A Project-Based Learning Curriculum for Spanish Heritage Language Learners:

Implications for Written and Oral Development

by

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ABSTRACT

The field of Heritage Language has experienced a great deal of advancement in the past few decades. Much research effort has been dedicated to analyzing and understanding different aspects of heritage language speakers, but less work has been done in the topic of pedagogical approaches. The few recent studies on pedagogical approaches have focused on the "how" of instruction of grammatical points in the heritage language classroom but dedicated less research efforts to an overall and comprehensive approach to classroom teaching and learning at the higher education level. Heritage language learners require teaching methodologies that differ from those used with second language students given their unique characteristics and needs. Having a curriculum and class materials that align to the needs of the students is essential in aiding the development and maintenance of the heritage language of the students.

This study explores whether the implementation of a Project-Based Learning (PBL) curriculum can result in measurable gains in the development of written and oral skills in intermediate Spanish heritage language students, when compared to a control group that follows a traditional non-project-based methodology. Fluency, complexity, and accuracy in the written and oral samples were analyzed through a variety of indicators. The data collection consisted of a pre, and post writing and oral sample obtained at the beginning and end of the semester.

The results showed that the students in the PBL curriculum achieved greater gains in their written skills when compared to the control group but had no effect on oral skills. The PBL group made significant gains in written fluency and complexity, and moderate gains in accuracy. The control group showed moderate gains in written fluency and

complexity, and no improvement in accuracy. Neither group achieved statistically significant gains in oral fluency, complexity, or accuracy after one semester of instruction. The results offer implications for the impact that a PBL curriculum can have on heritage language learner's linguistic development.

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CHAPTER 1

INTRODUCTION

The field of Heritage Language (HL) has experienced a great deal of advancement in the past few decades (Lynch, 2014). Much research effort has been dedicated to analyzing and understanding different aspects of HL learners' linguistic and pedagogical needs. One of the areas with the most published research is the language of these students (i.e. discourse production, and judgment tasks) followed by topics on attitudes and identities (Lynch, 2014). Less work has been done in topics of assessment, literacy, pedagogical approaches, and teacher preparation (Lynch, 2014). In particular, the area of pedagogical approaches directed to heritage language learners (HLL) has only started to come into focus recently (Carreira & Kagan, 2018).

Recent studies on pedagogical approaches have focused on the "how" of instruction (Carreira & Kagan, 2018; Lynch, 2014) of grammatical points in the HL classroom. Less research efforts have been dedicated to overall and comprehensive approaches to language teaching that include linguistic and affective needs of the students. Due to the naturalistic environment in which HL learners acquired their HL language, they have distinct linguistic characteristics and needs from second language learners (Anderson, 2008; Beaudrie et al., 2014; Beaudrie, 2016; Carreira & Kagan, 2018, Potowski, 2016; Russell & Kuriscak, 2015). Having a curriculum and class materials that align to these needs is essential to aid the development and maintenance of the students' heritage language (Carrera & Kagan, 2011; Rivera-Mills, 2012). Educational institutions need to reexamine their curricula in order to meet those needs, to account for the heterogeneity present in HL classrooms (Kondo-Brown, 2010; Montrul,

2011), and to build on students' backgrounds and rich cultural and linguistic repertoire (Kondo-Brown, 2010).

An approach that allows for great adaptability to the students' needs is project-based learning (PBL) (Bell, 2010; Kondo-Brown, 2010). It involves organizing learning around projects based on authentic questions or problems (Thomas, 2000). PBL allows for a deeper understanding of a topic, increased reading comprehension skills, and fosters increased motivation to learn (Bell, 2010). Students learn from authentic materials, which is fitting for heritage language students who learned their language in authentic naturalistic environments. PBL has been used extensively and successfully in math (Boaler, 2002), engineering (Shyr, 2012) and science (Al-Balushi, & Al-Aamri, 2014); and to a lesser degree with second language instruction (Barba, 2016; Moritoshi, 2018) or HL instruction (Alvarado, 2019; Ilieva, 2007).

This dissertation study aims to explore whether the implementation of a PBL curriculum can result in measurable gains in students' writing and oral development when compared to a control group that follows a traditional non-project-based methodology (see chapter 3). All students are enrolled in intermediate Spanish courses for bilinguals at a four-year university in the Southwest of the United States. Data from various measurements and assessment instruments are used to document students' language proficiency development.

1.1 Background of the Study

HL learners present different characteristics and exhibit distinct linguistic and affective needs when compared to L2 learners (Anderson, 2008; Potowski, 2016; Beaudrie, 2016). Extensive research into the linguistic characteristics of HL learners has

provided insights into some of the strengths and needs that this group possesses at different proficiency levels. For instance, lower-level HL students share some commonalities with L2 learners (Beaudrie, Ducar & Potowski, 2014; Montrul & Perpiñán, 2011) as they experience difficulties with some grammatical and lexical abilities (Lynch, 2008). These students seem to benefit from explicit instruction more than advanced students (Montrul, 2021). Advanced HL students can present native-like characteristics in speaking, listening, and reading, and an intermediate proficiency in writing. These students tend to communicate a desire to perfect academic writing skills and formal vocabulary (Alarcón, 2010). To address these differences, HL researchers have proposed different instructional approaches in the HL classroom to help learners further develop their language skills. Some of these pedagogical frameworks, grammar instruction approaches, and pedagogical approaches are discussed below.

With respect to pedagogical frameworks, Beaudrie and Loza (2023) present three frameworks (Critical pedagogy, Multiliteracies, and Critical Language Awareness) that can be used in the HL classroom to cultivate an inclusive learning environment and support students' socio-affective, bilingual, and cultural development. These frameworks are the theoretical foundations on which to anchor instruction and research, not a specific curricular program or teaching model. The first framework discussed, critical pedagogy, seeks to answer "big picture" questions such as the goals of HL instruction and develop socially responsive learning environments that are receptive to students' lived experiences as bilingual and bicultural individuals (Beaudrie et al. 2023). It stems from the work of the educator Paulo Freire (1970), who challenged traditional models that framed students in passive roles where education was a mere one-way transmission of knowledge from

the teacher to the student (Correa, 2011; Leeman, 2018). A central tenet of critical pedagogy is that immediate experiences of the learners should be integrated into the learning experience. In this manner, students' community knowledge, language practices and cultural productions are integrated into the curriculum. Critical pedagogy also posits ways for hemogenic practices, such as the subordination of Spanish in relation to English, or the traditional Spanish curriculum tendency of adopting acprescriptive approach to language variation in the U.S., to be resisted in the classroom (Leeman, Rabin, & Román-Mendoza, 2011).

The Multiliteracies framework "embraces the multiplicity and polysemy of language" and moves away from a linear view of literacy that idealizes the educated native speaker and instead seeks to expand HL learners' resources for meaning making (Samaniego & Warner, 2016). Learners' literacy development has been at the center for HL instruction since this population typically possesses significant receptive abilities, and oftentimes fluent conversational skills, but limited writing skills (Beaudrie & Ducar, 2005; Beaudrie & Loza, 2023; Wilson, 2022). The term multiliteracies was coined in the mid-1990s in an effort to redefine literacy in the face of the rapid changes caused by globalization, technological advances, and the increase of social and cultural diversity in local communities (Samaniego & Warner, 2016). This framework accounts for the variability of communication as a result of multimodal productions (visual, auditory, spatial, gestural), dialect varieties and shifting literacy practices. Students are exposed to available designs (the existing linguistic, cultural and multimodal productions) that showcase linguistic diversity to then use and rearrange these designs to establish meanings (Samaniego & Warner, 2016). A key aspect of this framework is to expose

students to designs in different ranges of literacies, especially those in which they are interested in learning. These literacies can range from academic writing, news reports, to social media videos (Beaudrie & Loza, 2023). Implementation of different designs is important as exclusive focus on academic and professional registered may damage students' pride in their language variety (Correa, 2011; Leeman, 2005; Samaniego & Warner, 2016).

The third framework presented by Beaudrie and Loza (2023) is Critical Language Awareness (CLA). This framework places students' varieties at the center of HL instruction to support HL language maintenance and encourages students to examine the sociopolitical, sociocultural and sociolinguistic dimensions of language. It also raises learners' awareness of issues of language and power and how certain dialects are privileged over others, and highlights students' agency and its role in resisting oppressive language ideologies (Beaudrie & Loza, 2023; Beaudrie & Wilson, 2022; Holguín Mendoza, 2022). Beaudrie and Wilson (2022) argue that a CLA framework offers the space to challenge these language ideologies that can often lead to linguistic self-hate and threaten language maintenance. It also offers a rich environment for building confidence and developing positive linguistic attitudes. With all these benefits, CLA is an ideal approach to meet the eight goals for heritage language education, detailed in chapter 2 of this dissertation. Unfortunately, despite the support to include CLA in HL instruction (Correa 2011; Holguín Mendoza, 2018; Leeman, 2005; Martinez, 2003), adoption of a critical language approach does not seem to be widespread (Beaudrie, 2015; Beaudrie & Wilson, 2022).While these three frameworks offer theoretical foundations on which to anchor class instruction, grammar teaching approaches and specific curricular programs

need to be evaluated to continue working towards meeting HL students' needs. These two elements are discussed below.

In regard to HL grammar instruction, some approaches utilized for HL students are explicit and form-focused instruction (Montrul & Bowles, 2010), processing instruction (Potowski, Jegerski & Morgan-Short, 2009), the systemic functional approach (Colombi, 2009, 2015), bottom-up or micro-based approach (Beaudrie, et al., 2014; Carreira, 2016), the top down or macro-based approach (Beaudrie, et al.,2014; Carreira, 2016; Parra, et. al, 2018) which encompasses methodologies such as the sociolinguistically informed approach (Beaudrie, et al., 2014), and the multiliteracies framework Learning by design (Kalantzis, Cope, & Cooland, 2010; Parra, Otero, Flores & Lavallée, 2018).

Approaches such as the bottom up and form-focused approaches achieve better outcomes with L2 students with lower proficiency levels in the language. The bottom up or micro-based approach uses small pieces of information at a time to arrive at the big picture, such as studying grammar points and verb conjugations before moving into the phrases or discourse level. This methodology is widely used in second language acquisition contexts. In this respect, prior research studies on the effects of explicit instruction with HLL's of different proficiency levels show positive impact on the production of specific grammatical structures (Montrul & Bowles, 2009), accuracy (Beaudrie, 2009), and interpretation (Potowski, Jegerski & Morgan-Short, 2009). Nonetheless, it is important to mention that in order to achieve more benefits for the students, instruction needs to be contextualized along with bottom-up activities when necessary (Beaudrie, et al., 2014 p. 172).

Conversely, macro-based or top-down approaches are student-centered and consider students' extensive prior knowledge and needs as central reference for decision making regarding the content and teaching materials (Kagan & Dillon, 2004, 2009; Carreira, 2016). These characteristics make macro-based approaches well suited for advanced students with high proficiency levels in the language. Advanced students typically have been exposed and speak Spanish at home and have native-like proficiency in speaking, reading and listening and an intermediate proficiency in writing (Alarcón, 2010). Macro-based approaches utilize this existing knowledge and build upon it to achieve even higher levels of proficiency. Nonetheless, various researchers (Beaudrie et al., 2014; Parra et al., 2018; Swender, Martin, Rivera-Martinez & Kagan, 2014) add that for advanced students, it is also good practice to include the occasional use of bottom up or explicit instruction methodologies within the course to target certain grammatical structures and expand students' lexicon.

In terms of pedagogical approaches used with HL learners, many stem from L2 approaches such as outcomes-based methodologies and content-based (Kondo-Brown, 2010). In an outcomes-based curriculum, students' improvements are tested through standardized assessment instruments. While the use of this approach is not widespread in HL programs, this type of curriculum has increased its demand in public institutions due to funding and accountability issues in the context of L2 and dual immersion programs that serve both HL and L2 learners (Kondo-Brown, 2010). A content-based curriculum aims at advancing the learners' competencies in the language by integrating some content area materials in the target language; the target language serves as a vehicle for information (Kondo-Brown, 2010; Morioka, Takakura & Ushida, 2008). The most

common context where a content-based approach is applied is in dual immersion schools at the pre-collegiate level (Kondo-Brown, 2010). This approach falls under the macro-based pedagogical approaches and its use is recommended by the National Heritage Language Resource Center (NHLRC) for HL education (Kagan & Dillon, 2009).

Macro-based pedagogical approaches are ideal for HL learners because they support the development of students' functional abilities as they provide opportunities for students to use their HL in a global context (Carreira, 2016; Kagan & Dillon, 2004; 2009). In light of these research findings, different macro-based methodologies have been employed to innovative curricula for HL learners. One example is the Learning by Design framework, adopted by Parra et al. (2018), following a functional approach to language as base for the coursework (p. 208). Another example is Task-Based learning (TBL), a pedagogical model compatible with macro-based principles. Several studies (Blake & Zyzik, 2003; Bowles, 2011; Henshaw, 2015; Torres, 2018, 2020, Torres & Vargas Fuentes, 2021) have provided proposals for how to implement this approach in the classroom, but none of them have tested the effectiveness of TBL on HL students' linguistic development. Instead, they have used the TBL approach to test for the effect of corrective feedback, peer interactions (such as language related episodes), task complexity or mode of interaction on students' learning outcomes. Other approaches under the macro-based umbrella whose core values are authenticity and relevance are Project-based learning (PBL) and Inquiry-based learning (IBL). Both of these approaches have been widely used at the K-12 level and to a lesser degree in higher level education in areas of science, technology, engineering, and medicine (Beier, Kim, Saterbak,

Leautaud, Bishnoi & Gilberto, 2019; Requies, Agirre, Barrio & Graells, 2018; Shyr, 2009).

While IBL and PBL are similar in the fact that both approaches support motivation and engagement (Bell, 2010; Belpoliti & Fairclough, 2016; Blumenfeld, Soloway, Marx, Krajcik, Guzdial, & Palincsar, 1991), there are key differences. On the one hand, IBL seeks to take the student on a journey to discover the answer to an inquiry within a theme provided by the teacher. The students engage in research (internet information, surveys, field data collection) in order to solve their questions and present their gained knowledge in written or oral formats (sometimes chosen by the teacher). The IBL process allows students to find and build both content and skills and become an autonomous learner (Belpoliti & Fairclough, 2016). On the other hand, while PBL also starts with a question, it has to be a real-world problem, then students engage in research to answer said question and finally present their conclusions by creating an authentic artifact or a project of their choosing (Blumenfeld et al., 1991; Carreira, 2019).

Despite the premise that these approaches hold great potential to be used with HL students to meet their heterogeneous needs (Belpoliti & Fairclough, 2016; Carreira, Chik, & Karapetian 2019), there are few empirical studies testing them within the HL context. Most publications such as Belpoliti and Fairclough (2016) and Ilieva (2007) are accounts of the anecdotal effects of the IBL or PBL curriculum and descriptions of the activities, rather than presenting results of an empirical study carried out with HL students. For example, Belpoliti and Fairclough (2016) is a detailed description of an Inquiry-based curriculum that implemented cultural projects for HL students at the university level, and how it allowed students to expand their connection and appreciation of their home culture

and develop their language skills. Ilieva (2007) discussed the perceived impact of a PBL curriculum with Hindi HL students in a New York University. Ilieva considers PBL as an effective method to manage the mixed abilities that HL students bring, integrating skills for real-life communication purposes while also stressing the value of assembling a project as a critical part of learning. Because of the potential benefits seen by authors such as Ilieva (2007) with PBL, furthering classroom-based, empirical research on PBL is needed in order to test its effectiveness on HL students.

One of the reasons why PBL is a student-driven approach is that the student is engaged and motivated to develop deeper understanding of the subject by resolving authentic, real-world problems (Bell, 2010; Blumenfeld, Soloway, Marx, Krajcik, Guzdial & Palincsar, 1991) through the use of cognitive (technology-based) tools (Thomas, 2000). It is the idea of "learning-by-doing" and the means of making schoolwork useful and readily applicable to real world contexts that prompted the expansion of this approach throughout the United States in the early part of the century (Barron et al., 1998). PBL can be effective in language learning for students with different backgrounds, needs and styles given that it opens opportunities for the students to use their own individual skills and take charge of their own learning for real communicative purposes (Ilieva, 2007). This model proposes that learners find solutions to non-trivial problems by asking questions, researching, debating, analyzing data, drawing conclusions, and creating new artifacts (Blumenfeld et al., 1991). The processes incurred while learning under this approach also promote organizational skills, self-reliance, and social collaboration, which are abilities that students need to master for real life contexts (Bell, 2010).

Within the context of HL education, Carreira (2019) and Carreira, Chik & Karapetian (2019) make a case for the use of PBL. These authors discuss that HL students' naturalistic knowledge of their HL, early exposure, great variability of knowledge, backgrounds and needs requires a pedagogy like PBL that can be customized to these characteristics. Responding to and utilizing the students' bilingual experiences and motivations through PBL, increases students' confidence, engagement, motivation, enjoyment, and creativity (Carreira, et al., 2019; Stoller & Myers, 2019). In addition to these non-linguistic benefits, PBL provides opportunities for students to use and further develop their language skills through meaningful, context-rich activities. When it comes to language development, prior research (Beaudrie, et, al., 2014; Carreira et al., 2019) underlines that form-focused activities centered on discrete language items can be introduced in the process of learning. However, they should be introduced when they become necessary and relevant for understanding or producing ideas and completing tasks. In PBL the language has a communicative function, and it is utilized with intent and authenticity to carry out the tasks of the project decided by the students. HL students tend to focus on the communicative aspect of the tasks and not on the forms to express it, as seen in Torres' (2013) study. Therefore, an approach that lets students learn or improve discreet language items within a meaningful context is more likely to be effective and engaging for HL students (Carreira, Chik & Karapetian, 2019).

Carreira, Chik & Karapetian (2019) recognize PBL as an overarching pedagogy that can: 1) build on students' home abilities brought to the classroom; 2) respond to students' experiences and motivations for studying their HL; and 3) differentiate instruction to manage the different levels of proficiency to create learning opportunities

for all students (p. 137). Through the implementation of differentiated instruction, teachers can modify elements from the curriculum such as the content or materials to use, the activities to practice that material, the product to demonstrate mastery of the material, and the pacing of learning (Carreira & Chik, 2018). Due to this flexibility, the class can be responsive to students' differences, needs, interests, and level of readiness.

The studies and articles presented until this point offer a theoretical and pedagogical foundation as to the appropriateness of a PBL approach to the context of HL learners. The vast advantages that PBL can offer to HL students of Spanish are still left unexplored due to the lack of empirical studies in the area. Numerous calls have been made for more empirical research in the HL classroom to explore effective pedagogical and curriculum approaches (Lynch, 2014; Parra, Otero, Flores, & Lavallée, 2018). The present study seeks to investigate the impact that PBL can have on intermediate level Spanish HL students' writing and oral skills after one semester of instruction.

1.2 Rationale

Currently, there is a lack of classroom-based research studies in the HL field to inform us about the most appropriate approaches to follow to instruct this population (Beaudrie, 2021). Carreira and Kagan (2018) stated that most of the data about HL students' needs and linguistic system come from studies presented data gathered through students' self-reporting surveys (Carreira & Kagan, 2011), assessment studies (Swender, Martin, Rivera-Martinez, & Kagan, 2014) and laboratory settings (Bowles, 2011). While these studies' findings have been vital to better understand this population, they tend to simplify the reality found in the classrooms by offering only a limited overview of the challenges faced while teaching. Beyond carrying out studies, there is an urgent, growing

need for curriculum redesign of Spanish classes that respond better to HL students in light of the traditional FL grammar guides and textbooks that do not speak to the needs of current HL students (Parra, 2017). The findings of this study will further our understanding of effective curriculum design and instruction for HL learners through classroom-based research, as well as respond to the call for more empirical research in PBL (Stoller, 2006; Peterson, 2008; van Lier, 2006) and HL classes (Lynch, 2014; Carreira & Kagan, 2018).

Additionally, this study will be an innovative project in the field of heritage languages. Despite previous studies describing students' experiences with PBL and its perceived effectiveness on linguistic and non-linguistic aspects (Stoller & Myers, 2019), its benefits for HL students' language proficiency have yet to be studied. Previous L2 research suggests that PBL can have positive linguistic gains in students (Bas, 2011; Collier, 2017; Eyring, 1989; Hardy, 2016; Simpson, 2011). Other studies (Almeida-Mendez; Beckett, 1999; Coleman 1992; Nor, 2008; Oh, 2012) claim that these linguistic benefits can stem from the fact that PBL allows students to use their language for real-life and meaningful tasks that relate to their interests. The authenticity of the project and the process (reviewing authentic sources of information, interviewing community members in the target language, creating an artifact with possible use in real-life) instills confidence in students and makes them feel capable of using and creating authentic materials. This aspect of a PBL curriculum can be beneficial to HL students who may have negative feelings towards their HL and a low linguistic confidence, which result from the internalization of discourses of deficiency about their HL (Sánchez-Muñoz, 2016).

Students' confidence can be fostered even further because with PBL the one-size fits all methodology is abandoned, and instead, through differentiated instruction, students can learn and show what they learned in an individual way that fits their learning needs. One of the biggest challenges for HL education is the heterogeneous proficiency levels that students bring to the class (Beaudrie, Ducar, & Potowski, 2014); this approach can help instructors address this concern and incorporate learning opportunities for all students (Carreira et al., 2019). With this approach, students have a choice on their learning process and final product, highlighting their agency in developing their heritage language. PBL's flexibility also allows the implementation of overarching frameworks such as Critical Pedagogy or CLA previously discussed that can aid instructors to create an inclusive learning environment for HL learners.

PBL provides a context rich environment where students can develop their linguistic skills to make meaning through meaningful interactions within the purposeful context of the projects (Carreira, Chik & Karapetian, 2019). Through the process of constructing new ideas, exploring the surrounding world and interacting with new materials, students can develop a deeper knowledge on a topic than those students passively taking information in from the teacher. Students also learn to work collaboratively, a skill needed in real-life situations (Barron Schwartz, Vye, Moore, Petrosino, Zech, & Bransford, 1998; Bell, 2010; Chen & Yang, 2019). This study aims to contribute to and expand the body of empirical research done in the area of pedagogical interventions and curriculum design for Spanish heritage language learners. To examine the above-mentioned issues, this study will be guided by the following research questions.

1.3 Research Questions

The following research questions motivated the study:

1. Does a project-based curriculum improve students' written competence on performance tests? Are there any differential gains between the experimental and the control groups?

2. Does a project-based curriculum improve students' oral skills on performance tests? Are there any differential gains between the experimental and the control groups?

1.4 Definitions of Important Terms

In order to provide clear arguments and understanding with the reader, this section offers definitions of key terms used throughout this dissertation. All definitions are informed according to the usage and literature within the HL field.

Heritage Languages:

Within the context of the United States, this term is used to refer to languages other than English, that have a particular family relevance to an individual (Fishman 1999 as cited in Van Deusen-Scholl, 2003). These languages are spoken or understood by members of a minority population (Valdés, 2005). These languages can be divided into three categories: indigenous, colonial, and immigrant languages (Fishman 2001; Wiley, 2001). Indigenous languages are the ones spoken by Native American tribes such as the Navajo, Cherokee, Tohono O'odham, Sioux and many others. The unfortunate history of mistreatment towards these communities has had a negative impact on the transmission of their native languages (Fishman, 2001). Colonial languages are those spoken by early settlers such as Dutch, Swedish, Finish, German, French and Spanish among others. In

certain communities, these languages have not been transmitted intergenerationally, rather their current existence in the United States is due to migration and not colonial roots. The last category, the immigrant languages, are those spoken by groups of immigrants to the United States, including Spanish, Chinese, Korean, Russian, etc. As evidenced, Spanish can be perceived as both a colonial and an immigrant language.

Although the term has achieved popularity, the concept could be perceived as "ill-defined and sensitive to a variety of interpretations within social, political, regional, and national contexts" (Van Deusen-Scholl, 2003 p. 212). Other authors such as García (2005) have opposed the term "heritage language" citing that it evokes the past rather than the present or the future as well as contributing to the effort to control the discourse so that English remains a more powerful language. On the other hand, according to Beaudrie et al. (2014), the term is neutral and inclusive and implies the inheritance of cultural and linguistic patrimony. Other terms found in the literature to refer to heritage languages are "home languages", "community languages", "native languages", "ancestral languages" "minority languages" or LOTE (Language Other Than English).

Heritage Language Speaker/Learner:

All the participants in the study were part of a heritage language course and therefore to some degree, they have already identified themselves, linguistically, personally or historically, as heritage language learners. Regarding the definition of this term, there is much disagreement due to the fact that it is being used to describe a complex situation with implications of inclusion, exclusion and identity politics (Wiley, 2001). Within the field of HL, the most popular definitions to determine who is considered an HL learner are what are designated as the narrow and broad definitions.

The narrow definition, the most commonly cited and canonical in the field, is the one coined by Valdés (2001) who defines an HL learner as someone "raised in a home where a non-English language is spoken. The student may speak or merely understand the heritage language and be, to some degree, bilingual in English and the heritage language" (p.1). The broad definition includes individuals who have a "heritage motivation" (Van Deusen-Scholl, 2003) or were raised with a strong cultural connection to the language but do not speak or understand it (Fishman, 2001).

Although adopting the broad definition helps to encompass a diverse range of cultural profiles, given the characteristics of the participants in this study, the narrow definition would be better suited since all the participants had to have an intermediate low/mid proficiency level in the language to be part of the courses involved in the study. Furthermore, for the purposes of this study, Spanish is considered a heritage language because the community under investigation uses it and has personal connections to Spanish.

The label heritage language learner/speaker will be used throughout this dissertation as a comprehensive term that includes other commonly used terms such as "community language learners", "bilingual learners" "quasi-native speakers", or "native speakers" (Draper & Hicks, 2000; Valdés, 1997). Furthermore, some distinctions have been made between the terms HL learner and HL speaker. HL learner has been used, rather than HL speaker, for those individuals that understand the language but do not speak it (Beaudrie et al., 2004 p.5). Nonetheless, for the present study, these labels will be used interchangeably.

Language Proficiency:

It is the speaker's consistent functional ability to use language in writing, reading, listening or speaking for communicating for real life purposes in non-rehearsed contexts (ACTFL, 2012). This degree of competence allows the student to use the language in authentic situations not confined to the classroom. The most commonly used foreign language proficiency model in the United States is the ACTFL Guidelines. The guidelines identify five major proficiency levels: Distinguished, Superior, Advanced, Intermediate, and Novice where the Advanced, Intermediate and Novice levels are subdivided into High, Mid and Low sublevels (see figure 1).

It is important to note that these guidelines were designed to measure foreign language proficiency and might not be a perfect fit for HL learners' proficiency. Kagan and Friedman (2003) pose that for languages with many varieties, such as Spanish, the ACTFL measures might not be appropriate as ACTFL accommodates better to languages with less dialectal variation. Different studies have found differing outcomes when implementing them. While studies such as Martin, Swender & Rivera-Martínez (2013) and Swender, Martin, Rivera-Martínez & Kagan, (2014) have successfully used the ACTFL standards to evaluate the functional competency of Spanish and Russian heritage speakers, other authors express disagreement. In a similar study to Martin et al. (2013) and Swender et al. (2014) but with Hindu HL learners, Ilieva (2012) shares contrary implications concluding that it is necessary that ACTFL includes distinctions between HL and L2 learners. She cites that the characteristics of HL and L2 learners' languages present difficulties for examiners to rate HL learners fairly. In a more practical perspective, due to the lack of a better suited proficiency measure for HL learners, the ACTFL guidelines are commonly used for the proficiency evaluation of HL learners.

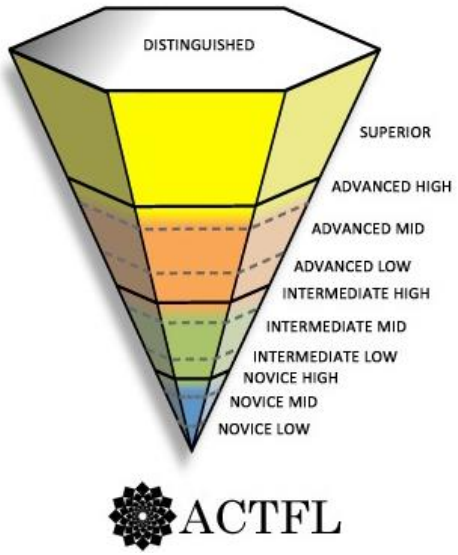


Figure 1. ACTFL Proficiency Guidelines
Note. Reprinted from "*ACTFL Proficiency Guidelines 2012"* by the American Council on the Teaching of Foreign Languages, 2012. https://www.actfl.org/resources/actfl-proficiency-guidelines-2012

1.5 Chapter Summary and Overview of the Dissertation

This first chapter has discussed the background, and rationale behind this study and acts as the starting point for the reader. The chapter briefly discusses previous literature, their findings, and implications for the field. It frames the previous research efforts and discusses the existing gap that this study attempts to answer. It also lists the research questions, motivated by this previous literature, that were addressed throughout this study. As previously discussed, this thesis attempts to contribute to the pressing search for teaching methodologies for heritage language learners. It takes previous theoretical work and implements an empirical research study testing the effects of Project-Based learning on HL students' oral and written proficiency.

