and procedures used in this case study where the interactions between a native English speaking Biology professor and his students were observed. The three research questions guiding the study were:

1. Does the use of specific teaching strategies in English-medium courses increase students' language and content comprehension?

2. How do a Biology professor's linguistic and strategic communicative competencies (in students' native language) help or impede the learning of content?

3. How do a professor's linguistic and strategic communicative competencies affect students' language anxiety?

Research Design

For the purpose of this case study, both qualitative and quantitative data collection methods were used. The rationale behind the use of the two was to develop a holistic scope of the perspectives of some UPRM students majoring in Biology, Industrial Biology and/or Pre-Medicine. Since I only had access to this Biology class, a case study that focuses in a small group, was the appropriate method (Merriam, 2009). Tellis (1997) states that case studies are designed to provide the information with great amount of detail. This was provided from the viewpoint of the participants by using multiple sources of data and it is highly descriptive. A case study aims to investigate a particular case (biology classroom) in order to understand a complex phenomenon,

and has many advantages. It is a mixed methods approach; therefore it may involve a variety of data collection methods and multiple ways of validating the data.

The study, in particular, employed three primary sources of data:

1. Classroom observations

2. Questionnaires

3. Participant interviews

Participants

The main participant for this study was a Biology professor at UPRM. He was selected purposely because the primary goal was to examine specific aspects of the communication process inside an English-medium classroom. This individual played a crucial role in this research thus he was the focal point in the observations. Doing these observations I was able to gain a better understanding of the extent to which he worked to incorporate an environment where both content and language were learned efficiently and effectively. Originally, I aimed to find a professor whose first language was not English or Spanish yet taught the class in English. A few professors, who were originally approached to participate in the study, responded in a very reluctant and unenthusiastic manner. This could have been because the core objective was to highlight what can be done to help students who are obviously competent in their content knowledge, but do not have mastery of English language to succeed in an English-medium course. Despite a few initial refusals, one professor, whose pseudonym is Dr. Schroeder, agreed to be an active participant in the study. He was a junior faculty member at the time of data collection, and had recently obtained his PhD in the US. At the time of data collection, he taught at the UPRM for just over a year and a half. Although Dr. Schroeder was not from the US and his first language is English, I thought it was best to begin my pilot study with him and try to find a willing professor whose first language

was not, English nor Spanish, later on. After consulting other professors, I decided to use the native English-speaking professor as the focal participant.

One particularity about this professor is that he was not the only faculty member who taught the particular course observed in the Biology Department. Interestingly, at the time he was the only one who conducted this particular class in English, used a textbook written in English, and whose instructional strategies were in English as well. Despite the fact that all classes, materials, and tests were in English, Dr. Schroeder could understand Spanish very well. In fact, he is able to use Spanish communication with students outside the classroom upon their request. Students are expected to understand the English language in order to take the class and he is very specific about this, but they are also aware that if any questions come up, he will be able to answer in Spanish or understand they can answer in Spanish. Since no other professors agreed to take part in the study, this professor became the sole participant, who was not only observed throughout the semester, but also interviewed at the end of the semester (Appendix F). A final interview was also scheduled the following semester, which culminated the data collection (Appendix G).

In addition to the focal professor participant, students also played an important role in this study. I focused only on one of the three sections offering the Biology course; all of the participants were taking the course together. The class started with approximately 38 students and 12 dropped the course. Out of the 26 students left, 17 were willing to participate in the questionnaire. Even though I emphasized how the participation in the study was anonymous, most students did not want to be a part of it. In fact, a couple students who did not fill the contact form expressed their interest in being a part of the study and gave me their number, but did not respond my attempts to contact them and changed their minds about participating. In the end, four of these students who expressed their willingness to participate in the study were interviewed. At the time,

these were majoring in Biology, were mostly in their third to fifth year of study, and ranged from 19- 23 years old. Out of the four participants, three rated themselves as balanced bilinguals. The other one expressed how although he understood it, he experienced evident struggle when trying to speak it.

Research Site

The University of Puerto Rico at Mayaguez (UPRM) was originally founded as a College of Agriculture when it was established in Mayaguez on September 23, 1911. During 1912, the name was changed to College of Agriculture and Mechanical Arts (CAAM) and remained so for fifty years. In 1966, due to a reorganization procedure in the University of Puerto Rico, the campus was renamed as UPRM; which is now the second largest campus and the only land, sea, and space grant state university on the island of Puerto Rico. Furthermore, it is the only campus within the University of Puerto Rico system that hosts a College of Agriculture, Geology, and Graduate Marine Sciences Programs.

At present, the campus has four academic units: Agricultural Sciences, Arts and Sciences, Business Administration, and Engineering. According to the UPRM Institutional Research and Planning Office (OIIP) submitted in October 6, 2010, it has 977 professors.   It had an enrollment of over 12,474 students in the Fall Semester 2011-2012, from which 11,534 were undergraduate and 940 graduates (http://oiip.uprm.edu/). Spanish is the language of instruction in most courses at UPRM, yet a substantial amount of textbooks and research materials are in English. For this reason, students are required to have background knowledge of the English language. In fact, the UPRM 2011-2012 *Undergraduate Catalogue* under "Language of Instruction" establishes that 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 chooses the language used in class lectures, resources, and student- evaluation activities (Undergraduate Catalogue, p. 65).

Although the *Undergraduate Catalogue (2011-2012)* establishes Spanish as the primary language for instruction, the student should have working knowledge of the English language. Every student at the UPRM is required to take 12 credits in English courses, ranging from basic, intermediate, and/or advanced tracks, depending on the students' individual performance in a standardized College Entrance Examination. Once completed, they do not have to take more language classes. Some professors do not come from either PR or the US and use English as a *lingua franca* to communicate with their students because they do not have enough Spanish proficiency to conduct a class for the entire semester. Others use textbooks and course materials that are published in English and believe it is easier to use the same language for instruction, while others were educated in the US and find it easier to explain complex content and theory to students in English. Despite the various different ways in which English and Spanish are used in content courses, there is no way to know the language that will be used for instruction. Thus, in order to know whether the course is taught in English or in Spanish, students must go to their department's advisor, talk to friends, go to online unofficial professor-rating sites, where students give grades to professors and comment about the class, or find out in the classroom on the first day of class. Ultimately, each professor decides whether English or Spanish will be used in class lectures, assessment, and other instructional strategies, but this individual decision can affect students' performance in the class, especially if their use and understanding of English might be considerably limited, and consequently reflect in their grades.

The Biology Department is within the Faculty of Arts and Sciences. This department was founded in 1946, and initially offered only a Bachelors of Science (BS), but has experienced

significant growth over the last few decades with increased course offerings and an additional

Masters in Science as of 1962. Currently, the department has a faculty of approximately 40

professors, 100 graduate students and 1,200 undergraduates (http://biology.uprm.edu). Moreover,

the department is active in the interdisciplinary programs of Industrial Microbiology and Industrial

Biotechnology. The program provides its students with the opportunity to develop in the areas of

education and research in fields of botany, microbiology, genetics, and parasitology, among others

(http://biology.uprm.edu/).

      Course offerings vary widely in the Biology Department. For this case study, the class

chosen is a requirement for students majoring in Biology. It was chosen not only because the

professor was the only one who agreed to be a participant, but also because it is a basic

requirement for majors. Therefore, studying and obtaining a satisfactory grade in the Biology

course is quintessential for students' success in their later more specialized Biology courses. Since

the university allows professors to choose between English or Spanish to teach their respective

courses, the focus was finding a class offered by various professors, but that at least one professor

who delivered the lectures and assessed students in English. The main objective during this first

part was to attend class during an entire semester and record through field notes (diary) the

classroom dynamics between the professor and students while I performed a dual role: that of a

researcher and an active participant who listened to lectures, took notes, and engaged in informal

conversation with the other classmates.

Data Collection Sequence

      The data collection sequence is one of mixed approach thus it encompasses both qualitative

and quantitative methods. The quantitative aspect stems from the questionnaire students answered.

The qualitative component is how participants explain their understanding on the issue at task through two instruments: observations and interviews.

The data encompassing the research was divided into three main areas. The core and most relevant aspect within the data is the recording of daily class lectures that were compiled in a series of field notes. During the 50- minute class period, interactions and dialogues were written up. The second portion of the research included the questionnaires. These instruments were administered during mid-semester, after student-teacher evaluations, for the purpose of understanding students' views on English-medium courses and their particular linguistic/communicative needs within these.

The next step was getting students to answer the questionnaires. Those students who filled out and handed in the additional contact form attached to the questionnaires were considered for the third and final stage of the data collection: the interviews. The research needed four to five students who voluntarily agreed to participate. Three of these students gave their contact information when the questionnaire was administered and two expressed their interest personally. However, one decided not to participate when contacted during a few months after the semester ended. Students who filled out the form did agree to share their experiences inside other courses taught in English including the one being observed. This was done in order to understand language needs in second language learners (SLL) and students majoring in fields unrelated to language.

Dr. Schroeder, the professor facilitating the course was also interviewed. The interview gave him a space to provide insight on previous teaching opportunities, his experience teaching SLL, and the teaching strategies used inside the classroom.

Observations

One of the qualitative aspects of this study is the daily classroom observation. The everyday interaction with the professor and the students while taking the class was essential in order to further examine language use, teaching techniques, and response from the group.

The semester began with approximately 38 students and throughout the semester, 12 dropped, leaving 26 students. Class duration was 50 minutes long and met three times a week for a total of 45 contact hours per semester. Of those 45 hours, I spent approximately 30 hours in the classroom observing the dynamics of the teacher and students. A month and a half after observations began, permission from Dr. Schroeder was obtained and students were instructed to fill out a short questionnaire on their thoughts of whether educators should have linguistic or communicative competence of students' first language, helpful tools for facilitating instruction, and what elements make them comfortable/uncomfortable in a classroom. Those students, who agreed to provide additional information on the questionnaire, were asked for an interview once the semester ended.

Once in the course, I noticed there was much to document regarding teaching practices and the use of language. Some might think that a class only involved the dialogue from teacher to student, yet this was not the only aspect to be taken into consideration in this particular study. Body language, tone of voice, teaching techniques, and overall student-teacher interactions were the focus of my observations as well. Observations took place during the semester and after each day of observations I wrote up field notes documenting the events of each class. These notes demonstrated the consistency and efficacy of teaching methods, lowering students' anxiety and increasing language, and content comprehension. Findings of the observations were then triangulated with the information provided in the questionnaires and interviews.

Questionnaires

The objective of the study's questionnaire was to distribute the instrument to most of the students in Dr. Schroeder's course at the midpoint of the semester, to gather more information that would help to further understand students' interpretation of their own classroom experiences, and consequently shed some light as to how they felt were some of the professors' most effective techniques for teaching these types of courses. The questionnaires were designed in Spanish so that students would not feel that language was an impediment for answering the questions thoroughly. Plus, they would not need to get additional individuals involved if they needed help when writing in English. This questionnaire also had a research information sheet regarding the study and a consent form (see Appendices B and C); it also contained a separate contact form in case the student wanted to participate in the third part of the study, which was the interview. If the information sheet was filled out, it meant the student wanted to be part of the interview and could be contacted once the semester ended.

An eleven-item questionnaire was administered (see Appendix D) to 17 students who attended class. Items one through three aimed towards understanding how students felt when taking courses in English and what courses, taught in English, they had taken before this Biology class. The fourth, fifth, and sixth item asked students to self report their reading, writing, speaking, and listening skills in English. The seventh and eighth item asked students to identify, from the given options, which techniques or resources they used to help understand the content better. Items nine to ten asked students to pinpoint previous classes taken in English, the outcome and suggestions for professors whose courses are taught in English.

The instrument was used to receive background information from the students and build on previous and current experiences in courses where the content was taught in their second language.

The advantage of using this type of instrument was that it was fairly common and familiar to most people. Furthermore, the uniform questions reduced the chance of bias, thus they would only provide information regarding the specific question posed. As the researcher, my opinion did not interfere with the answers of the participant because there was no face-to-face interaction, which reduced the chance for the researcher to provide language clues that could potentially lead the data off. This was another factor as to why the questionnaire was written in Spanish. Students should not have felt uncomfortable or pressured to answer in English, which might have limited their responses.

The rationale behind adding questionnaires to the research was to understand how participants perceived courses where the content is taught in English. They mostly address the issue of linguistic anxiety and their perceptions of English in the classroom. Students were asked how comfortable they felt when taking English medium courses. Students also pinpointed which courses, apart from those offered by the English Department, they prefer to take in English. Here, students could have chosen English classes from a professor whose first language was Spanish, a professor whose first language was English or a professor whose first language was neither of them and explain their reason. In the questionnaires, they were also able to rate some of the most common strategies used by professors when teaching a course. These range from additional aids such as visuals, written material presented while lecturing, or even specific teaching styles that would enable learning and content attainment.

Interviews

The interviews were the third data collection method used in this case study. After participants volunteered to participate by filling out an additional consent form on the questionnaire, I contacted student participants. The interviews were with two different groups: the

professor and the students. Attaining both the professor's perspective and that of the students, regarding teaching and the strategies, was essential to understanding the effectiveness of teaching.

Interviews were first conducted with the four students who volunteered in the questionnaire contact form. However, these were not done until after the semester ended. This allowed students to finish the course and perform an evaluative introspection as to what were the results they received in terms of learning and understanding, based on the techniques used and the effort they put into the course. Moreover, the fact that they had finished the course once interviews were conducted gave them the freedom to express their thoughts, feelings, and comments regarding their own experience in Dr. Schroeder's biology classroom with sincerity and having no fear of negative repercussions reflected in their grade. This was in no way possible since the study is confidential, yet I anticipated it as a factor that could have affected the participants.

The first items asked students about their English skills before entering college. Then they were asked about professors whose classes were conducted in English and the techniques they used; they also compared and contrasted these with Dr. Schroeder's class, to prove the effective or ineffectiveness of teaching methods. The open nature of the interview questions allowed for the interviews to shed light on particular teaching techniques that some professors used and others did not. Furthermore, the open-ended nature of the interviews allowed students to compare strategies made by other professors on campus who teach in English.

Timeline

The data collection process for this research took approximately five months, from March to July 2011. The research began with classroom observations, which were gathered in the form of field notes, which began earlier in the semester. Eight weeks after the initial observation the questionnaire was administered among the students enrolled in the course. Observations continued

until the semester ended. Once classes ended, students who filled out the contact form expressing interest in the study were contacted for interviews. Each student was contacted and each of his or her interviews was recorded separately for approximately an hour. The professor was also interviewed. The data collection process ended in July 2011 and the data analysis and writing of thesis began in August of that same year.

Chapter Summary

Chapter III provided a description of the research design, site, data collection sequence and methods, and a description of the participants used in the aforementioned study. It addressed and explained the rationale behind the case study methods used to try to better understand the teaching practices of a Biology course taught entirely in English at the UPRM. The main reason for using a case study was because it provided a scope on the needs and educational preferences of UPRM students in English-medium courses. Class observations along with the questionnaires and interviews, were used to gather information as to what techniques students believed could help SLL learn content, especially with professors who do not share the same first language and cultural background. The subsequent chapters will present the findings and connect the data collected to previous research in second language acquisition and content-based courses using students' second language as medium of instruction.

CHAPTER IV: RESULTS

The purpose of this study was to investigate techniques used by non-Speakers of Spanish in their lessons to Spanish speaking students to lower their affective filter and obtain content and linguistic development. The following three research questions guided the collection of data:

- Does the use of specific teaching strategies in English-medium courses increase students' language and content comprehension?

- How do a Biology professor's linguistic and strategic communicative competencies (in students' native language) help or impede the learning of content?

- How do a professor's linguistic and strategic communicative competencies affect students' language anxiety?

The results gathered from the three data collection methods employed in the semester long case study of the Biology course at the University of Puerto Rico, Mayaguez are presented. The first section of the chapter discusses the categorical results found in the questionnaires, which entails the techniques identified by students as the most useful information about their English competence, language preference for English medium courses, among others. The second major section presents the most noticeable tactics recorded in observations used by the professor in class and helped students understand the content of the course better. To facilitate the reading of this particular section, I present the results of the most relevant items in the questionnaires, and then addressed the categories and techniques found in the field notes. The third section of the chapter documents a comparison and contrast of answers stemming from the individual interviews of four participants.