The second chapter offers an extensive literature review on relevant topics. First, it reviews the pertinent literature on PBL methodology, its history, theoretical foundations, definitions, and outcomes associated with the methodology. The next section provides information on heritage language education including approaches to teaching, and PBL within an HL context. The third chapter presents a detailed account of the methodology used to collect data for the study and the analysis that was carried out. First, the chapter dives into the research context for the study, which includes information on the courses used for the study, the teacher-researcher and the student participants information. Then, the PBL curriculum is explained and compared to the existing curriculum used for the control class. Next, the chapter details the research procedures followed and the data collection instruments utilized to collect data for this investigation. Finally, the data coding procedures and analysis for the data are discussed.

The fourth chapter is dedicated to the results and analysis of the data collected. First, the chapter offers a deeper look into the participants' background information collected through the HL department's demographic questionnaire. The information from the questionnaire is broken down in the different sections such as descriptive statistics, cultural and ethnic background and identity, previous and current Spanish language contact and use, and finally language confidence and self-assessment of language competencies. Then, the results for the first research question concerning writing skills are presented, followed by the results of the second research question regarding oral skills. The results for both questions within each skill are presented by the measures observed: fluency, complexity, and accuracy.

The fifth and final chapter covers the key research findings in relation to the research questions and previous literature on the topic. It also presents the study's pedagogical implications, value and contribution to the field based on the findings and how they can be applied to a wider HL audience. The following section of the chapter reviews the limitations of the study and proposes opportunities for future research. Finally, it wraps up with my concluding remarks.

CHAPTER 2

LITERATURE REVIEW

The purpose of this chapter is to provide a review of the most pertinent research studies and theoretical frameworks relating to Project-Based learning and heritage language instruction in order to contextualize the present study. With the growth of Spanish as heritage language programs (Beaudrie, 2012; Beaudrie & Marrero, forthcoming), the need to restructure teaching practices and methodologies to create pedagogical spaces to accommodate heritage language learners has become of vital importance. A handful of pedagogical tools have been suggested to address students' needs; unfortunately, not many of these approaches have been empirically researched. One of these approaches is Project-Based learning, which is the focus of this research study.

The first part of this chapter presents the historical overview of PBL, its theoretical foundations, definitions, and key features as well as the benefits and challenges of the approach. Second, a brief overview of the pedagogical approaches that have been used with HL learners is presented. After that, a thorough discussion highlighting the advantages and aptness of PBL for teaching HL learners will be presented as the rationale behind the creation of a PBL curriculum for HL courses. The chapter concludes with a summary of the most significant literature findings.

2.2 A historical overview of Project-based learning literature

Project-Based Learning (PBL) and its student-centered approach may feel like a recent addition, especially when it incorporates technology. However, the roots of what is

considered PBL can be traced back to the early 20th century, and it is accredited to David Snedden (mid-1800s) and educational theorist John Dewey (1891) as the pioneers (Beckett, 2006). Nonetheless, other researchers such as Francis Parker and William Heard Kilpatrick have contributed to the development of the methodology (Peterson, 2012; Zilversmit, 2005). Snedden was the first to propose an efficient form of instruction in the field of agricultural science favoring content-based courses focused on the acquisition of a specific skill relevant to the content of study (Roberts & Ball, 2009). Dewey, in a "battle of words" (1914-1915) with Snedden over vocational course design, argued for a holistic, integrated approach where vocational skills and academic content are blended in a context-rich environment to develop transferable life skills (Roberts & Ball, 2009). Dewey's experiential learning philosophy sought to achieve not only skills in the content area but also interdisciplinary and life skills.

These transferable life skills are those cognitive and social skills that are now at the core of modern PBL, and especially relevant for project-based language learning (PBLL) (Moritoshi, 2017). This is why Dewey is more commonly cited as the pioneer of the problem-based methodology as well as the one who laid the foundation for the project-based approach (Boss, 2011; Boss, & Krauss, 2014; Mergendoller & Thomas, 2005; Slater & Beckett, 219). As early as 1891, Dewey's methodology led with the concept of collaborative discussions in the classroom where the teacher acted as the mediator of the curriculum, challenging the teacher-driven, rigid structured, rote memorization and passive learning of the time (Nebeker, 2002). Dewey's model later evolved into project-based learning with Dewey's protégé Kilpatrick. Kilpatrick's expansion of Dewey's vision is the implementation of the idea that students learn better

when there is an activity with a wholehearted purpose carried on in a social environment (Barron, Schwartz, Vye, Moore, Petrosino, Zech & Bransford, 1998; Peterson, 2012). In 1918, Kilpatrick released an article named "The Project Method" rooted in the widespread education reform movement started by Dewey but with added relevant projects. Inspired by Kilpatrick's model, PBL has been translated into practice in a spectrum of ways due to the particularities of differing instructional settings such as diverse student populations, instructional objectives, institutional constraints, and available resources (Stoller, 2006). Despite the various configurations, PBL keeps the constant characteristics of providing opportunities to recycle skills and language, and student-centered activities to enable autonomy and responsibility (Stoller, 2006).

The collaborative, holistic and flexible nature of PBL makes it a powerful approach for implementation in the teaching of languages and literacy and has been implemented at various levels and contexts (Beckett,1999; Beckett, 2005; Fried-Booth, 2002; Levis & Levis, 2003; Luongo-Orlando, 2001; Mohan & Beckett, 2003; Weinstein, 2004). Project-Based for language learning (PBLL) offers students valuable opportunities to learn collaboratively and produce language in an authentic manner within real-world contexts where they can work on topics that are of personal interest to them (Moss & Van Duzer, 1998). In the context of language teaching, PBL was first introduced to English as a second language (ESL) education to enable student-centered learning (Hedge, 1993). PBL is a reasonable and sound pedagogy that allows the use of language as a medium to learn language form, content, and sociocultural knowledge (Slater and Beckett, 2019). Nonetheless, the use of PBL in language education did not start until around the late 1970's going into the 1980's (Hedge, 1993, as cited in Beckett, 2006). Zhang (2010)

compiled studies and research that make up the literature of PBL from 1979 through 2008. This compilation is shown in Table 1, as cited and translated by Moritoshi (2017).

Table 1
PBLL- related literature between 1979-2008

	Decade			
	1979-1988	**1989-1998**	**1999-2008**	**Total**
Articles	5	22	31	58
Research articles	2	3	4	9
Teaching materials and books	1	3	5	9
Doctoral level theses	0	1	5	6
Anthologies	0	0	1	1
Sub-total	8	29	46	83

Note. Reprinted from "*The perceived English language learning outcomes associated with project-based language learning: a case study at a Japanese junior college"* by Moritoshi, P., 2017, p. 66.

One of the earliest articles published involving language learning and PBL-like methods was that of Eslava and Lawson (1979). In the article, students had to use English in a creative way by recording a voiceover for a silent British movie clip. Although no empirical data was collected, students' oral and written statements, and teacher's observations and evaluations, indicated development of students' oral communicative skills. Also noted was students' improved motivation to learn. Shortly after, in 1982 Fried-Booth published her research article of project work in an ESL class that created a booklet named *The Good Wheelchair Guide* to give information about public facility access to tourists. The guide was based on the information obtained from interviews conducted with citizens and staff of public amenities. As with the previous study, Fried-Booth (1982) did not provide information about measurable evaluation of the project.

The main concern was to raise motivation to learn and use the language in useful ways to create a task that coherently connects all different aspects of language learning. According to the author, all these goals were achieved. These few studies, articles, and teaching materials in the first decade of 1979-1988 mark the beginning of the ESL/SLA field involvement in PBL.

The second decade (1989-1998) shows a remarkable increase in research publications, teaching materials, books as well as the first large-scale empirical research of PBLL in the form of a doctoral dissertation by Janet Eyrin (1989). Her study documented teachers' experiences and ESL students' responses to PBLL. Importantly, Eyrin's study revealed the practical difficulties of implementing a PBLL approach in a classroom which marks a shift from simply presenting projects or discussing the benefits of PBLL (Zhang 2010 as cited by Moritoshi, 2017). Towards the end of the second decade, Stoller (1997) made an important contribution towards the development of teaching materials specific to language teaching. Stoller contributed an article in an English language journal about how to implement project work into language classrooms step by step, as well as the learning outcomes of PBLL implementation. The article was later published again as a chapter in a language teaching book (Stoller, 2002), which is the primary source used for this dissertation.

The third decade (1999-2008) shows, once again, an increase in various types of publications on PBLL, making the approach more prominent in the literature. At this time, existing literature (Beckett, 1999; Eyring, 1989; Moulton & Holmes, 2000; Wilhelm, 1999) offered conflicting students' evaluations of PBL noting that learners did not see the value of learning through projects and appeared dissatisfied with the

approach. These conflicting evaluations motivated Beckett and Slater (2005) to create 'The Project Framework'. The framework is a mediation tool created in an effort to raise students' awareness of how language, life skills and content can develop through projects (Beckett & Slater, 2005). The authors of 'The Project Framework' explain that it is influenced by Mohan's (1986) Knowledge Framework, which is grounded on a systemic functional linguistic perspective itself. Mohan's framework advocates for the "integration of language socialization of students into new ways of thinking about language and language learning." (Beckett & Slater, 2005, p.110). This is a central tenet of Beckett and Slater's (2005) 'Project Framework'. Through the implementation of this methodological tool, students work with a planning framework graphic (Figure 2) elaborated by the teacher or in co-construction with the students. It also includes a project diary (Figure 3) to raise consciousness of language use and learned skills through the completion of the project.

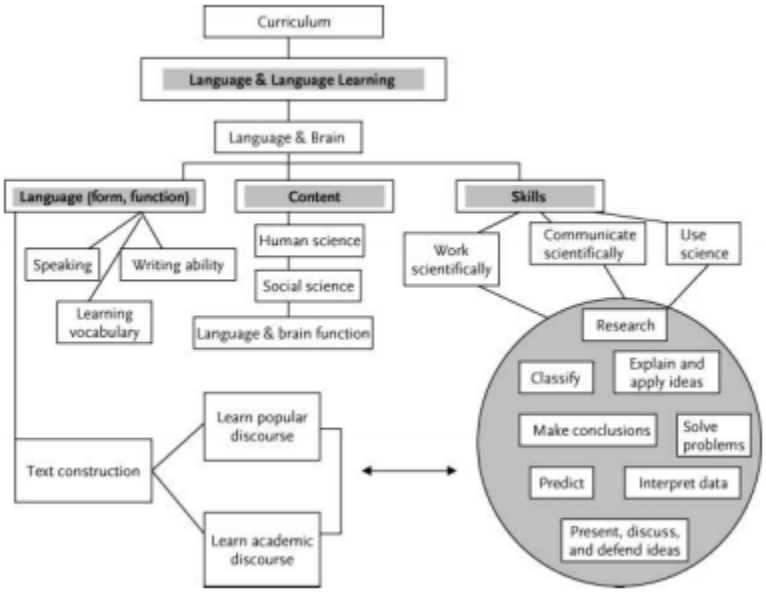
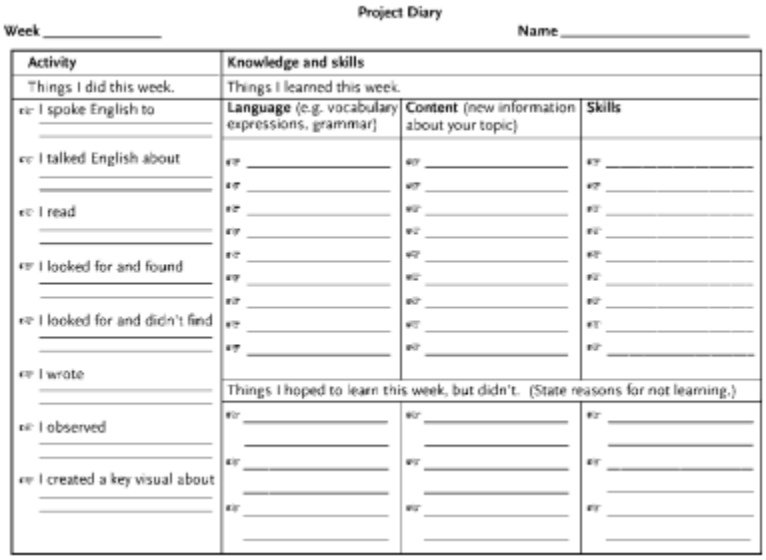


*Figure 2***.** Project Framework Graphic

Note. Reprinted from "*The Project Framework: a tool for language, content and skills integration"* by Beckett and Slater, 2005 p. 110.



Project Diary

Week _____ Name _____

Activity	Knowledge and skills		
Things I did this week.	Things I learned this week.		
I spoke English to	**Language** (e.g. vocabulary expressions, grammar)	**Content** (new information about your topic)	**Skills**
I talked English about			
I read			
I looked for and found			
I looked for and didn't find			
I wrote	Things I hoped to learn this week, but didn't. (State reasons for not learning.)		
I observed			
I created a key visual about			

Figure 3. Project Diary
Note. Reprinted from *"The Project Framework: a tool for language, content and skills integration"* by Beckett and Slater, 2005 p. 111.

Not included in Zhang's (2010) compilation of PBL literature, some other PBL studies are the master's thesis of Kitano (2004) and Petersen (2008). Both studies covered guidelines and explanations for PBL implementation, and students' evaluations of projects of the overall approach. Petersen's (2008) work is an extension of the doctoral dissertations of Eyring (1989) and Beckett (1999), pioneers of the largest empirical studies in the subject during the late 90s. Another important addition to the literature was Alan & Stoller's (2005) 10 step process for PBL implementation. Since Zhang's (2010) compilation there now exists a decade of new research and work in the field of PBLL. For instance, Stoller & Meyer's (2019) Five Stage Framework to guide language teachers' PBL implementation or Larmer and Mergendoller' (2010) 7 Essentials for PBL

Learning. Larmer and Mergendoller's work is the base for the PBL model of essentials popularized by the Buck Institute for Education, a forerunner in PBL education.

Due to its versatility, PBL has proven useful to teach content-based second-language education (Stoller, 1997), English for specific purposes (Fried-Booth, 2002), project-based computer-assisted English as a foreign language education (Fang & Warschauer, 2004) and community-based language socialization (Eyring, 2001). The flexible and student-centered nature of PBL is a result of the various theories that are part of the foundation of the approach.

In this section I have put forward the most salient history pertaining to PBL as a general educational approach and more importantly, as an approach for language teaching. The next section covers the theoretical foundations of PBL.

2.3 Theoretical Foundations of Project-Based Learning

The instructional methodology of the Project-Based approach encompasses principles found in a great variety of theories (Stoller, 2006), especially relevant are those of constructivism, language and literacy/academic socialization, systemic functional linguistics, experiential learning, learner autonomy, and the communicative approach. PBL follows the constructivist principles of attaining and constructing knowledge through social interactions (Vygotsky, 1978) and students' own recollection of concepts through investigations of realistic problems within realistic contexts (Lee, 2018; Slater and Beckett, 2019). Colored by Vygotsky's constructivist perspective, PBL subscribes to the principle that in order to develop higher levels of proficiency in the target language, interaction and usage in context with other speakers and sources are needed.

The same notion of the importance of context for language learning is shared by the language socialization approach (Ochs & Schieffelin, 1995) a valuable set of principles that informs PBL in language learning (Beckett, 2006). Under language socialization perspectives, language is both the focus and the medium of study (Schieffelin & Ochs, 1986 as cited in Beckett, 2006). In other words, by using the target language to investigate a topic for the creation of a project, students are actively constructing content knowledge, real-life skills while also learning how to use the language. Language learning is not only the learning of grammatical rules. Instead, it encompasses the acquisition of linguistic skills, sociocultural knowledge, various real-life skills and curriculum content (Beckett, 2006). Language socialization theory holds that language and culture are inseparable, language is the medium of socialization while at the same time socialization occurs through language (Garrett, 2007; Kobayashi, 2005).

The literacy/academic socialization of students relates to teaching appropriate learning strategies to actively construct knowledge. Students are guided to apply learning strategies to construct academic knowledge by collecting, synthesizing, connecting, hypothesizing, comparing and contrasting information to then interpret and present through means of writing or speaking (Beckett, 2005). This perspective of language as a resource to learn content, language and real-life skills is directly related to Halliday's (1994) proposal of systemic functional linguistics (Beckett, 2006). Halliday advocates for the usage of language as a meaning-making tool, where language is used for an authentic purpose (Halliday, 1994). All these theories inform PBL and make it an approach where students can learn language with purpose and know how to successfully utilize language in different contexts.

By using language in context, PBL follows a holistic view of language where the various aspects of language knowledge are an "inseparable whole" (Moritoshi, 2017). PBL endorses Canale's (1993) communicative-experiential approach which focuses on "the purposeful use of the language to perform real-life or close to real-life tasks and to exchange information in meaningful ways" (Ilieva, 2007). The different components of communicative competence (grammatical, sociolinguistic, discourse and strategic competence) (Canale & Swain, 1980; Canale, 2014; Swain 1985) can be reached through the process and the completion of projects where challenges and real language use is required. Through PBL the learning is contextualized, integrating skills to successfully express a variety of communicative functions explored in Canale and Swain's (1980) communicative approach (Ilieva, 2007). Students are actively using what they know by exploring, interpreting, and negotiating in order to express themselves in a comprehensible and appropriate manner. According to Beckett (1999), the meaningful interactions (Long, 1983, 1996) occurring in PBL allow the development of students' cultural and linguistic skills.

Furthermore, PBL partakes of the characteristics found in the experiential-learning framework where student-centered, active learning experiences connect new learning experiences with students' current knowledge, delivering a sense of making and a deeper understanding (Allen, 2004; Fried-Booth, 2002). A PBL curriculum allows these new experiences to become valuable because students have the freedom to study topics of their interest and show their knowledge through student-led projects. Contrasting traditional teaching where students are passive, in PBL the role of the student is as selector of content, performer of the project, collaborator with other participants,

investigator of the topic, constructor of knowledge and presenter of the final project (Oh, 2012). This autonomy is a characteristic that falls under the theoretical framework of learner autonomy (Beckett, 2006). PBL as a progressive pedagogical approach contains a philosophical basis where students are considered "fully functioning persons" who can learn how to learn and come with their own experiences and knowledge, not as blank slates upon which to imprint knowledge (Brown, 2000, p.92). Learning how to learn provides students with the dignity and freedom rejected in traditional classrooms where students are not given a voice (Brown, 2000). PBL is an action-based pedagogy with human agency at its core, therefore, PBL-informed curricula must reflect the treatment of learners as agents and inquirers (van Lier, 2006) where the role of teacher is as mediator and not as a superior bearer of knowledge. Learners take charge of their own learning by creating work that is flexible, creative and able to produce "lifelong learning" (van Lier, 2006).

In sum, PBL can be regarded as a "semiotic-ecological endeavor" focusing on using multisensory and multimodal signs of communication (van Lier, 2006 p.xiv) to attain knowledge of the target language, content but also life or academic skills. The different frameworks and theories that inform PBL create a pedagogical tool to provide heritage language learners with an educational experience that can meet their unique needs and skills. The versatility of PBL as a teaching approach allows teachers to incorporate various theories and methodologies in order to meet the differing instructional settings.

2.4 Definition and Conception of Practice for Project-based Learning

The PBL approach bears the tenet that learning occurs through the creation of projects where students solve authentic problems by being involved in the design, the decision-making process, and the investigative activities carried out to complete said project. But defining PBL, and therefore PBLL, is complex because there are a multitude of ways in which PBL has been put into practice, with no universally agreed definition of what constitutes a project (Stoller, 2006). This section has a twofold purpose: first, to examine the different labels of PBL/PBL-related approaches and the different configurations or types; secondly, to discuss the key components that make up PBL.

2.4.1 Labels and Types of Project-Based Learning Approaches

The PBL approach goes further than just the implementation of projects into the curriculum, proving to be a more complex pedagogical practice than the name suggests. Since Dewey's problem-based beginnings, which evolved into project-based approach with Kilpatrick's intervention, the core of PBL has been captured by many labels within mainstream and language education (Stoller, 2006). Some of those labels given to classroom approaches that include projects are:

-Problem-based learning: Savoie & Hughes (1994), Barell (2007), Wood & Head (2004)

-Investigative research: Kenny (1993)

-Investigative learning: Fried-Booth (1982)

-Exploratory learning: Legutke (1985, 1985)

-Cooperative learning: McGuire, Thornton & Kluge (1997), Kimura (2009)

-Collaborative learning: Davey (2001)

-Experiential and negotiated language learning: Carter & Thomas (1986), Legutke & Thomas (1991), Eyring (2001), Padgett (1994)

-Project approach or project-based approach: Diffily (1996), Levis & Levis (2003), Papandreou (1994)

-Project-work: Fried-Booth (1986, 2002), Haines (1989), Fried-Booth (2002), Hardy-Gould (2003), Henry (1994), M. M. T. Lee et al., (1999), Phillips, Burwood & Dunford (1999)

-Project-oriented approach: Carter & Thomas (1986)

-Project-based learning: Peterson & Myer (1995),

-Project-based language instruction: Moss & Van Duzer (1998), Oh (2012)

-Project-based language learning (Kemaloglu (2010), Simpson (2011)

All these labels have the commonality of including characteristics associated with PBL such as experiential- learning by doing- learning, research and inquiry, student interest, real-life tasks and problem solving through the incorporation of projects. According to van Lier (2006 p.xiii), all these holistic educational approaches "flow from the same ideological and pedagogical well" originated in Dewey and Kilpatrick's movement. The above list of variations serves as evidence that despite the different configurations, due to its student-centered and hands-on experiences, PBL is a long-standing approach to teaching and learning that has been found valuable to mainstream and language teachers (Fried-Booth, 2002; van Lier, 2006).

Furthermore, in practice, project work can take on various configurations, while still implementing the characteristic features of PBL (learning by doing, real-life tasks, etc.). PBL can vary depending on factors like learners' age, proficiency level, their

exposure to PBL, the institution's curriculum restrictions, curricular objectives, time constraints and materials available (Stoller, 1997, 2006). As such, instructors and institutions must make appropriate changes to fit the needs of the learners. Projects can differ on many aspects such as the degree of structuredness, their link to the real world, data collection techniques and point of contact, the final product, the audience, among others (Stoller, 1997, 2006).

The structuredness of the project refers to the degree of independence that students have to decide on the direction and goals of the project. Some projects are highly structured, where instructors dictate themes and even the medium of the final product. It is apt for teachers who are new to implementing PBL and to familiarize students with the approach (KoreaTESOL, 2013). Others are semi-structured with features determined in part by the teacher and in part by the learners. And lastly, highly unstructured projects are those where learners have the independence to define the direction and goals of the project (Henry, 1994; Stoller, 1997, 2006).

Some projects can be linked to real-world issues (elections, the environment, etc.) where students create a booklet with important information to help visitors such as Fried-Booth (1982). Other projects can be linked to simulated real-world issues where students debate or present information (Stoller, 1997). Other projects can be linked to themes in mainstream curricula (social studies, biology, math) and not directly tied to a real-world issue (Stoller, 2006).

Project work can differ on the data collection techniques and point of contact (Stoller, 1997) as demonstrated by the following types of projects. First, *Research and text projects* require students to use existing research in their project rather than people.

Some examples are Renjel (2006) and Ortmeier (2000) where students researched information about their home country or a foreign country to create an oral or written product. *Survey projects* involve creating a survey instrument and then collecting and analyzing data from informants such as Fried-Booth (1982) and Gras-Velázquez and Chindemi-Vila & Song (2019). *Correspondence projects* entail gathering information for a specific purpose through emails, letters or phone calls, for example Raof & Yusof's (2006) study where students contacted practicing engineers, or Wang (2019) where Chinese English-learning (EL) students contacted Korean EL students. *Encounter projects* result in face-to-face interactions in the target language with individuals outside of the classroom such as Legutke (1984, 1985) in an airport setting.

Projects can also vary depending on the way in which students display their knowledge, in other words the final product (Stoller, 1997). *Production projects* involve the creation of paper or electronic media such as bulletin boards, videos, poster sessions, audios, written reports, handbooks, brochures or itineraries. Some examples are Davey (2001), and Pitura and Monika (2018) where students created a webpage, Wang's (2004) magazine project or Coleman's (1992) video project. *Performance projects* take shape as staged debates, theatrical performances, food fairs or fashion shows. *Organizational projects* include the planning and formation of a club or a conversation-partner program. One example is Carter and Thomas' (1986) project where students became teachers for a short while in local junior schools. The final outcomes can be directed towards authentic audiences (letters to government, display around the city, website for tourists, presentation for new students) or simulated audiences of teachers and classmates (Stoller, 2006).

Depending on the nature of the project, these can be carried out extensively for a long period of time or intensively over a short period of time. They can be done in groups or individually, be confined to the classroom or involve the community (Stoller, 1997). Furthermore, any project can be a combination of different types of projects. For instance, Fried-Booth's (1982) *The Good Wheelchair Guide* is a semi-structured, real-world, survey, research, and production project. The task and product were designed by the instructor, but students were free to choose the locations to research. The information was gathered by surveying staff of public amenities as well as researching newspapers, articles, and government reports to create a paper booklet for authentic use. Once again, the versatility of PBL allows instructors and institutions to decide on the characteristics that their project will take.

2.4.2 Key Features of Projects Under Project-Based Learning

The section above explained the aspects of structure and direction that can change in the conception of the projects. This section is concerned with the essential aspects that projects under PBL must have. A project can change structure, data collection techniques, or type of final product but must include the core aspects of what constitutes PBL. A look through the PBL and PBLL literature (Alan & Stoller, 2005; Hedge, 1993; Krajcik & Blumenfeld, 2006; Stoller, 1997; Thomas, 2000; Thuan, 2018) can help to build a working definition and a set of defining features through consensus. Some basic defining features of the approach are:

1. Student-centered activities with topics surrounding students' interest
2. Project work focusing on content learning rather than on specific language targets

3. It is process and project oriented with an emphasis on authentic integration of skills and processing of information from varied sources
4. Intention of developing the target language, content and skills
5. Projects are central and not peripheral to the curriculum
6. The products used as assessment of learning are authentic (mirroring real-life tasks) and tangible and can be shared with others, giving the project a real purpose
7. Teacher facilitation (instead of direction)
8. Cooperative rather than competitive
9. Work over an extended period of time
10. Project work is potentially motivating, empowering and challenging

In reality, translating those ideal features into the projects done in class can be challenging. Therefore, the Buck Institute for Education (BIE), a leading resource for educators implementing PBL at any level, created a framework to direct instructors, schools and organizations to measure, calibrate and improve their practice and the design process of projects under PBL. The current framework, revised in 2014 from the original version from 2010, offers two components: the model Gold Standard PBL containing the essential project-design elements (see Figure 4), and a list of PBL teaching practices for instructors (see Figure 5) (Mergendoller & Larmer, 2015). While the former offers a guide of the essential components of projects to engage and prepare students for success, the latter advises teachers how to adapt their traditional teaching practices to PBL step by step (Larmer, 2015a; 2015b). First, we will review the essential elements of the Gold

Standard PBL model. Afterwards, the recommended teaching practices will be briefly presented.

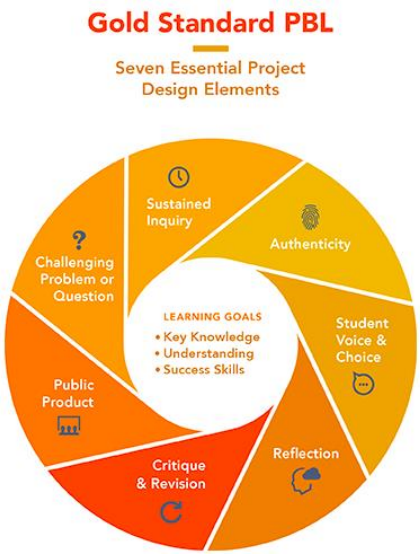


Figure 4. Gold Standard PBL: Essential Project Design Elements
Note. Reprinted from *"Gold Standard PBL: Essential Project Design Elements*" by Larmer, 2015a.

The seven essential elements for projects under PBL are described in the following paragraphs.

A challenging problem or question: This is the heart of a project; the driving question must engage students so that learning becomes more meaningful. The project can seek to resolve a concrete or abstract challenge pertaining to the students' experiences and interests. Through the research carried out in order to solve the question, students gain knowledge and skills that they need to know to create a project that matters to them. In other words, the knowledge gained is utilized to achieve a visible and relevant purpose (Larmer, 2015a).

A sustained inquiry: The process of sustained inquiry requires to actively and deeply investigate a topic. The inquiry process takes time; therefore, projects should be extended work and not one-day's work. The investigation process can incorporate different information sources such as interviews with experts, service providers or users, in addition to more traditional sources like books or websites. Furthermore, students can inquire into the needs of the users of the product that they are creating or even the audience of the project (Larmer, 2015a).