Questionnaires

The questionnaires, which were distributed a month before classes ended, serves as the basis for the rest of the sections discussed in this chapter. By answering the questionnaire (which was written in Spanish), participants not only had the opportunity of self-reporting information about their communication skills in English, but could also express their language preferences in content courses, talk about previous classes taught in English, and even pinpoint which were the most useful techniques for professors to use in order to help ESL students learn the content more effectively.

The most important aspect of the questionnaires, although it was not the first item in the instrument (Item 4), was students' self-reporting of their language proficiency. One might think that since there were two other professors teaching the course in Spanish, the students who enrolled in Prof. Schroeder's course had a high level of English proficiency, yet this was not necessarily the case. Although students had a working knowledge of English, the uneven numbers shows that not all students believed they had sufficient mastery of the language. The information below shows the various categories for English competency and overall responses.

Table 1. Students' English Competency Self Report

Question	Very Good	Good	Fair	Not so Good
In English, I read…	14 (82%)	3 (18%)	0	0
In English, I write…	12 (71%)	5 (29%)	0	0
In English, I speak…	8 (47%)	4 (24%)	5 (29%)	0
I understand what is dictated in English…	13 (76%)	4 (24%)	0	0
I understand some English sentences and phrases.	12 (71%)	4 (24%)	1 (6%)	0

As can be observed in the previous table, no student reported their communication abilities in English as "not so good." Most students self-reported their communication abilities in their second language were "very good" and "good", the numbers reflect contrast in each category. In fact, the highest score was given to self-report on how students' read in English. Almost all of them evaluated their performance as very satisfactory or *muy satisfactorio* in Spanish. The next question asked, "I understand what is dictated in English" with 76% of the participants stating that they do so "very good". The following self-reported category is for those students who understand some sentences and phrases. Even though when answering, "I understand what is dictated in English" 13 students rated their abilities as "very good" and not a single student rated their abilities as average, when students' were asked about their ability to understand phrases, one reported it to be average. In the following and most concerning item, students had to self-rate their speaking skills by answering, "I speak in English…" This category had the lowest scores as 47% of the participants identified how they speak "very good", four speak "good" and five speak a "fair" amount of English.

In the first item of the questionnaire, students were asked to identify how they feel in English-medium courses. Eleven participants (65%) said they felt very comfortable in English-medium courses while six (35%) reported to feel comfortable. On item two, participants were asked to enumerate and write-in which courses they preferred in English, besides those offered in the English Department. They could answer which ones they preferred in Spanish as well. Most Biology students directly mentioned how they preferred Biology classes to be in English. Only 35% of the students referred to their preference of some courses in Spanish, yet only 12% specified how Chemistry is a class that they preferred to be taught Spanish.

On the third item, participants were asked to highlight and explain, whether courses where content was taught in English, should be taught by professors 1) whose first language is English 2) whose first language is neither English nor Spanish 3) whose first language is Spanish. In this particular question, 100% of the participants agreed on how they preferred classes in English to be taught by English speaking professors. In respect to this item, participant A-7 commented, "No confuc[s]iones con los acentos. Pero entiendo importante que conozca un poco de español. Que lo sepa hablar (aunque no muy bien) y lo entienda." [There are no confusions with accents. However, I do understand it is important for them to know a bit of Spanish. At least speak it even if it is not that well[1]]. Participant A-10 also said, " Hay muchas clases las cuales tienen una terminología específica y es necesario que la puedan explicar bien. Tiene conocimiento del idioma (ingles) y pude dar mejor la clase." [There are many classes, which have a specific terminology, and it is necessary for professors to explain it accurately. If they have knowledge of the language (English) they can give a better class]. The last sample answer is from participant A-14 who stated, "Porque usualmente cuando su lengua primaria no es el inglés no se entiende muy bien y tiende a confundir al estudiante. Es importante que sea el inglés la lengua primaria pero que conozca un poco de español". [Usually when the primary language is not English one cannot understand clearly and (the professor) tends to confuse the student. It is important that their primary language is English but also knows some Spanish].

Although the 17 participants answered item three with "I prefer classes in English to be taught by a professor whose main language is English", three of them also marked the third option "I prefer an English class taught by a Spanish-speaking professor". Participant A-8 wrote, "Es más cómodo para escribir todas las explicaciones que dicta la/el profesor. [It is easier to write the

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[1] The author has translated students' answers gathered from questionnaire and interviews.

44

explanations dictated by the professor]. While Participant A-15 expressed, "Debido a que como vivímos en un país cuya lengua primera es el español, el estudiante se siente con más confianza de decir algo que no sepa decirlo en inglés." [Since we live in a country whose first language is Spanish, the student feels more comfortable saying something that (he/she) does not know how to say in English]. No student answered that they preferred English classes to be taught by a professor whose native language was neither English nor Spanish.

The seventh item asked students to identify how many classes in English medium classes (besides English language requirements from the English Department) they had taken throughout their college career. All students said they had taken English-medium courses. Out of the 17 students, 35% responded to have taken one or two classes, another 35% also said they had taken three or four classes and 29% of students had taken five or more classes in English throughout their years of study. Participants also had to identify, from a list, the instructional techniques used by professors, which can help understand courses taught in English. They could choose all the answers they thought applied but also had a space marked "Other" where they could write any other important technique that was not listed. The techniques are discussed in order of preference.

Table 2. Students Pinpoint Specific Teaching Strategies

Strategies Suggested	Participants	Percentage
Audiovisuals (use of the board and/or projector)	16	94%
Body language, gestures, enunciation	12	71%
Distribution of handouts	6	35%
Use of Spanish	4	24%
Other: Most important material should be presented using visuals and the explanations of those visuals could be read in the textbook.	1	6%

Additional strategies used by students were also discussed in item 5. Participants had to choose the strategies they used or would used to understand the material if their English competence was not satisfactory.

Table 3. Strategies students use to learn content in English-Medium Classes

Strategies Used by Students	Participants	Percentage
Read from the textbook	14	82%
Presentations given by professor as study guide	12	71%
Look for information on the Internet	7	41%
Translate material to Spanish	5	29%
Scholarly articles written in Spanish	2	12%

The final item, number 9 on the questionnaire, asked students to provide suggestions for the professor. A few of the suggestions were the use of more pictures or videos related to the class, present material-related examples and Power Point presentations. Participant A-7 commented on how professors should, "Aprender un poco de español como una forma de romper 'the language barrier'. [Learn a bit of Spanish as a way to break the language barrier]. Note how the participant used "language barrier" in English although the rest of the answer was in Spanish. Participant A-13 mentioned, "Los 'PowerPoints' siempre ayudan. Si es un profesor extranjero, hacer referencias a las situaciones que pasan en Puerto Rico lo hace más fácil de relacionar." [The Power Point[s] (presentations) always helps. If a professor is foreign, (he/she) should make reference to situations happening in Puerto Rico because it is easier to relate.] Participant A-14 mentioned how professors should master a certain degree of Spanish and despite the course being in English, they should let students know that they could ask or discuss in Spanish. The student added how, "Tambien, el

utilizar palabras en español durante la clase y en las presentaciones. [They should also use words in Spanish during class or in the presentations].

I will now turn to discuss the findings in the observations, which complement the results of the student-administered questionnaire. Each category and specific examples demonstrates to what extent the questionnaires, observations and interviews confirms the findings gathered throughout the semester.

Observations

Throughout my time observing Dr. Schroeder's Biology course, I was able to observe a variety of techniques that were used by the professor, which appeared to elicit student attention, consequently engaging students in class discussion. The observations shed some light as to what were the tactics that might have allowed effective acquisition of the course content and clearer understanding of the topics posed. The most salient techniques presented in the observations were: 1) allowing students to use Spanish and making an effort on the part of the professor to speak Spanish, 2) the use of images, drawings or any type of visual form to organize content in class discussion, 3) relatable examples and 4) the sense of a learning community. The following subsections further explain each category and provide instances from the observations.

The Use of L1 in an English Medium Course

One of the particularities of English-medium courses is how the main goal behind the approach is to teach students the material, vocabulary and information in another language. Although this is extremely beneficial for these college students, their particular setting, PR, is one where they are exposed to English, Spanish or both simultaneously in their courses. At times, this certainly can create some confusion when students speak, thus they might not remember a word or concept related to the class. The following data presents a number of instances where Spanish was

used in the Biology class taught in English. Note that the use of the technique is highlighted in bold.

Table 4: Student's Use of Spanish during Friday Activity

Background information:	Most Fridays are "discussion Fridays". In this activity, the professor brings a cup and students pick a number, the question corresponding to the number is shown and students get in groups. Students participate for points.
Field notes:	Three minutes have passed after the question has been asked. The professor asks a student to answer the question. The student starts talking but is really struggling with his English. **When the professor sees it is difficult for him to even utter a word he jumps in and suggests, "You can say it in Spanish if you want." The student immediately switches to Spanish with no problem and waits for the professor to answer. After the professor heard the student's question, he answers the question in English.**

Since participation is as important as scoring a high grade on the exam, students push themselves to speak in class. However, there was obvious anxiety in the classroom as the professor asked questions. During the first weeks of class, students would sit in groups making a circle with their chairs. As I asked them about the question, some began explaining in Spanish. However, when it was the group's turn to answer the question, they would tell each other "Dilo tú" [You, say it] to either avoid answering the question or avoid using English in class. This was seen a number of times. This is why the professor established how a basic inquiry or even commenting, "I do not understand this particular concept" could get them the participation points for the week, and then factored into their grade. He stressed how reading the book played an important role thus if the student does not read it, they would not be able to pinpoint what is it that they do not know and would not be able to ask about it in class, which consequently would result in no participation (and

no points) for that week. Table 4 also provides another example from a previous Friday activity where a student used Spanish to answer and explain a question while also obtaining his participation points for the week.

Table 5: Student's Use of Spanish in a Friday Activity

Background information:	Most Fridays are "discussion Fridays." In this activity, the professor brings a cup and students pick a number, the question corresponding to the number is shown and students get in groups. Students participate for points.
Field notes:	Another question is screened in the projector, the ninth question: "What causes convergent evolution?" **A student without raising his hand immediately began answering, "It is when they evolute [evolve]. Ahhhh.", he uttered, demonstrating some frustration in his face and tone of voice. "Es cuando se unen por presión ambiental[2]", the student summarized. The professor exclaims, "Great! You actually answered the question and went on to talk about it."** He seemed pleased and continues asking the students if they remembered similar ecological pressure.

In the previous exchange one can observe how the student wanted to answer and knew the content, but could not really come up with the answer in English. He, then, resolved to answer the question in Spanish; the student knew that his fellow classmates and the professor would understand what he said. The professor listened and although he did not comment further, he did provide positive reinforcement and feedback.

The next situation presents how the professor discusses a student's question in Spanish. The actual dialogue was not recorded adequately because of my location in the classroom, which

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[2] When they unite due to environmental pressure.

was distant from the group where the discussion took place. I was only able to distinguish the language used and the interaction happening.

Table 6: Professor Answers in Spanish

Background information:	Professor began class giving students the grades for the exams and discussed these. Most of the class time was spent talking about the questions and answering students' doubts.
Field notes:	A student asked the professor about parsimonious phylogeny. The professor asked another student to answer the question but another student jumped in and tried to explain to the student in Spanish. The student who originally asked the question seemed a bit confused. The professor interrupts and tells the other students to allow him to explain. He explained in English and when [he] finishes, the students summarized his explanation in Spanish. **The student still does not look sure and the professor sees that. The professor tries to explain it again, but the student does not understand. Then, the professor began explaining the concept in Spanish. He was very slow and struggled, but used his hands and looked directly at the student when explaining. Once he was done, the student was asked to repeat what he understood back to the professor in Spanish. When he did, the professors seemed satisfied with the answer and continued around the room answering other questions.**

In very interesting situation, the professor used his linguistic knowledge of both languages to mediate class and meaning. In this case, there was an obvious communication problem and the only person knowledgeable to answer was the professor. He tried explaining it various times and even students explained in Spanish without success. It was not until the professor intervened in Spanish that the student understood the concept.

Incorporating Visuals in Lectures

Another salient aspect of class observations was how there were lots of visuals used in class. Lectures always had a presentation. The presentation had a few phrases that would guide the professor's discussion and indicate what was being talked about to students. One could also observe images, graphs, or tables attached to help explain the material better. Presentations were available via Moodle; therefore students could access the graphics and use these to study. Another important detail was how the professor used the board to draw concepts. Despite the fact that images were in the presentation, the board was used to explain concepts that were not clear or those he wanted students to visualize as it developed. When processes were to be discussed, drawings seemed to be the best way to explain. The following data exemplifies the use of audiovisuals in class lectures and how these were incorporated constantly in lectures and explanations.

Table 7: Images for Understanding

Background information:	Most Fridays are "discussion Fridays." In this activity, the professor brings a cup and students pick a number, the question corresponding to the number is shown and students get in groups. Students participate for points.
Field notes:	The professor was choosing questions and having the students answer them. One of the questions read, "Draw the maps of the population: allopatric, sympatric and parapatric." Although students were asked to participate, no one volunteered. **The professor used the board to draw a representation of the population groups on the board and students had to draw it.**

The whiteboard was mainly used for drawing since most of the text was in the presentations. When students did not understand a graph or the process of a concept, he would draw diagrams and explain concepts from the beginning. The board was rarely used for text; the professor

incorporated an interesting technique during one of his lectures, the use of a mnemonic devices. Employing a mnemonic device was a learning technique used to help memorize concepts or information. The following table demonstrates the use of the technique in the classroom.

Table 8: Mnemonic Device as Tool for Attainment

Background information**:**	The professor began class talking about the geological periods and told students it was important to know each period.
<u>**Field notes:**</u>	After having reviewed a few aspects of class with students, the professor discussed the different geological periods: **Cambrian, Ordovician, Silurian, Devonian, Carboniferous, Permian, Triassic, Jurassic, Cretaceous, Tertiary, and Quaternary. "It might be difficult to learn all of these, but here is a trick I use." He then proceeded to write the following sentence on the board and reads it to students, "<u>C</u>razy <u>O</u>rnithologists <u>S</u>pend <u>D</u>ays <u>C</u>atching <u>P</u>arrots They <u>J</u>ust <u>C</u>an't <u>T</u>rap Quickly."**

Although this was obviously not a picture, mnemonic devices were aids, which helped the brain retain important and at times, confusing or long information. In this case, the professor uses a catchy verbal device and created a mental image in the students for them to consequently remember the first letters of the different periods and their specific order for the exam.

Relevant Examples

So far, this chapter has presented the use of examples from interactions in the classroom, suggesting how the uses of models or precedents help illustrate the application of a rule or concept. Usually these paradigms boost students into connecting the material presented with their own lives, the world around them, and other forms of knowledge they have learned about. Throughout the observations, the professor used examples related to the Puerto Rican culture; others targeted toward students' age group, and some even related to other classes they might have previously

taken. This section presents some of instances in which the professor made these connections for students.

Table 9: Real-life Application of Theoretical Concepts

Background information:	The professor talked about the various evolution theories. One of them was Lamarck's theory of Evolution.
Field notes:	The professor said, "Basic creatures are formed by spontaneous generation" A student asks what does Lamarck refer when he says "simple creatures". The professor looked at him and said, "I don't know. I've read about him, but never read Lamarck's work. What his theory said however is that if an organ gets used a lot your offspring will also develop the same organ. That's his theory. **For example, If you have big muscles and you have a baby, it will inherit your big muscles.**"

This particular example is very interesting. First of all, he was simply giving students some background information on the different evolution theories that had been developed through time. However, one student asked something that he could not really answer because he was not familiarized with the work itself. He clarifies the theory using a relevant example, because he did not understand what the theory meant. I assume the professor thought the student did not understand it either. The next example demonstrates how Dr. Schroeder used ideas or items specific to students' daily lives to help them visualize the concepts posed in class.