Authenticity: For projects to be authentic, they must mirror a real-world task. This aspect is important because an authentic project increases student motivation and learning. According to Larmer (2015a) there are different ways for a project to be authentic. First, a project can have an authentic context such as when learners solve problems faced by people in the world outside of the classroom (a politician's advisor recommending a policy change, engineers designing a construction, etc.). Second, it can involve using real-world processes, tools, tasks, and performance standards such as when students use editing tools to produce videos approaching professional quality. Third, it can have a real impact on others such as when students create a product to be used by others or address issues affecting the communities (helping to plant a community garden, hosting an event for a cause). Lastly, the project can have personal authenticity by addressing students' own concerns, interests, cultures, identities, and other issues in their lives (Larmer, 2015a).

Student voice and choice: Being part of the decision-making process creates a sense of ownership. This can result in students' heightened care and interest for the project. Students' input is valued, and they have a say on different aspects of the project, from the

question generated, to the resources used to resolve the problem, to the final product. For advanced and PBL-experienced students, in an unstructured project, learners can even decide on the topic and nature of the project itself. They write their own challenging questions, decide how to solve them as well as decide the means through which they will demonstrate their learning (Larmer, 2015a).

Reflection: Through the process of completing a project, students and teachers are encouraged to reflect on what they are learning and why they are learning it. This element is directly tied to Dewey's concept that we do not learn from experience, we learn from reflecting on the experiences. In practice, it can be an informal class dialog, but it can also be an explicit part in the form of project journals, formative assessments, and discussions at project checkpoints. Reflecting on the content knowledge gained helps students solidify what they have learned and think about other contexts where they can apply their knowledge. Reflecting on the skills developed helps students internalize what the skill means and to set new goals for further growth. Lastly, reflection on the process of completing the project helps students decide how they might approach the next project and helps teachers refine or improve their PBL practice (Larmer, 2015a).

Critique and revision: A hallmark of the Gold Standard PBL is high quality work, which can only be achieved through thoughtful critique and revision. In this step, guided by rubrics, models and formal feedback protocols, students can give and receive constructive feedback from peers, teachers and even from outside experts that can contribute to the authenticity and real-world point of view. This step is informed by research on the importance of formative evaluation as a way to improve students' products through teacher feedback and students' self-evaluations of the results of their learning.

Public product: A public product can be a tangible product or a presentation of a solution to a problem shared in public. There are different reasons as to why this aspect is vital for a successful project. First, like authenticity, a public product boosts motivation and encourages high quality work by increasing the stakes of having to present their work to the public and not only their teacher and classmates. However, this can also cause differing levels of anxiety for the students, which can detract from performance. To avoid high levels of anxiety, students have to be well prepared to make their work public. Second, having a public product makes students transform what they know into a tangible form to be discussed with the public. Instead of only being a private exchange with the teacher, "the social dimension of learning becomes more important" (Larmer, 2015a). This creates a learning community where discussions about learning, the process of learning, acceptable standards of performance and plans for improvement can be examined. To create this product, students develop 21st century skills like information gathering and processing, research and inquiry skills, problem solving and time management (Oh, 2012). Lastly, when students' work is public, it becomes accessible to parents, community members and the world outside the classroom to demonstrate what the students can actually do. Institutions can show that students are able to utilize their knowledge for real-world products and not only on tests.

At the center of the diagram of the Gold Standard PBL model are the student learning goals: key knowledge and understanding and key success skills. Key knowledge and understanding relate to content standards, concepts and in-depth understandings vital to academic disciplines. Success skills or "21st century skills" relate to competencies (critical thinking, collaboration, digital literacy) that students need to develop to thrive in

the real world outside of the classroom. Through projects, students apply their knowledge to solve real world problems while also applying and further developing success skills. These learning goals are found at the center of the diagram to signify that through the entire process of completing a project, all the core content, key skills, and understandings fundamental to students' subject and grade level can be accomplished (Larmer, 2015a). This eighth element was included to counter stereotypes that PBL was not an effective approach to instruct standard-based knowledge, skills and understanding (Mergendoller & Larmer, 2015).

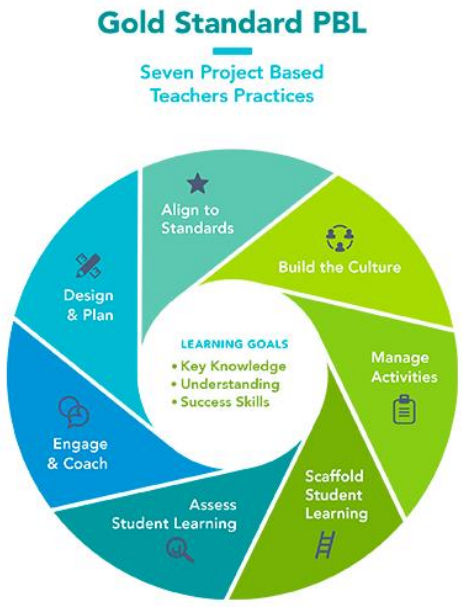


Figure 5. Gold Standard PBL: Project Based Teaching Practices
Note. Reprinted from "*Gold Standard PBL: Essential Project Design Element"s* by Larmer, 2015a.

The second part of the Gold Standard PBL model is the Project based teaching practices component. This component contains seven teaching practices that teachers can follow in the process of teaching with PBL. These practices are:

-***Design and plan***: Create or adapt a project to the appropriate context and plan its implementation from beginning to end while allowing for some degree of student voice and choice.

-***Align to standards***: Plan the projects making sure to address the subject areas' key content knowledge.

-***Build the culture***: Explicitly and implicitly promote student independence, inquiry and collaborativeness.

-***Manage activities***: Work with students to organize tasks, set checkpoints and deadlines, and find resources to use for the project.

-***Scaffold students learning***: Employing a variety of teaching strategies, support students in reaching the project goals.

-***Assess student learning***: Use formative and summative assessments, including self and peer reviews, to assess students' learning.

-***Engage and coach***: Teachers must identify when students need skill-building, redirection, encouragement and celebration by engaging in learning and creating alongside the students.

The seven teaching practices in the model surround the same student learning goals (key knowledge and understanding and success skills) as the seven essential project design elements. In other words, these teaching practices must always have students' learning goals as the core.

The Gold Standard framework is a necessary tool because it provides a much-needed framework for PBL so that practitioners can have a more structured approach to follow. The Buck Institute for Education explains that even though it is encouraging to

see a surge of interest in PBL, it was necessary to create a model for teachers to follow when creating projects (Larmer, 2015a). Otherwise, the unpreparedness can lead to a variety of classroom implementations with differing project quality standards which can affect student learning, wasted time, frustration, and failure to understand the possibilities of PBL (Larmer, 2015a). The framework put forth by the BIE aids in defining the characteristics that a successful PBL classroom can implement.

In this section I have presented the different labels applied to classroom approaches that incorporate projects, as well as the types of PBL projects depending on the structure and conception of the project. The defining elements of projects under the PBL approach were also discussed. To this end, a functional framework created by the BIE, a forerunner in PBL, was used as direction for the defining features of a successful project.

2.5 Positive Outcomes of Project-Based Language Learning (PBLL)

Despite the abundant literature about the effects of PBL in language development, much pertains only to theoretical reports advocating for its benefits. Many practical papers such as Vincent (1990), Coleman (1992), Gardner (1995), and Nakayama (2001) offer materials for PBL implementation, evaluation and perceived or anticipated learning outcomes but do not present empirical evidence of the effectiveness of the projects described. To date, there are few empirical studies surrounding PBL and language. From those few studies, a minority focuses on linguistic gains. Instead, most focus on participants' perception of the effectiveness of the approach or effects on non-linguistic aspects. This section will cover some of the most commonly cited positive outcomes and benefits of working with PBL in the L2 and FL settings.

2.5.1 Linguistic Benefits of PBL

The studies exploring linguistic benefits associated with PBL can be divided into two categories: studies about perceived linguistic benefits and those assessing linguistic benefits through language tests. The former category makes up most of the existing literature about the linguistic gains achieved through PBL.

Perceived Linguistic Benefits of PBL

The studies examining students' perceived linguistic gains used primarily interviews or questionnaires to obtain their data. One of the oldest and most frequently cited is Carter and Thomas' (1986) study describing the effects of the PBL "Brown eyes" project with 12 junior high ESL students in Bath, England. The data collection instruments were observations and students' post-project feedback. The researchers found that students reported enhanced English competence and improved communicative strategies as a result of PBL.

A few years later, Coleman (1992) carried out a 7-8 week-long project in a French L2 course also in England. The project consisted of the creation of a 10-minute video and a written dossier about a contemporary French topic previously discussed with the instructor. Students were instructed on how to use the technical equipment needed for the project (camcorder and editing facilities) for the first few weeks prior to starting the task. It was followed by opportunities to have students form their groups and select the topics of the project. After the creation of a self-selected topic video as a project, students filled out a post-project survey where they shared that they perceived gains in their French writing (74%), speaking (82%), reading (64%), and listening (77%) (p.36).

To broaden the understanding on the emerging field of PBL within language learning, Beckett (1999) pursued his dissertation on this topic. From February 1995 to October 1997, he studied the implementation of a PBL curriculum in eight ESL Canadian classes by examining teachers' and students' evaluations of the approach. The data collection instruments used were interviews, observations of two projects in action, field note taking, and the examination of students' journals and other written work such as their project written reports and portfolios. The students' written work was analyzed to compare it to the students' evaluations and opinions shared during the interviews. There was a total of three teachers and 78 8th-12th grade students observed; they were also all interviewed, with the exception of one of the three teachers.

Beckett's results were mixed. On the one hand, teachers evaluated the PBL approach positively and the researcher's observations supported these evaluations. The teachers considered PBL a successful methodology to increase students' creativity and unexpected learning (acquisition of knowledge other than the content of the project). On the other hand, despite teachers' view of PBL's success in fostering students' independence, a number of students' evaluations were mixed. While some students reported improved language abilities in the areas of writing, vocabulary and presentation skills (p.126), others demonstrated negative feelings toward the approach. Of the 73 students interviewed, 13 (18%) said that they liked the project, 18 (25%) had mixed feelings, and 42 (57%) said they did not like projects. The positive aspects shared by the students were that project creation is fun and it provides opportunities for language use and improvement of skills such as computer, writing and presentation skills. The mixed comments shared were that although they learned, they were not sure what it is that they

learned, seemingly needing the presence of clearer objectives or guidance. Other comments were about liking only some of the projects carried out and disliking others. Additionally, students admitted that while projects challenged them more than textbook work, they were more time consuming.

Another dissertation dedicated to PBL, and perceived language learning outcomes is Moritoshi (2017). The research took place at a Japanese junior college with 28 low-level EFL students for a period of eight weeks. The data was collected by using pre-post project surveys, semi-structured interviews, field observation notes, project activities surveys, and students' project output. The pre-post project surveys presented a five-point Likert scale and was used as a self-evaluation method for students about their skills in speaking, listening, reading, writing, grammar, vocabulary, spelling, and pronunciation. The results, presented in Table 2 for language skills and Table 3 for other language aspects, vary according to skill and language aspect measured. Nonetheless, generally there is only a slight perceived improvement followed by no perceived change in knowledge. Additionally, it is important to point out that there is a small portion of responses where students have perceived slight deterioration in their skills and language aspects.

Moritoshi explained that the perceived language deterioration stems from a combination of lacking interest in the class or subject and poor preparation for classes. Therefore, the perceived linguistic deterioration is ascribed to "affective factors and perceived poor study practices, rather than an actual deterioration in EFL proficiency…. Seeing others use English while they did not or could not, might have resulted in some students rating themselves more negatively post-project than they had pre-project"

(p.178). These results suggest that while PBL can at least slightly improve students' perceived language skills, greater gains may require longer PBL interventions.

Table 2.
Summary of results of language skills development in Moritoshi (2017)

Change in skill	Speaking (n=23)	Listening (n=23)	Reading (n=23)	Writing (n=23)	Total	%
Substantial improvement	0	0	0	1	1	1%
Moderate improvement	0	4	1	1	6	6.6%
Slight improvement	13	10	8	16	47	51.6%
No change	6	7	12	5	30	33%
Slight deterioration	4	2	1	0	7	7.8%

Note. Adapted from Moritoshi (2017, p.210).

Table 3.
Summary of results of language aspects development in Moritoshi (2017)

Change in skill	Grammar (n=23)	Vocabulary (n=23)	Spelling (n=23)	Pron. (n=23)	Total	%
Substantial improvement	0	0	0	0	0	0%
Moderate improvement	3	0	3	0	6	6.5%
Slight improvement	12	21	7	9	49	53%
No change	8	2	10	11	31	34%
Slight deterioration	0	0	3	3	6	6.5%

Note. Adapted from Moritoshi (2017, p.257)

In a study implementing PBL within an English content course, Nor (2008) investigated the effect of a PBL project within an English for Career Search course at a university in Malaysia. The course aimed at equipping students with job-hunting strategies, so that they were able to secure a job upon graduation. There was a total of

fifty-five participants from two different language classes taught by different instructors but with a standardized PBL task and instructions. The PBL task, interviewing a professional working in a discipline related to their future career, was integrated into the job search component of the class. Through the use of a 4-point Likert scale questionnaire and open-ended questions, the study found that 100% of students reported that the project component of the course helped them improve their English skills. Nor shared that the success of the project was due to the student interaction in the target language by interviewing a practicing professional and reporting their findings. The study concluded that the interaction with the practicing professional revealed to the students the importance of English in the working world of an Engineer.

Almeida-Mendez (2017) and Oh (2012) shed light on the usage of PBL with Korean L1 students and Korean L2 learners. Almeida-Mendez (2017) investigated the effects of a PBL methodology on the experiences of eleven Korean students in an intermediate Portuguese course at a South Korean university. The teacher-researcher used two projects: Project 1 followed a rigid teacher-chosen topic; for project 2 students could choose the topic (with the help and topic suggestions from the teacher). At the beginning of the final exam, students were asked to share their experiences conducting the two projects and to comment on which project they preferred. Students shared that they liked the experience because they felt like their opinions were respected as they were given the freedom to choose certain aspects of the projects (date of presentation, topic, group). Additionally, most participants (eight out of 11) declared their preference for the second project due to the freedom to choose a topic of their interest, which directly ties into the positive experiences students shared that they had throughout the course. Similarly, Oh

(2012) used surveys to gather undergraduate Korean L2 learners' self-evaluations of their learning experiences in a PBL course. The participants were a total of 14 students part of four different Korean language courses at Harvard University. The study unveiled participants' positive evaluations of their PBL course, sharing that through researching and writing about topics of their interest, they perceived great progress in their language skills.

Regarding the perceived effects of PBL on Spanish learners' language skills, Collier (2017) documented high school students' experiences after one PBL unit through a post-intervention survey. Besides students' perceptions of the effectiveness of PBL, Collier (2017) also sought to empirically test if PBL had an effect on students' writing, vocab and grammar development of an experimental and control group. However, these linguistic aspects will be presented in the following section of this dissertation. The survey utilized to measure students' perception was only presented to the experimental group as the control group had no change in instruction methodology. The study found that 60.5% of students felt that their abilities in writing and speaking had increased while only 27.9% felt that they had not. Students' comments indicated that having to mainly use the target language to complete the project posed a challenge but that it had helped them improve.

Continuing with the context of Spanish L2 classes, Parker (2020) also found that after a semester of a class implementing PBL, students perceived an improvement in some language skills. The 26 participants were in an intermediate level class at a US university and completed 3 projects throughout the semester. Through surveys, the study found that 86.36% of participants agreed that they gained a better understanding of

Spanish as a result of the PBL approach used in the course. Students expressed having perceived a strengthening of their listening skills (59.09%), speaking skills (50%), and writing skills (31.82%) mostly. Only 13.64% of students felt that their reading skills in Spanish had improved. Additionally, 86.37% felt comfortable applying the grammar covered in the course to complete the projects. The author highlights that overall, students had a positive experience in the class due to the opportunity to use the language in a hands-on environment applying their creativity and knowledge.

Lastly, Santhi, Suherdi & Musthafa (2019) study of PBL's effectiveness in 35 Thai ESL students conveyed similar positive results. The PBL intervention lasted 5 weeks and students created and published a group YouTube video related to an analytical exposition text (p.30). The data was gathered through observation, interviews and questionnaires at the end of the evaluation session. The study found that all students claimed a perceived enhancement in their English skills at different levels. According to the authors, 57% of participants stated that their English skills greatly improved, while 43% perceived that only little improvement in their English skills was achieved.

Although these studies did find positive perceived outcomes after PBL instruction, it is not without its nuances, like any other teaching methodology. While most students admitted to having perceived gains in all language aspects in addition to other skills, there were some negative experiences as well. Some participants expressed not liking doing projects in general, feeling confused throughout the process, wanting a more systematic process, or lamented the time-consuming nature of projects. These negative feelings can have a negative effect on how students perceive language gains from PBL (Moritoshi, 2017). In order to lessen these negative experiences, it is

imperative to offer additional guidance, linguistic support and create efforts to slowly familiarize students with PBL and the responsibilities it conveys. These efforts can prepare students to transition from more traditional pedagogies to PBL.

Empirically-Tested Linguistic Benefits of PBL

Within the studies using a pre-post research design to empirically investigate the linguistic effects of a PBL curriculum, unit or lesson on language acquisition and development most are dissertation studies (Alvarado, 2019; Collier, 2017; Eyring,1989; Hardy, 2016; Simpson, 2011) and a few articles (Bas, 2011; Turnbull, 1999). The dissertations of Alvarado (2019) and Collier (2017) are the only ones to date, to my knowledge, to test PBL's effect on Spanish HL students' language development, as such, they will be discussed in the PBL within a heritage context section later on this investigation.

Eyring's (1989) doctoral dissertation documents teachers' experiences and ESL students' proficiency gains and responses to PBLL. The participants were students of three courses at UCLA and UCLA extension, a continuing education institution. The experimental group had 10 students from a 6-week English course offered during the summer at UCLA. There were two control groups made up of students in two 10-week English courses offered during the traditional semester. There is no information as to the number of participants in the control groups. These courses were deemed equivalent enough because they followed the same curriculum and completed the same final examinations. The aim of this study was to examine learners' attitude and proficiency change over the course of a university term as well as teachers' experiences implementing the approach. This section discusses only the results regarding linguistic

proficiency, the non-linguistic insights will be discussed in the section on non-linguistic benefits later in this study. To address the linguistic concerns, the author employed a pre-post proficiency cloze test, and a UCLA departmental final test which also included a written essay portion.

The research found limited and mixed results. There were no overall language proficiency gains made by either group in the pre-post cloze test. Similarly, in the UCLA final examination test, there was no significant difference in listening, reading, grammar or writing between the groups. The only differences found were that the control group performed significantly better on the "vocabulary in context" section of the final exam, while the PBL class performed significantly better on the written fluency measure by creating longer final essays. It is unclear whether the course length was a factor in the study's conclusions. The treatment course was an intensive 6-week summer course (versus 10 weeks for control) where students were expected to learn the same material, take the same exams, and also create projects in an environment with more of a time constraint. This situation can negatively affect the efficiency of the approach since it violates the essential project design element of extended work/ sustained inquiry, posed by the BIE in their PBL framework. The element of sustained inquiry poses that students need extended time to analyze and process information to then create a quality project that sustains gains (Larmer 2015a).

In a similar fashion, the dissertation of Simpson (2011) investigated whether a 16-week project had effects on 16 Thai undergraduate students' EFL proficiency, learning skills and self-confidence. The insights into the non-linguistic benefits will be covered in the upcoming section of this chapter dedicated to non-linguistic benefits of PBL. To

assess the participants' English language proficiency, the pre-post design included three quantitative instruments: researcher-made writing and speaking tests and the Test for English as a Foreign Language (TOEFL). The researcher-made writing and speaking tests were graded on content, organization, vocabulary, language use, mechanics (for writing) and delivering (for oral). The TOEFL exam includes listening comprehension, sentence structure and written expression and reading comprehension questions. Additionally, to obtain qualitative data at different points throughout the project, the researcher utilized an observation scheme and field notes, along with student feedback forms, open ended questionnaires, project diaries, and work-in progress discussions. The students were divided into three groups (low, medium, and high achievers) based on the pre-test results of the TOEFL, writing and speaking tests.

The study yielded mixed results. In general, PBL had statistically significant effects on the speaking skills in all students but differed in other skills depending on the group's proficiency levels. For low achieving students, PBL had a positive influence on students' writing and speaking assessed through the researcher-made test and on listening and reading skills assessed through the TOEFL. However, there was no effect on their sentence structure and written expression results tested through the TOEFL. For medium achievers, there was a statistically significant gain in all skills in both instructor-made tests and TOEFL: sentence structure and written expression, listening, reading, writing, and speaking. The high achieving students showed progress in speaking and writing tested through the researcher-made test. In the skills measured by the TOEFL, high achieving participants had significant results in sentence structure and written expression but no significant gains in listening and reading skills.

Continuing the research with ESL students, Hardy (2016) tested the effects of a PBL unit (4 weeks) on 6th and 8th grade emergent bilingual students' academic content (robotics) and English linguistic gains. There were 97 students from 6th grade classes and 113 students from 8th grade classes. Hardy divides students in "round 1" and "round 2". Students in round 1 completed the robotics project during the time frame of the study. During this academic intervention block, the round 2 students engaged in content-specific work with their English and humanities teachers through online learning instead of doing the robotics project. During this period, both groups had regular math and science classes besides their assigned robotics project or English and humanities online learning (see Figure 6). After the study was completed, the groups switched, with round 2 students completing the robotics project and round 1 changing to English and humanities online learning.

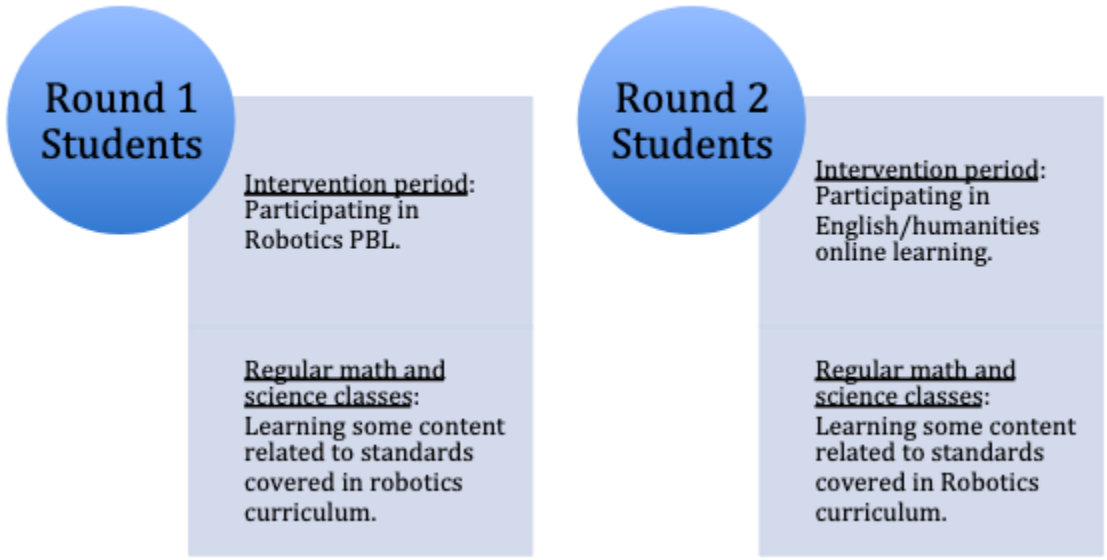


Figure 6. Participants' division in Hardy (2016)

Note. Reprinted from "*The effects of Project-based Learning on the Academic and Linguistic Achievement of Emergent bilingual Learners: A Mixed Methods Approach"* By Hardy, 2016 p. 33.

Only round 1 students were considered to have participated in PBL during the unit observed for Hardy's study. As round 2 participants did their projects after the period of 4 weeks observed for the research, their experiences and results are not included in the study (p.51). Therefore, this study does not have an authentic control group where both control and experimental received the same content at the same time. Instead, Hardy uses the round 2 group as "a comparison baseline to isolate growth from participating in PBL from growth that occurred due to attending regular math and science classes" (p.51). Round 2 students took the pre and posttest along with round 1 participants, but did not experience the PBL intervention as they were engaging in English and humanities classes during this period instead of the robotics project.

For academic and linguistic data gathering, the researcher created two sets of pre and post-tests to separately measure PBL's effect on robotics and English knowledge. The pre and post-test were taken two days before and two days after the PBL unit observed respectively. This section will only provide details of the pre and post-test used to gather linguistic data. The academic content gains are briefly discussed in the upcoming section on PBL's non-linguistic benefits. The pre and post- tests assessed students' knowledge of what the author calls tier 2 and 3 terms. Tier 2 terms are general academic terms that are aligned with their robotics project; tier 3 terms are content specific words, such as "insulated wire" and "soldering iron". The tier 2 words were tested by asking students to match the words to their definition and the tier 3 words were

assessed through open-ended questions. The rubric for the open-ended portion included strands of the Texas English Language Proficiency Standards (TELPAS) proficiency level descriptors and the 7th grade STAAR (State of Texas Assessment of Academic Readiness) expository writing rubrics.

The study found that PBL led to positive results for students' language development for 6th graders only. For the 6th graders, students in round 1 grew 150% from the pre to the post-test with an average of 22.7% in the pre-test and 58% in the post test, a statistically significant difference of 35.3% points. For 6th graders in round 2, the difference was minimal and not statistically significant, averaging 25.3% in the pre-test and 31.8% in the post-test. For the 8th grade students, participants of round 1 went from 40% in the pre-test to 51.7% in the post-test, showing a non-statistically significant growth of 11.7%. Similarly, students in round 2 scored 37.1% in the pre-test and 47.6% in the post-test, a non-statistically significant difference of 10.5%. Despite the favorable evidence of PBL's effect on the linguistic development in the 6th graders, there is no evidence of statistically significant effect on the 8th graders. A drawback from this study is the lack of clarity in the distribution of students in groups and rounds, making the findings equivocal, a limitation recognized by the author (p.27).

Continuing in the realm of dissertations, but this time within a Spanish L2 classroom, Collier (2017) contributes to the expanding body of literature on this topic. Collier (2017) implemented an action research study that looked into the effects of one PBL unit on students' achievement and writing performance on four Spanish 3 high school classes. The study also aimed to find out students' feelings of enjoyment of the PBL unit and perceived advancement in written and speaking skills (covered in the

following section of this dissertation). Additionally, Collier also sought to identify effective steps for the implementation of PBL into high school level language learning courses. The study's participants were chosen using a convenience sample as they were all classes that the researcher was teaching herself. The four classes were divided into experimental group (two classes) and control group (two classes). The experimental group received one thematic 11-day PBL unit while the control group received traditional instruction for that unit, the same approach that had been used for the other five units taught previously during the school year.

To measure students' language growth, the researcher applied 3 instruments: 1.) An achievement pre-test containing 25 multiple choice questions consisting of eight vocabulary and 17 grammar questions linked to the unit, 2.) an achievement 65-question post-test consisting of 20 vocabulary and 30 grammar questions, and 3.) a post-intervention performance-based written presentation assessment provided by the school district. The written task was graded by the teacher utilizing an analytic proficiency-based rubric measuring spelling, punctuation, vocabulary, accuracy, and comprehensibility.

Similar to the conclusions from Simpson (2011), Collier found mixed results depending on skill tested. The study concluded that the PBL curriculum positively affected achievement in grammar and vocabulary as tested by the pre and post multiple choice achievement tests. While both experimental and control groups experienced statistically significant improvement from the pre to the post- achievement test, the experimental group made further progress than the control group. The experimental group grew 46.9% from pre to post-test, while the control group progressed 39.6% from

the pre to the post-test. The difference in the growth between the two groups was statistically significant (p= 0.032), showing that the PBL group made more significant gains in achievement in grammar and vocabulary. Conversely, the writing task results showed that both groups scored similarly, and while they improved, it was not at a statistically significant level. The control group performed slightly better than the experimental group with a mean of 13.26 out of 15 points versus a mean of 13.07 for the experimental group, however, the difference between groups is not statistically significant either. Thus, the study concludes that PBL had no effect on students' writing performance.

In addition to dissertation studies, some research papers regarding PBL's effect on language development have also been published. Bas (2011) researched the effect of PBL on 60 Turkish 9th grade students' academic achievement and attitudes towards English on a unit of five weeks. The attitudinal data will be detailed in the following section of non-linguistic gains as with the studies above. The participants were from two different classes randomly assigned the role of control and experimental; the first received no treatment (textbook approach) while the latter experienced PBL. For data gathering, the study utilized a pre-post design where participants answered a 45-item academic achievement test developed by the researcher following the Secondary School 9th Grade English Curriculum (MEB, 2007). There is no description of the type of questions within the test. After carrying out statistical analysis of the data, results showed no significant difference in the pre-test scores within groups, suggesting that their knowledge before the intervention was comparable. Additionally, similar to Collier's (2017) results, while both groups had statistically significant gains in the English academic achievement test, Bas

found that participants in the experimental group outperformed the control group. The post-test results between the groups showed a statistically significant difference between the groups' posttest. The experimental group gained 24.8% while the control group gained 14.1% from an initial 48.5% score for the former and 48.2% for the latter. The author attributes the effectiveness of PBL to the active role and responsibilities that students had in the learning process.

An early work towards testing the effects of PBL on language development, this time with French instead of English is the study conducted by Turnbull (1999). Turnbull added an extra level by comparing different teaching techniques while implementing PBL. This study looked at one 8-week PBL instructional unit in four L2 French 9th grade classes in Canada, comprising a total of 81 students. Each participating course came from a different school of the same school district; therefore, each course was taught by a different instructor. After 8 weeks of observation of the teachers' teaching style, the researcher classified two classes as multidimensional project-based and the other two as less multidimensional. The multidimensional class is described as having communicative-experiential activities and assessments related to a project while the less-multidimensional classrooms had some communicative activities and assessments within context but not related to a project. The linguistic data collection instruments used were, pre and post-tests of overall French proficiency (listening, reading, writing and speaking) and achievement tests based on the course objectives. The achievement test was taken after the observation period and after the unit intervention and it assessed listening, reading, writing, speaking and cultural knowledge. The speaking tests of both the French

proficiency pre and post-test and the achievement test were performed on a subset of only 8 students in each class.

The results of Turnbull's study are divided by the type of PBL approach used (multidimensional vs less multidimensional). The multidimensional PBL classes achieved statistically significant score increases in the post-test measuring listening, writing, and reading. For the achievement test, this same group also obtained significantly higher scores than the less multidimensional PBL group in listening, reading, writing and oral measures. Despite the positive effects, the author points out that the effects of PBL in students' outcomes can have different confounding factors such as the instructors' target language use, student involvement in curricular decisions, and the use of focus on form. This study advances our understanding that although PBL can yield significant growth, other factors such as target language use and student curricular decision can affect these results. Although allowing student choice in curriculum decisions is a promising idea, it is important to remember that not all programs, courses or instructors have the flexibility to do so.

Despite the limited number of studies, collectively, these articles and dissertations do support theoretical works such as Beckett (2006) and Stoller (2006) who indicated that through the use of the target language, negotiated meaning and purposeful opportunities to create projects, students see enhanced linguistic benefits. PBL promotes interactions where modified input, output and negotiated meaning can happen (Eyrin, 1989) as well as the recycling of language and skills into new contexts (Haines, 1989). These purposeful interactions permit integrated focus on form and other aspects of language competence such as speaking and listening (Gardner, 1995; Hilton-Jones, 1988; Legutke,

1984; Tomei, Glick & Holst, 1999), writing (Barba, 2016; Gardner 1995; Hilton-Jones, 1988; Oh, 2012), and reading (Garder, 1995; Gu, 2002; Hilton-Jones, 1988; Ho, 2003) which ideally lead to increased skills in those areas. The tangible public end product is a driving factor to enhance students' eagerness to create accurate and well-presented information, leading to greater linguistic gains (Stoller, 2006).

2.5.2 Non-Linguistic Benefits of PBL

While still limited, more empirical research has been carried out on the non-linguistic advantages of PBL compared to research about its linguistic benefits on language learning. This section outlines the non-linguistic benefits associated with the PBL methodology presented in various articles and dissertation studies.

Authentic experiences and content knowledge

A benefit true to PBL's nature is that project work leads to authentic experiences and language use by partaking in authentic tasks for real life purposes (Díaz & Suñén, 2016; Stoller, 2006). Additionally, students can encounter authentic audiences when presenting the final projects, providing authentic experiences from start to finish. Evidence of this benefit is presented in Raof & Yusof's (2006) study about a project work within an English for Specific Purposes course for civil engineers in Malaysia. The study had a total of 170 participants. The project consisted of interviewing an in-service engineer in order to get insights into the profession. The authors offered a questionnaire at the end of the project where students shared their perception on their project work assignment. The participants voiced their appreciation of the authentic task of the project, where they got to use language in a real context, with someone from outside the class and about an authentic problem or interest of theirs. Furthermore, participants claimed to have

increased their content knowledge about engineering. Great gains in content knowledge were also achieved in Hardy's (2016) study where the pre-post design of a robotics test evidenced statistically significant growth in both 6th and 8th graders. This is an expected result of PBL because through the process of gathering, processing, and reporting various sources of authentic information about a subject, learners increase their content knowledge (Allen, 2004; legutke, 1984; Oh, 2012; Renjel, 2006). As a compatible teaching practice with content-based instruction, PBL is a dual commitment to content and language learning (Stoller, 2006).

Collaborative skills

Another benefit often cited for PBL is the improved abilities gained in order to function in a group by developing their collaborative skills (Coleman, 1992; Gardner, 1995; Ho, 2003). These skills are achieved throughout the process where students gather, process, synthesize, and report information. Simpson's (2011) dissertation involving Thai EFL undergraduate students described in the prior section for its investigation of PBL's role in linguistic gains, also explores this benefit. Simpson used student surveys, diaries, open ended questionnaires, field notes and work-in-progress discussions to gather non-linguistic data. After interviews and diary entries, it was found that 77% of students were comfortable working in group projects. However, four out of the eight high achieving students voiced discomfort in working with others. Nonetheless, the observer's notes recorded a positive atmosphere of cooperation and teamwork. These skills are essential for real-life tasks and students can easily transfer them to other contexts. Additionally, from the perspective of teachers, Thomas (2000) asserted that PBL also increases educators' collaborative working, as well as commitment to the goals of the school, and

opportunities for reflection and investigating (Gómez-Pablos, del Pozo, & Muñoz-Repiso, 2017).

Learning skills and strategies (21st century skills)

PBL implementation has also been associated with improved decision-making abilities, analytical thinking (Gardner, 1995), time management (Coleman, 1992), responsibility (Fried-Booth, 1986; Hilton-Jones, 1988) and critical thinking skills and problem solving (Almeida-Mendes, 2017; Bas, 2011; Beckett, 2006; Ortmeier, 2000; Renjel, 2006). These skills are also part of the 21st century skills which are important to live successful lives (Stein, 1995). These benefits were clearly seen in Simpson's (2011) dissertation where students' diary entries reflected their perceived improved thinking, planning, evaluating and problem-solving skills which are all part of critical thinking.

Similar results were found by Oh (2012), who surveyed students that had taken a PBL Korean class at the university level. The survey seeked to obtain information on students' assessment of the course, reflections and feedback. It also asks participants to share what they perceived to have gained from the class. Regarding non-linguistic gains, students reported that the process of researching for their project, condensing information, and creating a tangible product allowed them to develop life-long learning skills to enhance the acquisition of both content and language knowledge. Students also shared that this process fostered the development of their independence as learners and enhanced their sense of achievement.

Conversely, Eyring (1989), the only study with a control and an experimental group testing the development of learning skills, found conflicting results. For data collection Eyring used interviews and a pre-post design 5-point Likert scale strategy

inventory where students rated how often they used various language strategies supposedly developed through project work (p.70). The study found no significant difference between groups in terms of language learning strategies. When asked about this in the final interviews, students from both groups described having done the minimal work required and although the PBL group did more outside research, it was limited to easily available sources. Therefore, one could conclude that the development of learning skills is tied to student effort and motivation to learn more than one specific learning methodology.

Naturally, when students develop learning strategies, other 21st century skills are increased. Among these we can find autonomy, independence, self-initiation, self-discipline and responsibility for their own learning (Bas, 2011; Oh, 2012; Raof & Yusof, 2006). Throughout the process of creating a project, students develop a sense of pride and ownership by having the freedom to shape the project, and become more autonomous and independent (Stoller, 2006).

Linguistic confidence, enjoyment, and positive learning attitudes

An advantage that PBL presents is exposure to target language, implementation of student voice and choice and use of authentic language throughout the process of project creation. The aspect of student choice allows learners to enjoy the learning process by using their creativity and interests to create a product to express themselves. The authentic experiences lead students to perceive gains in their language skills which naturally instills in them linguistic self-confidence and positive attitudes toward learning (Carter & Thomas, 1986, Gardner, 1995; Renjel, 2006; Stoller, 1997, 2006). Empirical research to back up these claims is found in Simpson (2011) and Bas (2011).

Simpson (2011) found improvements in linguistic confidence throughout the project process through the teacher's field notes and students' points of view. The teacher monitored students' levels of confidence in week 3, 7 and 13. During week 3, the teacher's observation notes indicated that most students shyly answered questions by reading from their notes and without making any eye contact, appearing nervous with no questions asked from the students. In week 7, students talked instead of reading their notes and even asked for clarification although still acting nervous. By week 13, students were not afraid of speaking up, asking questions and voicing opinions as well as starting to make jokes in English, creating a relaxed and engaging atmosphere. The students' point of view was gathered through an open-ended pre-post questionnaire where they talked about their confidence using English. The researcher coded the responses, finding that at the pre-questionnaire stage, 77% of participants reported low confidence, 11.5% medium confidence and 11.5% very low confidence. At the end of the study, 38.5% of participants reported high confidence, 42.3% medium confidence, 19.2% low confidence and 0% very low confidence.

A crucial aspect to achieve a positive learning attitude is being able to offer a learning environment where students enjoy learning. Due to the core aspects of PBL such as student choice where students integrate their creativity, interests and skills into the class, PBL has the potential to contribute to creating such an enjoyable experience. In order to find out if students who experience a PBL unit enjoy the approach, Collier (2017) utilized surveys at the end of the unit to ask the experimental group, who had one PLB unit intervention, if they enjoyed it. The results indicated that 50.8% enjoyed the unit in comparison to the other traditional approach units of the year, 24.4% had no

preference and 24.6% enjoyed the previous method. In other words, this research indicates that PBL appealed to the majority of students (even if it is a slight majority) as most of them enjoyed their experience with the approach or at least did not develop feelings of animosity towards PBL. With regard to the negative comments, it is necessary to identify issues and implement changes to strive for a more positive learning experience.

After the implementation of a PBL unit, Bas (2011), explained in detail in the previous section of linguistic benefits, attempted to measure PBL's effect on students' attitudes towards learning. To this end, Bas utilized a pre-post English lesson attitude 3-point Likert scale. The results revealed that students in the experimental group performed better than the control group, meaning that learners trained with PBL showed more positive attitudes towards English lessons. Students' linguistic confidence and positive attitudes towards learning were stimulated throughout the learning process when students use the target language in authentic situations (Bell 2010; Carter & Thomas, 1986; Stoller & Myers, 2019). Additionally, the usage of their language abilities to create a project with individual relevance increases positive attitudes towards learning.

Motivation and engagement

Similar to its effect on linguistic confidence, the authenticity of the projects and the satisfaction of building solutions to relevant problems adds to the cognitive engagement and motivation of the learners (Blumenfeld et al., 1991). Engagement and motivation are intricately linked where the first is the internal process that results in the public behaviors of engagement (Amy & Christenson, 2012; Borup, Graham, West, Archambault & Spring, 2020; Lund, 2016). Engagement is a multicomponent construct

that comprises active and energetic involvement in academic tasks (Pekrun & Linnenbrink-Garcia, 2012). Students' active engagement is essential for learning and is presented in various forms: behavioral, cognitive, and emotional (Borup et al., 2020; Darr, 2012). Ideally, these forms interact with each other, and students become active participants in their learning (behavioral engagement), have personal investment in the material (cognitive engagement), and create connections with their teachers, peers and the school context influencing their willingness to work. The indispensable aspect of allowing agency to the students to partake in the decision-making process is linked directly to the nature of PBL and is another driving force for student engagement and motivation (Bell, 2010; Blumenfeld et al.,1991; Díaz & Suñén, 2016). Solving real-life problems requires students to use their own unique inquiries and to be actively engaged over an extended period of time as opposed to just completing isolated daily classroom activities (Blumenfeld et al., 1991).

A study that sought to investigate PBL's effect on students' motivation is Nor (2008). While also producing results in the area of perceived language development as cited in a previous section, Nor also delineates findings regarding motivation. Conducted in an English for Career Search course at a university in Malaysia, this study used a questionnaire and open-ended questions to see the effects of a PBL task. The task was interviewing a professional working in a discipline related to their future career. The study found that 92.7% of participants showed high motivation and 5.5% were slightly motivated to improve their English proficiency after conducting the interview aspect of the project task.

PBL enhances engagement through the process of creating projects that relate to their lives and interests and by responding to HLLs' bilingual and bicultural experiences through the (Carreira, Hitchins Chik & Karapetian, 2019). For instance, Santhi, Suherdi & Musthafa's (2019) video project, detailed in the prior section, shares their insights on this topic. By using observation, interviews, and questionnaires at the end of the evaluation session, the study found that students claimed a heightening engagement in class. From students' interview excerpts and observations, the authors share that the project truly engaged students because they were invested in the topic of their project (which they chose) and also in creating a quality and creative video for an authentic audience (YouTube) to see (p.33).

Overall, PBL is an effective pedagogical tool to achieve not only language learning but also personal and professional gains. Heritage language learners can certainly benefit from the advantages that such a stimulating and student-led approach can offer.

2.6 Challenges of Project-Based Learning

Despite the many successes of PBL in areas of academic achievement, problem solving and critical thinking skills, longer retention of material, improved standardized tests scores and student and teacher motivation (BIE, 2013; Thomas, 2000), it is not free of problems. This section briefly outlines some of the more common challenges underscored in the literature.

PBL can be an uncertain methodology where students could or could not see the same benefits of a project as their peers or the teacher sees. In PBL, an overall direction is set but the actual realization of the project is uncertain since it depends on the student

and their effort (Oh, 2012). It is necessary to remember that some projects can fail, just like in the real world if there is lack of organization, group cohesion and communication or determination (Oh, 2012). One of the first barriers to the realization of a project, highlighted in the early PBLL research studies, is student resistance or misunderstanding of the approach or even resistance to work collaboratively (Beckett, 1999; Eyrin, 1989; Moulton & Holmes, 2000; Parker, 2020). Students' negative perspectives towards PBLL can disrupt the implementation of the approach and negatively affect engagement, hindering learning. For instance, Oh (2012) found that for some students, the project's element of student choice can result in feeling uncomfortable due to the lack of guidance and with "too much freedom" (Oh, 2012 p.144).

In order to overcome these challenges, students have to be aware of the rationale behind PBL and instructors must provide sufficient guidance. To that effect, Beckett (1999) and Wilhelm (1999) advocated making explicit for learners the goals and resources associated with PBL (Beckett & Slatter, 2005). Beckett (1999) called for the creation of an instrument to raise students' awareness of how language and skills can be developed through PBL. Beckett's call became reality when Beckett and Slater (2005) created 'The Project Framework', explained at the beginning of this chapter. Interestingly, this challenge is also experienced by teachers. Studies have discovered that instructors implementing PBL can feel like they lack guidance and support. For instance, Kuo, Sutton, Wright, & Miller's (2019) study found that while teachers see the value of PBL, they feel unprepared to implement it and unfortunately have limited professional development opportunities. Collier (2017) found that teachers felt a lack of knowledge and experience when trying to organize activities while implementing a PBL approach.

This issue can lead to many teacher quandaries which can be helped with experience, mentoring and following PBL guides such as Wilhelm (1999) created a guide of do's and don'ts for teachers to foster self-learning.

This lack of experience and organization can present other problems in the execution of PBL. For instance, despite the positive results found by Raof and Yusof (2006) such as increased confidence and responsibility, students also shared that a problem they faced was time constraint. This is especially true for projects that require interviews since it requires taking into consideration someone else's time. This student experience can resonate with those of the teachers as well. In fact, one of the reasons behind the lack of PBL adoption is teachers' concerns regarding the potentially intensifying impact that the use of PBL may have on their workload (Al Salami, Makela, & de Miranda, 2017; DeWalt, 2021; Fallik, Eylon, & Rosenfeld, 2008; Kodkanon, Pinit, & Murphy, 2018; Ribeiro, 2011; Spronken-Smith, 2005; Wynn & Okie, 2017). After the implementation of a PBL unit, Collier (2017) categorized the observations found in her own Teacher Observation Journal and revealed that the lack of time to implement all the activities was one of the issues she faced. Nonetheless, Collier (2017) also shares that as activities are adapted and repeated, the challenges can be overcome. The lack of experience, and perhaps the unawareness of student preference, can also be related to the challenge of encountering student dissatisfaction with the project. In her dissertation study, Eyring (1989) found that students were dissatisfied and complained about the length of the quarter-long project, claiming that too much time had been spent in one project (p.176). This finding is echoed by Oh (2012) whose participants shared that they

would have preferred to make several smaller projects which can be incorporated into a final project as opposed to one big semester-long project (p.143).

Thomas (2000) presents other difficulties to consider when thinking about utilizing PBL. The versatility of PBL can result in both an advantage and a disadvantage. It is an advantage because due to this flexibility the instruction can be tailored to students' needs. However, it also results in a wide range of features and a lack of a universally accepted model. This situation makes it difficult to articulate one single definition of PBL that includes the various ways in which it can be incarnated into practice (Stoller, 2006; Thomas, 2000), resulting in a variety of PBL models (e.g. Intentional learning, Scardamalia & Bereiter, 1991; Design experiments, Brown, 1992; Problem-based learning, Gallagher, Stepien, & Rosenthal, 1992, and even perhaps Inquiry based learning, Edelson, Gordin, & Pea, 1999). According to Thomas (2000), this lack of consensus generates difficulties when trying to judge what can be considered a real project under the PBL model or a "desert project" (Buck Institute for Education, nd). To shed light on this issue, the BIE created the aforementioned Gold Standard framework as a guide for teachers to successfully create projects under the PBL approach.

The lack of agreement across disciplines as to what are the defining features of PBL complicates the creation of a generalization and a manner of testing the effectiveness of the approach. Bell (2010) indicates that PBL cannot always be easily assessed through standardized testing. Despite some studies advocating for its effectiveness in standardized measures with young learners in math and reading (Boaler, 2002; Mednick & Wainwright, 1999; Bound, 1999), part of PBL's gains is the

development of 21st century skills which are rarely tested through standardized measures. The highly creative nature of PBL makes it difficult to evaluate objectively (O.M., 2018). This can be a problem given that in the current education climate ruled by standards and tests, "there is a pressure to rid the curriculum of anything that does not directly feed into test scores in reading and math" (van Lier, 2006 p.xiii). Approaches such as PBL, by nature and conception, oppose commodification and homogenization, defining aspects of standardized testing (van Lier, 2006). Lastly, as no empirical study using PBL in the HL context has been published, it is a challenge to conceive valid assessment measures for HL students.

In sum, many of the benefits that PBL offers can appear to be shadowed by the disadvantages, which mainly stem from the lack of preparation, uniformity in implementation and assessment tools. Nonetheless, it is possible to overcome these challenges thanks to the efforts of researchers that have designed tools and guides to assist instructors in the creation and implementation of projects and PBL curricula (Alan & Stoller, 2005; BIE, 2015a; Stoller & Meyer, 2019). The benefits and advantages that PBL can offer outweigh the disadvantages (Alan & Stoller, 2005).

PBL has a long-standing record of offering a flexible approach to teaching, yet its benefits have been minimally considered in the field of heritage language education. The following section presents the most recent literature regarding the application of a PBL curricula to HL students.

2.7 Heritage Language Education

With the continued increase of interest in HL education, scholarship addressing pedagogical concerns and advances in teaching are on the rise (Torres, Pascual y Cabo & Beusterien, 2018). Educational institutions need to reexamine their curricula to align their teaching practices and class materials to the needs of the students to develop and maintain their heritage language (Carrera & Kagan, 2011; Kondo-Brown, 2010; Rivera-Mills, 2012). Along with the curricula and teaching practices, another issue that needs reconsideration is the learning goals that language programs hold for HL classes. Traditionally, the ACTFL standards are used for all language instruction; however, the needs and strengths of the HL population require a different perspective and goals. Although no national goals or standards specific for HL instruction have been implemented, in 1995 Guadalupe Valdés published a groundbreaking article outlining the main goals for HL instruction, adding two additional goals a few years later. A seventh goal was proposed by Aparicio in 1997, and one last goal was added by Beadrie and Wilson in 2021, resulting in the eight HL goals frequently used as guidelines for HL curriculum planning (Beaudrie et al. 2014; Beaudrie & Wilson, 2022). These goals as outlined in Beaudrie & Wilson (2022) are:

1. The development of critical language awareness in HL learning communities
2. Language maintenance
3. Acquisition or development of a prestige language variety
4. Expansion of bilingual range
5. Transfer of literacy skills
6. Acquisition or development of academic skills in the heritage language

7. Positive attitudes towards both the heritage language and various dialects of the language, and its cultures

8. Acquisition or development of cultural awareness

Despite the increased interest in HL pedagogy and other advances such as the goals stated above, only a few studies have tested the effects of pedagogical approaches in HL learners' learning outcomes (Bowles, 2021; Montrul & Bowles, 2010; Parra, Llorente Bravo & Polinski, 2018; Parra, Otero, Flores & Llavallé, 2018; Potowski, Jegerski & Morgan-Short, 2009). Therefore, a gap on "the how" of instruction remains (Carreira & Kagan, 2018; Lynch, 2014).

2.7.1 Approaches to Teaching in the Heritage Language Classroom

Limited approaches to teaching have been proposed and studied in hopes of finding an appropriate manner to teach HL learners. While the HL learner population has its own characteristics and needs, the pedagogical interventions used to teach HL classrooms stem from the SLA literature (Bowles & Torres, 2021). While these instructional practices have been found to discriminate against US Spanish and prioritize and idealize privileged ways of Speaking Spanish (Beaudrie & Loza, 2023) this body of literature is a helpful initial point of departure (Bowles, 2018). Some examples of these approaches are form-focused instruction (Montrul & Bowles, 2010; Song, O'Grady, Cho & Lee, 1997), and Processing Instruction (Bowles, 2021; Fernández Cuenca & Bowles, 2022; Potowski, et al. 2009). Beaudrie et al. (2009) posit that both microbased and macrobased approaches can be helpful teaching methodologies for HL instruction. Microbased approaches present the idea of using explicit, form focused grammar instruction. However, it can yield mixed results due to HL learners' unfamiliarity of the

technical terminology and grammatical explanations contrasting L2 learners' years of explicit instruction in the SLA classroom (Potowski et al., 2009; Torres, 2013). Recent scholarship (Beaudrie, Ducar & Potowski, 2014; Carreira, 2016; Parra, Llorente Bravo & Polinski, 2018; Zapata & Lacorte, 2017) has proposed adopting broader and inter-disciplinary oriented approaches to language learning, in other words, macrobased approaches to teaching. This shift aims to achieve meaningful pedagogical practices that address students' affective needs, raise motivation, engagement and agency while also helping them develop sophisticated levels of language proficiency (Parra et al., 2018). Ideally, a mixed usage of macrobased approach with selective grammatical instruction targeting difficult forms for HL students while presented in context can have value for HL instruction, particularly with beginner levels (Beaudrie & Holmes, 2022). The following section explores studies and suggestions of macrobased teaching methodologies for HL learners as well as the viability of using PBL to support their learning.

2.7.2 Macrobased Approaches to HL Teaching

There are a handful of integrated approaches stemming from L2, L1 and general education methodologies that can be used with HL learners. The umbrella term of macrobased or top-down approaches utilizes the knowledge and skills that students already possess to analyze and process new information (Beaudrie, Ducar & Potowski, 2014, Startalk, s.f). In this manner, top-down teaching satisfies not just linguistic needs but also affective needs since it uses and values students' experiences. Top-down approaches create a sense of personal relevance and authenticity in the learning process, a

quality that is difficult to achieve with other non-student-centered pedagogies (Carreira, 2016).

Carreira, in her COERLL (2016) workshop, asserts that an advantage of top-down pedagogies is that it presents authentic content, language and tasks that are motivating and attractive for students. Through macrobased approaches, activities integrate different grammatical structures, reflecting real language use which helps students learn and apply knowledge in real contexts. Students are not learning through decontextualized, isolated activities which are common in the L2 classroom (Carreira, 2016; Carreira & Kagan, 2018). Intermediate or advanced HL students have been exposed and speak Spanish at home and have native-like proficiency in speaking, reading and listening and an intermediate proficiency in writing (Alarcón, 2010). Macro-based approaches utilize this existing knowledge and build upon it to achieve even higher levels of proficiency. Nonetheless, various researchers (Beaudrie et al., 2014; Parra et al., 2018; Swender, Martin, Rivera-Martinez & Kagan, 2014) add that for advanced students, it is also good practice to include the occasional use of bottom up or explicit instruction methodologies within the course to target certain grammatical structures and expand students' lexicon.

Under the macrobased pedagogy umbrella, there are approaches such as content-based, genre-based, task-based, inquiry-based and project-based teaching that can be used with HL learners (Carreira, 2016). Research on the effects of the approaches that have informed curricula for HL students is presented below.

Content-based and Genre-based Approach

Kondo-Brown (2010) discusses the effectiveness of a content-based approach which aims at advancing the learners competency in the language by integrating some

content area materials in the target language; the target language serves as a vehicle for information (Kondo-Brown, 2010; Morioka, Takakura & Ushida, 2008). The use of this approach is recommended by the National Heritage Language Resource Center (NHLRC) for general HL education. The most common context where a content-based approach is applied is in dual immersion schools at the pre-collegiate level (Kondo-Brown, 2010). An example of an approach that includes both content-based and genre-based teaching, although not an empirical study, is Glen Martínez' (2010) Medical Spanish for Heritage learners. Genre-based teaching offers students explicit understanding of how writing different genres of texts differs (Hyland 2003, p.26 as cited in Carreira, 2016). Genre-based teaching is also a means to ground the development of a certain discourse in different contexts (Carreira, 2016). In Glen Martínez' course, students develop linguistic and cultural resources to progress from using colloquial discourse to scientific discourse through the discussion and production of texts of different genres (Carreira, 2016).

Task-based Learning

This methodology has been used by various studies as a framework to analyze the effect of peer interactions (such as language related episodes), and task complexity on HL students' learning outcomes. Blake and Zyzik (2003) looked at the interaction between dyads of HL and L2 learners solving an "apartment-solving" jigsaw task to elicit linguistic negotiation. Results showed that both types of learners resolved negotiations of meaning mostly of a lexical nature, but also of grammatical and pragmatic nature to a lesser degree. Furthermore, results demonstrated that HL learners learned some new vocabulary words from their L2 counterparts but that HL students assisted their L2 partner more often during the task. This result is echoed by Henshaw (2015) who also

examined L2-HL dyads in a TBLT environment through audio recorded interactions and found that L2 learners benefited more from interactions than their HL partners. In this study, HL students were more likely to provide corrective feedback, but they did request assistance from their L2 partners often regarding grammar topics. Bowles (2011) also looked at the interactions between HL-L2 pairs of students for three tasks: one oral and two written. Results showed that while resolving the tasks, both types of learners had their language related negotiations largely resolved in equal proportion. However, some differences were seen in the writing tasks as the HL learners relied on their L2 partners for orthographic issues. The L2 learners relied on their HL partners mostly on vocabulary issues and to a lesser extent, grammar issues. A few more studies investigating the interactions between learners in a TBLT environment are Bowles, Adams, and Toth (2014) and Torres and Vargas Fuentes (2021).

Torres (2018) sought to uncover if task complexity played a role on L2 and HL language development, specifically, the subjunctive in adjectival relative clauses. To test for language development, the study implemented a pretest/posttest/delayed posttest design. During experimental conditions, participants completed either simple or complex versions of a computerized task. Students received written recasts as corrective feedback from the computer program. The complex task had participants engage in more intentional reasoning. Results showed that students engaged in the simple tasks had greater gains in retention of the target form in a delayed written test.

Multiliteracies Pedagogy

Another macrobased approach is the Multiliteracies pedagogy. This approach stems from language arts and literacy education and has been used in the teaching of

minority and HL learners (Cope & Kalantzis, 2000; Zapata, 2018). The Multiliteracies pedagogy was conceived by the scholars of the New London Group (1996) as an intervention to teach literacy in a way that reflects reality, encourages critical thinking and integrates students' experiences. It was later further developed by Cope and Kalantzis (2015) with the pedagogical approach Learning by Design (Cope & Kalantzis, 2000; Zapata, 2018). The Multiliteracies framework is theoretically interconnected with Halliday's (1994) systemic functional linguistics, where "language is a semiotic system that cannot be separated from its social function, as it expresses meaning according to the different social contexts in which it is used." (Zapata, 2018).

Parra, Llorente Bravo and Polinski (2018) and Parra, Otero, Flores and Llavallé (2018) present the design and implementation of a curriculum for HL learners using the Multiliteracies Framework Learning by Design. Both of these studies proceed from the same pedagogical research project, making up the third classroom-based empirical study with HL learners to date. The curriculum also included differentiated instruction and a sociolinguistic and functional approach to language as a base for the coursework. The course applied a pre and posttest design to test for oral, writing and reading development as well as for students' linguistic self-evaluations. In terms of oral and writing development, the course resulted in language development gains in complexity, length, and broader vocabulary (use of discourse connectors and sophisticated vocabulary). The curriculum appeared to have been a major boost in students' reading skills where students went from an average of 137 words per minute to 343 in the post test. To record both pre and posttests, the software *Lectura inteligente* was used. Students also demonstrated reading comprehension by answering questions about the reading through the same

software. Students' linguistic confidence also increased in all language aspects, with the post- self-confidence scales displaying a more positive self-perceived class.