Table 10: Using Daily Life Situations

Background information:	The professor talked about species and how their diversity changes over time. In order to understand this, he asked students what are continuum variables and starts drawing a graph that exemplified correlation.
<u>**Field notes:**</u>	The professor asked, "What is correlation?" Nobody answered. The professor waited for a minute and continued, "It is the relationship between the continuum variables." Students were quiet and he resumed **"Your height has nothing to do with how much you like hamburgers or *arroz*."** Students chuckled at his example. He continued, **"People who make less money, drink Budweiser and those who make more drink Coors Light." Students giggled and he asked, what is that, "Negative correlation," said a student.** He continued explaining the rate of origination and extinction rate.

In this example, the professor was offering information so that students could connect the material regardless of the language while simultaneously encouraging students to get together and share their comprehension of the material (Echevarria &Graves, 2006). If it were not for the connections, a simple concept like this one could be more difficult to illustrate and understand. In this case, the professor uses an everyday example to show students what the term correlation means. In this way, students understand how the concept relates to the world outside of the Biology classroom.

Sense of Community

Another important technique seen in class observations is the sense of community encouraged by the professor at all times. This created more assurance and positive attitude towards the class, which resulted in easiness when participating and engaging in the discussion. The professor learned their names, called them out in class, and took the time to evaluate students body language to determine whether students understood or not. He would do this through the participation aspect, thus this rule elicited a lot more interaction among students than it would

actually happen in a regular classroom where professors do not promote participation. In this class, participation was part of the evaluation; it worked towards their grade. Students felt that they had to speak to prove that they knew the material and get their weekly points. The first example shown demonstrates how the professor works together with students to reach an understanding of the material discussed.

Table 11: In-class support from classmates

Background information:	The professor entered the classroom and began setting up the presentation. As the computer started, he used the time to answer questions students had. However, he also allowed and/or prompted students to answer their peers' questions.
Field notes:	**One student asked a question and the professor referred to one of the students to see if the student could answer. Another student jumped in and answered the causes. The professor replies, "Great". Another student asked, "What is an ecological niche." Another peer immediately jumped in and answers in Spanish; another one added an example regarding birds and their niche. The professor was looking and listening. Once the students had finished he says, "The only thing I would add is not to limit you to geographical settings. Humidity, heat, and others are all parts of its niche."**

The previous situation demonstrates how the professor assesses students' knowledge of the material, while simultaneously encouraging students to get together and connect their comprehension of the material, share what they know, and simply help each other during the semester.

Having a positive relationship with the professor is not something seen in all classes, yet in this one, a clear effort from the professor was observed. The following dialogue demonstrates student trust and honesty when talking to their professor.

Table 12: Student Makes a Recommendation

Background Information	The professor entered the classroom and before starting the class he handed in the exams to students and began discussing the questions. Volunteers read the questions and answered them. In some instances, the professor jumped in to clarify concepts or misconceptions.
Field notes:	A question was being discussed and although one of the students answered it, the professor wanted to make sure everyone understood so he began explaining the concept all over again. **As he was explaining, a student jumped in and said, "I am confused" with a strong accent, "You speak too fast." The professor laughs and says, "That's a pretty legitimate thing to say." He began explaining more slowly.**

Not all students stop the professor mid-sentence to point out how he is speaking in a fast pace. At the very beginning of the semester the professor mentioned that if they did not understand something they should feel free to say it. However, the fact that this particular student felt comfortable to directly address the professor's speed for explaining a concept speaks volumes the strong honesty ties that were developed among this learning community.

The techniques observed in class are summarized in the following table:

Table 13: Instructional Techniques Observed in Biology Classroom

Instructional Strategies	Definition
L1 in English medium course	Incorporation of students' first language in class-related activities and discussion to allow further participation and confidence.
Visuals: Drawings, presentations, images, videos	Convey ideas more effectively than words. Helps visualize abstract concepts and stimulate thinking.
Mnemonic Devices	Memorization technique used to improve students' ability to remember an idea or concept.
Relevant Examples	Use of age/culture- related models to help illustrate class content.
Sense of Community	The teacher and students belong to a group who learns and works together. They all contribute collaboratively to achieve this goal.

The following section constitutes what the interviewees had to say about English-medium courses and the techniques used by Dr. Schroeder and other professors who have taught concentration courses in English.

Interviews

Interviews were the last data collection method employed in this study and served to triangulate the data. The interviews were conducted once the semester concluded. The purpose of the interviews was to double check and validate the data received in both, the questionnaire portion of the study, as well as the observations. The four interviews were conducted in Spanish so that participants could express themselves without inhibitions and were translated to English.

This section begins with the demographical information of each of the students and continues with their answers to the questions posed in the interview. It is vital to mention that three out of the four participants offered to participate in this study by completing the form attached to the questionnaire. These were participants A1, A2, and A3. The remaining participant completed the questionnaire but did not fill out the form. He expressed his interest to me personally a few weeks after the surveys were conducted in class and filled out the consent form and questionnaire a few weeks before scheduling the interview. The heading of each section corresponds to the question asked, and underneath these headings the responses given. The final interview was done to Dr. Schroeder once the semester was over and the observations concluded.

Previous Education and English in School

Participants were asked to briefly describe their education and their English classes before entering college. All of the participants attended the Puerto Rican public school system throughout their entire life. The only one who went to a private school was participant A3 during elementary,

yet was transferred to a public school for middle and high school. Interestingly, participants A1, A2 and A3 agreed on how English education was efficient in high school. Participant A1 has a parent who was from the United States and English was spoken in the household most of the time. Interestingly, participant A2 said she learned English thanks to the television since she lives in Rincón, a town where English is emphasized due to the growing English speaking community that has settled there, and therefore, she was very exposed to the use of English. Participant A3 said his English education was not that good, but from eleventh grade on he noticed how the quality of English classes improved a lot. Participant A2 commented how her classes in middle school were not satisfactory, but she liked to watch English television programming from an early age and that helped her improve her English skills. This resulted in her being selected to enroll in Advanced English in the public high school she attended. Participant B3 understood that his English education neither in private nor public school was effective. Although he understands it, he has trouble communicating.

Outlook on Instructors Lacking Spanish Competency

Most of the participants in the survey mentioned how they had taken at least one English-medium course. However, the idea behind this question was to know whether these students had any English-speaking professors who did not understand Spanish at all.

Participant A2 provided some interesting details about her experiences with these professors. As a sophomore, she took a course related to genetics with a professor who had just arrived to PR and did not know any Spanish. The results in that class were satisfactory for her because he gave the class in English, the book assigned was in English and she did not have to translate from one language to the other. I also asked if, at some point, a professor would use both languages in class

any of those English medium courses. She answered affirmatively and spoke about Organic

Chemistry:

> Si, este, en química orgánica era así. Algunos ejercicios tienen reglas y
>
> dependiendo del lenguaje las reglas cambian, como las letras o algo asi (de las
>
> formulas). Cuando haces un ejercicio del libro, que es en inglés, se usa un
>
> formato. Pero el examen es en español y es diferente. Te puede confundir. Y el
>
> profesor requería que el ejercicio fuese hecho en español aunque el libro te lo
>
> enseña a hacer en inglés.
>
> [Yes. Um, in Organic Chemistry. Some exercises have rules and depending on
>
> the language the rules change. For example, a letter or something. When you do
>
> the exercise from the book, which is in English, they use a format but in the exam
>
> one must do the exercise in Spanish and it's different. It might confuse you. And,
>
> the professor required the exercise to be done in Spanish although the book
>
> taught it in English].

This situation in particular was not to her liking. She had to pay extra attention to the exercises,

since something really simple could undermine her execution on the exam. However, she did meet

another English-speaking professors who had a different outlook on language in the classroom

despite their own limitations to using Spanish. Another one of her professors taught Human

Physiology and despite not knowing Spanish, he allowed students to answer in English or Spanish.

His only rule was that it had to be written correctly. If it was not, he took some points off and

emphasized that the answers must be either all in English or all in Spanish. Participant A2

continues: "El hasta decía, 'Pueden contestar en español, así yo aprendo más. Nunca había

escuchado a un profesor decir eso." [He even said, 'You can answer in Spanish, that way I can

learn more.' I had never heard a professor say that]. In this case, the participant saw willingness to learn and help students out, as the professor was willing to translate the answers to allow students to answer the test in Spanish. This was similar to what the participant had to do, translate to then do the work. In this situation, the professor demonstrated an eagerness to learn the language in order to help students who were willing to learn but maybe did not have high English language proficiency, just as he did.

Participant A3 also took class with a professor who did not know Spanish; it was an Ecology professor. He mentioned how the class was not great and he did not have a positive attitude.

He mentioned,

No me gustó. No me gustó porque decía, "Ustedes pueden contestar en español pero yo no lo voy a corregir porque yo no se español." Te estoy hablando de un profesor que llevaba años en Puerto Rico y nunca se molestó por aprender. Entonces, no entiendo porque él decía que podíamos contestar en español en la clase. A veces no sabías que decirle y si no sabías una palabra en inglés y te salía en español él te cortaba a mitad y decía "Yo no hablo español." Y uno se quedaba como que. . . en shock y te olvidabas de lo que estabas diciendo. Schroeder trata y si no entiende te pregunta que intentabas decir. O te dice que le preguntes a un estudiante que te diga esa palabra que no sabes en inglés. Definitivamente, él no es de esos profesores que se cierran cuando un estudiante usa español.

[I did not like it. I did not like it because he said, "You can answer in Spanish but I am not going to correct it because I do not know Spanish." I am talking about a professor that had been in Puerto Rico for years and never bothered to learn. Therefore, I do not understand why he would say we could answer in Spanish during the class. Sometimes one would not

know what to say and if you did not a word in English and it came out in Spanish he would

cut you mid-sentence and say, "I do not speak Spanish." And one would be like … in

shock and forget what you were saying. Schroeder tried and if he does not understand he

asks what you were trying to say. Or even tells you to ask a student to tell you how to say

the word in English. He is definitely not one of those professors who shuts down when a

student uses Spanish].

This example demonstrates a situation that provoked certain uneasiness in a student. The professor

tried to provide an alternative for PR students, yet showed an attitude of disdain in class, making

students feel intimidated to ask questions or engage. He compared the Ecology professor to Dr.

Schroeder and commented how he was open to using Spanish and put an effort into understanding

students who had trouble communicating in English for any reason.

What did you like about the Evolution course?

Participants had to respond on what aspects/techniques of the class they liked. The

responses varied. Participant A1 mentioned the following:

Siempre me ha fascinado la evolución. Si es relacionado a la genética y eso, todo

me fascina. Es más, yo había tomado antes otra clase con el "animal behavior." Me

gusta como el da la clase. Él explica y te da la oportunidad de aprender un poco

más del contenido. También motiva. Motiva al estudiante a hablar y hacer

preguntas. Me gusta ese ambiente y creo que es muy bueno para aprender.

[I have always been interested in Evolution. If it is related to genetics, all of that

fascinates me. In fact, I had previously taken a class with him: Animal Behavior. I

like how he teaches the class. He explains and allows you to learn more in depth

about the content. He also encourages students to talk and ask questions. I like that

environment and I find it great for learning.]

Si estas prestando atención, vas a captar muchas bromas que el hace de los temas

de la clase. Como "nerdy jokes" y ejemplos usando nuestra cultura puertorriqueña.

Además, él siempre se está moviendo de lado a lado y me mantenía despierta. Es

bien dinámico también. Me gustaban los debates. El también promovía el

mantenernos al día con la lectura porque lo que da en clase es lo que está en el

libro.

[If you are paying attention, you will get lots of jokes that he makes regarding the

topics in class (nerdy jokes) and examples using our Puerto Rican culture. Plus, he

is always moving from side to side and it kept me awake. He is very dynamic as

well. I enjoyed the debates.

He also promoted keeping up to date with the reading because what he gives in

class is the same as what is in the book].

Participant A1 discussed some of the class aspects she enjoyed. Emphasis was given to how he

encouraged student participation and created a comfortable environment to promote it. Participant

A2 mentioned a few of the characteristics of the class she thought useful and effective as well.

El vocabulario que el usa es más urbano, como el que se usa en televisión. Si una persona

tiene problemas entendiendo ingles con él es más fácil. También me gustan los ejemplos

hipotéticos que usaba con unicornios o dragones. Usaba animales ficticios porque quería

saber si éramos capaces de aplicar la teoría con cualquier situación.

[The English vocabulary he uses is more urban, like the one used in television

If a person has trouble understanding English it is easier. I also liked the hypothetical

examples he would use with unicorns or dragons. He would use fictional animals

because he was interested in knowing if we were able to apply the theory to

 any situation].

Él es bien organizado. Además, no daba clase todos los días. Teníamos discusión los

viernes. Él es el único que haces esas cosas. Me gusta proque no da quizzes sino puntos de

participación. Así, el verifica si el estudiante aprendió o no y al mismo tiempo nos conoce a

nosotros.

 [He is very organized. Plus, he did not give class every day. We had discussion Friday.

 He is the only one who does these types of things (discussion Friday). I like it because he

 does not give quizzes but participation points.

 That way, he assesses whether the student learned or not and at the same time gets to know

 each one of us].

 Cuando el escribe en la pizarra, porque no solo está explicando o enseñando lo que se

 ve en el Power Point sino que se ven los dibujos, tu entiendes. Mira, por ejemplo, el

 tiene una presentación de un organismo y como resultó, pero usa la pizarra para enseñarte

 el estado original del organismo, también daba un montón de ejemplos.

 [When he [the professor] writes on the board, because he is not just explaining or teaching

 what is being observed on Power Point but you can also see the drawings and understand.

 Look, for example, he has a presentation of an organism and how it turned out, but uses the

 whiteboard to show the original state of the organism. He also gave lots of examples].

Some of the most salient characteristics emphasized by participant A2 were the types of examples.

She also mentioned how beneficial Friday activities were and how these helped assess the content.

There is also reference to the professor's use of language, stating how simpler vocabulary is more

straightforward for students. She also mentioned in the interview how, the book selection used by

Dr. Schroeder was very different from the book used in the other sections. The book used by the professor under study had a lot of details and visuals, while the other book was old, dated, and written in a narrative form, similar to a diary.

Participant B1 however, had a very particular situation. He was enrolled in Biology with one of the Spanish-speaking professors, but due to an unexpected situation, he was forced to take the course in English. The participant was not a Biology major but Pre-Medic student who had to change fields to graduate on his expected date.

Despite this circumstance, he was not interested in Evolution and using English was out of the question for him, he commented the following in regards to the class:

> A mí en verdad no me gustaba la clase. Traté pero no me gusto. Pero si, tengo que decir que es bueno. Podías ir a la oficina el mismo día del examen y si te tenía que explicar todo lo hacía. Es más, te explicaba ejercicios y cuando tomaba el examen decía, "Mira pa' allá. Me explicó el mismo ejercicio del examen." Si estabas dispuesto a buscar ayuda el te la daba.'
>
> [I did not like the class; I tried but I did not like it. However, I do have to say he is good. You could go to his office the same day of the exam and if he had to explain everything to you he would. In fact, he would explain some exercises and when I took the exam, I would notice how they were the same he explained and you would go like, ' Alas, he explained the same exercise that is on the test.' If you were willing to look for help he would provide it].

The participant referred to other courses that he did feel comfortable. He even attributed his confusion to the fact that Dr. Schroeder might not have a lot of teaching experience. Although this

is a valid argument, he is the youngest professor teaching the Biology course, the participant had to admit that he has a great attitude and willingness to help students.

Participant A3 expressed how he did a small poll to choose the Biology professor. He heard that the class with Dr. Schroeder was harder than with the other two, yet he was pro-student and was interested in helping the student learn.

An excerpt of his comments on the class is shown below:

Pude aclarar algunas lagunas que tenía de otras clases como ecología. Mejoré eso con esta clase. Él explicaba mejor, desde los orígenes.

[I managed to fill some gaps I had from other classes such as Ecology. I improved these with this class. He explained better, from its origins].