Inquiry-based Approach

Another approach is Inquiry-based (IB). This approach seeks to take the student on a journey to discover the answer to an inquiry within a theme provided by the teacher. The students engage in research (internet information, surveys, field data collection) in order to solve their question and present their gained knowledge in written or oral formats (sometimes chosen by the teacher). To my knowledge, the only research on an inquiry-based curriculum for HL learners is Belpoliti and Fairclough's (2016). Although it is not an empirical study, it is a useful description of research-based activities and curricula employing IB learning with HL students of different proficiency levels (beginners to advanced). By conducting research, collecting and analyzing information through the IB curricula, all four classes in which it was applied, showed positive results. Through cultural projects, students expanded their connection and appreciation of their home culture while also advancing their language skills by articulating their research findings through oral and written mediums. Furthermore, according to Belpoliti and Fairclough (2016), the IBL process allows students to find and build both content and skills and become an autonomous learner.

Project-based Learning

Lastly, a similar macrobased approach that integrates projects is project-based learning. A similarity with IB is that there are no published peer-reviewed empirical studies testing it within the HL context. The only literature available consists of one thesis (unpublished empirical study by Alvarado, 2019), anecdotal reports and theoretical

papers advocating for its effectiveness with HL students. This section explores the results from the empirical study and analyzes the anecdotal reports and theoretical papers regarding PBL within the HL Context.

The only study, to my knowledge, to have empirically tested the effects of PBL on Spanish HL students' language development is Alvarado (2019). Alvarado's thesis tested the effects of a PBL curriculum (experimental group) versus a "traditional curriculum" (control group) on Spanish HL students' development of written accent marks after a period of two weeks. The "traditional curriculum" is explained as one that has been designed for monolingual English speakers, with a focus on grammar, usage of worksheets and little emphasis on oral skills. Importantly, the groups switched roles in the second week. In other words, the group that received PBL instruction the first week, switched to receiving traditional instruction the second week.

To test the effects of the teaching approaches, a pre and a posttest design was applied. There were two sets of pre and posttests, one at the beginning and end of the first week and a second set at the beginning and at the end of week two. The pre and posttests corresponded to the topics covered in their respective weeks, were timed at 10 minutes and consisted of sentences where students needed to place any accent marks where deemed necessary.

For both weeks, after receiving the same instruction on accent rules via PowerPoint, the class was divided into a PBL group and a traditional group to begin working on their respective tasks. The first week there was an introduction to the rules of accentuation, while the second week covered the exception rules regarding the accent rules. During the first week, the PBL group was tasked with the creation of a game to

review the rules while the traditional group completed a worksheet packet. During the second week, the PBL group created a script for a play while the traditional group completed worksheets as in week one.

The findings of the study were mixed. While the PBL's group performance increased by 39% in the first week, the PBL group for the second week decreased their performance by 12%. In comparison, the traditional group increased by 28% and 5% in the first and second week respectively. The author attributes the mixed and unexpected results to two aspects. First, there was not sufficient time provided for students to process the information learned, analyze, and apply it critically. Second, the more complex and challenging tasks require more guided instruction in order to then move on to the creation of a project. Alvarado points out that the worksheet in week two provided the words that contained exceptions to the accent rules through sentences in context, acting as a stable guide. On the other hand, the week two project of creating a script asked students to come up with their own words, requiring more complex thinking in a short amount of time (Alvarado, 2019 p.51). The combination of having very limited time to learn and process new knowledge while also having to create a complex project, made students become overwhelmed resulting in a harsh environment to retain information and poor performances in week two's project. These findings resonate to one of the key features of PBL: work over extended periods of time. According to Larmer (2015a), extended periods of time have to be provided for projects to integrate the essential element of sustained inquiry through which students process new information, explore and learn.

Although Alvarado (2019) is the only empirical study with PBL and HL learners to date, the limited instructional time of the PBL curriculum must be acknowledged. Each

group only experienced PBL for one week and, therefore, the true effects of a PBL curriculum on HL students over an extended period of time are still left unexplored.

An anecdotal description of a PBL curriculum and its learning outcomes with Hindi HL learners is presented by Ilieva (2007). The author regards PBL as efficient to manage the mixed abilities of HL students. PBL integrates skills for real-life communication purposes and the experiences of assembling a project as a critical part of learning. A prominent advocate of PBL for HL students is María Carreira. She has multiple conference presentations (Carreira, 2019), and a book chapter (Carreira, Chik & Karapetian, 2019) detailing the reasons and benefits of PBL for HL students as well as examples and guides for its implementation.

Carreira, Chik & Karapetian (2019) recognize PBL as this overarching pedagogy that can build on students' home abilities brought to the classroom and respond to students' experiences and motivations for studying their HL. In other words, a PBL curriculum would assure that students' language skills and content knowledge are expanded through the exposure to authentic material in the target language. Through PBL, community-based or service-learning projects are possible, where students will be exposed to real language use. These projects give students opportunities to interact and collaborate with the HL community, a priority for many learners (Carreira & Kagan, 2011). The projects are the perfect tool to accomplish the ACTFL standards (National Standards Collaborative Board) since they provide real cultural context where students can communicate, make connections and comparisons and interact with the community around them (Carreira et. al., 2019). Backing these assertions of Carreira et al., (2019), Mikulec and Miller (2011) provide examples of how through a cultural learning project,

an eighth-grade French class, was able to meet all "5Cs" in the World Readiness Standards for Learning Languages (National Standards Collaborative Board), enhancing their Francophone language and culture. Furthermore, these projects respond to and utilize the students' bilingual experiences and motivations, increasing students' confidence, engagement, motivation, enjoyment, and creativity (Carreira, et al., 2019; Stoller & Myers, 2019).

Additionally, implementing a top-down approach like PBL gives educators the freedom to incorporate different principles and practices suggested by HL experts in order to help teachers and students reach the learning goals. Beaudrie, Ducar and Potowski (2014) suggest the implementation of differentiated instruction and a sociolinguistically informed approach to provide corrective feedback.

Differentiated instruction is a learner-centered style of teaching that allows instructors to abandon the one-size-fits-all approach to introduce a course where instruction and tasks vary to address students' needs (Beaudrie et al., 2014; Carreira, 2012; Carreira & Hitchins Chik, 2018). Differentiated instruction entails using different approaches to the content, the learning process and the product created to demonstrate what students have learned (Beaudrie, Ducar & Potowski, 2014). PBL is the perfect pedagogical tool to incorporate differentiated instruction to manage the different levels of proficiency to create learning opportunities for all students because student choice and agency is one of its pillars (Carreira et al., 2019).

A sociolinguistically informed approach to "correcting" entails a sensitive approach to providing corrective feedback (Beaudrie et al., 2014). Through this approach, instructors recognize and validate what students bring to class and use that proficiency as

a bridge to a more formal and academic variety of the heritage language. This approach seeks to provide students with opportunities for developing critical language awareness by gaining knowledge of how certain language varieties are given higher prestige than others. PBL opens opportunities to use language in authentic contexts such as the community through community-based projects. Therefore, a sociolinguistically informed approach will enable students to analyze and discuss the use of different varieties of the HL without the prejudices often encountered in prescriptivist approaches.

In sum, PBL is a sound methodology capable of meeting students' language and affective needs. In keeping with the best practices of HL teaching, PBL integrates real-world issues, authentic materials and language use, engagement in complex tasks and the creation of tangible products. Students use their home-acquired skills to start the process and gradually acquire new vocabulary, grammatical structures and functional skills naturally triggered by the requirements of the project (Carreira et al., 2014). As Carreira et al., (2014 p.138) framed it, "differentiation is built into the process" as students' language grows naturally to successfully accomplish an authentic project. PBL is the perfect platform to incorporate personally relevant community-based projects where students can build closeness to the HL community while also fulfilling World Readiness Standards for Learning Languages (National Standards Collaborative Board). Nevertheless, despite the growing interest in the potential of PBL for HL instruction, empirical research into the benefits of PBL for HL learners is currently a part of the pool of unexplored areas in the HL field.

2.8 Chapter Summary

This chapter contextualized the literature in PBL, its history in language learning and the growing need for its implementation in the HL context. PBL has been a longstanding approach used in different educational fields. It has experienced different implementations and aspects while still maintaining its core elements of student-centered, autonomous and authentic learning opportunities that help students develop their subject matter knowledge and real-life (21st century) skills. Although PBL offers many benefits and advantages, it is not without its challenges. The versatility that enables PBL to be used in so many educational contexts and has been regarded as one of its greatest characteristics can also be a cause of complications. The challenges are vastly due to the lack of uniformity and consensus of the definition and characteristics of the approach. Nonetheless, PBL researchers have put forth different guides and frameworks to direct instructors and institutions in the planning, implementation and culmination process of PBL.

The studies and articles presented in this chapter offer a theoretical and pedagogical foundation as to the appropriateness of a PBL approach for teaching HL learners. Nonetheless, the vast linguistic and affective advantages that PBL can offer to HL students of Spanish are still left unexplored due to the lack of studies in the area. This study contributes to the field by evaluating the effectiveness of a PBL curriculum in HL students' writing and speaking skills as well as engagement and linguistic confidence. It also fulfills the many calls for empirical research in the HL classroom to explore better pedagogical and curriculum approaches (Lynch, 2014; Parra, Otero, Flores, & Lavallée, 2018; Torres, Pascual y Cabo & Beusterien, 2018). The following chapter details the methodology and analysis applied to examine this study's data.

CHAPTER 3

METHODOLOGY AND ANALYSIS

This chapter will describe the methodology for the present study. As stated in chapter 1, the purpose of this dissertation is to determine the effects of a PBL curriculum versus a "traditional heritage" curriculum on HL learners' oral and written skills. The following research questions motivated the study:

1. Does a project-based curriculum improve students' written competence on performance tests? Are there any differential gains between the experimental and the control groups?

2. Does a project-based curriculum improve students' oral skills on performance tests? Are there any differential gains between the experimental and the control groups?

The research questions drafted seek to uncover the impact of a PBL curriculum on oral and written linguistic development. These aspects are tested because progress in proficiency is naturally one of the goals of the course and of the students taking the course. Unfortunately, testing PBL's effect on affective aspects was not possible due to lack of student participation in the tools testing engagement and linguistic confidence.

Empirical research into effective teaching methods for heritage language students is of great value to the HL field in order to advance instructional practices to better serve the needs of HL students (Carreira & Kagan, 2018). Currently, this type of research is scarce, leaving HL language teachers in need of evidence-based pedagogy to guide their instructional practices (Bowles & Bello-Uriarte, 2019). It is necessary to find a methodology that can implement tools that help meet students' socioaffective and

linguistic needs. PBL has the potential to deliver for these needs while meeting the eight goals of heritage language pedagogy due to its versatility and naturalistic approach to learning that allows instructors to adapt it and support students' cultural and linguistic identities. While PBL has an abundance of theoretical literature, it has very limited empirical research into its effects on students' language development. The purpose of these research questions is to investigate if PBL is an effective methodology to foster HL students' linguistic development.

This chapter presents a detailed description of the research context, designs and procedures followed for the study. First, an overview of the HL class at the university is presented to provide the context of the specific settings of the study. Then, a description of the selection of participants, both teacher and students, is presented along with the design and research application procedures. The data collection instruments, their coding and analysis are subsequently introduced.

3.2 Research Context

The study took place at a large public Hispanic-serving university in the Southwest of the United States with an undergraduate student population of 57,588, of which 26% identify as Latinos or Hispanic according to the university's fall 2022 official data on university students and employees. The following section offers an overview of the HL course used for the study, including the learning goals, content, and assessments.

3.2.1 Spanish 204: Intermediate Spanish II for Bilinguals

This study was carried out in two sections of Spanish 204, a hybrid intermediate level course for bilingual students at a large public university in the U.S Southwest. In this context, a hybrid course implies the use of flipped-learning methodology where the

course meets in-person twice a week and students have to watch instructional videos provided by the instructor prior to coming to class. At the time of the study, Spanish 204 was the second course in a sequence of four courses in the HL program offered at the university (see Figure 7). However, the program expanded and added SPA 103 (first course) and SPA 416 (last course), currently offering six courses. The six courses in the HL track are equivalent to their hybrid L2 counterparts Spanish 102, 201, 202, 313, 314, and 412. Spanish 204 addresses students' affective, cultural, and linguistic needs. The general focus is on expanding learners' bilingual abilities in all four modalities within a confidence-building environment. The course differs from its L2 counterparts in its approach to teaching which includes language instruction, but also a sociolinguistic approach that addresses the eight goals of HL pedagogy (Beaudrie & Wilson, 2021) outlined in chapter 2, such as the maintenance and development of positive attitudes of students' heritage language. The confidence-building environment of Spanish 204 helps with previously reported feelings of insecurity experienced by HL speakers as a result of internalized inferiority discourses about their HL, their English or both (Sánchez-Muñoz, 2016).

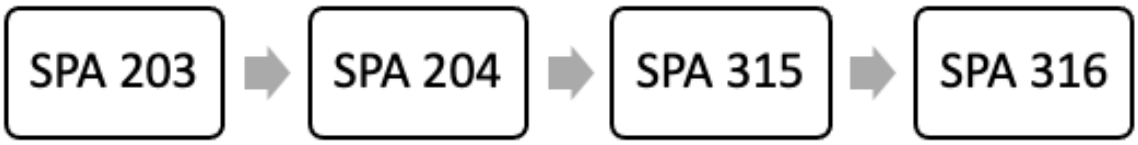


Figure 7. Spanish courses for bilinguals at the university at the time of the study

Spanish 204 develops fluency, especially in speaking and writing, being able to write well-structured paragraphs and essays, improve the command of spelling and written accents, and strengthen and expand grammatical structures and lexical repertoire.

It is also concerned with teaching about and appreciating language variation within Spanish varieties along registers, contexts, and communities. The Spanish 204 course provides opportunities to be exposed to examples of language variation for students to appreciate linguistic and cultural differences, including their own variation.

Table 4.
Curriculum Topics for Existing Spanish 204 Course

Content	Grammar and orthography
● Values of Latino cultures in the United States ● Register (formal and informal speech) ● History of El Salvador, the civil war and its effect on immigration ● History of Nicaragua and its effect on immigration ● History of Panama ● Panama canal and the relationship between the United States and Panama ● Transition words (Academic register) ● History of Guatemala ● Native groups of Guatemala and their migration to the United States ● Immigration stories ● Language contact ● Usage of vos ● History of the countries in the Southern Cone ● Human rights ● Marketing strategies targeting Latinos in the United States ● The Spanish conquest ● The diary of Christopher Columbus	● Division of syllables ● Recognizing the stressed syllable ● Accentuation rules ● Preterite ● Imperfect ● Relative pronouns ● Orthographic irregularities (stem-changing verbs) ● Present subjunctive ● Past subjunctive

Regarding learning materials, at the time of this study, the class used a textbook (Carreira & Geoffrion-Vinci, 2008) designed specifically for HL students for most of the reading assignments and as a guide for the topics covered in class (see Table 4). The first five chapters are used for the lower-level Spanish 203 course and chapters six through ten

for the next course, Spanish 204. Each chapter of the textbook is dedicated to one or two Spanish-speaking countries, covering historical, political, and cultural information about it while also making connections to U.S Hispanic cultures and students' lives. The chapters also offer sociolinguistically related readings to raise students' awareness of language registers and varieties, with a special focus on discussions about U.S. Spanish and its characteristics such as lexical borrowings, Anglicisms, and code switching. Supplemental materials covering grammatical and orthographic content as well as extra readings and films are obtained from the web (YouTube, newspapers, etc.) or are teacher-created. Throughout the course students are engaged in reading activities, writing and web assignments, group discussions and oral presentations to achieve greater flexibility in their language skills. Grammar and spelling activities are also present in the class on a limited basis with the purpose of supporting learners' language development.

The reading activities include pre and post reading exercises and vocabulary practice. For pre-reading activities, texts in each unit provide a list of vocabulary words and their definitions for students to match before reading the text by using context clues to achieve it. As post reading activities, during class time students discuss and analyze the readings in the target language through group or partner discussions. These discussions can also involve writing and reading components to achieve a well-rounded experience and critical analysis of the topics covered in the texts.

Additionally, an innovative assignment implemented in the course is the learning contracts. Learning contracts offer an extra degree of independence, respect students' agency and allow the involvement of all four language skills by having students create a weekly schedule of activities to work towards the accomplishment of four language

objectives chosen by the students themselves. Similar to agendas, students work on their own to complete the activities that they proposed. This type of activity has been suggested as a way to differentiate instruction by addressing HL students' highly heterogeneous proficiency skills (Carreira & Chik, 2018).

The assessments in Spanish 204 seek to integrate content knowledge covered in class and language skills in accordance with the ACTFL proficiency standards (2012). In regard to writing skills, students have a range of assignments to practice different registers through conversation forums, newspaper assignments, two formal research essays, three mini-projects, and a final project. In the conversation forum, students are asked questions regarding topics covered in class to which they have to respond in a paragraph form, they also have to provide thoughtful responses to two classmates. The newspaper assignment allows students to practice both reading and writing by having to read a newspaper article and fulfill a task that can be writing a summary, looking for transition words, or looking at the structure of a written interview. From the two formal essays in the course, the first one is an elaborate two-page paper based on an interview conducted, transcribed, and analyzed by the students. The second essay requires students to investigate and compare one cultural aspect of two Spanish-speaking countries and provide sources to support their research. The three mini projects are short essays focusing on students' experiences. The first one asked students to describe, compare and contrast their parents' hometowns and their own. The second mini project emphasized language variation, by requiring students to watch an hour of a show in Spanish and write about the lexical variation of the language used in the show and their own variety. The third mini project required students to do two hours of community service at an

organization that serves the Latino community and that provides opportunities to use the target language. Based on their experience, students had to write a 1-page reflection. The final project consists of merging the information gathered from essays 1 and 2 and the first mini-project into a public web-based tool (a website, a video, an online poster/collage) to showcase the skills learned throughout the semester.

To assess oral skills, learners are tasked with two 5-7 minute oral presentations about topics related to the class content and students' interest. The first presentation is a group presentation on the historical, social, political and economic impact of Latinos in the United States. The second is an individual presentation about students' own final project. There are also chapter quizzes and a final exam where students demonstrate their understanding of class content and language development through multiple choice, true and false, reading comprehension, short answers, and essay questions.

3.3 Participants

3.3.1 Teacher-Researcher

The instructor of both participating Spanish 204 sections is the researcher of this study. The instructor-investigator approach is unavoidable because these two sections of Spanish 204 are the only sections offered in the Spring 2020 semester and I am the only teacher teaching Spanish 204. In addition, this design constitutes an effort to contribute to the growing implementation of practice-oriented educational research which seeks to make a connection between educational research and educational practice (Groothuijsen, Bronkhorst, Prins & Kuiper, 2019).

As a participant with a double role in the study, it is vitally important that the roles, beliefs, and potential biases of the researcher be delineated upfront. In the semester

when the research study took place, I was a teaching associate and graduate student at the School of International Letters and Cultures (SILC). I was twenty-seven years old, placing me in the same "generation" as most, if not all, the students from the class. I am originally from Honduras and arrived in the United States at the age of eighteen. I have an undergraduate degree in Spanish education and a master's degree in Spanish. I had three years of experience teaching Spanish as a foreign language both as a graduate assistant while completing my master's degree and one year at a public high school. As an instructor at Arizona State University, I had taught Spanish 204 four times, in both online and in-person modalities. This situation has allowed me to become familiar with the texts, content, and assignments of the course. I have received formal training in HL pedagogy through graduate courses and training sessions at the university under the direction of the HL program director and professor in the Spanish Linguistics PhD program.

3.3.2 Student participants

The student participants for this study were learners enrolled in two sections of Spanish 204 at Arizona State University during the Spring 2020 semester. The control and the experimental tag for each section was chosen at random. Prior to the beginning of the investigation, the director of the Spanish for Heritage Language Program was contacted and I meticulously explained the details and purpose of the study. After obtaining approval from the director, all materials for the study were finalized to be submitted to the Institutional Review Board (IRB).

Both sections were selected because they were the only sections of Spanish 204 in-person courses offered the semester of Spring 2020. The maximum enrollment of each

section is 28 students. Each section is offered on different days of the week to accommodate students' schedules. The experimental class was taught on Mondays and Wednesdays and originally consisted of twenty students. The control group was taught Tuesdays and Thursdays and originally had fourteen students. Nonetheless, as Mackey and Gass (2016) explain, participant attrition is unavoidable in longitudinal design studies, and this study is no exception. For participants to be counted as part of the study, they had to have completed the pre and post-test in all the tasks.

After the attrition mentioned above, the groups decreased the number of participating students (see Table 5). The PBL group originally had a total of twenty students. After coding for student participation, subsequent to the end of the semester, fourteen of these twenty students, eleven females and three males, were found eligible to participate. The control group originally had fourteen students, but after coding for student participation, after the semester was completed, only eleven, eight females and three males, were found eligible to partake of the study.

Table 5.
Participants included in the analysis

Instrument	Experimental group	Control group
Writing assessments	14	11
Oral assessments	14	11

3.4 Approach and Design

3.4.1 The PBL Curriculum

The PBL curriculum revamping implied a change in only a few aspects of the existing curriculum. First, the curricula for both the control and experimental courses

were limited to four units instead of the five units that the original curriculum had. This decision was made to allow for more in-depth discussions of the topics of the course. Each unit in the PBL curriculum has a project to be completed by the end of the unit. The four PBL projects replaced the aforementioned three mini-projects and the second discussion forum in the control group. The topic of the discussion forum and the mini projects was the same as the PBL projects. They only differed in the fact that the PBL group created unit-long projects while the control group produced a written discussion forum and three mini-projects (short essay assignments). Table 6 below presents a very brief summary description of the projects that each class produced. Moreover, all the readings and the rest of the assignments were exactly the same for both groups. Due to the switch to remote learning as a result of the COVID-19 pandemic, the first two units were taught in person and the last two online as synchronous sessions via Zoom.

Table 6.
Comparison of the PBL and control group curricula

Control	**Experimental**
Discussion forum 2: La variedad lingüística Watch the following *BBC en español* YouTube video and answer the following questions: ¿Qué es el spanglish? ¿hay otras variedades parecidas al spanglish? ¿Qué dicen los lingüistas sobre el tema? ¿Por qué se usa el spanglish? ¿En qué contextos usas tú en spanglish (familia, trabajo, etc.)? ¿Cómo respondes al mito de que "el español de España es el mejor y el más correcto" o que "existe un español puro"? Write your response using the readings about Language variation we have covered in this unit.	**Project 1:** La variedad lingüística Watch the following *BBC es español* YouTube video and choose a comment from the comment section regarding a myth about Spanglish. Then, write a response using the readings about language variation we have covered in this unit.

Mini project 1: Grupos latinos/hispanos en los Estados Unidos	**Project 2:** Grupos latinos/hispanos en los Estados Unidos
In this essay you will present information about one Latino/Hispanic group in the United States (Mexicans, Puerto Rican, Salvadorians, etc.) You can include information in the following aspects: -Area of concentration -Historical reasons for migration -Population percentage -Linguistic characteristics of the population -Contributions to the United States	For this project you will create an infographic with information about one Latino/Hispanic group in the United States (Mexicans, Puerto Rican, etc.) You can include information in the following aspects: -Area of concentration -Historical reasons for migration -Population percentage -Linguistic characteristics of the population -Contributions to the United States
Mini project 2: La comunidad latina/hispana en Phoenix In this mini project, you will write an essay talking about the representation of Latinos/Hispanics in the city where you reside. Your essay will present information (history, importance, symbolism, etc.) and pictures of 3-5 artifacts that represent the Latino/Hispanic community in your city. These elements can be: statues, murals, restaurants, supermarkets, community centers, art pieces, etc.	**Project 3:** La comunidad latina/hispana en Phoenix For this Project you will create a video talking about the representation of Latinos/Hispanics in the city where you reside. Your video will present information (history, importance, symbolism, etc.) and pictures of 3-5 artifacts representing the Latino/Hispanic community in your city. These elements can be: statues, murals, restaurants, supermarkets, community centers, art pieces, etc.
Mini project 3: Organizaciones sin fines de lucro: apoyando a mi comunidad latina/hispana	**Project 4:** Organizaciones sin fines de lucro: apoyando a mi comunidad latina/hispana
For this mini project you will create your own non-profit organization based on the needs you have noticed within your community. To develop this project, you will carry on research to find out your community's needs: what organizations already exist? Which ones are needed? Why is your organization crucial for the community?	For this project you will create your own non-profit organization based on the needs you have noticed within your community. To develop this project, you will carry on research to find out your community's needs: what organizations already exist? Which ones are needed?

You will present your idea in an essay of 1-1.5 pages of length.	Why is your organization crucial for the community? You will present your idea in a formal 3-5-minute-long video.

3.4.2 Research Design

This study uses a pretest-posttest quasi-experimental research design to investigate the effects of a PBL curriculum on students' oral and written language development. Quasi-experimental research bears resemblance to experimental research in that there is a direct manipulation of conditions and that the purpose of the research is to determine a cause-and-effect relationship (McMilan & Schumacher, 1997). The two designs differ in that in quasi-experimental research the participants are not randomly selected, unlike in true experimental research (Salkind, 2010). In this study, assigning subjects to a different treatment group is not feasible, instead, intact classes were used. The two sections used as treatment groups already existed as classes based on students' self-registration, and not formed by the teacher-researcher.

The control group received instruction using the traditional methodology applied to the HL courses at the university as described in section 3.2.1 of this chapter. The experimental group's treatment was PBL instruction. As previously mentioned, due to the transition from in-person learning to remote learning, the first two units were imparted in person while the remaining two were taught online. The independent variable is the methodology employed for instruction and the dependent variable is the oral and written skills development. This variable is measured with pre and post instruments. The data from the language development variables was analyzed using paired sample T-tests for within the groups' differences (pre vs post) and independent sample T-tests for between

the groups' differences. The demographic information about the participants was gathered from an on-boarding questionnaire built into the class assigned to all students enrolled in a heritage language course at the university in the first week of the semester.

The curricular innovations covered an entire semester (15 weeks) with students following a PBL curriculum in the experimental group and the existing heritage language curriculum in the control group. Careful considerations were taken at the moment of designing the experimental PBL curriculum and modifying the control curriculum in that both groups were assigned the same readings, did a comparable amount of work, and had assignments on the same subjects and objectives. Despite the change in unit titles in the curricula, both groups were assigned the same texts and videos, with the exception of an extra reading in the control group to accommodate the theme of their last unit. This reading was not included in the experimental curriculum because it did not fit into the theme of the unit. The projects of the experimental class were translated into written tasks (originally called mini-projects) in the control class. The projects and written tasks had the same theme and prompts, differing on the final product and the process of the completion of the project. The BPL project completion process (see Figure 8) required students to turn in drafts of the project and in-class time was dedicated to the reflection of the ideas, obstacles and process of the project. Conversely, the written tasks in the control group did not require these steps prior to the submission of the assignment.

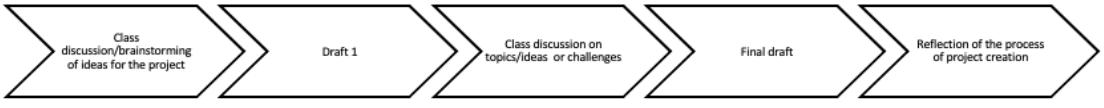


Figure 8. *Project creation process*

3.5 Research Procedures

The collection of data for this study took place during the spring 2020 semester. The teacher-researcher worked on developing the PBL curriculum in the fall 2019 semester and implemented and fine-tuned it during the spring 2020 semester. The curriculum was created along and under the direction of the Heritage Language program assistant coordinator and approved by the Heritage Language program coordinator. To begin the data collection process, in the third week of the semester, the program's assistant coordinator visited the two Spanish 204 sections and invited the students to be part of the study by explaining the study's process while the teacher-researcher stepped outside of the classroom, as per IRB requirements (see Appendix C). After explaining the process, students were asked to sign the IRB consent form. These documents were kept in a locked drawer in the assistant coordinator's office and were not available to the teacher-researcher until after final grades of the semester were posted. By this time, students had already completed the pre-intervention written task and demographic questionnaire, already existing parts of the course, and the pre-intervention oral task. The post-intervention written and oral tasks were taken online during week 16 counting as assignments for the course. All subjects participated voluntarily and did not receive any extra points for their participation. Table 7 shows a summary of the data collection procedures.

Table 7.
Data collection procedures

Measurement Instruments

1. Demographic questionnaire
2. Written assessment (rated with CAF analysis)
3. Oral assessment (Rated with CAF analysis)

Week	Instrument
1	Demographic questionnaire
2	Pre-written assessment Pre-oral assessment
16	Post-written assessment Post-oral assessment

3.6 Data Collection Instruments

The materials and linguistic instruments used for this study were taken or modeled after previous studies in the language field. A total of 3 instruments were used to complete this investigation: one questionnaire and two proficiency assessment tools (one oral and one written). This section details the development, purpose and function of each instrument.

3.6.1 Demographic Questionnaire

This study used the responses of a questionnaire that students took at the beginning of the semester through Canvas with the intention to obtain participants' demographic information. This 54-item questionnaire is assigned to every heritage language class at the university, and it is intended to gather demographic information about the students in the HL program. The teacher-researcher had no part in creating it and the instrument was not manipulated.

The questionnaire comprises a mix of multiple choice and short answer questions. It contains questions about the students' demographics, cultural and ethnic background

and identity, language contact growing up, prior Spanish courses, current language use and information about how they heard about the heritage language program at the university. All of the information obtained through the questionnaire is summarized in Table 8.

The first set of questions ask students for their demographic information: age, sex and undergraduate academic level. The following items ask for participants' birthplace, and preferred cultural/ethnic identifying term. It also includes questions asking students to name the first person from their family to move to the United States and their family's birthplace. Afterwards, students share their contact with Spanish during childhood, prior Spanish courses, and any experience living abroad. Students then rate (never, rarely, sometimes, frequently, always) their Spanish contact and usage during their childhood with different family members and in common different social settings (with family, friends, the community).

Participants are then asked to rate how often (never, rarely, sometimes, frequently, always) they currently use Spanish in different social settings and with different people in their lives. Students also rated their estimated weekly consumption of media in Spanish (if any). The next set of questions looked into students' language confidence. These questions ask them to disclose if they feel more comfortable carrying out different language competencies in Spanish or in English. Then students self-assessed what they think is their strongest and weakest language skill in Spanish. The last portion of the questions asks students to share why they are taking the class, what they want to get out of the experience, and how they heard about the HL program.

Table 8.

Demographic questionnaire categories

Categories	Items
Demographics	1-3
Cultural and ethnic background and identity	4-8
Prior Spanish language contact and use	9-18
Current Spanish language contact and use	19-38
Language confidence and self-assessment of language competencies	39-47
Reasons for taking the course and learning expectations	48-50

3.6.2 Writing task

To measure learners' language development after one semester of instruction, a pre and post writing task were administered to both groups at the beginning (week 2) and end (week 16) of the semester, assuming that language development can be evaluated by means of developmental measures applied to the learners' output (Beaudrie, 2006; Wolfe-Quintero, Inagaki & Kim, 1998). This task reflects the most naturalistic performance elicited in the study. The writing prompt at the beginning of the semester is a typical task already used in the course as a diagnostic tool. The post-writing prompt was part of a graded essay assignment that students complete at the end of the semester. The decision to not introduce extra assignments to the class and use the writing tasks that they already have was made to reduce student fatigue. The prompt for each task was created by the teacher-researcher following the criteria, prompts and topics of previous class assignments.

The pre-treatment written elicitation task (see Appendix A) asked students to respond to a prompt with a familiar topic already talked about during the first week of class, a narrative about personal identity. This familiar topic and genre were chosen as a deliberate effort to reduce the complexity and processing demands that such a task could elicit in an attempt to lower the competition for attentional resources between form and meaning (Skehan, 1998). The teacher-researcher presented the prompt and allowed the last 20 minutes of class and instructed students to respond to the best of their abilities. The post-treatment written elicitation task (see Appendix A) asked students to respond to another familiar prompt, covered in class, a narrative about the use of Spanglish in society and their personal lives. This prompt was also presented by the teacher-researcher during the last part of a class, but this time, taking place through Zoom, in the main room, in an effort to emulate the in-person experience of the pre-treatment writing task. Students responded through a Canvas assignment and were allotted 20 minutes to finish the task, emulating the pre-treatment task as best as possible.

3.6.3 Oral task

The oral task also follows a pre-post design to explore learners' narrative performance at the beginning (week 2) and end of the semester (week 16). Language production studies have utilized a similar approach by having participants describe picture stories (instead of a silent video); a well-known example is Frog stories as used in Berman & Slobin (1994). The animated film narrative task has been utilized within HL education in Beaudrie (2009) with receptive bilinguals, in Gonzalez (2011) with receptive, beginner and intermediate students, and Parra et al., (2018) with advanced students. Parra et al., (2018) (previously detailed in the literature review) has the most

similarity with the present study, in that it used this task to evaluate students' growth after the implementation of a semester-long curriculum following a macro-based approach, in their case, the Learning by Design framework. Pre-post tasks reveal areas of student progress where we can identify language competence areas that are subject to positive change after instruction, or prone to being lost despite instruction (Parra et al., 2018).

Both oral elicitation tasks (see Appendix B) asked students to watch a silent video from a link provided, record a narrative describing the video to then upload it to the course' online platform. The two clips were created and posted on YouTube by the same content creator, Birdbox Studio, and are of comparable length and context. The video chosen for the first oral elicitation task is one minute and twenty-two seconds and presents a scene at a parking lot featuring a man and a dog. The clip for the second oral elicitation task is of one minute and twenty-seven seconds and features a dog's feeding time activities.

3.7 Data analysis

The preceding section presented each instrument and how they were coded for analysis. This section details the procedures followed to analyze the data obtained from each instrument.

3.7.1 Demographic Questionnaire

The demographic data collected through the class Canvas questionnaire was downloaded as Microsoft Excel spreadsheets for analysis. The students who were excluded from the study were taken out of the spreadsheet prior to analysis. Ordinal, interval (time) and categorical data was coded to be submitted for analysis in SPSS 27.0 to run descriptive statistics. The qualitative data gathered from the short-text answers

such as cultural identity, cultural background, study/lived abroad experiences and self-assessment of Spanish proficiency, was transcribed to compare each group's characteristics.

3.7.2 Data coding procedures for written and oral samples

Written and oral samples coming from the pre and post-tests of both the control and experimental groups were transcribed and submitted to a developmental index analysis. In order to demonstrate language development, a CAF (complexity, accuracy and fluency) analysis was utilized. While the field of SLA has prominently used this type of analysis to account for language development in response to educational programs, teaching, tasks, topic, and other stimuli, its use has grown in the study of HL as well (Beaudrie, 2006; Kisselev, Klimov & Kopotev, 2021; Michael, 2017; Norris & Ortega, 2009; Wolfe-Quintero, Inagaki, & Kim,1998). The CAF dimensions characterize different levels of L2 performance (Wolf-Quintero et al., 1998). It is assumed that when comparing students' production to the production of an earlier stage of development (e.g., before an instructional intervention), more proficient learners will have accomplished more complex grammatical structures and vocabulary, more accurate and fluent utterances (Michael, 2017). In the HL context, there are some studies analyzing learners' written texts and oral output, using product-based indices like accuracy and complexity. Most of the studies looked into HL students' written texts, only two analyzed oral samples (Beaudrie, 2006; Gutierrez-Clellen & Hofstetter, 1994). However, literature can be found of CAF analysis to measure oral proficiency in other languages (Cayer & Sacks, 1979; Iwashita, 2006; O'Donnell, Griffin & Norris, 1967; Scott, Roberts, & Krakow, 2008; Stewig & Vail, 1985). The following section first introduces the studies utilizing

CAF within the HL context and then presents the ways in which CAF is measured in this study.

Beaudrie (2006) employed T-unit segmentation in order to measure CAF in written and oral tasks produced by two groups of Spanish HL learners enrolled in HL and FL courses, and a group of FL learners taking the same FL courses. T-unit or minimally terminable unit is "a main clause with all the subordinate clauses attached to it" (Hunt, 1965 p.20). To evaluate complexity two measures were used: lexical richness and syntactic complexity. The lexical richness was obtained by measuring the ratio of the number of different words by the total number of words (type-token ration). Syntactic complexity was measured by the number of subordinate clauses per T-unit and by counting the increase or decrease in the number and types of structures in the students' productions. Accuracy was measured by counting error-free T-units within verb and noun clauses. In this case, error free meant only errors within subject-verb agreement accuracy and gender and number agreement between the noun and its determiners. Finally, fluency was measured by counting the total number of T-units produced, the mean length of T-units (MLT) and the percentage of English used. For the oral tasks, an additional fluency measure was utilized: speech rate (number of Spanish words produced per minute). It is important to mention that the MLT measure has traditionally been used for complexity analysis and not fluency. However, Beaudrie (2006) states that MLT "does not discriminate among the ways in which length is achieved. Therefore, a measure of the length of T-unit represents a more accurate measure of fluency rather than complexity." (Beaudrie, 2006, p. 117).

Gutierrez-Clellen and Hofstetter (1994) analyzed the syntactic complexity of recorded narratives of 77 school-aged Spanish speaking children in public schools in the United States. Although this study seeks to measure Spanish-speakers' oral samples, it differs from Beaudrie's study as it was not carried out with the intent of measuring students' language gains in their HL language after instruction. The study's objective was to analyze bilingual students' first language oral complexity, with the understanding that "a solid foundation in the native language may be needed to maximize children's achievement in a second language" (Gutierrez-Clellen and Hofstetter, 1994, p. 653). It is also different as it only looks into syntactic complexity, as opposed to also testing for fluency and accuracy. The samples' syntactic complexity was analyzed by comparing the number of T-units, words per T-units, mean length of T-unit (MLT), average number of clauses per T-unit (index of subordination), type of clause (relative, nominal, infinitive, adverbial) and type of phrase (adverbial, prepositional).

Utilizing product-based indices such as CAF to assess exclusively written samples, Camus and Adrada (2015), compared the writing samples of 28 Spanish L2 learners and 18 HL. The study measured complexity through mean length of T-unit (MLT), mean number of clauses per T-unit (subordination) and mean length of clause by word. Accuracy was measured as error-free clauses. Orthographic and spelling errors were not considered. Finally, fluency was measured by counting the essays' total number of words. In a study with similar sample groups, Spicer-Escalante (2007) also utilized HL and L2 learners' samples but added Spanish native speakers' samples as well to study participants' overall language production. Her study analyzed and compared the writing samples of 10 HL learners, 8 L2 learners and 5 Spanish native speakers living in Mexico.

Spicer-Escalante utilized length measures such as the length of T-units, length of sentences (number of words), and the length of the overall samples measured by both the number of T-units and also total number of words. She also measured the use of simple, coordinated and subordinated sentences and the type of clauses in the texts: nominal, adjectival, adverbial.

In a smaller study, Schwartz (2003) examined the writing process and output of 3 Spanish HL learners through various tools and measures including CAF. Schwartz assessed fluency by counting the number of words and number of T-units in the samples. Grammatical complexity was assessed by measuring the total number of clauses divided by the number of T-units. Accuracy was measured through the number of errors divided by the number of T-units. Yanguas and Lado (2012) used CAF to analyze 37 HL students writing assignments. They measured complexity by analyzing lexical variety, accuracy was represented by error-free T-units and fluency by counting the number of words produced and number of words per T-unit.

Some studies choose to utilize only two out of three developmental measures. For instance, Mikulski and Elola (2011), measured fluency and accuracy of Spanish and English writings of 12 HL students. Additionally, the participants were recorded through a screen-capture software while writing to monitor their planning and execution time. Fluency was measured by the total number of words in the sample, mean sentence length (words), and words per minute (utilizing the software recordings). Accuracy was measured in two steps. First by counting the error-free T-units in the samples. Then, to account for the varying lengths of the essays, a percentage of error-free T-units was calculated. To obtain this percentage, the number of error-free T-units were divided by

the total number of T-units produced. Spelling errors were counted with the exception of missed accents, capitalization and punctuation. In a more recent study, Torres (2020) coded for accuracy and syntactic complexity in the writing samples of 13 Spanish HL-L2 student pairs and 16 HL-HL students pairs. Accuracy entailed error-free T-units, which included spelling and accent errors. Syntactic complexity was assessed by measuring the mean length of clause (MLC), dependent clauses per T-unit (D/T) and coordinate phrases per T-unit (CP/T).

Finally, Abchi & Mier (2017) measured only syntactic complexity in written samples of 118 Spanish HL children and 46 Spanish L1 children growing up in a Spanish Speaking context. The participants watched a silent short film and then were asked to write the storyline. The study's measures of complexity were length of text (in words), number of T-Units, mean length of T-Unit (MLT), syntactic complexity index (subordinate clauses per T-unit), and percentage of error free clauses. While the percentage of error-free clauses is usually an accuracy measure, Abchi et al. (2017) treats it as a complexity indicator, however, the authors acknowledge that it is a measure linked to accuracy (p. 141).

In sum, the various measures of CAF have been successfully utilized to analyze different aspects of HL students' writing development and to a lesser extent oral development. As such, these are the guidelines that are utilized in this dissertation.

3.7.2.1 Language fluency

This aspect refers to the eloquence of the output, the degree of control that the user has over the language. Language development requires an increased level of control which entails more fluent language production (Beaudrie, 2006; Wolfe-Quintero, Inagaki,

& Kim,1998). It is assumed that increased language production in a pre-post design reflects language growth (Beaudrie, 2006), to this end, three measures of fluency for written and oral samples were calculated: total number of T-units, mean length of T-units (MLT), and the percentage of English words used in the samples. One additional measure, speech rate, was used for the oral samples.

As briefly mentioned in section 3.7.2 previously in this chapter, the T-unit or minimally terminable unit is "a main clause with all the subordinate clauses attached to it" (Hunt, 1965 p.20). In other words, it is the smallest word group that can be considered a grammatical sentence. Within a sentence, each independent clause can be considered its own T-unit; an independent clause along with its dependent clause(s) constitutes one T-unit. As Spanish is a pro-drop language, T-units can have limited conjugated verbs without an overt subject, so each main verb is counted as a different T-unit, regardless of whether an overt subject is present (Ortega Alvarez-Osorio, 2000). Some examples of T-units from the written samples are provided below:

a. /yo hablo mucho en Spanglish con mi familia/ /mi Nana se habla mas en español/. (2 T-units)
b. /yo hablo más en inglés/. (1 T-unit)

The protocol for T-unit segmentation follows the guidelines set forth by Ortega Alvarez-Osorio's (2000) study. Ortega Alvarez-Osorio presents a long list of guidelines, below are some of the most relevant ones for this study. The rest of the guidelines are listed in appendix D.

1.Independent clauses joined by periods, commas, or simple juxtaposition are each one T-unit:

a. Se acabo la funcion. // Fue muy buena.

2. Indirect reported speech was included within the T-unit whereas direct reported speech formed its own T-unit.

a. 1 t-unit: / " y la papá del niño le dijo que se fuera a su recámara" /

b. 2 t-units: / 'El papá dice al niño' / / 'vas a su [room]' /

3. Independent clauses joined by coordinating conjunctions are each one T-unit:

y (or e) Después la mujer lleva la cartera del hombre //y fue a las tiendas.

o (or u) Puede cambiar la vida mucho, // o solamente lo hace mas emocionante.

pero Unfortunadamente, ellos ganaron la batalla. // Pero no ganaron la guerra

sino (que) Los niños no solo ven al mundo por la television // sino ellos experimentan la vida.

4. Count as a separate T-unit main clauses starting with the following linking words (similar to the English "so" or "therefore"):

asi Nadie lo fijo al perro // asi el disfruto una manzana.

asi que Es una dia importante // asi que celebramos lo mucha.

pues La nina, que se llama rosa, dice que ella no comprende la filosofia. // Pues, ella pregunto' su papa por un explinacion [: explicacion] de la filosofia.

por lo tanto Al correr mucho musculos son envolver, // por lo tanto dolores occurre.

por eso Y despues una coche me fue mojado. // Por eso yo estaba enojado.

5. Occasionally a normally subordinating conjunction ("porque," because, or "aunque," although) is used in an independent clause separated from the previous clause by a period (or by a preceding intonation contour which is clearly terminal, in spoken

data). Count such a case as an independent clause or 1 T-unit.

6. Count 2 (or more) subordinate clauses to a main clause which are coordinated (possibly with elided complementizer) as 1 T-unit:

creer/imaginar/esperar/pensar... que A y (que) B = 1 T-unit

resultar/parecer/suceder... que A y (que) B = 1 T-unit

7. When a subordinate clause is followed by two or more main clauses, always count each clause after the first main clause as a separate T-unit:

si A entonces B, y C, y D, y E = 4 T-units

cuando A entonces B y C = 2 T-units

Cuando el perro empezo salir, el hombre gordo dio cuenta al perro y peleo el perro. = 2 T-units

Entonces, cuando el continuaba que correr, un coche casi lo atropello a el y el se le tiro el

agua de la calle. = 2 T-units

All T-units containing one English word, or a compound phrase (compound verb or a connector) were included to analyze more of the students' output. Some examples of compound phrases are *make-up, believe in, ended up, to add on*. T-units with more than one English word were excluded from the study.

The second fluency measure, the MLT, was calculated by calculating the total number of words and dividing it by the number of T-units in the sample. Wolfe-Quintero, Inagaki and Kim (1998), one of the main sources for CAF studies to date despite having been published more than two decades ago, suggest the MLT as an accurate measure of fluency instead of complexity as it has been traditionally used. Wolfe-Quintero et al.

(1998) argue that length should be viewed as a function of fluency because, although longer productions are thought to indicate the presence of more complex structures, these measures do not discriminate between the different manners in which length can be achieved (p.14). Finally, the percentage of English words per sample was calculated by dividing the number of English words used by the number of total valid words in the sample.

For the spoken data sources, the pre and post oral tasks were transcribed and coded in the same manner as the written production. Due to the fact that the oral data originated from audios submitted by students, the T-unit segmentation occurred on the basis of syntactic information from the transcripts. To check for the accuracy of the segmentation decisions, the segmented data was compared with the audio data. All necessary modifications in syntactic analysis stemming from prosodic information were made. The T-unit analysis has been considered a less useful unit of analysis for spoken discourse because it does account for "naturally and typically occurring phenomena in spoken language" (Beaudrie, 2006; Crookes, 1990; Foster & Skehan, 1996). Although studies using T-unit segmentation and MLT calculation for this very purpose can be found (Beaudrie, 2006; O'Donnell, Griffin & Norris, 1967). Therefore, this analysis was deemed appropriate for the oral samples of this study because they consisted of many elliptical utterances as well as the monologic nature (as opposed to a conversation between interlocutors) of the samples.

A fourth fluency measure used only for the spoken discourse is the speech rate, measured by the number of Spanish words produced per minute. The calculations were done by counting the number of valid Spanish words produced, dividing it by the total

amount of seconds used to complete the task and then multiplying it by 60 to obtain a figure of words per minute. The Spanish words included are those part of "standard" Spanish but also Anglicisms listed in the ANLE's dictionary of Anglicisms of the Spanish from the United States (DAEE) (Moreno-Fernandez, 2018). In addition to the exclusion of T-units with more than one English word for all data in this study, the oral data was subjected to an extra pruning process. Repetitions, false starts, self-corrections, and hesitations were excluded from this analysis. This was performed due to the nature of spontaneous speech where this type of occurrence is common, as opposed to the more controlled speech found in the written samples.

3.7.2.2 Language complexity

Increased complexity is reflected by the elaborateness, richness and diversity of the L2 performance (Michael, 2017). This study seeks to measure syntactic complexity through two indicators: the depth of clause and the tense/aspect use complexity. The depth of clause refers to the number of subordinate clauses per T-unit (Hunt, 1965) which is used to determine if the increase in length is due to increased subordination (Beaudrie, 2006). This measure seeks to find out if students' post samples are more sophisticated. The tense/aspect use complexity is measured by analyzing the development of students' range of structures. It is analyzed by counting the number and types of structures in students' output. Based on the linguistic structures covered in the course and the expectation of students' proficiency at this level, the structures coded for this study were: 1. present, 2. preterit, 3. imperfect, 4. Subjunctive (present and imperfect), 5. present perfect, 6. new structure (new tense/mood/aspect). The last category includes tenses, aspects and moods not covered in class such as future tense, gerund within present

progressive and the conditional. Other CAF studies in HL and L2 contexts (Colombi, 2002; Danzak, 2020; To et al.,2013; Yu, 2010) have utilized lexical richness (lexical diversity or lexical density) as one more index of language complexity, however, it was not used in this dissertation due to validity concerns of the measure (Johansson, 2008; Gregory-Signes & Clavel-Arroitia, 2015; Palloti, 2015).

3.7.2.3 Language accuracy

Accuracy measures target-like and error free usage of language (Michael, 2017). Due to the low-intermediate proficiency level of the learners, where most T-units are likely to contain some type of error, and the short time span between the pre and the post test, the production was analyzed within the verb and noun phrases only. In verb phrases, only accurate attempts in subject-verb agreement were counted. Auxiliary verb accuracy, such as cases of extension of estar, was not included in the count. In noun phrases, attempts involving gender and number agreement between the noun and its modifiers were counted. Therefore, the noun phrases were limited to nouns (including pronouns) with modifiers to measure the change in gender and number agreement from the pre to the post-test.

3.8 Chapter Summary

This chapter presented a detailed description of the methodology and analysis utilized for this dissertation. An overview of the settings of the study and the process followed for the selection of the subjects was provided to fully understand the perspective and context in which this research was conducted. Then, the chapter offered a comprehensive explanation of the research design as well as procedures followed for implementation of the PBL curriculum and the changes it brought upon the courses

selected for participation. Afterwards, it explained the data collection instruments and how they were used to answer the research questions posed. Moreover, it presented the procedures applied to code and analyze the data collected with the instruments. The following chapter presents the detailed results obtained from the data collection process described in this chapter regarding the impact of a PBL curriculum on students' oral and written skills.

CHAPTER 4

RESULTS AND ANALYSIS

This chapter presents a detailed account of the findings of the research questions guiding this study. The purpose of this research study is to compare PBL's effect on heritage language students' writing and speaking skills when compared to a traditional instruction heritage language control group. This study seeks to add to the growing efforts of finding an instructional methodology that best fits the needs of the heterogeneous heritage language population. The research questions posed were the following:

1. Does a project-based curriculum improve students' written competence on performance tests? Are there any differential gains between the experimental and the control groups?
2. Does a project-based curriculum improve students' oral skills on performance tests? Are there any differential gains between the experimental and the control groups?

The first section of this chapter will present the results found through a demographic questionnaire; a tool utilized by all HL courses at the university. It will delineate participants' family background, cultural and ethnic background, prior and current language contact, and their language self-assessment and confidence. This information will provide context for the study and the participants. After codifying the participants' responses into Excel, descriptive statistics were run through SPSS 27.0 to analyze this data. The second part of this chapter presents the findings of the writing and speaking tasks to answer the two research questions regarding language development

throughout the semester. Paired and independent sample T-tests were run to analyze this data through SPSS 27.0.

4.1 Demographic Questionnaire Data

4.1.1 Descriptive Information of the Participants

This study had a total of 25 participants, divided between 2 sections of Intermediate Spanish for heritage speakers (Spanish 204). The experimental group consisted of 14 students; the control group consisted of 11 students. Of the 25 students, 19 identified themselves as female and 6, male. All the students were between the ages of 18 and 25 years old, with an average age of 19.38 years old for the entire sample. Spanish 204 was the second course of the Spanish for beginners' sequence at the time this research was carried out. It was composed mostly of students in their first or second year at the university. In this sample, 48% (12 students) were in their first year at the university, 28% (7 students) in their second year, 20% (5 students) in their third year, and 4% (1 student) in their fourth year.

4.1.2 Cultural and Ethnic Background and Identity

The survey asked participants about the immigration history of their family to the United States. Results showed that none of the students in the sample were first generation immigrants; in other words, all the participants in this study reported being born in the United States. The generational breakdown of the sample population, following Silva-Corvalán (1994) is as follows: 44% (11 students) were second generation (their parents were the first to immigrate to the U.S.), 40% (10 students) third generation (their grandparents immigrated to the U.S.), 8% (2 students) fourth generation (their great-grandparents immigrated to the U.S.) and another 8% (2 students) fifth generation

(their great-great grandparents immigrated to the U.S.) or beyond. The family origin within the participants was 72% (18 students) Mexican, 8% (2 students) Cuban, 8% (2 students) American, 4% (1 student) Mexican-Honduran, 4% (1 student) Mexican-Salvadorian, and 4% (1 student) Mexican-Puerto Rican. The two students who responded American as their family origin were students without national ties to Spanish-speaking countries, but instead were considered heritage language learners due to learning Spanish through immersion at dual language programs or by studying abroad. Most of the students have never lived outside of the United States. In fact, only three students responded that they have lived abroad in a Spanish-speaking country: two lived in Mexico and the third one lived both in Mexico and Spain while studying abroad.

4.1.3 Prior Spanish Language Contact and Use

Prior Spanish Use

Prior research has suggested that the language shift toward the majority language can be observed over three generations (Jenkins, 2018; Potowski, 2004; 2010). The first generation is dominant in their native language, and they adopt English as a second language in a "non-native fashion" (Jenkins, 2018, p.59). The second generation is bilingual, having learned how to speak Spanish at home from their parents and acquired English upon entering formal education. The norm for the third generation is often a complete shift to English, with little to no competency in the minority language (Jenkins, 2018). The results of this study seem to support this language shift trend due to the frequency with which the participants reported speaking Spanish at home during childhood. The largest group of students (40%), reported that they spoke Spanish only

sometimes at home during their childhood. 28% reported that they *always* spoke Spanish at home during childhood, 16% *rarely* spoke it, 12% *frequently* spoke it, and 4% *never* spoke Spanish at home during childhood.

When it comes to speaking Spanish with relatives during childhood, the data shows recurrent use of Spanish, although not as much use as at home. Most participants reported speaking Spanish with relatives *sometimes (36%),* or *frequently* (24%). Only 16% reported *always* speaking Spanish with relatives during childhood, and another 16% reported *rarely* doing so. Lastly, 8% *never* spoke Spanish during childhood with their relatives (see Table 9).

When asked to rate how often they spoke Spanish during childhood with their grandparents, results showed that most participants either *always* (44%) or *frequently* (24%) spoke it. 16% spoke it *sometimes*, and 12% *never* spoke it. There was one student (4%) that reported "not applicable" to this question. The reason for this was not further inquired, and it is necessary to note that this participant wrote "not applicable" for all questions regarding grandparents. The results of this question indicate that grandparents are the only indicator where most students reported *always* speaking Spanish with them during childhood. Conversely, most participants only *sometimes* spoke Spanish at home, and with relatives (see Table 9). This is not a surprising revelation since 40% of participants (10 students) are third generation, meaning that their grandparents were the first of their family to migrate to the United States from a variety of Spanish speaking countries.

Table 9

Frequency of participants speaking Spanish during childhood (%)

Contact	Never	Rarely	Sometimes	Frequently	Always	NA
At home (with parents)	4	16	40	12	28	0
Grandparents	12	0	16	24	44	4
Relatives	8	16	36	24	16	0

Prior Spanish Contact

As previously mentioned, the results showed that most students in the sample (44%) are second generation, which means that their parents would be first generation (dominant in their native language and who adopted English as an L2 according to Jenkins (2018). However, the largest group of participants reported speaking Spanish at home (with parents) during childhood only *sometimes*, while they said to have *always* spoken it with their grandparents. The results of the following set of questions regarding being spoken to in Spanish seem to follow a similar trend. While Spanish was present in their home to some degree, only 28% of students reported that their parents *always* spoke Spanish to them at home during their childhood. Another 28% reported *frequently*, 20% *sometimes*, 8% *rarely*, and 16% *never* had their parents speak Spanish at home during childhood. With grandparents, the results show a greater and most often use of Spanish, leading to the assumption that most of the Spanish input during their childhood came from grandparents. In fact, 56% of participants said that their grandparents always spoke Spanish to them during childhood, 24% *frequently*, 8% *sometimes*, 8% *never* and 4% (1 student) "not applicable". Results indicate, for the present sample, a higher tendency for grandparents to speak in Spanish to their grandchildren than parents to their children.

Finally, in regard to relatives speaking Spanish to them, the biggest group of participants (36%) said that it occurred *frequently* or *sometimes* (28%). Only 24% reported *always* having relatives speak in Spanish to them during childhood, 8% *rarely* and 4% *never*. This finding is similar to students' own use of Spanish with relatives, as uncovered in the previous section. Table 10 summarizes these results.

Table 10

Frequency of Spanish spoken to participants during childhood (%)

Contact	Never	Rarely	Sometimes	Frequently	Always	NA
At home (with parents)	16	8	20	28	28	0
Grandparents	8	0	8	24	56	4
Relatives	4	8	28	36	24	0

The following items asked how often they heard Spanish spoken at home, spoken by their grandparents and their relatives, but not directly to the participant. The majority of students said that they heard Spanish being spoken at home during childhood to some degree. The largest group (40%) reported that they *always* heard Spanish spoken at home, 32% *frequently*, and 24% *sometimes* heard Spanish at home being spoken during their childhood. Only 4% of students *never* heard Spanish spoken at home during their childhood. Regarding participants hearing their grandparents speak Spanish at home during childhood, there is again a higher Spanish use by grandparents in comparison with other family members. Results showed that the majority of the participants either *always* (64%) or *frequently* (20%) heard their grandparents speaking Spanish at home. 8% reported *never*, 4% *rarely* and 4% not applicable. Participants also declared that, during

their childhood, they listened to their relatives speaking Spanish at home *frequently* (40%), 28% *always*, 16% *rarely*, 8% *sometimes* and 8% *never*. The data shows that, while growing up, most participants had oral input with Spanish being spoken around them often by their family members (see Table 11). Grandparents showed to be the highest source of input and relatives the lowest. Nonetheless, it is unknown how often they had contact with their grandparents and therefore how constant participants had this Spanish input.