Me gustaba la discusión los viernes. El formato era como que: clase, clase, discusión. El se sabía tu nombre y te marcaba en el *rollbook* si participaste.

[I really enjoyed the Friday discussion. The format was like: class, class, and discussion on Fridays. He learned your name and would mark you if you participated].

Creo que todos los profesores deben ser así y preocuparse si uno aprende. Algunos tienen actitud y no les importa si uno no aprende. Eso se refleja en la actitud del estudiante.

[I think all professors should be like that and worry for one's learning. Some have an attitude and do not care if the students do not learn and that reflects upon the students' attitude as well].

Él también le preguntaba al estudiante directamente y si uno no sabía cómo expresar una duda él te ayudaba. Y él entiende mucho español así que entendía cuando le preguntabas en español.

[He also asked students directly and if one did not know how to express the doubt he

would help out. And he understands a lot of Spanish so he would understand what was

asked to him in Spanish].

This student took Ecology some semesters before this Biology course, yet noticed how some of the

material presented in this class helped him understand a few concepts and gaps that he never fully

grasped in that the Ecology class. He also commented on Friday activities and how these were

helpful throughout the learning process. It also provided a structure for the students, they knew

what to expect in class. Other aspects mentioned are the use of Spanish in class, because unlike

other professors, he does understand a lot of it.

Spanish Competency in the Biology Classroom

Language is part of a group's culture; it identifies us as members of a group and also

creates a sense of belonging within its speakers. When students were asked whether a foreign

professor should learn some Spanish, at least for communication purposes outside the classroom

(i.e. office hours), they all replied affirmatively.

Dr. Schroeder has Spanish competency. He is not able to carry out his class in Spanish due to

limited vocabulary, but with some effort, he can understand a fair amount what students are saying

in their first language. Therefore, participants were asked whether the fact that the professor had

Spanish competence helped students feel more comfortable when participating in class. The four

students interviewed agreed on how, although he reinforced participation in the class, knowing

some Spanish was a big relief for many. Moreover, students could tell that he was putting some

effort into trying to understand Spanish despite it not being his first language. This made students

place effort into the class, thus they realized he was doing everything he could to facilitate the

learning process.

The following table breaks off the individual comments in regards to the use of Spanish in class:

Table 14: Spanish Competency in Class

Participant ID	Response
A1	Mira, yo conocí a una chica que me dijo que se sentía bien tímida cuando hablaba. Y mientras pasó el semestre ella hablaba más, yo lo note. Era porque se sentía más segura y vio que si no sabía algo en inglés el profesor entendería porque sabía algo de español. [Look, I met a girl who told me she felt shy when talking and as the semester progressed she would talk more. It was because she felt more confident and saw that if she did not know something in English, the professor would understand because he knew some Spanish].
A2	Me gustaba cuando alguien no sabía una palabra en inglés y el grupo tenía que decirle para que la persona aprendiera. Era súper positivo. Y él hablaba o trataba de usar español. Me imagino que tiene que aprender, porque en el salón él puede hablar inglés pero afuera en su casa y eso tiene que usar español. No sé, cuando compra algo por ahí debe usar español. [I liked when someone did not know a word in English and the group had to tell him/her so they could learn. This was super positive. And he spoke or tried to use Spanish. I imagine he has to learn because in the classroom he can talk English but outside in other places he must use Spanish. When buying something he may have to use Spanish].
A3	Si ayuda porque a veces uno no sabe cómo decir algo y todo el grupo se ayudaba. [Yes, it helps because sometimes one does not know how to say it and we (the group) helped each other].
B1	Él les preguntaba a los estudiantes directamente y si no sabía cómo expresar su duda él le ayudaba. Y él entiende bastante español así que entendía cuando se le preguntaba en español. Él decía que entendía español. El usaba ingles con palabras en español para llamar nuestra atención.

	[He would also ask students directly and if the student did not know how to express his doubt, the professor would help him/her. And he understands a fair amount of Spanish so he would also understand what was asked to him in Spanish. He said he understood Spanish. He used English with Spanish words to draw our attention].

Participants and former students really argue that Dr. Schroeder's knowledge of Spanish played an important role in classroom interactions. Students felt more comfortable and if there was initial fear, it diminished as the semester progressed. It was also highlighted how Spanish competency is indirectly related with feelings of teamwork, cooperation, and comradeship.

Understanding Students' Culture

Students' learning is not only impacted by the input they receive. Their social environment greatly impacts their learning and class performance. Therefore, it is important to consider different aspects such as the roles of the teacher, the ways in which they learn best, their environment, and their preferences. The differences are especially noticeable when the instructor comes from a different environment than his students, thus it can affect classroom dynamics, and interaction. For example, in many countries, students are expected to ask questions and challenge the professors. In other cultures, the professor is the expert, and asking a question or challenging an idea might be viewed as disrespectful. For this reason, students believe it is important for educators to study and understand their students' culture.

The participants mentioned the following:

A1   Yo lo llamaba por su apellido y note que me respondía como raro. Después el me

comentó que no le gustaba que lo llamaran por su apellido. Para mí era algo bien

normal, es más, era más respetuoso. Pero él me explicó por qué no le gustaba y me

dijo que mejor lo llamara por su nombre.

[I would always call him by his last name and I noticed that he would always reply in

a strange manner. He later explained that he did not like to be called by his last name

only. For me it was normal, it was even more respectful but he explained why he did

not like it and told me I could use his first name].

El me preguntó porque todo el mundo lo llamaba por su apellido, Schroeder. Él decía

que los estudiantes lo hacían, pero el prefería que lo llamaran por su nombre. Le

explique que era un símbolo de respeto. Ahí aprendió algo nuevo.

B1

He even asked me why we called him by his last name, Schroeder. He said students

did it but he preferred to be called by his first name. I told him it was a symbol of

respect. There he learned something new].

This particular situation demonstrates the effect a message might trigger in the intended recipient

based on their cultural influence or background. The professor did not like to be called by his last

name, yet learned that students saw as a normal and even respectful gesture. Nevertheless, he

was honest and direct about the issue. In addition, the fact that he interacted with students in

such an individual way by: learning their names, saluting them in hallways, showed interest for

students culture/language, and using strategies appealing to different learning styles, developed a

learning community and, in a way, gave allowed him to say or do things that might be construed

as impolite if it were a professor who did not establish that connection with students.

Other aspects regarding adaptation to culture were also emphasized in class. Students

provided situations where Dr. Schroeder adapted real life situations or examples as a point of

reference to clarify the content presented in class. Students mentioned a few approaches that he

took into consideration when preparing for a class and (in their opinion) help students understand the material in a better form.

Participant A1 gave her input on this particular point:

A1

En la otra clase que cogí con él, *animal behavior*, notó como muchos estudiantes no sabían usar Excel y dedicó una clase completa a enseñarnos. Aprendí tanto… él se adaptó a nuestro grupo. . . el no tenía que dar la clase, pero tomó el tiempo de observar, aprender y enseñarnos. El se adaptó a sus estudiantes.

[In the other class I took with him, Animal Behavior, he noticed how many students did not know how to use Excel and he dedicated an entire class to teach us. I learned so many things …He adapted to our group, he did not have to give it but he took the time to observe, learn, and teach us. He adapted to his students].

If the student's culture is different from that of the professor, there might be a despairing unfamiliarity with each other's educational conventions. Therefore, it is important to be aware of the cultural differences without having to lower academic standards. Professors must be specific, clear, and study students in order to identifying those techniques that seem to be more effective. Some of these approaches include providing examples or models of the type of work students should perform, present the material in various ways, culturally relevant examples, among others. It is also important to keep in mind that both, the student and the teacher, need to compromise on what works, for the educational process to be as easygoing and successful as possible.

Interview with the Professor

The professor was also interviewed during this process to see what he had to say about his previous experiences, teaching techniques, and adapting to teaching in PR. The interview, although

70

short, provided important information as to what he takes into consideration when offering the course.

He began his teaching experience as a Teaching Assistant in 1998, yet he began lecturing as a professor in 2004. The decision behind coming to PR was thrilling for him. Dr. Schroeder thought it was "the perfect job" given the fact that he visited Latin America, had studied some Spanish, and his dissertation was regarding tropical birds in Panamá. When asked about his ability to hold a conversation in Spanish, he felt confident, "I've gotten better everyday." However, despite the fact he speaks Spanish in casual conversations, he is very emphatic about the language used in the classroom, "Students need competence in English to pass my class." Although he is very eager to help and even uses Spanish to communicate with his graduate students, especially those who have trouble speaking English, there has to be a certain competency of the language, just as he has Spanish competency as well to try and help them.

The professor shared the most evident and salient techniques used when lecturing. He enunciates when speaking and the reason for doing this is because he "tends to mumble." During lectures he tries to speak slowly, repeats important points, and gives students enough time to take notes. When asked whether he gets mad when students do not take notes he answered:

> I remind them to take notes. I vary my tone of voice; use my hands, and the whiteboard. I also address students directly, by name or eye contact. Especially when people are falling asleep or not paying attention. I start lecturing them or walk over to their desks.

He knows when the techniques work, usually because of the immediate response he gets from students. Additional approaches are more guided towards getting students involved in the class. He comments, "I give participation points. Some students don't like it, but I want students to feel like they are learning actively, they are involved." The rationale behind the participation points is

getting the shy people to talk. The professor mentioned, "You spread the talking around the classroom. Plus, opening your mouth makes students feel involved." The participation points go hand in hand with the Friday activities, which are done because, "some students just can't be talked at for such a long time." He also thinks it is great to encourage the sharing of ideas and develop a sense of community in the classroom. It also helps them develop public speaking skills and makes students responsible for their ideas. It also encourages them not to get behind in the reading. Other tools used are Moodle; the presentations he shows are prepared and uploaded beforehand so they can study these. Mock exams are also provided for practicing and there is exam review on the day of the exam at a separate hour. They also have open-ended questions once the exam is corrected to answer doubts.

Although nothing has changed since the observations were conducted, he assures his commitment to improve as an educator. He is also aware of how he makes lots of jokes that nobody understands so he tries to consciously drop Puerto Rican words, local species, or a culturally relevant example to get immediate reaction from students. He also tries to assess his sections to see what needs to be changed or modified to address their specific needs.

Chapter Summary

This chapter comprises the results gathered by the three data collection methods employed in the study. The first section of the chapter discusses the results obtained in the questionnaires. Through this instrument students pinpointed which teaching techniques were the more useful inside the classroom, information about their English competence, language preference for CBC, among others. The second part presents the most noticeable tactics used by the professor in class, which helped students understand the content of the course better. The third portion documents the answers stemming from the individual interviews of four focal participants and the professor.

CHAPTER V: DISCUSSION & CONCLUSION

The purpose of this study was to examine the teaching techniques used by a non-native speaker of Spanish in an English medium Biology course which made the teaching of content linguistically accessible to ESL student population enrolled in the class. Throughout the classroom observations, surveys, and interviews it was clear that there was a conscious implementation of sheltered strategies, which helped increase students' language and content comprehension. When analyzing the data across the various data sets, the three most salient emerging themes were: 1)culturally relevant examples, 2)use of visual aids, 3)and native language reinforcement. Each will be discussed individually. The themes that emerged from the data suggest that Dr. Schroeder's linguistic competence indeed made his teaching of content more comprehensible to his students. Thus, I have organized this chapter in order to first examine these primary themes and then answer the research questions and finish with suggestions for future research and concluding remarks.

Culturally Relevant Examples

At times, students who do not share the same cultural background of their professors tend to get confused when the professor uses specific terminology or examples of objects, places, people, that are not culturally or linguistically relevant. Therefore, in any content area course it is important to introduce new concepts posed in class by building on the previous knowledge these already have (Echevarria & Graves, 2010). Although cultural relevance of examples was not one of the areas I anticipated I would observe at the beginning of my study, they played a major role in making the content of Dr. Schroeder's biology course comprehensible. Throughout the semester, Dr. Schroeder would frequently make references to objects, places, or people that were culturally relevant to the students. They would respond, laugh, and at times, add to the discussion. After

various examples, I realized how culturally relevant examples enables the negotiation of meaning in a classroom, which in turn allowed students to process, or "make sense" out of the information as a group (Brooks, 1968).

Culture goes beyond the mere traditions or rituals of a given group, thus when referring to the term culture one associates it with, "a set of meanings, and values shared by a group of people" (Alvesson, 2002, p. 29). In a way, the shared norms, beliefs, values, and traditions of the group guide their negotiation of meaning between the sender of the message and the receiver. Since communication is a purposeful and comprehensible transaction, teachers should be aware of students' perception processes and try to incorporate what they know and have experienced into class lectures. According to Wood's (2007) there is a "perception process" where our minds process the information provided by our five senses to actively generate thoughts, organize, interpret and analyze information, suggesting that students are not passive receivers of information (p. 45). As exemplified by students who participated in this study, when these perceived that the surroundings were relatable to their own knowledge and previous experience, they were able to connect that material and make sense of it in a more straightforward manner. The professor constantly used examples referring to their own age group, bird species found in PR, PR culture, among other popular aspects to help them make connections to the concepts presented in class. Roxá (2010) states there is a cultural negotiation approach to teaching when commenting how:

> A cultural approach to change in academic teaching and learning would mean to focus on the norms, values, shared assumptions, etcetera, that guide university teachers and their practice. If such an effort would succeed it would show itself in changed classroom experiences as well as in changes in the ways academic teachers talk about and interpret teaching, learning and assessment practices (p. 100).

The findings resulting from my research suggest that although educators, have freedom to do and choose their own materials, assessment, and educational strategies without limitations or specifications, it is imperative to remember that classroom learning should be guided by students' needs through the use of methods that work toward their benefit. This does not translate into the watering down of material, but the use of alternatives for lecturing and assessment related-activities.

Prior knowledge plays an important role in learning. The more information students knew before the lecture, the easier it was for them to understand, regardless of the language being used in the classroom. Wood (2007) states how there are "a number of factors which influence which stimuli we notice", this is why we only notice "things that STANDS OUT" (p. 46). Although education is a process of learning new things that we necessarily do not know and pay attention to processes that were at first unnoticed, teachers can enrich classroom interaction and students' attainment by highlighting a specific idea through the use of culturally relevant examples. Dr. Schroeder constantly provided culturally relevant examples. One example was when he wanted to focus on Lamarck's theory of evolution. Dr. Schroeder explained how this theory explained traits, "… if you have big muscles and you have a baby, it will inherit your big muscles" (Table 9), fragment which exemplifies how he provides relevant, basic, and reasonable associations so that students understand the concept at hand. It connects to, and stimulates students own understanding of the human reproductive system, allowing students to correlate actual theory to their everyday understanding of the world, consequently making it easier to process and store.

Moreover, Rosa (2011) also documents insightful proof on how culturally relevant education applied to math can positively influence mathematical attainment. Similarly, according to my observations and the end of the semester interviews with students, the data highlighted a

clear picture of how Dr. Schroeder provided similar contextual examples in class to allow students

to apply their own understandings of culturally relevant examples to Biology. In one case the

professor asked, "What is correlation?" but not one student answered (Table 10). He continued by

answering: "your height has nothing to do with how much you like hamburgers or *arroz*." In this

citation one can observe how the professor provided a culturally relevant example by using

students' food preferences; as basic as a hamburger or a bowl of rice. However, it is very

interesting to see how he not only mentioned the word "rice" but did it in Spanish: *arroz*. This

subtle use of the students' mother tongue exemplified his willingness to emphasize, highlight, and

stress specific content while using culturally relevant examples for exemplification. When

instructors develop a relationship between culture and class content by identifying certain linguistic

and cultural backdrops with which students could significantly relate to, it results in educational

achievement (Rosa, 2011). Rosa (2011) further comments on how in the case of his study, which

related students' culture to mathematics, it helped using students' existing knowledge in order to

better impart mathematical instruction. According to Rosa and Orey (2007), showing

respectability to "students' linguistic and cultural experiences" into mathematics taught at schools

increases their motivation in class and results in an increase in their execution (p. 1853). As an

observer, it was obvious that when students giggled, sat a little straighter and leaned a bit forward

in their seats, they were engaged and learning both content and language. Moreover, their posture

and body language was evidence that they were receiving the message clearly. Even myself, as an

English graduate student, understood concepts when explained using culturally relevant examples.