Table 11

Frequency of participants hearing Spanish spoken during childhood (%)

Contact	Never	Rarely	Sometimes	Frequently	Always	NA
At home (with parents)	4	0	24	32	40	0
Grandparents	8	4	0	20	64	4
Relatives	8	16	8	40	28	0

Students were also asked if they had frequent contact with Spanish in the community, while growing up, outside of their family. The largest group (36%) reported that they only *sometimes* had frequent contact with Spanish in their community. 28% reported *frequently*, 24% *always*, and 12% *rarely*. It must be noted that none of the participants reported that they *never* had recurring contact with Spanish in their community while growing up. Indicating that they all had contact with the Spanish language to some degree in their community. Although there were no further questions asking what spaces within the community served as frequent contact with Spanish, the following question showed that it was not likely to be contact with friends. When asked if

they spoke Spanish with friends during their childhood, the biggest group (40%) said *rarely*, 32% *sometimes*, 16% *frequently* and 12% *never*. There were no students who chose *always* to their early use of Spanish with friends.

Table 12

Frequency of participants' contact with Spanish outside of their family (%)

Contact	Never	Rarely	Sometimes	Frequently	Always
Community	0	12	36	28	24
Friends	12	40	32	16	0

Overall, results indicate that students had the greatest language contact and exposure to Spanish throughout their childhood with grandparents, followed by language usage at home with parents, and lastly, through relatives. Outside of their home, participants did in fact use Spanish, but to a lesser extent than with family. Interestingly, most students had frequent use of Spanish in the community, but they rarely spoke it with friends.

4.1.4 Current Spanish Language Contact and Use

The following set of questions addressed students' current language use and contact. First, we will break down their reported use within their family, then we will look at their use in the community and entertainment (TV, music, etc.).

Current Spanish Use

Results showed that participants' Spanish use varies depending on the family member (see Table 13). From the sample, most participants reported currently speaking

Spanish to their mothers/stepmothers to some degree. 36% of participants rated their current Spanish usage with their mothers/stepmothers as *sometimes*, 20% *always*, 12% *frequently* and another 12% *rarely*. However, 20% reported that they *never* currently speak Spanish with their mothers/stepmothers. In contrast, with their fathers/stepfathers, the largest group (36%) reported that they *always* currently speak Spanish with them. Then, 16% reported *sometimes*, 8% *frequently*, and 8% *rarely*. A large group (24%) reported *never* currently speaking to their fatherly figure in Spanish, and 8% reported not applicable to this question. It is worth noting that while more students *always* speak Spanish with their fathers/stepfathers (36%) than their mothers (20%), in general, the usage of Spanish with mothers at some degree is greater (80% of all participants) than with fathers (68% of all participants). With siblings, results show the least current use of Spanish, when compared to their mothers/stepmothers or fathers/stepfathers. In fact, 36% reported to currently *never* use Spanish with them, 24% *rarely*, 20% *sometimes*, and 4% *frequently*. Only 4% (1 student) reported *always* currently speaking Spanish with their sibling, while 12% said not applicable.

Students' current use of Spanish with grandparents yielded similar results than previous questions relating to grandparents, showing the most frequent use of Spanish with them than with other family members (see Table 13). Most participants (52%) rated their current interactions in Spanish with their grandparents as *always*, 16% *frequently*, 16% *sometimes*, 4% *rarely*, 4% *never* and 8% not applicable. The next question looked into students' current use of Spanish with relatives. The answers are also similar to the responses of past Spanish usage with relatives, indicating that relatives are a constant source of Spanish contact. Participants rated their current interaction in Spanish with

relatives as mostly *sometimes* (36%), or *frequently* (28%). Then, 16% reported *rarely*, and only 12% reported that they *always* speak Spanish with relatives. 8% of students reported *never* speaking Spanish with relatives.

Finally, participants rated their usage of Spanish with friends. The biggest group (36%) responded *sometimes*, which shows a small increase of usage from their *rare* use of Spanish with friends during childhood. Still, the next most popular answer was *rarely* (24%), followed by 20% *never*, 12% *frequently*, and 8% *always*. Table 13 displays a summary of participants' current use of Spanish.

Table 13

Percentages of frequency of participants' current Spanish use

Contact	Never	Rarely	Sometimes	Frequently	Always	NA
Mother/Step-mother	20	12	36	12	20	0
Father/Step-father	24	8	16	8	36	8
Siblings	36	24	20	4	4	12
Grandparents	4	4	16	16	52	8
Relatives	8	16	36	28	12	0
Friends	20	24	36	12	8	0

Current Spanish Contact

The following questions asked participants to rate how often those around them currently speak Spanish to them. Table 14 displays a summary of all participants' current contact with Spanish. These questions are very similar to the previous questions that asked participants to rate how often they currently speak Spanish to their family

members. The answers of the following items mostly mirror the results from the previous section.

The first question in this set, asked students to rate how often their mothers/stepmothers speak Spanish to them. 32% of the sample said that their mother/stepmothers speak Spanish to them *sometimes*. This finding mirrors the results from the previous item regarding participants' own use of Spanish with their mother/stepmother. The rest of the responses also reported some Spanish contact: 20% responded *frequently*, 16% *always*, and 16% *rarely*. Only 12% responded *never*, and 4% not applicable. In the following question regarding their father/stepfather speaking Spanish to them, most participants reported that it also happens to some degree. 28% of participants reported *always*, 24% *rarely*, 12% *sometimes*, and 8% *frequently*. 20% reported that their father/stepfather *never* speaks Spanish to them, and 8% reported not applicable. These results were also similar to the questions in the previous section regarding their own use of Spanish with fatherly figures.

When asked about their Spanish interaction with their siblings, results show that while most students (52%) hear their siblings speak Spanish to them to some degree, it is not the most used. In fact, 36% said that their siblings *never* speak Spanish to them. Only 8% reported that their sibling *always* speaks Spanish to them, 4% reported *frequently*, 16% *sometimes*, and 24% *rarely*. 12% of participants responded not applicable to this question.

For the next item, participants rated how often their grandparents speak Spanish to them. As with previous questions, grandparents seem to be the family member with whom students have the most contact in Spanish. Results showed that most participants

(52%) reported that their grandparents *always* speak Spanish to them. The rest of the sample reported as follows: 20% *frequently*, 8% *sometimes*, and 4% *rarely*. Similar to the previous question about students speaking Spanish to grandparents, 8% of students chose *never*, and 8% not applicable.

Next, students rated how often their relatives speak Spanish to them. Most students (84%) experience Spanish being spoken to them by relatives to different degrees: 36% *sometimes*, 24% *frequently*, 12% *always*, 12% *rarely*. Only 16% of participants *never* experience their relatives speaking Spanish to them. The results were similar to the previous question regarding Spanish contact with relatives. Finally in this section, students rated how often their friends speak Spanish to them. Again, results show that to some degree, most students (84%) have contact in Spanish with their friends, but it does not seem to be the most often used language. The largest group of participants (36%) reported that their friends speak Spanish to them *sometimes*. This was followed by *rarely* (24%), 12% *frequently* and only 12% *always*. 16% of participants reported *never*. The results echoed the results from the question in the previous section regarding students' own use of Spanish with their friends.

Table 14

Percentages of frequency of Spanish currently being spoken to participants

Contact	Never	Rarely	Sometimes	Frequently	Always	NA
Mother/Step-mother	12	16	32	20	16	4
Father/Step-father	20	24	12	8	28	8
Siblings	36	24	16	4	8	12

Grandparents	8	4	8	20	52	8
Relatives	16	12	36	24	12	0
Friends	16	24	36	12	12	0

The results of the different questionnaire sections show that students' contact and use of Spanish has not changed much from childhood to their current age. Grandparents are the family members with whom students interact the most often in Spanish, followed by fathers/step-fathers, mothers/step-mothers, relatives, friends, and finally siblings.

Looking further into the usage within the community, students rated their current Spanish use in different environments (see Table 15). For their interactions in Spanish at work, 24% of the sample chose "not applicable" for this item, perhaps indicating that they did not have a job at the time of taking the questionnaire. The rest of the responses showed very little use of Spanish at work: 24% *rarely*, 20% *sometimes*, 16% *never*, while only 12% chose *frequently*, and just 4% *always*. Then, students were asked to rate their use of Spanish at church. As with the question about their use of Spanish at work, this item also received a high number of non-applicable answers. In fact, 48% replied "not applicable". The rest of the results showed a consistent use of Spanish at church: 16% reported *always*, 12% *sometimes*, 8% *frequently*, and 4% *rarely*. 12% reported that they *never* use Spanish at church. Finally, students rated their contact with and usage of Spanish at the university. Results show that their contact with Spanish in this environment is very limited. 32% rated it as *rarely*, 24% *frequently*, 20% *sometimes*, 12% *never*, and only 8% *always*. 4% (1 student) did not answer the question.

Table 15

Percentages of frequency of participants contact with Spanish in the community

Contact	Never	Rarely	Sometimes	Frequently	Always	NA
Work	16	24	20	12	4	24
Church	12	4	12	8	16	48
University	12	32	20	24	8	4

The last section on current language use focused on entertainment activities, where results showed a clear preference for English in these recreational activities (see Table 16). Most students (60%) rated their frequency of watching TV in Spanish as *never*, 24% *rarely*, 12% *sometimes* and 4% *frequently*. When it comes to reading in Spanish, similar results were found. The biggest group of students (48%) also responded *never*, 44% *rarely*, and 8% *sometimes*. Lastly, listening to music in Spanish showed a small increase in frequency: 36% reported *sometimes*, 24% *rarely*, 12% *frequently* and 4% *always*. 24% of participants reported *never* listening to music in Spanish. It is clear that Spanish is not the primary language for entertainment, with the exception of listening to music where there was a minor increase of activity in Spanish when compared with the other two activities.

Table 16

Use of Spanish for entertainment activities

Activity	Never	Rarely	Sometimes	Frequently	Always
Watch TV in Spanish	60%	24%	12%	4%	0%
Read in Spanish	48%	44%	8%	0%	0%

Listen to music in Spanish	24%	24%	36%	12%	4%

4.1.5 Language Confidence and Self-Assessment of Language Competencies

In the first set of questions regarding language confidence, students were asked to rate in which language they felt more comfortable speaking and writing. In the item about speaking, 76% of participants chose English, 12% Spanish and 12% both. For writing, 100% chose English as the language they are more comfortable with.

For the following section, students rated their Spanish skills through a Likert scale (0= muy mal (very bad), 1=mal (bad), 2=más o menos (so so/ more or less), 3= bien (good), 4= muy bien (very good), 5= excelente (excellent)); results are displayed in Table 17. The questions regarding skills that require students' output (productive skills) are presented first. This is followed by questions about receptive skills. Finally, the last item involved engaging in conversation, requiring both receptive and productive skills.

Table 17

Student self-rated Spanish skills

Skill	Excellent	Very Good	Good	So so/ more or less	Bad	Very Bad
Speaking	8%	8%	16%	44%	20%	4%
Writing	4%	8%	8%	40%	24%	16%
Listening	16%	28%	36%	20%	0%	0%
Reading	8%	4%	32%	40%	12%	4%

Students first rated their ability to speak Spanish ('Yo creo que mi habilidad de hablar español es:"). Results showed that students tended to perceive their speaking skills either neutrally or positively (see Table 17). Nearly half of the students (44%) responded *so-so*, 16% *good*, 8% *very good*, 8% *excellent.* Only 20% reported *bad*, and 4% *very bad*. For writing, a similar trend is noted in the fact that the most popular answer (40%) was *so so/more or less*. However, results also revealed that another 40% rated their writing skills negatively: 24% of participants rated it as *bad*, and 16% *very bad*. Only 8% rated it as *good*, 8% *very good*, and 4% *excellent.*

The item regarding students' ability to understand Spanish received overwhelmingly positive answers. A third of participants (36%) responded *good*, followed by *very good* (28%), and *excellent* (16%). The remaining 20% responded *so-so*. No students from the sample regarded their listening skills negatively (bad or very bad). When it comes to their ability to read in Spanish, students rated it mostly positively or neutral. Nearly half of the sample (44%) assessed their reading skills in Spanish positively: 32% *good*, 4% *very good*, and 8% *excellent.* 40% of participants responded that their reading skills in Spanish were so so/more or less. The remaining 16% self-rated their reading skills as either *bad* (12%) or *very bad* (4%).

The last item asking students to rate their confidence level when participating in conversations in Spanish showed that participants had mostly a low level of confidence in this aspect (see Table 18). In fact, a total of 44% of students rated their confidence negatively, as either *bad* (28%) or *very bad* (16%). 32% had rated their confidence in a positive light, where 16% responded *excellent,* 12% *good* and 4% *very good*. 24% of respondents rated it as so so/ more or less. In general, results indicate that students were

more confident in their receptive skills but lacked confidence in their productive skills as well as when engaging in conversations, as it typically requires a mix of skills.

Table 18

Student confidence participating in a conversation in Spanish

Confidence level	Percentage
Excellent	16%
Very Good	4%
Good	12%
So so/More or less	24%
Bad	28%
Very Bad	16%

Students then were asked to self-assess their skill in Spanish that they perceive as the strongest and weakest. These two questions were open ended, and students could list the skills they felt were the strongest and the weakest. Mirroring the results from the previous section, Table 19 displays the results showing that students perceived their receptive skills in Spanish to be stronger than their productive skills in Spanish. Listening was rated the highest (33%) out of all the listed skills as their self-perceived best skill in Spanish, followed closely by reading (31%). Then, students rated speaking (25%), and finally, writing (11%).

Table 19

Students' self-perceived best skill

Skill	Percentage
Listening	33%

Reading	31%
Speaking	25%
Writing	11%

Regarding their Spanish skill that needed the most improvement, the answers were more mixed as students included aspects of grammar and vocabulary instead of just the four language skills. As Table 20 shows, students rated writing (28.5%) and speaking (28.5%) as their top skills to improve. This is once again mirroring the results from the previous two questions where students rated productive skills as the ones they are less proficient and comfortable with. The next most popular weakest skill/aspect listed was grammar (14%), followed by listening (11%), reading (9%), vocabulary (6%), and syntax (3%). There were two students who did not list a weak skill.

Table 20

Students' self-perceived weakest skill

Skill	Percentage
Speaking	28.5%
Writing	28.5%
Grammar	14%
Listening	11%
Reading	9%
Vocabulary	6%
Syntax	3%

The final portion of the questionnaire asked students for their motivation to take the class. 64% of the participants cited wanting to learn more/improve their Spanish, 24% responded that it was due to degree requirements, and 12% were working on a Spanish minor. The questionnaire results provided background information about the students' previous and current experience and contact with Spanish. It also revealed students' self-perceived strengths and weaknesses in the language and their motivation to take the class. The following section will present the results of the writing and speaking tasks with the purpose of answering the two research questions of the study. It also details the procedure followed to check for interrater reliability.

4.2 Research Question 1

1. Does a project-based curriculum improve students' writing skills on performance tests? Do those gains vary between the experimental and the control group?

This study implemented two sets of elicitation tasks, a written and oral task. Both were performed in a pre and posttest design. The first research question seeks to find out if a PBL curriculum can improve students' writing skills, while the second is concerned with oral skills development. To assess language development after the semester of treatment (or no treatment for the control group), three measures were used: fluency, complexity and accuracy. The study had a total of 25 participants, 14 in the experimental group and 11 in the control group.

After coding the samples through the T-unit segmentation process described in Chapter 3, the data was entered into Microsoft Excel spreadsheets for further analysis through the statistical analysis program SPSS (Statistical Analysis for Social Sciences), version 27. Paired sample T-tests were used to analyze the pre and posttest scores within

each group to determine if there were any changes in fluency, complexity, and accuracy throughout the semester. Independent sample T-tests were also done to compare the pretests of the groups with each other to determine if the groups started at a comparable level in each indicator that showed improvement in the posttest. Additionally, an independent sample T-test was done on the growth/decrease (post-test minus pre-test) that each group made (if applicable), in an effort to compare if the gains achieved by each group were comparable.

4.2.1 Independent coding for reliability check

Interrater reliability checks were conducted between the researcher and a second coder using a total of 9 written samples chosen at random. The samples used were transcripts originally written by the participants. The first coder was the teacher-researcher. The second coder was a native speaker of Spanish with a background in Spanish linguistics. The teacher-researcher trained the coder on the coding protocol by first providing detailed explanations on T-unit segmentation. Then, training on the coding of the different elements observed: subordinate clauses, subject-verb agreement, number accuracy, gender accuracy, present tense, preterit, imperfect, subjunctive, present perfect, new structures. One extra random sample was used as practice before embarking on independent coding of the remaining 8 samples. After completing the practice samples, the teacher-researcher and the second coder discussed instances of coding disagreement until reaching an agreement. This discussion of sources of coding error was repeated with the 8 samples independently coded. Table 21 below presents the number of agreements as percentages.

Table 21

Interrater reliability checks for written samples

Element	Reasons for disagreement	Total agreement
T-units	Oversight of connectors, oversight of main clause, oversight of subordinate clause, disagreement of T-unit coding protocol	92.62%
Subordinate clauses	Oversight of connector, disagreement of interpretation	91.82%
Subject-verb agreement	Oversight of verb	98.18%
Number accuracy	Oversight of noun	90%
Gender accuracy	Miscounting, oversight of noun	98.64%
Present tense	Oversight of verb	97.96
Preterite	Oversight of verb	66.66%
Imperfect	None	100%
Subjunctive	Oversight of verb	50%
Present perfect	None	N/A
New structures	Miscalculation, oversight of verb	82.36%

There were only two uses of subjunctive in the written samples coded. One of these two iterations was missed by the second coder, resulting in 50% accuracy. Similarly, for preterite, there were only three uses in the samples, and one was overlooked by the second coder. There were only seven uses of imperfect in the coded samples and all seven were coded correctly by both parties. In a similar manner, there was one use of present perfect in the samples and both coder and teacher-researcher

analyzed it correctly. For number accuracy, one out of the nine instances in the samples was missed by the second coder. The T-unit disagreements were mostly due to oversight or failure to adhere to the T-unit coding guidelines. The subordinate clause disagreements were mostly due to oversight of connectors and disagreements of interpretation.

4.2.2 Written Task

4.2.2.1 Fluency

To measure fluency in the written samples, three indicators were calculated: total number of T-units, mean length of T-units (MLT) and percentage of English words per sample. First, a paired sample T-test was performed to compare each group's pre and post test results. This test allows us to see differences within each group's written sample before and after the semester of treatment.

The control group obtained mixed results in the three indicators used to measure fluency. As Table 22 below shows, Mean Length of T-unit (MLT) is the only indicator that showed a statistically significant increase between the pre-test (*M*= 11.19, *SD*=1.93) and the post-test (*M*= 13.61, *SD*=2.46). The indicator of total number of T-units showed a non-statistically significant increase of T-units between the pre (*M*= 16.82, *SD*=5.89) and the post-test (*M*= 17.55, *SD*=2.84). Finally, the control group's percentage of English dependence was overall less than 1% in both the pre and post-tests. The English dependence decreased from the pre-test (*M*= 0.71%, *SD*=0.90) to the post-test (*M*= 0.59%, *SD*=0.95), but not in statistically significant ways. Therefore, the control group's fluency gain is shown through lengthier T-units exclusively.

Table 22

Fluency indicators for the control group

Fluency indicators	Pre (SD)	Post (SD)	Mean difference	*t*	*p*
Total number of T-units	16.82 (5.89)	17.55 (2.84)	0.73	0.38	0.70
MLT	11.19 (1.93)	13.61 (2.46)	2.42	3.74	0.00*
Percentage of English	0.71 (0.90)	0.59 (0.95)	1.12	0.47	0.64

*Significant at alpha level 0.05

The experimental group showed statistically significant gains in all three of the fluency indicators (see Table 23). The total number of T-units increased from 14.43 (*SD*=2.84) in the pre-test to 18.79 (*SD*=5.39) in the post test. The MLT indicator also showed a statistically significant increase from the pretest (*M*= 10.94, *SD*=1.85) to the posttest (*M*= 14.47, *SD*= 1.72). These indicators together showed that the experimental group's posttests had significantly more T-units than the pretests as well as lengthier T-units than their pretest. Similar to the control group, the experimental group had a very low dependance of English in their essays. Results indicated that the experimental group's dependence on English in their samples decreased from 0.87% (*SD*=1.27) in the pretest to 0.10% (*SD*=0.17) in the posttest, yielding a statistically significant difference.

Table 23

Fluency indicators for the experimental group

Fluency indicators	Pre (SD)	Post (SD)	Mean difference	*t*	*p*

Total number of T-units	14.43 (2.84)	18.79 (5.39)	4.36	2.97	0.01*
MLT	10.94 (1.85)	14.47 (1.72)	3.53	5.57	0.00*
Percentage of English	0.87 (1.27)	0.10 (0.17)	0.77	2.28	0.04*

Next, to compare the groups' fluency baseline to determine the marginal difference, an independent sample T-test of the groups' pretests was done. That way it can be determined whether the groups began the semester with comparable fluency levels. Table 24 presents the pretest fluency mean scores for both groups. Results showed that there was no significant difference between the groups' fluency levels at the beginning of the semester. Levene's test indicated unequal variances for the total number of T-units (F= 12.38, *p*= 0.00), revealing differing variance among the groups for these two measures.

Table 24

Pretest fluency mean scores for both groups

Fluency indicators	**Control**	**Experimental**	***t***	***p***
Total number of T-units	16.82 (5.89)	14.43 (2.84)	1.23	0.23
MLT	11.19 (1.93)	10.94 (1.85)	0.95	0.74
Percentage of English	0.71 (0.90)	0.87 (1.27)	0.34	0.73

An additional independent sample T-test was done on the growth achieved (the difference of the posttest minus pretest) by each group in the MLT indicator to see if this

growth is also comparable. Within the fluency indicators, only MLT's growth was tested for this T-test because it is the only one in which both groups had a significant increase. For the other two indicators (total number of T-units and reliance on English), only the experimental group showed a significant gain, outperforming the control group. Results showed that there is no significant difference between the MLT gains from the experimental group (M=3.53, SD= 2.36) and the MLT gains from the control group (M=2.42, SD=2.14). Therefore, both groups started at a similar level in their Mean Length of T-unit and also achieved comparable gains in this aspect.

4.2.2.2 Complexity

To measure complexity in the written samples, syntactic complexity was used. Syntactic complexity is calculated through two indicators: the depth of clause and the tense/aspect use complexity. The depth of clause refers to the number of subordinate clauses per T-unit (Hunt, 1965) used to determine if the increase in length is due to increased subordination. The tense/aspect use complexity is measured by analyzing the development of students' range of structures by counting the number and types of structures in students' output. Based on the linguistic structures covered in the course and the expectation of students' proficiency at this level, the structures coded for this study were: 1. present, 2. preterit, 3. imperfect, 4. subjunctive, 5. present perfect, 6. new structures. The last category includes tenses and moods not covered in class such as future tense and the conditional. All measures were analyzed using paired sample T-tests of the pre and posttest results of each group.

The control group showed, once again, mixed results in the indicators used to measure complexity. First, there was a non-significant increase of the depth of clause

from their pretest (*M*= 0.76, *SD*=0.45) to their posttest (*M*=0.99, *SD*=0.44) with a 0.055 p-value. This lack of significant increase indicates that the written samples from the control group did not show an increase of subordinate clauses per T-unit. Even though the Mean length of T-unit for the control group significantly increased in the posttest (as seen in the fluency section), results indicate that this length gain was not a result of increased subordination.

Second, for the tense/aspect use complexity, half of the observed structures had no significant change from the pretest to the posttest as seen in table 24 below. The structures that experienced a significant change in usage were preterite, present perfect and new structures. Most of these changes were gains in the usage of the structure, with the exception of preterite that suffered a decline. Results showed that students in the control group used significantly less percentage of preterite forms from the pretest (*M*=8.08, *SD*=4.85) to the posttest (*M*=2.05, *SD*=3.20). Although the use of present perfect increased from the pre-test (*M*= 0, *SD*=0) to the post-test (*M*= 1.77, *SD*=2.52), it is unlikely that it caused the sharp decline of preterite use as students' overall production of present perfect was low. The decline could not be due to shifting to present tense either as, even if not statistically significant, its use also declined in the posttest (see Table 25). It is important to mention that these decreases are not a result of shorter posttests. In fact, as seen in the fluency indicator previously presented, the control group's posttests are longer than the pretests, even if not in a statistically significant manner. However, the use of new structures grew exponentially from the pretests (*M*=1.06, *SD*=2.38) to the posttests (*M*=8.98, *SD*=4.19). Therefore, it is likely that, in the posttests, students used

new structures to convey ideas communicated through present and preterite in the pretests.

Table 25

Mean tense distribution in the control group' written samples

	Control				
Tense/Mood	**Pre (SD)**	**Post (SD)**	**Mean difference**	***t***	***p***
Total tense use (number of attempts)	29.09 (9.50)	35.09 (6.87)	6.00	1.64	0.13
Present tense %	87.23 (7.85)	83.79 (8.88)	-3.44	0.98	0.34
Subjunctive %	0.732 (1.70)	0.80 (1.43)	0.07	0.09	0.92
Preterite %	8.1 (4.85)	2.06 (3.20)	-6.04	3.71	0.00*
Imperfect %	2.88 (4.18)	2.6 (4.90)	0.28	0.15	0.88
Present Perfect %	0 (0)	1.77 (2.52)	1.77	2.33	0.04*
New structure %	1.06 (2.38)	8.98 (4.19)	7.92	5.54	<0.00*

For the experimental group, results showed a significant increase in both complexity indicators. The group's depth of clause saw a statistically significant improvement from the pretest (M=0.72, SD=0.30) to the posttest (M=1.04, SD=0.24) (p=0.01). This growth indicates an increase in subordination, showing a higher number of subordinate clauses per T-unit in the posttest.

For the second complexity indicator, the tense/aspect use complexity, only two observed structures showed a statistically significant change: present tense, new tense/mood. Table 26 shows that new tense/mood experienced an increase in use from a mean of 3.17% (*SD*=4.23) in the pretest, to 11.06% (*SD*=6.18) in the post test. The second change is that there was a decrease in present tense use from the pretest (*M*=87.41, *SD*=10.67) to the posttest (*M*=77.65, *SD*=11.69). The present tense result is similar to that of the control group, who also showed a decrease in present tense usage in the posttest, but in a non-significant way.

Table 26

Mean tense distribution in the experimental group' written samples

	Experimental				
Tense/Mood	**Pre (SD)**	**Post (SD)**	**Mean difference**	***t***	***p***
Total tense use (number of attempts)	23.93 (6.93)	37.71 (8.67)	13.78	5.25	<0.00*
Present tense percentage	87.42 (10.67)	77.62 (11.67)	-9.80	2.16	0.050*
Subjunctive percentage	0.73 (1.93)	2.35 (3.83)	1.62	1.28	0.22
Preterite percentage	5.8 (6.64)	4.31 (4.98)	-1.49	0.76	0.46
Imperfect percentage	2.14 (4.90)	2.87 (4.39)	0.73	0.37	0.71
Present Perfect percentage	0.73 (1.88)	1.79 (3.33)	1.06	0.94	0.36
New structure percentage	3.18 (4.23)	11.06 (6.18)	7.88	5.12	<0.00*

It is important to point out that both groups started at comparable levels of complexity, as shown by the independent sample t-test results of the pretests scores in Table 27. Levene's test indicated unequal variances for present perfect (F= 9.23, *p*= 0.00) and new structures (F=7.07, *p*=0.01), revealing unequal variances among the groups for these two measures. Nonetheless, results reveal that there were no significant differences between the groups' complexity levels prior to instruction as shown by the p-value, indicating that significant differences at the end of the semester could be due to the curriculum of instruction.

Table 27

Pretest complexity mean scores for both groups

Complexity indicators	**Control (SD)**	**Experimental (SD)**	***t***	***p***
Depth of clause	0.76 (0.45)	0.72 (0.30)	0.26	0.79
Total tense use (number of attempts)	29.09 (9.50)	23.93 (6.93)	1.57	0.13
Present tense percentage	87.23 (7.85)	87.42 (10.67)	0.05	0.96
Subjunctive percentage	0.732 (1.70)	0.73 (1.93)	0.00	0.99
Preterite percentage	8.1 (4.85)	5.8 (6.64)	0.95	0.34
Imperfect percentage	2.88 (4.18)	2.14 (4.90)	0.40	0.69
Present Perfect percentage	0 (0)	0.73 (1.88)	1.45	0.17
New structure percentage	1.06 (2.38)	3.18 (4.23)	1.58	0.12

Overall, results showed a persistent heavy reliance on present tense by both groups during the pre and posttest, even if usage decreased by both groups at the end of the semester. As Table 25 presented, the control group had a non-statistically significant decrease of 3.43% reliance on present tense by the end of the semester, where their posttests' total present tense usage was 83.79%. The experimental group's posttest showed that 77.61% of the sample was written in present tense, decreasing 9.8% from the present tense usage in the pretest, creating a statistically significant difference (see Table 26).