The class observations were not the only data sets from which the theme emerged.

Participants commented on how examples were helpful when students did not understand a

concept.

In the interview section, participant A1 stated,

Si estás prestando atención, vas a captar muchas bromas que el hace de los temas de la

clase. Como "nerdy jokes" y ejemplos usando nuestra cultura puertorriqueña.

[If you are paying attention, you will get lots of jokes that he makes regarding the topics in

class (nerdy jokes) and examples using our own Puerto Rican culture].

Participant A2 agreed with the use of examples and how it was not only beneficial for students but

also made it seem like he cared about their learning. The participant commented,

También me gustaban los ejemplos hipotéticos que usaba con unicornios o dragones.

Usaba animales ficticios porque quería saber si éramos capaces de aplicar la teoría en

cualquier situación.

[I also liked the hypothetical examples he would use with unicorns or dragons. He would

use fictional animals because he was interested in knowing if we were able to apply the

theory to any situation.]

Participant A2, restates how culturally relevant examples impacted students' learning, even when

teaching students at a college level. González, Moll, Amanti (2005) comment on the importance

of using students "funds of knowledge" in the classroom. Although the researchers refused to

mention the term "culture" to avoid generalization, it is true that when teachers incorporated

cultural practices or "local knowledge" or community traditions and practices in the class, students

understand the concepts being taught more effectively (Gonzalez et al., (2005). Vygotsky (as cited

in Gonzalez et al., 2005) mentions how "cultural practices and resources mediate the development

of thinking" (p.4). For this reason, the educational process can be enhanced when teachers learn

about their students' lives and bring context into the content-based classroom. In fact, some of the

failure of ESL students in English-medium classes is related to the fact that not only is the

language used not their own, but also the way in which the language is taught is often divorced of the cultural and content that students already know (Cruz-Jiménez, 2009). Cummins (1979) also argues that students who have developed academic language proficiency in one language can make use of this proficiency for learning in a second language.

One of the techniques mentioned in order to accomplish the building on knowledge is the use of contextualization in class. González et al. (2005) refer to the term and how it is:

> [c]oncerned with making meaning and connecting school to students' lives.
> What better way to engage students than to draw them in with knowledge
> that is already familiar to them and to use that as a basis for pushing their
> learning? (p. 6)

Using culturally relevant examples allows the transportation of knowledge with ease, which might increase when new material is being discussed in a language that is not your own. Therefore, drawing on context of what is culturally known might have various positive outcomes.

Connecting cultural practices and resources to mediate meaning has a powerful effect on comprehension. Students in class were able to develop critical thinking that allowed them to unveil and positively become part of their own learning process instead of it just being "handed down" to them. Thus, when providing familiar cultural context, connections are established, which in turn help students' mind to categorize what they know and what is similar and even establishes the relationships between concepts which consequently promotes cognitive flexibility and neglects visions of learning as something superficial, such as mere memorization. Moreover, the use of students' background knowledge resolves ambiguity caused by the learning of new information. This happened a number of times in Dr. Schroeder's class. He used a culturally relevant example and it was so memorable in students' minds that they would use it in Friday discussions to answer

questions or explain concepts to other students who did not understand. Bloom (1956) states that there are three different domains of educational activities: cognitive, affective, and psychomotor. Bloom (1956) gives priority not only to intellectual skills such as recalling, memorization, recognition, and imitation of patterns, among others, but also focuses on the affective and psychomotor domain, which although are rarely incorporated at once in a classroom, it was frequently observed in Dr. Schroeder's Biology class.

In taking an English medium course when a student's first language is not English, would be normal for that student to feel anxious when learning something for the first time. If the concept is in another language, taught by a professor who is not fluent in your native language, the situation can create uneasiness and insecurity, and feelings that hinder learning altogether. In the end, examples that are relevant to the culture, either the culture of the nation or age specific sub-cultures, can allow accelerated learning of new concepts and lower anxiety. In her dissertation, *Designing a culturally relevant curriculum for immigrant Mexican American fifth-grade students,* Cruz-Jiménez (2009) state that, "[t]he importance of cultural relevance in learning should not be underestimated. Learning about one's culture allows the growth of "Voice" and increased self-worth" (p. 305). In other words, students not only understand, but also feel reassured about the learning process taking place in the classroom despite it being in their second language. In the questionnaire for this study, when asked about suggestions for the professor, participant A-13 directly suggested that educators should reference situations, examples or events that are known in Puerto Rico because it is easier to relate to them. This suggestion on the part of the student goes hand in hand with Morales (1999) who noted that a teacher of English to PRI used the *Washington Post* newspaper, and because students did not know what it was, they established *El Nuevo Día* newspaper in PR as a point of comparison to help them understand. This proves how at times it is

not that students' who are not literate enough in their second language to grasp the content but it is more an issue of culture and aspects of the specific group who are not taught in the specific context. According to students, the use of culturally relevant examples in a classroom is an effective strategy thus it has proved how learning is not simply a question of transmitting knowledge, but rather of working with students so that they can reflect, theorize, and create knowledge.

Using Visual Aids and Appealing to Multiple Learning Styles

With increased use of cell phones, computers, projectors and the Internet, our society has become more visually mediated. Visuals are part of our everyday lives and we notice them everywhere. Visual cues in a classroom are like advertisements, they are meant to be fun, colorful and command attention, and because of their common use in the classroom, they are almost expected by most students. This has to do with the fact that with actual texts, our brain is required to create the image, but if the image is already created, the human sight analyzes and decodes information directly. Berman (1998) agrees that now, most young children have the ability to "store memories by associating them with their senses and may even have the ability to cross-sense" (p.187). Because of this, visual aids have an even more powerful effect on students and their learning. According to the *India Guide for Instructors*, a student relies on their eyesight 75% in contrast to the other four senses (unodc.org). With more visual learners in classrooms today, teachers must resort to a variety of ways of explaining the concepts, besides using their presence and words.

The use of visual aids in the Biology class was the second theme that emerged across the three data sets. In the case of Dr. Schroeder, he never lectured without additional visual aids. In fact, the professor always had a colorful and well-prepared presentation, which was projected onto

a screen at the front of the classroom. With it, he would highlight the most important aspects of class discussion. However, it is important to note that these Power Point presentations did not substitute the actual class content. These were used as a visual aid by which he would guide the lecture, discussion, and examples. In fact, participants in the interview agreed that reading the presentations (available via *Moodle* educational platform*)* did not provide sufficient material for a holistic review. Students had to come to class and listen to the lectures, but had an advantage; Dr. Schroeder prepared the slides a week before so they could print the slides beforehand and come prepared to take notes in class.   It was the combination of the lecture with the presentations and other visuals in the presentation, which elicited students' attention to class, and a positive reinforcement. Plus, it meant a meaningful benefit to those students whose English linguistic competence is not as advanced, thus the words provide a visible framework which allowed them to follow the class discussion.

Observable materials offer numerous benefits, one of them being that they allow ideas to be conveyed in a more effective manner. This is especially true when the class pertains to their major, because it holds special relevance towards their professional career, visual aids can be of great use. These might range from tables, graphs, charts, pictures, diagrams, presentations, or drawings. Participant A3 positively commented on Dr. Schroeder's use of visual aids in class and how at times the explanation or presentations were not enough but when seeing the drawing students understood. Thus, the visual aids used by Dr. Schroeder were effective in that they helped create a mental image and connections to prior knowledge, allowing the students to comprehend course material.

Visuals also help students retain more information than they do with text. This is not just because we are a visually oriented society, but also because everyone is intelligent in a different

way. The emergence of the theory of multiple intelligences was a concept propelled by Gardner in

1983 as cited in Bas (2008). He established that everyone had a different learning style; there are

specific activities for each individual that will trigger their maximum potential as opposed to

others. The theory aims to instill in educators the idea that the more variety in classrooms, the

more students will benefit in terms of learning. Ninety four percent of students pinpointed how the

use of audiovisuals (the board and/or projector) was the teaching strategy they found most helpful.

Regarding visuals, participant A2 highlighted Dr. Schroeder's use of them in class. The participant

commented how,

> Cuando el escribe en la pizarra, porque no solo está explicando o enseñando lo que se
>
> ve en el Power Point sino que se ven los dibujos, tu entiendes. Mira, por ejemplo, el
>
> tiene una presentación de un organismo y como resultó, pero usa la pizarra para
>
> enseñarte el estado original del organismo.   También daba un montón de ejemplos.
>
> [When he [the professor] writes on the board, because he is not just explaining or
>
> teaching what is being observed on Power Point but you can also see the drawings and
>
> understand. Look, for example, he has a presentation of an organism and how it
>
> turned out, but uses the whiteboard to show the original state of the organism. He also
>
> gave lots of examples].

This comment suggests that visuals highly reinforce abstract concepts and thus help students when

listening, understanding, responding, processing sequenced information and paying attention in

class. For this student, a drawing meant the extra help, which allowed for the understanding of a

concept that was not clear at first.

Bas (2008) also comments how teachers should incorporate ways of integrating the

multiple learning styles in ESL and EFL classrooms. Among the various activities mentioned were

the use of games in the classroom and the cooperation not competition system. Not only do these two activities target diverse learning styles, but also are also relevant visual aids. Games focused on cooperation are not an image, video or graph, yet help exemplify in a visual form what the student is expected to learn while simultaneously practicing the concepts through continuous action. Students interviewed had a lot to say about the Friday activity, that was more like a game. Dr. Schroeder had numbers in a cup, and the number you picked corresponded to the slide number in the presentation; the professor would scroll down until he reached the slide corresponding to the number in the paper. Students could get in groups to answer (and move the chairs) or stay alone. The only condition was that in order to accumulate participation points for the week, students were expected to either answer a question or ask one in relation to the question/answer talked about. Participant A1 commented how, "El es bien dinámico. Me gustaban los debates." [He is very dynamic. I enjoyed the debates (referring to the Friday activities)]. Participant B1 also mentioned how he really enjoyed the Friday discussion because the weekly format was lectures on Monday and Wednesday and discussion/activity on Fridays. He also mentioned the importance of learning students' names and giving points for participation. This technique also allowed students to feel more comfortable when asking a question any day in class or at his office. He made himself approachable and students felt confident when providing their input on a certain topic. In addition, games are fun at any age and that fun makes students become less worried with their language ability and more worried about creating meaning.

When reading a paragraph, or listening to words, our brain is automatically trying to create a mental picture of the message emitted. According to Anderson (1969), in regards to Edgar Dale's "Cone of Experience", students remember 30% of what they see, such as watching moving or still pictures and 50% of what they see and hear. Some examples of these are exhibits and/or

demonstrations. A learning environment that encompasses hearing and visuals does help accelerate the cognitive process of visual learners, and in turn, stimulates thinking and reflection. According to Berman (1998) as cited in Bas (2008), "if children can draw or visualise [visualize] an image, hum it or move through it first, they may be able to more easily talk or write about it (p. 169)." In fact, observables/visuals allow students to be more engaged and interested in the subject. Usually explanations become alive when a photograph, video, or any other visual is shown and raise interest in students and consequently tends to help them make connections in a quicker manner and remember easily. Moreover visuals tend to break information into manageable parts, instead of overwhelming students with content all over.   Those visuals played a substantial role in the Dr. Schroeder's Biology course and were probably one of the primary reasons that his English medium course was made comprehensible to his ESL students.

Native Language Reinforcement

The use of a student's first language (L1) in a second language (L2) classroom is an issue that has been in constant debate in research focusing on second language acquisition and the teaching of content in students' second language. Some researchers have established how L1 is a problem that should be avoided as much as possible in ESL classrooms. Although much controversy has surrounded the language as a problem vs. language as resource policies, it is now seen how the combination of education in two languages is not only beneficial for English language learners, but might be a necessary step "to maximize learning" which will work towards the development of integral bilingual citizens; a concept known as "translanguaging" (Lewis, 2012, p. 4). It is true that students can greatly benefit from immersion, an all-English approach in class, but when the main focus of the class is content itself and English is simply the language used to mediate that instruction, a "sink or swim" environment is not the solution (Gonzalez et al.,

84

2005). When pinpointing teaching strategies, only 24% of the participants considered the use of

Spanish as helpful for classes taught in English. Participants also said that some strategies they use

to learn content in English-medium courses were to translate the material to Spanish (29%) and

look for scholarly articles in Spanish (12%). Despite the fact that the numbers were not high;

participants in the interviews did emphasize how the use of Spanish in the Biology class played a

vital role in classroom interactions and communication.

Teacher's use of L1 in an L2 classroom can be beneficial for students. Using it for certain

situations such as giving instruction, providing complex explanations, translating words, among

others; allows students to achieve comprehension much faster than when the teacher tries to

mediate meaning in L2 (even through the use of gestures, repetition, and rewording). If students

know that they can count on the teacher to use some Spanish when they have questions and are

confused, they will feel better about asking their questions and consequently their level of anxiety

is potentially lowered. Lewis (2012) comments on Williams (2003) about how "translanguaging

often uses the stronger language to develop the weaker language." (p. 4). This notion reinforces

the balanced bilingual approach while developing a sense of closure and empathy from the teacher

to the student as the one seen in the funds of knowledge approach discussed earlier.

The use of Spanish by Dr. Schroeder was mentioned across data. Four participants in the

survey identified the use of Spanish words or phrases as helpful in classroom interaction and

commented how professors should learn some Spanish as a way to break the language barrier or

use Spanish in their presentations. Participants interviewed commented on Dr. Schroeder's use of

Spanish. According to participants interviewed, Dr. Schroeder cared about students being able to

grasp the material. Participant B1 commented on how he asked students directly and if one did not

know how to express the doubt he would help out. This comment suggests that Dr. Schroeder was

aware that at times, due to their limited linguistic repertoire or lack of settings to practice, they are unable to clearly express complex ideas related to science in their second language. Another singularity was the fact that Dr. Schroeder understood some Spanish and questions addressed to him in the language would be answered without major language interference. This gave students certain confidence and freedom to incorporate a Spanish word within a sentence (said in English) to be understood. One student also commented, "…el entiende mucho español así que entendía cuando le preguntabas en español." [He (the professor) understands a lot of Spanish so he would understand when you asked a question in Spanish]. In fact, the professor even spoke Spanish during one lecture in an attempt to explain a concept to a student, an action that shows true commitment to the learning of his students (Table 3).

However, Dr. Schroeder was not the only one who stood out for using or having a positive attitude towards students' L1 in their L2 mediated course. Students mentioned other professors and how their expressions or views on students' language affect how students perceive the professor's attitude. Participant A2 commented about another professor and how he actively encouraged students to answer in English or Spanish but no mixing and it had to be written correctly. According to A2, the professor said, "Pueden hablar español, así yo aprendo más." [You can answer in Spanish, that way I can learn more]. The participant expressed how he/she was pleasantly surprised to see the professor's willingness to learn students' language and help them feel better about taking his class and exams. As a result, positive attitudes towards the class and the content flourished (Cruz-Jiménez, 2009, González et al. 2005). The professor's receptiveness and understanding towards students' language and culture impacted the participant in such way that she felt the need to highlight it in the interview.

Participant A3, on the other hand, had a different experience; the professor had specifications for exams, "Ustedes pueden contestar en español pero yo no lo voy a corregir porque yo no se español." [You (all) can answer in Spanish, but I will not correct it because I do not know Spanish]. According to the participant, the fact that this professor had lived in PR for years and never bothered to learn or cut students mid sentence if they answered in Spanish, immediately gave the participant the impression that the professor had a negative attitude and did not respect students' learning processes. The student then highlighted how Dr. Schroeder tried hard to understand and mediate meaning in class and did a contrast on how both professors dealt with their audience, Puerto Rican students who were (mostly) native speakers of English. The participant then, compared Dr. Schroeder by saying, "El no es de esos profesores que se cierra cuando un estudiante habla en español." [He is definitely not one of those professors who shut down when a student uses Spanish]. This instances exemplify how, when an educator incorporates the use of L1 in a classroom or allows students to use L1 to an extent, these students feel motivated and respected, a trait that was also seen in students participating in the "Funds of Knowledge" study conducted by Gonzalez et al. (2005).

Throughout the semester while I observed the Biology class, I noticed how most of the students worked in pairs during the Friday game activity. As they worked in their dyads, they used Spanish to analyze the texts that were provided for them in English, yet their response to the entire class was in English. This common and very interesting movement back and forth between English and Spanish and back to English allowed students to work together facilitating their learning through what Vygotsky called the "Zone of Proximal Development" (ZPD). The Friday activity goes hand in hand with Moll (1990) and his argument on how the ZPD is a period where the work that "children can perform collaboratively or with assistance today they can perform

87

independently and competently tomorrow" (p.3). The organization of Dr. Schroeder's course facilitates learning by providing an environment where students can use their L1 in their small groups or dyads in order to make sense of the week's concepts. One student mentioned how, "El es bien organizado. Además, no daba clase todos los días. Teníamos discusión los viernes. El es el único que hace esas cosas." [He is very organized. Plus, he did not give class every day. We had discussion Friday. He is the only one who does these types of things (discussion Friday).] The fact that Dr. Schroeder provided a different alternative for obtaining points was an aspect of class, which students enjoyed. Plus, it worked towards lowering their language anxiety, thus they had an opportunity to ask questions regarding the content of the class while simultaneously practicing their second language communication skills. Participant A3 mentioned the importance of Friday activities by stating, "Me gustaba la discusión los viernes. El formato era como que: clase, clase, discusión. El se sabía tu nombre y te marcaba en el *rollbook* si participaste." [I really enjoyed the Friday discussion. The format was like: class, class, and discussion on Fridays. He learned your name and would mark you if you participated]. By allowing students to use the language of their choice to answer questions, using some Spanish himself for clarifying doubts, and even putting some effort into learning all of his students' names, Dr. Schroeder reinforced the idea of the classroom as a learning community; a place where students and teacher engage in the learning and sharing of knowledge.

During their first years of life, most children are not given a formal education at home, yet they repeat the learned behaviors that they observe from their parents and after emulating their models, they are fully capable of performing those tasks without any help. Teaching abstract concepts and theory is no different. At first, it is daunting and unknown for students. For this reason, emulation is very important in the classroom. Imitation and practice facilitates and

88

encourages successful learning. Instruction is all about modeling students' critical thinking, cooperative skills, and even proper language skills and pronunciation. When teachers themselves trigger students to imitate a series of tasks and little by little give more responsibility to them, they will learn concepts accurately. In Dr. Schroeder's class, he provided both the modeling and the group support to create a language stress-free environment for learning. He focused on Spanish, not only as a way to mediate meaning, but his students and ESL learners served as a support to each other in regards to the use of a language that they do not master as their own. Participant A2 mentioned how he/she liked when someone did not know a word in English and the group had to tell him/her so that the student could learn. The participant identified this as a positive practice inside the classroom.

Interestingly enough, although Puerto Rican islanders are exposed to English at the UPRM, they live in a context where the use of English is constrained to specific areas and limited situations (Blau and Dayton, 1997). A limited linguistic repertoire might result in them being unable to know how to say or explain their ideas when having to declare knowledge of something, especially concepts related to the field of science. In regards to this particular aspect, Participant A3 added, "Y el entiende mucho español así que entendía cuando le preguntabas en español." [And he understands a lot of Spanish so he would understand what was asked to him in Spanish.] This excerpt from an observation presented on Table 5 also demonstrates student's use of Spanish during a Friday activity,

A student without raising his hand immediately began answering, "It is when they

evolute [evolve]. 'Ahhhh.' he uttered, demonstrating some frustration in his face and

tone of voice. "Es cuando se unen por presión ambiental[3]", the student summarized.

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[3] When they unite due to environmental pressure.

The professor exclaims, "Great! You actually answered the question and went on to

talk about it." He seemed pleased and continues asking the students if they

remembered similar ecological pressure.

Even though the student could not come up with the answer in English, he did try to engage in the

activity and participate. Therefore, allowing the use of L1 in a classroom is a decisive advantage

because it eases students' anxiety and feelings of inadequacy due to inability to understand. Plus, it

allowed communication to flow continuously, avoiding awkward silences caused by students who

felt embarrassed of were not able to deliver a message effectively due to low proficiency or fluency

(Cook, 2001). In addition, incorporating the use of L1 as a means student collaboration created a

bond and worked toward the creation of a learning community that worked together toward a

common goal: learning the material and passing the course with a good grade.

Research Questions

Having the ability to communicate effectively in English not only denotes prestige, it is

also a praised ability due to its international value for educational and professional purposes (Blau

and Dayton, 1997). Regarding its language policy, the UPRM's Undergraduate Catalogue (2011-

2012) under "Language of Instruction" states,

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 (p.65).

It seems that this institutional language policy promotes students to broaden their working

knowledge of the English language. Moreover, as it is of common knowledge that faculty

members who have studied in universities abroad have been incorporated into our campus, English

medium courses have become commonplace in departments outside of the UPRM's English

Language Department. Mazak (2003) comments on the perceptions of English in PR universities and how one of the participants in her study mentioned how at the university professors would assign texts in English, especially in fields like accounting, among others. In fact, when asked about the amount of English medium courses (without counting language requisite courses from English Department) not one student from this study answered zero. Participants had taken at least one English-medium course.

However, despite their familiarity with these types of courses, previous research shows how English medium courses do create a certain level of anxiety in students whose first language is not the one used for instruction. In traditional classrooms, professors tend to be impersonal and distant with students, focusing only on delivering a lecture. However, students' success in English medium courses could be due, in part, to the teaching strategies professors use to make students feel comfortable communicating inside the classroom. When professors create an environment full of strategies and attitudes, which serve the purpose of acquiring knowledge of specific fields of study while reinforcing basic communicative skills and linguistic proficiency, students are more open to learning. This is partly due to having various methods of reinforcing the content besides listening to the professor's lecture, which is in their second language.

This practice and its effects on students have developed a series of studies regarding teaching strategies that lower students' English language anxiety, which have been conducted in PR and the US (Morales, 1999, González, et. al., 2005, Cruz-Jiménez, 2009). These primarily focus on the importance of using culturally relevant curriculum for students' educational benefit. Ladson-Billings (1995) as cited in Cruz-Jiménez (2009) establishes that, teachers should not only become "knowledgeable about the cultural backgrounds of their students but "[t]hey should also acquire the skills needed to translate that knowledge into effective instruction and an enriched

91

curriculum" (p. 36). Therefore, professors teaching English medium courses should focus on students' knowledge and experience, using what is known for them and use it to explain the unknown.

Research Question 1:

Does the use of specific teaching strategies in English-medium courses increase students' language and content comprehension?

Being in a classroom does not necessarily mean that students are learning. For this reason, teachers must be willing to implement the most adequate practices designed to help increase student learning in the content course being taught. However, to help increase the content, there also has to be language comprehension. Sparks (2012) establishes how language comprehension is the construction of meaning through the use of various aspects that comprise the language (i.e. written material, conversation, articles, among other everyday materials and activities). When a teacher demonstrates adequate planning by incorporating specific pedagogical strategies to address the needs and reinforcement areas of students and there are "understanding classrooms as cultural settings," students grasp the content and the language in which the lesson is taught in a clearer form (Gonzalez et al., 2005, p. 19).

Even though students at the UPRM are expected to have a working knowledge of the English language, not all of them feel their English communicative abilities are those of a balanced bilingual. Table 1, which shows students' self report on English competency, demonstrates how 47% of students reported their English speaking abilities to be "very good." This score was the lowest of the five communicative aspects presented and shows how students do not feel completely confident of their capacity to hold a fluent conversation in English.   Despite many students' perceived lack of confidence or competency in using English, Dr. Schroeder used three specific

strategies that directly impacted students' language and content comprehension. These three strategies will be outlined below.

Due to the obvious discomfort that might result in students having to take a course in their second language, students could be negatively distracted from their main course objective: learning the course content. Based on the observations and input provided by students in Dr. Schroeder's classroom; the use of effective pedagogical strategies created a certain confidence which helped increase students' content comprehension in contrast to previous class experiences. As students established during the interviews, Dr. Schroeder used a plethora of appropriate strategies as well as daily class practices, which helped them acquire the content and understand the language in which the lesson was taught. According to the responses of the questionnaires, the daily observations I witnessed, and more specifically, the narratives of the participants interviewed, students constantly mentioned how they greatly benefited from the incorporation and effective use of pedagogical strategies as opposed to other English-medium courses at the UPRM.

While sharing about their previous courses, students mentioned how the strategies incorporated in Dr. Schroeder's biology course had helped them bridge existing gaps from previous science courses. Participant A3 stated, [I managed to fill some gaps I had from other classes such as Ecology. He explained better, from its origins]. Participant A2 mentioned another professor who allowed Spanish in the class and how students felt surprised but comfortable about participating in class, [He even said, "You can answer in Spanish." I have never heard a professor say that]. Having the professor provide certain linguistic and strategic flexibility creates a comfortable environment that allows students to relate and connect to the content, and when relating their previous knowledge to the new information, their comprehension increases.

Another key strategy for increasing language and content comprehension was the use of visual aids in the classroom. Visual aids used ranged from pictures, videos, presentations, charts, graphs, and diagrams. Participants consistently commented on the important role visuals played in Dr. Schroeder's biology class. Table 2 presents students responses to the specific teaching techniques, which help them, understand concepts posed in English medium courses; 94% of the participants identified "audiovisuals" as their number one choice. In her work, Cruz-Jiménez (2009) agrees by stating, "I provided graphic organizers for the children in the form of maps, timelines, and writing on maps to help them visualize where individuals and events fell in the grand scheme of Mexican and U. S. history" (p. 186). Plus, students with instructional practices aimed towards a multiple intelligences approach are more retentive and register higher achievement levels (Bas, 2008). One of the participants in the questionnaire stated how to increase his/her comprehension as a student, the most important material should be presented using visuals and the explanations of those visuals could be read in the book. Dr. Schroeder did just that. He took images, graphs, and diagrams, among other visuals and used them to explain concepts posed in the textbook. In fact, one of the participants who answered the questionnaire explicitly commented about the examples and Dr. Schroeder's use of the whiteboard to draw in order to exemplify the concept being discussed in a visual form. All of them affirmed how after Dr. Schroeder's visuals, concepts, and course content in general would be much more clear.

The third strategy used to increase comprehension were culturally relevant examples incorporated into the lessons. Even though the class was more focused towards specific science-related concepts, Dr. Schroeder still managed to connect theories, concepts and ideas to relevant aspects of the students' PR culture or age group. Table 9 shows how Dr. Schroeder uses fitness (which generates some interest in most college students) to explain Lamarck's theory on how

babies inherit traits. Dr. Schroeder explained how, "if you have big muscles and you have a baby, it will inherit your big muscles." He also used culturally relevant examples to explain correlation (Table 10). The examples were targeted towards food and alcohol, since it is perceived that PR college students like to eat rice and hamburgers and drink alcohol when hanging out. In this part he explained, "Your height has nothing to do with how much you like hamburgers or *arroz*" and "People who make less money, drink Budweiser and those who make more drink Coors Light." When using these examples he elicited more attention and participation from students than when he directly asked, "What is correlation?" Participant A1, during the interview, established how the professor used nerdy jokes regarding the field of biology and examples using "our Puerto Rican culture." Participant A-13 mentioned how [Power Point presentations always help] and [If a professor is foreign (he/she) should make reference to situations happening in Puerto Rico because it is easier to relate].

In her study, Cruz-Jiménez (2009) also highlights as one of her strategies how, "The topics of our discussions provided connections to their own life experiences and current events" (p. 188). Because Dr. Schroeder was consistent in using these strategies everyday in the classroom, students knew what to expect in class. Even though the class, textbook, and professor guided the class in students' second language, there were other techniques employed to increase understanding of content. In fact, he not only used examples, additional aids and other teaching strategies but went far beyond by also re-discussing concepts in his office, despite his difficulty to communicate in Spanish. Participant B1, who openly did not like Mr. Schroeder's Biology class, mentioned this practice. Despite not liking the course, he explicitly admitted that Dr. Schroeder's ability and willingness to use Spanish during his office hours provided a great deal of help in learning the course content and preparing him for subsequent exams. This comment shows how even when

students had difficulty with the class, the professor or even the language (which he also had), Dr. Schroeder incorporated strategies that attempted to help students' individual needs and learning styles. Thus, in answering Research Question 1, Dr. Schroeder's use of culturally relevant examples, use of visual aids, and native language reinforcement seemed to increase his students' language and content comprehension and allowed them to clarify theoretical aspects related to the field of biology in general.

Research Question 2:

How do a Biology professor's linguistic and strategic competencies (in students' native language) help or impede the learning of content?

Knowing a language is not enough but knowing how to combine the message with the appropriate expressions and instances also plays an instrumental role in the effectiveness of communication mediation. Robatjazi (2008) establishes how "communicative competence draws on how one foreign or second language learner uses his foreign/second language command and what he in different settings and interactions utters as appropriate" but adds "linguistic awareness may never be sufficient unless it is along with cultural awareness." (p. 250). Similar to Alksandrowicz-Pedich, et al (2003), students agree on how Dr. Schroeder's linguistic competence in Spanish, along with his cultural understanding helped his students learn the complex principles of Biology. He has tried to work on his Spanish competence and even though he admits it is far from perfect, he does try to incorporate a word or two to make students familiar with the concepts being spoken. Dr. Schroeder is also confident in his Spanish in more informal settings, such as his office, for those students who do not understand the lecture presented in class. Students also expressed how helpful it was to know that an English-speaking professor was able to use Spanish in class to address specific questions they had. Participant A-7 stated how professors should learn

some Spanish as a way to break the 'language barrier.' Participant B1 also pointed out how Dr. Schroeder would use "English with Spanish words to draw our attention". Whether consciously or not, the professor was also emulating a common language practice in Puerto Rican youth: using Spanglish or what some language experts would call "translanguaging." This way of speaking also elicited their attention towards the class and content.

However, there is more to it than just the sporadic use of Spanish in the classroom that made Dr. Schroeder's teaching more understandable. Becoming familiarized with students linguistic and cultural background helps educators examine and modify their educational practices and develop sensitivity towards their pedagogical choices, especially for ESL learners (González et.al., 2005 and Rosa, 2011). This awareness also helps mediate interactions between the professor and students (Moll, 1990). Dr. Schroeder knew that non-verbal communication is as important as linguistic competence, thus greatly impacts how students perceive and respond to the messages being sent. The professor possessed certain degree of linguistic competence but more importantly, seemed to have an idea of the unspoken communicative rules, which governed Puerto Rican college students' interactions. Dr. Schroeder constantly used hand gestures, eye contact, voice projection, and was eager to learn more. He even seemed aware that some of his need to think the question in Spanish and also think about the answer in Spanish before translating it to English thus he implemented communicative techniques such as think time and wait time. Students were given adequate time to think about the questions thoroughly and he patiently waited for them to construct their answers.

Dr. Schroeder was conscious that students tend to dose off in classes, especially those scheduled early in the morning. Therefore, he would make use of facial expressions and hand gestures, lowering and increasing his tone of voice, enunciation for students to understand what he

was saying clearly, turning lights on and off when pictures were projected on the screen, and telling students that they should be taking notes. Although these practices can go unnoticed for some, the fact that he has studied his Puerto Rican students well enough to know that it helps their attentiveness, demonstrates the importance of knowing better practices of non-verbal communication help deliver the message effectively.   He was also an active participant in the learning process and was well aware of the non-spoken rules that govern effective communication. Interestingly enough, in the questionnaires, 71% of the participants also pinpointed body language, gestures and enunciation as teaching strategies, which help them understand classes taught in English.

Similar to most Puerto Ricans in social contexts, Dr. Schroeder proved to be a very dynamic professor. He used both facial and hand gestures, to promote participation and was always moving from side to side. Even participant B1, who reportedly was not fond of Dr. Schroeder, admitted that he has a certain attitude that reflects caring, which made the participant feel at ease when talking to the professor or going to his office. Therefore, in answering research question 2, the data overwhelmingly suggests that Dr. Schroeder's linguistic and strategic communicative competencies helped students learn the content thus they were in an environment which inspired them with confidence and constant effort from the professor to help them.

Research Question 3:

How does a professor's linguistic and communicative competencies affect students' language anxiety?

According to Zhang (2004), "language anxiety is a state of apprehension occurring in the process of a second/foreign language use owing to the user's incompetence to communicate with language" (p.1). Students tend to feel anxious or scared when factors that are key to learning a

second language combine with motivational and attitudinal elements attributed mostly by psychological factors in their mind as language learners. This anxiety can be triggered by their lack of interest, motivation, confidence and/or inappropriate teaching techniques, yet can worsen when the teacher does not posses a certain degree of linguistic and communicative competence to effectively manage the situation. In this case study, the professor's empowerment of linguistic and communicative competence in students' first language, positively eased students' language anxiety. When students in Dr. Schroeder's class saw that he not only knew some Spanish but also fostered a friendly classroom environment where they felt comfortable and respected, the students responded positively. Participants had a lot to say about the unwritten policy for Spanish in the classroom. In the questionnaires, Participant A-14 suggested how professors should master some Spanish even if the course is taught in English. The participant added that professors should let their students know that they could ask or discuss concepts in Spanish. Participant A2 commented how, [I liked when someone did not know a word in English and the group had to tell him/her so they could learn. This was super positive. And he spoke or tried to use Spanish]. Participant B1also added, "He would ask students directly and if the student did not know how to express his/her doubt, the professor would help him/her".

The study revealed that students positively acknowledge professors who allow and/or explicitly embrace the use of students L1 in their classrooms even if do not know or speak the language. This notion is supported by Noels et al. (1999) when stating how when, "teachers communicate with students in a manner that supports these self-perceptions, students are likely to be intrinsically oriented"(p. 26). When students are motivated, they might be consistent and reach achievement, yet "students who find their teacher controlling or authoritarian and who believe that they are not given useful feed- back about their progress may lose their sense of self-

determination and competence in the learning process" (p. 26). In fact, participants expressed certain discontent with professors who avidly prohibited them from using their L1. Furthermore, Participant A-3 mentioned a former Ecology professor who had been living in PR for years and taught his class completely in English. The participant narrated how at times, students did not know how to say a single word in English and the professor would cut students off mid-sentence and state how he did not speak Spanish. Attitudes towards Spanish such as the one mentioned in the previous comment made students who experienced these kinds of professors feel uncomfortable when asking questions or participating in discussion. This same participant added how he felt Dr. Schroeder tried to understand or prodded students to help each other find the vocabulary to express their questions accurately so that he could answer them. This form of interaction unquestionably made students feel more comfortable. Moreover, the fact that Dr. Schroeder was open to discussing course content in Spanish after class was essentially just the opposite of other experiences that participants had when dealing with non-Spanish speaking professors. Cook (2001) supports the language-as-resource approach by reaffirming the idea of professors should not eliminate students' first language simply because they are taking an English-medium course. In fact, students' perception of positive attitudes from professor towards the students' L1 can elicit more positive attitudes from students and less anxiety. Furthermore, it gives students more freedom to ask questions and clarify doubts. Students' first language is a part of who they are, so the teacher's goal should be to create situations where students get to use their L2 without feeling embarrassed or inadequate.

Additionally, Dr. Schroeder's Spanish competence is not great. Nevertheless, students perceived that just as they were second language learners who were putting themselves out there when speaking in an English class, he was also breaking through when using Spanish, even though

it was far worse than their English. The fact that he tried without fear and apprehension made students feel less taken aback because he set the example. In various instances throughout the interviews, participants commented on how the fact that the teacher was open to learning about their second language through its use or allowing its use in class was a vital factor for success. In the end, students felt less anxious about the language in which the course was dictated and more focused on learning the content.

Pedagogical Implications

Taking content courses in English is a very challenging task for students whose native language is another one, even if the teacher is an expert in the field of study. It is up to the teacher to implement methods that will allow him/her to impart the knowledge in a comprehensible way in which meaning can be mediated. Coupled with effective strategic teaching, the teacher should study his/her student audience to determine which techniques will work toward the learning of new course content in their field of study and the simultaneous (and unconscious) betterment of their second language communication skills. Moreover, teachers should also be aware that students' levels of language proficiency are different and try to make learning more comprehensible for them. Simple modifications in class routines such as learning students' names, using simpler terms (not oversimplified) and showing interest in their culture will give students a more fulfilling learning experience regarding both content and language.

In order to provide a relevant learning experience, teachers need to prepare their lessons to build on their students' prior knowledge; this theory that has been proven with extensive research from Gonzalez et al., (2005), Alvesson (2002), Echevarria & Graves (2010) among others to help students understand the concept and make extended connections. Each student is different, and in no way I pretend to ask teachers to come up with individual ways of teaching, yet it is imperative

to understand that teaching is not merely transmitting content. Teachers should work with students so that these can reflect, theorize, and discover knowledge as well.

This case study reaffirms how teachers, even at the college level, should help students conceptualize knowledge through the use of teaching strategies that are fit for their age and culture group. As a result, content learning is higher and students' anxiety towards the language and class lowers. It could also mean that even professors need workshops and conferences in regards to the teaching of students, especially when their native language is not that of students.

Moreover, ESL students greatly benefit from the multiple pedagogical strategies/techniques pinpointed in this study. In the future, these can be incorporated into content courses throughout campus to allow a more varied and effective learning process. Through the use of these strategies in class, the content is being reinforced not only through their hearing when listening to the lectures. They are also required to use their eyes to observe the visuals presented, write notes in their notebooks, apply their L1 knowledge to their working L2 linguistic repertoire and develop a sense of community among classmates, while make connections to the world around them by relating the examples to their cultural environment.

This study also emphasizes how, when teaching a class in students' second language, the professor must be proactive in finding teaching strategies which facilitate students' learning and increases their confidence so that they can remain enthusiastic and positive about the class. If students see a professor who cares, despite the language barrier, he/she will try harder to perform in the best way possible.

Limitations

The process for developing this study was complex and difficult. At first, I envisioned a study in which I could observe multiple content courses from professors in various departments to

compare and contrast classroom interactions, strategies, and student response. The initial plan backfired when some of my potential professors were not interested or did not want to grant access to their classrooms. This was a set back in terms of finding new prospects to ask. In the end, Dr. Schroeder agreed to participate and I decided to observe only his class. After finding the professor/participant I began doing my observations. These observations were in the form of field notes and not video or audiotaped which meant that my field notes and data were constrained only to my notes taken in the class and my memory of the class when I was writing up the field notes. A few weeks after the observations began, I turned to the questionnaires. The downside of having created the questionnaires before observing the course and before I gained human subjects approval were that I was limited in my ability to squeeze items into the questionnaire that directly came from my observations. Nevertheless, this was mitigated in a way with my interviews at the end of the study. Toward the middle of the course, I decided to talk to the professor about "coming out" to students and telling them I was a graduate student doing a study for thesis and wanted them to answer a questionnaire. Because I could not identify myself beforehand, students did not know on which day I was going to distribute the questionnaires. On the day the questionnaires were administered, some students enrolled in the course did not attend class, others did not fully explain their thoughts clearly in their answers, and yet others simply left the room without participating (they had the right to do this because the questionnaire was completely anonymous and optional). Yet the average participation on the questionnaires led to a smaller pool of students who were interested in conducting the end of the semester interview.

When developing the methodology, I had envisioned that there would be a number of participants for the interview and that I would be able to select five to six students. This number would have allowed more room for comparison and contrast on the teaching strategies used by the

professors and allow more insight on the matter. However, not all students who agreed to be part

of the interview were available or willing when these were finally conducted. Nevertheless, the

interviews with both the student participants as well as the professor worked to confirm the other

data collected, it just would have been nice to hear more stories and opinions from a wider

selection of students.

Looking back at the instruments, some of the limitations in the questionnaire were that it

had specific questions regarding tools or strategies used by professors and it asked them to explain.

Having a multiple selection questionnaire without much room to expand on participants' thoughts,

on matters or previous experiences, did not allow great comparison among the experiences from

students who answered the questionnaire and those who participated in the interview process.

Suggestions for Future Research

Based on the limitations for conducting this research, I pose a few suggestions for future

research. The first one would be to find more professors and student participation. This would

allow students to actively and consciously meditate on their learning styles and strategies that work

best for content attainment. Moreover, developing a cross study with more professors of other

departments would allow a point of comparison and contrast on the different techniques used to

mediate meaning and content attainment and their effectiveness. A study with a similar approach

could also be observing a basic biology course (requisite) for freshmen. This would allow analysis

on how these strategies impact college students from diverse departments and contrastive

backgrounds of English use in high school.

Data collection methods could also be improved. If possible, observations should be

videotaped. This would be extremely useful for the researcher so he/she can go back and not only

review the dialogue used but carefully examine the non-verbal communicative strategies being

used in the classroom. Doing this would provide more accurate perceptions and interpretation of classroom data in general. Questionnaires should provide more space for students to express their opinion about their content classes and current classes because if the student does not want to be part of the interview process, the researcher can, at least, gather sufficient data to cross-examine with students who were interviewed. Moreover, questionnaires should be administered in class time, not after class. This is suggested because students feel their time for getting to other classes on time, studying for an exam or doing homework is not being taken away and they take the time to fill it out properly, if the professor is willing to do so.

Another great research approach would be comparing and contrasting ESL courses (which are focused on teaching language) with English-medium courses (classes focused on content). Being able to observe both class scenarios would provide many advantages to researchers in curriculum and instruction thus it might 1) establish the clear differences and similarities between the two 2) highlight strategies which work for each particular setting, but not the other, and 3) pinpoint which strategies work across classrooms. Studying these three aspects would not provide clear understanding as to what are the focus of each course, and how ESL courses should not work towards merely developing students second language interpersonal skills but also towards developing academic language proficiency, which will make input more comprehensible when taking English-medium courses.

Concluding Remarks

This study sought to pinpoint the importance that a professor's communicative competence has in the effective teaching of an English medium Biology course at the UPRM. The second goal was to examine the particular strategies that were used by the professor to engage his students in the content while using their second language as the medium of instruction.   The project was a case

study focused on a single section of a Biology course. Therefore, its purpose was not to make sweeping generalizations or to be representative of all of the English- medium content courses at UPRM. However, the case study does highlight successful teaching strategies that both students and the professor deemed to be important in making content comprehensible for college level second language learners of English and could potentially be implemented in English medium-courses at UPRM if and when similar conditions are present. The most salient themes and strategies used by the professor were the use of culturally relevant examples and materials, the use of visual aids and the openness to use students' first language both inside and outside of the classroom. The use of these themes and strategies can lead to lowered anxiety on the part of students and foster a learning community within the classroom itself.

The implications of this study suggest that when educators incorporate multiple forms of competence, comprehension and exemplification of the information in classrooms, students have positive attitudes towards learning. For this reason, instruction should take place in an environment, which supports culturally relevant material for students and allows multiple forms of learning. If educators pursue an inclusive teaching strategy that acknowledges and incorporate students' linguistic experiences, cultural practices, and interests, among other relevant aspects and incorporates these into classroom lectures, examples, and activities, they will be eager, enthusiastic students who are less concerned about being wrong and more concerned with learning the content of the course.

REFERENCES:

Alksandrowicz-Pedich, L., Draghicescu, J., Issaiass, D. & Sabec N.(2003). The Views of Teachers of English and French on Intercultural Communicative Competence in Language Teaching. *Incorporating Intercultural Communicative Competence in Language Teaching Education*. Council of Europe Publishing. 7-37.

Algren de Gutierrez, E. (1987). *The Movement Against Teaching English in Schools of Puerto Rico*. Lanham, MD: University Press of America.

Alvarez, R. M. (2011). Law, Language and Statehood: The Role of English in the Great State of Puerto Rico. *Law and Inequality: A Journal of Theory and Practice* , 1-70.

Alvesson , M. (2002). *Understanding Organizational Culture*. California: SAGE Publications Ltd.

Anderson, H. M. (1969). *Dale's Cone of Experience*. Retrieved January 10, 2012 from http://www.etsu.edu/uged/etsu1000/documents/Dales_Cone_of_Experience.pdf

Bas, G. (2008). *Integrating Multiple Intelligences in ESL/EFL Classrooms*. Retrieved August 20, 2012, from The Internet TESL Journals: iteslj.org/Techniques/bas-IntegratingMultipleIntelligences.html

Berman, M. (1998). *A multiple intelligences road to an ELT classroom*. Bencyfelin: Crown House. Brewster, J., Ellis, G. & Girard, D. (2003). (New Ed.). London: Penguin Books.

Blau, E., & Dayton, E. (1997). Puerto Rico as an English-Using Society. *Linguistic Studies in Honor of Bohdan Saciuk* , 137-148.

Bloom, B. (1956). *Taxonomy of Educational Objectives*. New York, NY: Longman.

Brooks, N. (1968, March). Teaching Culture in a Foreign Language Classroom. *Foreing Language Annals , 1* (1), pp. 204-217.

Carroll, K. S. (2008a). Building a Learning Community through Curriculum. *International Journal of Progressive Education*, 4 (3).

Carroll, K. S. (2008b). Puerto Rican Language Use on MySpace.com. *Centro Journal , 20* (1), 97-111.

Comité de Enlace, Dpto de Biología. (2006). Retrieved October 2, 2012, from Departamento de Biologia UPR RUM: http://biology.uprm.edu

Conroy, P. & Collins, P. (2012). Mnemonic Devices for Braille Instruction. *Insight*. 47-52.

Cook, V. (2001). Using the first language in the classroom. *Canadian Modern Language Review/La Revue canadienne des langues vivantes*, 57(3), 402-423.

Crawford, J. (1996). *Bilingual Education: History, Politics, Theory and Practice* (4th ed.). Illinois: Bilingual Education Services.

Crawford, J. (2004). *Educating English Learners: Language Diversity in the Classroom* (5th ed.). Illinois: Bilingual Education Services.

Cruz-Jiménez, A. (2009). Designing a Culturally Relevant Curriculum for Immigrant Mexican-American Fifth-Grade Students. (Doctoral Dissertation). Retrieved from ProQuest. (3389172).

Cummins, J. (2000). *Language, Power and Pedagogy: Bilingual Children in Crossfire*. Multilingual Matters.

Echevarria, J., & Graves, A. (2010). *Sheltered Content Instruction:Teaching Students with Diverse Abilities* (4th ed.). Boston, MA: Allyn & Bacon.

Emerson, R.W. (1876). *Letters and Social Claims*. Boston: James R. Osgood.

Fromkin, V., Rodman, R., & Hyams, N. (2003). *An Introduction to Language*. Boston, MA: Thomson/Heinle.

Gilani, M. R. A., & Gilakjani, A. P. (2012). Impacts of Learning Reading Strategy on Students' Reading Comprehension Proficiency. *The International Journal of Language Learning and Applied Linguistics World*, 72.

Goll, P. (2004). Mnemonic strategies: Creating schemata for learning enhancement. *Education,* 125 (2). 306-313.

González, N., Moll, L. C., & Amanti, C. (Eds.). (2005). *Funds of knowledge: Theorizing practices in households, communities, and classrooms*. Routledge.

Government of India. (2006). *Visual Aids*. Retrieved October 2, 2012, from United Nations Office on Drugs and Crime: www.unodc.org

Harper, C., & De Jong, E. (2004). Misconceptions about Teaching English Language Learners. *Journal of Adolescent and Adult Literacy , 48* (2), 152-162.

Kramsch , C., & Sullivan, P. (1996). Appropriate Pedagogy. *ELT Journals , 50* (3), 199-212.

Levins-Morales, A. (1997). *The Historian as Curandera*. The Julian Samora Research Institute, Michigan State University. East Lancing, Michigan: Michigan State University.

Lewis, G., Jones, B., & Baker, C. (2012, August). *Educational Research and Evaluation: An International Journal on Theory and Practice* .

Mariani, L. (1994). Developing Strategic Competence Towards Autonomy in Oral Interaction. *Perspectives , 20* (1).

Mazak, C. (2006). Negotiating El Dificil: English Literacy Practices in a Rural Puerto Rican Community. Michigan State University.

Méndez, M. (1977). Puerto Rico, la invasión que perdura. *Nueva Sociedad , 33*, 140-152.

Merriam, S. B. (2009). *Qualitative research: A guide to design and implementation*. Jossey-Bass.

Minick, N. (1987). Implications of Vygotsky's Theories for Dynamic Assessment. (C. S. Lidz, Ed.) *Dynamic Assessment* , 116-40.

Moll, L. C. (1992). Bilingual Classroom Studies and Community Analysis. *Educational Research* , *21* (2), 20-24.

Moll, L. C. (1990). *Vygotsky and Education: Educational Implications and Applications of Educational Psychology*. New York: Cambridge University Press.

Moll, L. C., & Greenberg, J. B. (1990). Creating zones of possibilities: Combining social context for instruction. (L. C. Moll, Ed.) *Vygotsky and Education: Instructional Applications and Implications of Sociohistorical Psychology* , 319-349.

Morales , B. (1999, May). The Teaching of Culture in the Puerto Rican University English Language Classroom. *ProQuest* .

Morales, A. (1983). *Puerto Rico: A Political and Cultural History*. New York: W.W. Norton and Company.

Muñíz-Arguelles, L. (1988). *Articulos*. Retrieved October 1, 2012, from Muñiz-Arguelles: muniz-arguelles.com/articulos.html

Noels, K. A., Clément, R., & Pelletier, L. G. (1999). Perceptions of teachers' communicative style and students' intrinsic and extrinsic motivation. *The Modern Language Journal*, *83*(1), 23-34.

Oficina de Investigación Institucional y Planificacion. (2011-2012). Retrieved October 1, 2012, from http://oiip.uprm.edu

Pousada, A. (1999). The Singularly Strange Story of the English Language in Puerto Rico. *Milenio* , 33-60.

Robatjazi, M. A. (2008). Language Education: Intercultural Communicative Competence and Curriculum.

Rosa , M. (2011). Understanding the Perceptions of High School Leaders about English Language Learners in California: A Mixed Methods Study to Understand the Influence of Language and Culture in Mathematics Learning. *Educational Research , 2* (13), 1847-1867.

Rosa, M., & Orey, D. (2007). Cultural Assertions and Challenges Towards Pedagogical Action of an Ethnomathematics Program. *For the Learning of Mathematics , 27* (1), 10-16.

Roxá, T., Martensson, K., & Alveteg, M. (2010). Understanding and Influencing Teaching and Learning Cultures at University: A Network Approach. *Higher Education , 62* (1), 99-111.

Sparks, J.R. (2012). Language/discourse comprehension and understanding. in N.M. Seel (Ed.), *Encyclopedia of the Learning Sciences* (pp. 1713-1717). Springer.

Tellis. W. (1997, September). Application of a case study methodology [81 paragraphs]. *The Qualitative Report* [On-line serial], *3*(3). Retrieved http://www.nova.edu/ssss/QR/QR3-3/tellis2.html

U.S. Census Bureau. (2010). *American FactFinder*. Retrieved October 2, 2012, from U.S. Census Bureau : factfinder2.census.gov

UPRM Undergraduate Catalogue. (2011-2012). University of Puerto Rico at Mayaguez. Mayaguez: Office of Dean and Academic Affairs.

Wheeler, R. (2008). Code Switching: Teaching and Learning Standard English in African American Classrooms. *Grammar to Enrich and Enhance Writing* , 235-257.

Wood, J. T. (2007). *Communication Mosaics: An Introduction to the Field of Communication*. Beverly, MA: Wadsworth Publishing.

Zhang, X. (2004). Language Anxiety and its Effects on Oral Performance in Classroom. Retrieved September 15, 2012, from http://ojs.unipamplona.edu.

Zentella, A. C. (1997). *Growing Up Bilingual: Puerto Rican Children in New York*. Cambridge: Wiley-Blackwell.

**UNIVERSIDAD DE PUERTO RICO EN MAYAGÜEZ
DECANATO DE ASUNTOS ACADÉMICOS
COMITÉ PARA LA PROTECCIÓN DE LOS SERES HUMANOS EN LA
INVESTIGACIÓN
(CPSHI/IRB─00002053)**

8 de marzo de 2011

Fiorelys Mendoza Morales
RR 01 Buzón 1791
Añasco, PR 00610

Estimado investigador;

El comité revisó su proyecto "Analyzing Communicative Competence in a Biology Course" y, luego de evaluar la documentación sometida, le aprueba el mismo. Recordándole que esta aprobación será por un año, hasta el 08 de marzo de 2012.

Atentamente,

Dra. Dafne Javier
Presidenta Interina
CPSHI

DJ/nmrv

APPENDIX B

Fiorelys Mendoza-Morales
Candidata a Maestría
Facultad de Artes y Ciencias
Departamento de Inglés
Maestría en Artes en Educación en Inglés

Titulo de la investigación: Analyzing Communicative Competence in a Biology Course

Descripción de la investigación.

Actualmente soy estudiante graduado de la Universidad de Puerto Rico en Mayagüez (UPRM) y candidata al grado de Maestría en Educación en Inglés. Como requisito de graduación he decidido escribir una tésis y por esto realizo esta investigación. El estudio explorará las alternativas de lenguaje de los profesores del recinto concentrándose en inglés y español para determinar estrategias viables en las que éstos pueden ayudar a que sus estudiantes aprendan eficazmente el contenido de las clases sin que el idioma sea una barrera para adquirir el conocimiento.

A continuación le ofrezco una descripción del estudio que pretendo llevar a cabo para facilitarle su decisión de participar en el mismo. Su participación no es obligatoria y el negarse a participar o terminar su participación en cualquier momento no presenta riesgos hacia su persona o la investigadora.

Los datos que serán recopilados consisten principalmente de llenar un cuestionario que se hará al principio de la investigación y entrevistas con aquellos estudiantes que expresen su deseo de participar en la misma. Estas se llevarán a cabo a mediados de marzo. El proceso de recopilar todos los datos y transcribir las entrevistas se llevará a cabo a finales de abril y mayo. Toda data recopilada se utilizará únicamente por la investigadora durante el proceso de análisis y no podrá ser accesada por alguna otra persona que no esté autorizada por el participante. El participante está en todo su derecho de hacer cualquier pregunta antes, durante y después de realizarse el estudio. Estaré a la disposición de compartir mi análisis de los datos recopilados al finalizar el mismo con quien lo solicite. Su identidad será conocida solo por la investigadora y para propósitos de la investigación, será sustituida por un seudónimo. No existen riesgos asociados a su participación en el estudio. Sin embargo, la participación del estudiante sería significativa al contribuir con el estudio sobre el análisis de la competencia comunicativa en salones donde se enseña en inglés. La investigación será utilizada para propósitos de mi tésis, pero podría ser publica**a** o presentad**a** en conferencias profesionales. Reitero que mantendré su confidencialidad en todo momento.

Hoja de Consentimiento Informado[4]

Fiorelys Mendoza-Morales
Candidata a Maestría
Facultad de Artes y Ciencias
Departamento de Inglés
Maestría en Artes en Educación en Inglés

Título de la Investigación: Analyzing Communicative Competence in a Biology Course

Duración de participación en encuesta: 15 minutos

o   He leído detalladamente la Descripción de la Investigación y **la** he discutido con la investigadora. He tenido la oportunidad de hacer preguntas acerca de los propósitos y procedimientos que esta investigación conlleva.

o   Ha sido aclarado y reconozco que mi participación en este estudio es completamente voluntaria. En cualquier momento de la investigación**,** puedo negarme a participar o retirar mi participación sin ser cuestionado y sin que haya alguna complicación. Tanto mis derechos como estudiante de esta institución como mi relación con la institución o la investigadora no se verán afectados por mi decisión.

o   Estoy consciente de que puedo terminar mi participación en ésta investigación en cualquier momento.

o   Si durante el estudio surgiese información importante que pueda afectar mi deseo de continuar participando, la investigadora me lo informará.

o   Cualquier información personal que sea tomada o derivada a través de este proyecto podrá ser divulgada únicamente con mi consentimiento.

o   Si en cualquier momento surgen dudas sobre esta investigación o mi participación en la misma, puedo contactar a la investigadora, Fiorelys Mendoza (**fiorelys.mendoza@upr.edu**), quien gustosamente aclarará las mismas. La investigadora me ha provisto su información para contactarla de ser necesario.
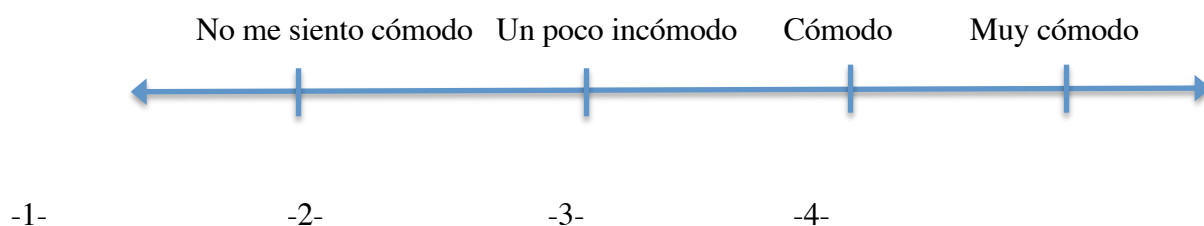
_____

Firma del participante

_____

[4] Este documento es una adaptación de la Hoja de 4 Informado creada por Zaira Arvelo, candidata de maestría del Departamento de Inglés de la UPRM.

Encuesta:
Competencia **C**omunicativa y la **E**nseñanza

1. **¿Cómo te sientes cuando tomas cursos dictados en inglés? Utiliza la siguiente escala** y **circula** cuán como te sientes siendo el 1-No me siento cómodo 2- Un poco incómodo 3- Cómodo y   4- Muy Cómodo

No me siento cómodo   Un poco incómodo   Cómodo   Muy cómodo

-1-   -2-   -3-   -4-

2. **Aparte de los cursos del programa de inglés, ¿Qué tipo de cursos te gusta tomar en inglés? Por favor enumera los cursos que prefieres tomar en inglés (si prefieres tomarlos en español explica porqué).**

   a. _____
   b. _____
   c. _____
   d. _____
   e. _____

3. **Los cursos ofrecidos en inglés deben ser por profesores: Marca tu respuesta y explica el porqué de la misma en el espacio provisto.**

   a. __cuya lengua primaria sea el inglés. **Explica**

   b. __cuya lengua primaria no sea ni español ni inglés. **Explica**

c. _ cuya lengua primaria es español. **Explica.**

4. **Califica tu dominio del inglés:**
   a. Leo en inglés: ____Muy bien ____ Bien _____ Regular ____No lo domino

   b. Escribo en inglés: ____Muy bien ____Bien _____Regular ____ No lo domino

   c. Hablo inglés: _____ Muy bien ___Bien ____Regular ____No lo domino

   d. Entiendo cuando hablan en inglés: ___ Muy bien __Bien ___Regular ___No lo domino

5. **Entiendo lo dictado en clases:** ___ Muy bien __Bien __Regular __No entiendo.
6. **Entiendo algunas oraciones o frases:** __Muy bien __Bien __Regular __No entiendo

7. **Si tu nivel de comprensión del inglés no es satisfactorio ¿qué recursos utilizas para adquirir el conocimiento de lo enseñado en clase?: (Marca todas las que apliquen)**
   a.   ___ Leo el material del libro
   b.   ___ Busco referencias o artículos en español del material en cuestión
   c.   ___ Traduzco utilizando internet.
   d.   ___ Busco información de internet.
   e.   ___ El profesor provee presentaciones y las estudio.
   f.   ___ Otros. EXPLICA.

8. **Para comprender mejor las clases dictadas en inglés ayuda el que el profesor:**
   a.   ___ utilice algunas palabras o frases en español.
   b.   ___ presente material audiovisual (pizarra o proyector), aunque éste sea en inglés

c. ___ reparte "handouts"

d. ___ hace ademanes o gestos (lenguaje corporal)

e. ___Otros. Explique.

9. **Sin contar las clases ofrecidas por el Dpto de Inglés, las cuales son requisito, ¿cuántas clases fueron dictadas en inglés en tu trayectoria como estudiante del RUM?**

_____ Ninguna

_____ 1 ó 2 clases

_____ 3 ó 4 clases

_____ 5 ó más clases

10. **De esas clases ¿crees que tu nota final se afectó por ser dictada en inglés? Marca y explica el porqué de tu respuesta (si lo quieres contestar por curso, siéntete en la libertad de hacerlo).**

a. __Sí. Explica

b. __No. Explica.

11. ¿Qué sugerencias podrías ofrecer para aquellos profesores cuyos cursos son dictados en inglés para que un estudiante con un dominio regular del idioma pueda comprender el material enseñado?

Si desea ser entrevistado para la investigación por favor llene y entregue con la siguiente información de contacto:

Nombre:_____

Número de teléfono: _____

Dirección_____

Si desea ser entrevistado para la investigación por favor llene y entregue con la siguiente información de contacto:

Nombre:_____

Número de teléfono: _____

Dirección:

_____

Si desea ser entrevistado para la investigación por favor llene y entregue con la siguiente información de contacto:

Nombre:_____

Número de teléfono: _____

Dirección

_____

Si desea ser entrevistado para la investigación por favor llene y entregue con la siguiente información de contacto:
Nombre:_____

Número de teléfono: _____

Dirección:_____

_____

Preguntas para Entrevista a Participantes

Estudio: *Analyzing Communicative Competence in a Biology Course*

Información Personal:

Nombre:_____

Edad: _____   Año de estudio:_____

Concentración: _____

Origen: _____

Dónde estudió escuela primaria: _____ privada _____ pública _____ OTRO: _____

Dónde estudió escuela secundaria: _____ privada _____ pública _____ OTRO: _____

Preguntas:

1. Crees tu que es importante que el professor, independientemente de su origen, esté familiarizado con la cultura de los estudiantes que enseñará?

2. El profesor debe aprender un poco de español, aunque sea para comunicarse con los estudiantes de manera informal (fuera de clase)?

3. Tomando en consideración la clase de biología que estabas tomando con el profesor, crees que el hecho de que el profesor entendiera español ayudó a que los estudiantes se sintieran cómodos participando en la clase?

4. Haz tomado clases con profesores que no saben nada de español? Cuál ha sido tu experiencia?

5. Tus compañeros se expresaban completamente en inglés, pero si no sabían una palabra la podían decir en español, cómo te hacía sentir esto?

APPENDIX F

First Interview to Professor

Study: *Analyzing Communicative Competence in a Biology Course*

1. How long have you been teaching?

2. Why did you decide to teach in PR?

3. Can you hold a conversation in Spanish with someone?

4. What are some of the teaching techniques that you usually use in the classroom?

5. Which of these techniques work best with students? How do you know it works?

6. Have you spoken Spanish in the classroom?

7. Have you spoken Spanish during office hours?

8. You use a "game" on Fridays, why do you use it? What makes you think this works?

9. Besides class lectures, what other teaching aids/materials do you use when teaching courses (this and other classes)?

10. Two other professors teach the course, what sets you apart from the other two (i.e. use of different textbook, etc.)

Continuity Interview for Professor

Course: *Analyzing Communicative Competence in a Biology Course*

1. Has being part of a study like this one made you more conscious on your teaching style?

2. Have you changed any aspect of your teaching?

3. If so, why did you make the changes/adaptations?

4. Have these adaptations to your teaching style helped students attain the content? How do you know?

5. When comparing this class with the one you taught last year, what are some of the techniques that you've improved.

6. Does taking into consideration students' setting help make better choices as to how can content be delivered?