By the end of the semester, both groups made use of all the grammatical structures observed. The present perfect was the only structure that was not used in the pretest by the control group, but it was used in the posttest, showing a statistically significant increase. The experimental group did use the present perfect in the pretest and also increased their use of this structure in their posttest but it was not significant.

In sum, the results from the complexity indicators showed that the experimental group outperformed the control by making gains in both indicators tested. For the first indicator, the depth of clause, only the experimental group showed a significant growth, indicating an increase of subordinate clauses per T-units. An increase in subordination shows more complex output, as opposed to solely or mostly simple sentences as multiclausal T-units would require more effort to construct (Scott & Balthazar, 2013). The second indicator, the tense/aspect use complexity, showed that both groups utilized all observed structures by the end of the semester. The only positive significant changes, however, occurred in the present perfect and new tense/structure use for the control group, and in present tense reliance and new tense/structure use for the experimental.

While both groups exponentially grew their use of new tenses/structures, the control group showed significantly more use of present perfect. On the other hand, the experimental group significantly lowered their reliance on present tense in their narratives, showing a wider range of use of different grammatical structures besides present tense.

4.2.2.3 Accuracy

Due to the low-intermediate proficiency level of the learners in the sample, where most T-units are likely to contain some type of error, and the short time span between the pre and the post test, students' output was analyzed within the verb and noun phrases only. To measure accuracy in the written samples, three indicators were calculated: subject-verb agreement, and gender and number agreement for nouns.

The control group showed no statistically significant improvement in any of the three accuracy indicators. As Table 28 indicates, the control group's subject-verb accuracy increased 2.39% from the pretest (*M*=92.07, *SD*=5.80) to the posttest (*M*=94.46, *SD*=7.75). Within the noun phrases, the control group also had a non-significant increase of 2.5% in gender accuracy from the pretest (*M*=91.72, *SD*=7.00) to the posttest (*M*=94.23, *SD*=5.31). For number accuracy, results found even smaller gains in accuracy (0.69%) from the pretest (*M*=95.55, *SD*=7.38) to the posttest (*M*=96.25, *SD*=4.41). As can be observed in the pretest means (table 27), students' accuracy at the beginning of the semester surpassed 90% in all three indicators observed. While, there was still room for improvement in all the indicators, gains are harder to make when the starting point is already so high.

Table 28

Mean accuracy results of control group's written samples

	Control				
Accuracy Indicator	**Pre (SD)**	**Post (SD)**	**Mean difference**	***t***	***p***
Subject-verb agreement	92.07 (5.80)	94.46 (7.75)	2.39	0.80	0.43
Gender agreement	91.72 (7.00)	94.23 (5.31)	2.50	1.30	0.22
Number agreement	95.55 (7.38)	96.25 (4.41)	0.69	0.41	0.69

The experimental group saw significant accuracy increases in only one of the three accuracy indicators, the subject-verb agreement (see Table 29). At the beginning of the semester, students' productions showed a mean of 87.50% (SD= 13.20) accuracy in subject-verb agreement which rose to 95.38% (SD=6.44) accuracy by the end of the semester. Gender accuracy increased only 3.75% from the pretest (*M*=88.48, *SD*=12.18) to the posttest (*M*=92.23, *SD*=3.75). In a similar manner, number accuracy showed a non-significant increase of 2.67% from the pretest (*M*=95.53, *SD*=5.47) to the posttest (*M*=98.20, *SD*=2.02).

Table 29

Mean accuracy results of experimental group's written samples

	Experimental				
Accuracy Indicator	**Pre (SD)**	**Post (SD)**	**Mean difference**	***t***	***p***
Subject-verb	87.50	95.38	7.88	3.30	0.00*

agreement	(13.20)	(6.44)			
Gender agreement	88.48 (12.18)	92.23 (10.70)	3.75	2.13	0.053
Number agreement	95.53 (5.47)	98.20 (2.02)	2.67	1.68	0.11

It should be pointed out that the control group produced highly accurate T-units in the pretest, outperforming the experimental group in all indicators at the beginning of the semester. Nonetheless, an independent sample t-test of the pretests of both groups showed that the groups' accuracy was comparable at the time of the pretest. As Table 30 shows, there was no statistically significant difference between the pretest accuracy scores between the groups. Thus, indicating that both groups started at comparable accuracy in all measures. However, only the experimental group had a statistically significant improvement in at least one indicator, subject-verb agreement.

Table 30

Results of both groups' written pretest accuracy

Accuracy indicators	**Control (SD)**	**Experimental (SD)**	***t***	***p***
Subject-Verb	92.07 (5.80)	87.50 (13.20)	1.15	0.26
Gender	91.72 (7.00)	88.48 (12.18)	0.78	0.44
Number	95.55 (7.38)	95.53 (5.47)	0.01	0.99

4.2.3 Summary of Findings for Research Question 1

The results of this study found moderate gains in writing skills for both groups. The Project-based group improved in all three fluency indicators, two complexity indicators and one accuracy indicator. For fluency, the experimental group showed a higher number of T-units, lengthier T-units, and less reliance on English in the posttest. For complexity, students' T-units showed greater depth of clause, demonstrated by higher usage of subordinate clauses per T-unit. In addition, usage of all grammatical structures observed, accompanied by a decrease of reliance on present tense. Within accuracy, the experimental group saw improvements in the subject-verb agreement.

The control group showed improvement in one fluency indicator and one complexity indicator only. There was no improvement on accuracy. The students' posttests showed longer T-units, showing an improvement in fluency in one of the three tested fluency aspects. Within complexity, results showed usage of all observed grammatical structures by the end of the semester. There was in fact, a significant increase of present perfect, a structure that was not present in the control group's pretest samples. There was no improvement in the depth of clause, which means that although students' posttests T-units were longer, it was not due to increased subordination. Further tests also showed that there were no significant differences between the groups' fluency, complexity, and accuracy levels prior to instruction, indicating that significant differences at the end of the semester could be due to method of instruction.

4.3 Research Question 2

2. Does a project-based curriculum improve students' oral skills on performance tests? Are there any differential gains between the experimental and the control groups?

4.3.1 Independent coding for reliability check

Interrater reliability checks were also conducted between the researcher and the second coder with a total of 9 oral samples chosen at random. The samples were transcripts created from the original videos by a transcribing service company. The data was coded for T-unit segmentation, subordinate clauses, subject-verb agreement, number accuracy, gender accuracy, present tense, preterit, imperfect, subjunctive, present perfect, new structures. As with the written data, one random sample was used as practice before independently coding of the remaining 8 samples. Table 31 below presents the number of agreements as percentages.

Table 31

Interrater reliability checks for oral samples

Element	Reasons for disagreement	Total agreement
T-units	Disagreement of subordinate clause, disagreement of T-unit coding protocol	95.08%
Subordinate clauses	Disagreement of subordinate clause, oversight of connector	90.91%
Subject-verb agreement	Oversight of verbs, miscounting	91.97%
Number accuracy	None	100%
Gender accuracy	Miscounting	83.33%
Present tense	Oversight of verbs,	93.56%
Preterite	Oversight of verbs	78.26%
Imperfect	Oversight of verbs, miscalculation	85.71%
Subjunctive	Oversight of verbs	50%
Present perfect	N/A	N/A
New structures	Oversight of verbs	94.74%

The low agreement percentage between coders is mostly due to the small sample. For instance, there were a total of four uses of subjunctive in the oral samples coded; two were overlooked (one by each coder) which resulted in an agreement of 50%. With gender agreement, there were 2 errors made by the second coder in a total of only 12 gender iterations. Errors within preterite are due to the oversight of 5 verbs out of the total 23 preterite uses in the samples. There was no present perfect used in the oral samples used for the interrater reliability coding.

4.3.2 Oral Task

4.3.2.1 Fluency

To measure fluency in the oral samples, four indicators were calculated: total number of T-units, mean length of T-units (MLT), percentage of English words per sample and speech rate. The data from the oral samples was analyzed in the same manner as the written samples: a paired sample t-test to measure the changes within each group and independent sample t-tests to compare the group's scores and gains.

Results show that the control group did not experience statistically significant changes in any of the fluency indicators (see Table 32 for details). However, improvements can be observed in three out of the four indicators. The total number of T-units and total number of Spanish words per minute (speech rate) increased, but the mean length of T-unit slightly decreased. These changes indicate that although participants produced shorter T-units, the post-test samples were slightly longer (more T-units) with more Spanish words per minute, which can be indicative of faster speech. Additionally,

the control group's reliance on English words decreased by 0.27% from the pretest to the posttest.

Table 32

Oral fluency indicators for the control group

Fluency indicators	Pre (SD)	Post (SD)	Mean difference	*t*	*p*
Total number of T-units	22.45 (6.42)	23.64 (6.56)	1.18	0.56	0.58
MLT	9.00 (1.90)	8.86 (1.47)	-0.14	0.27	0.79
Percentage of English	1.88 (2.13)	1.61 (1.81)	-0.27	0.55	0.59
Speech rate	88.34 (34.75)	94.27 (25.37)	5.92	0.94	0.36

The experimental group did not obtain statistically significant changes in any of the fluency indicators from the beginning to the end of the semester (see Table 33 below). The experimental group improved only in total number of T-units. Results showed a decrease in MLT, an increase of reliance on English (0.39%) as well as a decrease in their speech rate. These changes indicate that the experimental group produced longer samples (more T-units) but with shorter T-units by the end of the semester, mirroring results from the control group in these two indicators but failing to achieve a higher speech rate.

Table 33

Oral fluency indicators for the experimental group

Fluency indicators	Pre (SD)	Post (SD)	Mean difference	*t*	*p*

Total number of T-units	21.57 (7.36)	21.71 (8.34)	0.14	0.07	0.93
MLT	9.55 (1.92)	9.32 (1.93)	-0.22	0.44	0.66
Percentage of English	0.92 (1.11)	1.31 (1.53)	0.39	0.97	0.34
Speech rate	93.05 (37.16)	90.31 (32.96)	-2.73	0.53	0.60

Results from an independent sample t-test of the groups' pretests showed that the students in both samples started at comparable fluency scores (Table 34). Levene's test indicated unequal variances for percentage of English (F= 5.19, *p*= 0.03), revealing unequal variances among the groups for this indicator. Overall, neither group experienced statistically significant changes in fluency in their oral samples after one semester of class. While both groups improved slightly in some fluency indicators (mostly the control group), they also decreased faintly in other fluency indicators. By the end of the semester, both groups produced longer samples, but they contained shorter T-units than at the pretest stage. Nonetheless, the control group's reliance on English decreased and their Spanish words per minute (speech rate) increased. This is completely the opposite from the experimental group whose posttests had more reliance on English and a decreased speech rate.

Table 34

Oral pretest fluency mean scores for both groups

Fluency indicators	**Control**	**Experimental**	***t***	***p***
Total number of T-units	22.45 (6.42)	21.57 (7.36)	0.32	0.74

MLT	9.00 (1.90)	9.55 (1.92)	0.70	0.49
Percentage of English	1.88 (2.13)	0.92 (1.11)	1.35	0.19
Speech rate	88.34 (34.75)	93.05 (37.16)	0.32	0.74

4.3.2.2 Complexity

As with the written samples, to measure complexity in the oral samples, syntactic complexity was calculated. It is calculated through two indicators: the depth of clause (number of subordinate clauses per T-unit) and the tense/aspect use complexity. Through the tense/aspect use complexity, the development of students' range of structures is measured. The structures coded were: 1. present, 2. preterit, 3. imperfect, 4. subjunctive, 5. present perfect, 6. new structures.

Overall, the control group had no statistically significant changes in complexity. The first indicator, depth of clause, decreased from the pretest (M=0.54, SD=0.33) to the posttest (M=0.47, SD=0.36), indicating that the control group's oral samples at the end of the semester contained less subordination per T-unit than at the beginning of the semester.

For the second indicator, tense/aspect use complexity, students in the control group used the same measured structures at the end of the semester than they did in the pretests, showing no growth (shown in Table 35). Although present perfect was taught throughout the course, it was not used in the posttest (and neither in the pretest). There was a minimal increase in usage of present and subjunctive; and decrease of preterite, imperfect and new structures. Indicating that students' reliance on present tense increased

at the end of the semester for the oral samples, the opposite finding from the writing samples. Students also took less risks utilizing new structures, greatly contrasting with the increase of new structures in the writing samples.

Table 35

Mean tense distribution in the control group' oral samples

	Control				
Tense/Mood	**Pre (SD)**	**Post (SD)**	**Mean difference**	***t***	***p***
Total tense use (number of attempts)	38.82 (12.43)	36.27 (13.16)	-2.55	0.94	0.369
Present tense percentage	53.85 (27.65)	69.76 (22.15)	15.91	1.75	0.11
Subjunctive percentage	0.21 (0.69)	0.92 (2.47)	0.71	1.30	0.22
Preterite percentage	16.75 (13.05)	11.41 (13)	-5.34	1.32	0.21
Imperfect percentage	16.93 (17.96)	6.25 (11.54)	-10.68	1.10	0.29
Present Perfect percentage	0 (0)	0 (0)	0	0	0
New structure percentage	12.25 (5.09)	11.66 (7.07)	-0.59	0.19	0.85

Echoing the control group's results, the experimental group also showed no significant changes in any of the two complexity indicators. For the depth of clause, results showed a minimal decrease between the pretest (M=0.58, SD=0.19) and the posttest (M=0.54, SD=0.19). A similar pattern to the control group who also experienced

a non-significant decrease, implying that the PBL treatment had no effect on subordination.

Results of the tense/aspect use complexity indicator showed that all the measured structures were used both at the beginning and the end of the semester. This includes the use of present perfect, as opposed to the control group's samples who did not use it at any measured point. However, the posttest showed a decrease of most structures, apart from present tense and subjunctive which saw a non-significant increase (Table 36), indicating mostly, a grown dependance on present tense in the posttest, mirroring the control group's results.

Table 36

Mean tense distribution in the experimental group' oral samples

	Experimental				
Tense/Mood	**Pre (SD)**	**Post (SD)**	**Mean difference**	***t***	***p***
Total tense use (number of attempts)	34.79 (14.38)	32.14 (11.99)	-2.64	1.13	0.27
Present tense percentage	46.15 (34.07)	53.34 (28.54)	7.19	0.85	0.40
Subjunctive percentage	0.23 (0.84)	0.41 (1.07)	0.18	0.66	0.51
Preterite percentage	23.10 (23.60)	22.06 (20.64)	-1.04	0.16	0.87
Imperfect percentage	13.71 (15.64)	10.61 (10.01)	-3.1	1.36	0.19
Present Perfect percentage	0.42 (1.57)	0.38 (1.40)	-0.04	1	0.33

New structure percentage	16.39 (6.60)	13.20 (6.27)	-3.19	1.52	0.15

Overall, instruction did not seem to affect students' oral skill complexity. Results indicate that students in both groups had comparable complexity levels at the beginning of the semester (see Table 37). Then, neither the control nor the experimental group had significant changes in complexity after a semester of class. While not statistically significant, it must be noted that by the end of the semester, regardless of group, the students' reliance on present tense increased, while every other measured structure decreased (with the exception of subjunctive which increased in both groups). Students' willingness to use new structures/tenses not taught in class in their oral samples also diminished by the end of the semester, giving a preference for the present tense.

Table 37

Oral pretest complexity mean scores for both groups

Complexity indicators	**Control (SD)**	**Experimental (SD)**	***t***	***p***
Depth of clause	0.54 (0.33)	0.58 (0.19)	0.36	0.72
Total tense use (number of attempts)	38.82 (12.43)	34.79 (14.38)	0.69	0.49
Present tense percentage	53.85 (27.65)	46.15 (34.07)	0.60	0.54
Subjunctive percentage	0.21 (0.69)	0.23 (0.84)	0.04	0.96
Preterite percentage	16.75 (13.05)	23.10 (23.60)	0.79	0.43
Imperfect percentage	16.93	13.71	0.48	0.63

	(17.96)	(15.64)		
Present Perfect percentage	0 (0)	0.42 (1.57)	0.88	0.38
New structure percentage	12.25 (5.09)	16.39 (6.60)	1.71	0.10

4.3.2.3 Accuracy

As with the written samples, only subject-verb agreement, gender and number accuracy within the T-unit was measured. The control group showed no statistically significant differences in oral skill accuracy between the pre and the posttest. However, as shown in Table 38, the control group had high levels of accuracy in all indicators at the beginning of the semester. These surpassed the control group's pretest written samples, which were also highly accurate, as explained in previous sections. Notably, pretest oral samples had a number accuracy of 99.27%, leaving little room for growth. Even with the high pretest accuracy levels, results show a slight decimal improvement in all three accuracy indicators by the end of the semester. The biggest improvement was the gender agreement, with an improvement of 0.50% by going from a pretest with a mean of 96.82% (*SD*= 4.00) accuracy to a mean of 97.33% (*SD*= 2.85) in the posttest. The subject-verb agreement improved 0.05% and the number agreement improved 0.13%.

Table 38

Mean accuracy results of control group's oral samples

	Control				
Accuracy Indicator	**Pre (SD)**	**Post (SD)**	**Mean difference**	***t***	***p***

Subject-verb agreement	96.42 (5.94)	96.47 (7.83)	0.05	0.02	0.97
Gender agreement	96.82 (4.00)	97.33 (2.85)	0.50	0.36	0.72
Number agreement	99.27 (1.70)	99.41 (1.31)	0.13	0.18	0.85

Similar to the control group's results, the experimental group did not see significant changes in oral skills accuracy from the beginning to the end of the semester, as detailed in Table 39. Students in the experimental group also started with high accuracy levels in all three indicators, the lowest being subject-verb agreement (*M*= 94.59, *SD*=9.27) and the highest, the number agreement (*M*= 99.71, *SD*=0.75). The pretest oral samples from the experimental group show much more accuracy when compared to their pretest written samples. Only one of the oral samples' accuracy indicators had a slight increase by the end of the semester. Subject-verb agreement gained 1.54% in accuracy while gender agreement decreased 1% and number agreement decreased 0.47%.

Table 39

Mean accuracy results of experimental group's oral samples

	Experimental				
Accuracy Indicator	**Pre (SD)**	**Post (SD)**	**Mean difference**	***t***	***p***
Subject-verb agreement	94.59 (9.27)	96.14 (6.98)	1.54	1.33	0.20
Gender agreement	96.18 (6.71)	95.17 (6.88)	-1.00	0.61	0.55

Number agreement	99.71 (0.75)	99.24 (2.09)	-0.47	0.75	0.46

Results show that there were no significant changes in oral skills accuracy shown in the collected samples for any of the groups by the end of the semester. However, as Table 40 shows, both groups started with highly accurate oral samples, all the way to 99% accuracy, leaving small room for improvement. It also demonstrates that the control and experimental groups' oral skills accuracy levels were comparable at the beginning of the semester. These results evidence a ceiling effect, since most of the participants achieved near the highest score in the pretest (Salkind, 2010), indicating that the task was too easy and students' oral skills in subject-verb, gender and number agreement are well developed at the intermediate level.

Table 40

Oral pretest complexity scores for both groups

Accuracy indicators	**Control (SD)**	**Experimental (SD)**	***t***	***p***
Subject-Verb	96.42 (5.94)	94.59 (9.27)	0.56	0.57
Gender	96.82 (4.00)	96.18 (6.71)	0.27	0.78
Number	99.27 (1.70)	99.71 (0.75)	0.85	0.39

4.3.2 Summary of Findings for Research Question 2

Results showed that at the beginning of the semester all students started at comparable fluency, complexity and accuracy levels in their oral skills. Findings also

reveal no statistically significant differences in fluency, complexity or accuracy in the oral skills of students in both groups after a semester of instruction. Suggesting that the curriculum of instruction had no impact on students' oral skills, at least in the observed indicators.

In terms of fluency, the experimental group's posttests showed slight non-significant improvement in only one fluency indicator, the total number of T-units. When compared to their pre-tests, their samples were longer, but they produced shorter T-units (MLT), decreased speech rate and an increased reliance on English. For complexity measures, the posttests showed less subordination in the T-units, resulting in a decrease of their depth of clause. Furthermore, the posttests revealed no improvement in the tense/aspect use complexity. This was demonstrated by usage of all the structures measured (present, preterite, imperfect, subjunctive, present perfect, new structure) at the beginning and end of the semester but only a non-significant increase of subjunctive and present tense by the end of the semester. For accuracy, the experimental group increased only their subject-verb agreement and showed a slight decrease in gender accuracy and number accuracy.

The control group achieved non-significant gains in three out of the four fluency indicators. These indicators are total number of T-units, speech rate and percentage of English use. Results suggest that the control group's oral samples at the end of the semester were, although not statistically significant, longer, had a higher speech rate and a decreased reliance on English. However, T-units in the posttest seemed to be shorter as shown by the decreased MLT indicator. For complexity, results were similar to those of the experimental group. The posttests showed decrease of depth of clause as indicated

using less subordination in T-units. For the second complexity indicator, tense/aspect use, the control group used the same structures (present, preterite, imperfect, subjunctive, new structure) in the posttest as in the pretest. These results mirror the experimental group with an increase in subjunctive and present tense and a decrease in all other structures observed. This group did not use present perfect during the pretest nor the posttest, showing no acquisition of this structure. The control group experienced decimal gains in all three accuracy indicators.

4.4 Chapter Summary

This chapter presented a detailed account of the analysis and results of the data collected during the semester of instruction to respond to the two research questions of the study. The first part of this chapter presented the results of the demographic questionnaire, which included participants' cultural background and prior and current language use and contact. The second section presented the results of the first research question regarding PBL's effect on students' written skills development. The last section of the chapter discussed the findings of the second research question which looked into PBL's effect on learners' oral skills development. The next and final chapter will focus on summarizing the study and its findings to create a discussion of its pedagogical implications, and the study's limitations and future directions.

CHAPTER 5

DISCUSSIONS, IMPLICATIONS, AND CONCLUSIONS

5.2 Summary of Findings

Researching the effects of new teaching methodologies for HL learners is necessary to provide quality education that fits their needs. Understanding how best to help them maintain and develop their HL is a priority of the field. This dissertation study has provided a detailed account of the effects of a PBL curriculum on HL students' written and oral productions after one semester of instruction. Unfortunately, non-linguistic data (effects on engagement and linguistic confidence) had to be left out due to a lack of participation in the questionnaires measuring these aspects. Furthermore, it is important to take into consideration that COVID-19 struck in the middle of the semester, making it impossible to carry out the research as planned. While originally, all four units would be taught in person, due to Stay-at-Home mandates of March 2020, the last 2 units of the semester were taught online through Zoom meetings held at the same time as the in-person classes. The possible effects of this occurrence on students' experience are further discussed in the limitations of the study section of this chapter.

The data was collected through the implementation of pre-post intervention written and oral samples from the control and experimental groups. It was then analyzed through T-unit segmentation for fluency, complexity, and accuracy. For fluency in the written samples three indicators were observed: total number of T-units, mean length of T-units (MLT), and the percentage of English words used in the samples. For the oral samples speech rate was added as a fourth fluency measure. For complexity two measures were observed: the depth of clause and the tense/aspect use complexity. And

finally, for accuracy two measures were analyzed: subject-verb agreement and number-noun agreement. This dissertation aims to answer the following research questions: 1.Does a project-based curriculum improve students' written competence on performance tests? Are there any differential gains between the experimental and the control groups? 2. Does a project-based curriculum improve students' oral skills on performance tests? Are there any differential gains between the experimental and the control groups?

Regarding the first research question, this study found that while both groups experienced moderate improvement in their writing skills after one semester of instruction, the PBL group showed significant gains in more of the indicators observed than the control group. The PBL group improved in all three fluency indicators observed, two complexity indicators and one accuracy indicator. On the other hand, the control group showed significant improvement in only one fluency indicator and one complexity indicator. It is important to note that both groups started at comparable fluency, complexity and accuracy levels as shown by several independent sample t-tests presented in Chapter 4.

The PBL group's post tests showed an improvement in fluency by achieving higher number of T-units, lengthier T-units, and less reliance on English in the posttest. Regarding complexity, the posttest shows a higher use of subordination per T-unit (depth of clause) as well as the use of all the grammatical structures observed (tense/aspect use complexity). Notably, results showed significantly less reliance on present tense by this group. While present tense is still the most used structure overall, it decreased from 87.42% in the pretest to 77.61% in the posttest. There was also an increase in the use of subjunctive, imperfect, present perfect and new structures, although not statistically

significant. In accuracy, the PBL group only saw a significant increase in the subject-verb agreement. In sum, results indicate that the PBL group's posttest were significantly longer, with more complex T-units due to subordination, less reliance on English and an increase of a wider use of grammatical structures. The T-units were also significantly more accurate in subject-verb agreement in verb clauses. The number and the gender agreement started already highly accurate with an 88.48% and 95.53% accuracy rate respectively, so there was not much room for growth.

The control group's post tests showed an increment in MLT, one of the three fluency measures, indicating an increase in the length of the T-units in the post. Results also showed statistically significant in the tense/aspect use complexity indicator. This means that by the end of the semester, the control group used all the grammatical structures observed. This growth was specifically notable in the statistically significant increase of present perfect, previously not used in the pretest, and new structures by 8.98%. However, there was a statistically significant decrease of 6.02% in preterite. This decline cannot be attributed to shifting to present tense because, while not statistically significant, the group's reliance on present tense also decreased by 3.43%. The other complexity indicator, depth of clause, that measures subordination within T-unit did not see any significant increase. This would indicate that although the control group's posttest T-units are longer, which is representative of increased fluency, it is not due to increased subordination and therefore, less complex in that aspect. This group did not see any improvement in accuracy, but like the experimental group, the pre-test samples demonstrated 90% plus accuracy in subject-verb agreement, number agreement and gender agreement.

The findings from the students' writing samples present interesting implications for this study. General language proficiency improvement for both groups was expected regardless of course as a result of having taken a language course. A common improvement for both groups is the MLT (mean length of T-unit) which is a measure of fluency and the tense/aspect use complexity. A potential explanation to account for the common gains is the similar amount and type of input students received during the semester as comprehensible input can promote language development and have a positive impact on learners' language skills (Krashen, 1982). In both sections, students were exposed to Spanish for the entire semester, had extensive writing practices with many opportunities to learn and apply all the grammatical structures measured in the study.

Other indicators in the written samples did seem to be susceptible to different teaching approaches. These indicators are, higher number of T-units and less reliance on English, which are both fluency indicators; increased subordination per T-unit (depth of clause), which is a complexity indicator; and subject-verb agreement, an accuracy indicator. A possible explanation for the improvement in all these indicators for only the experimental group is the more collaborative nature of PBL. PBL's openness to activities to negotiate meaning and purposeful opportunities to create projects make an ideal environment that enhances linguistic benefits (Beckett, 2006; Stoller, 2006). The projects created opportunities for students to utilize what they learned in class in meaningful contexts. The creative end product, as opposed to essays, serves as an incentive for students to create accurate and well-presented information (Stoller, 2006). This can be a factor in the PBL group's higher accuracy in subject-verb agreement and less reliance on English, even when the grammar and vocabulary instruction did not vary between the

groups. These findings contradict Collier (2017) who found that a PBL curriculum benefited grammar and vocabulary learning in only multiple-choice tests but has no effect on students' overall writing performance.

Interactions among learners throughout the project creation process may have promoted language development since it leads learners to produce richer and more responsive writing when it is preceded by group discussions (Bruffee, 1984). The gain in fluency represented by a higher number of T-units was also found in Eyring's (1989) study whose PBL group achieved longer final essays. The author credits opportunities for brainstorming and peer interaction for the fluency improvement. As mentioned in chapter 3, a vital part of this study was the project creation process where students were involved in two brainstorming sessions, one prior to submitting the first draft and one after. It also included a class reflection session after submission of the final draft to discuss the process of creating their project. Through interactions, students are exposed to comprehensible input from peers and the instructor as well as producing comprehensible output when negotiating for meaning (Long 1982; Swain, 1995).

The second research question was concerned with students' oral development. The same indicators as with the written tasks were measured, with the exception of adding speech rate as a fourth fluency indicator. This study found no statistically significant improvement in oral skills between the pretest and posttest for either group after one semester of instruction. In other words, the curriculum of instruction had no impact on students' oral fluency, complexity, or accuracy from the pretests to the posttest, at least in the observed indicators. Contrary to Beaudrie (2006) and Parra et al.

(2018) who both analyzed oral development in HL students' complexity, accuracy, and fluency after a semester of instruction.

With the understanding that no statistically significant gains were achieved by either group, results do show a slight improvement in the control group's fluency and accuracy. For fluency, non-significant gains were achieved in three out of the four fluency indicators: total number of T-units, speech rate and percentage of English use. This change suggests that the control group's oral samples at the end of the semester were longer, had more words per minute, and showed a decreased reliance on English. However, T-units in the posttest seemed to be shorter as shown by the decreased MLT indicator. Additionally, the posttests showed an improvement in all accuracy indicators (subject-verb agreement, gender, and number agreement).

The experimental group saw non-significant improvement on one fluency indicator and one accuracy indicator. Within fluency, the group's total number of T-units increased in the posttest results, meaning that students created longer oral samples at the end of the semester. For accuracy, the experimental group saw a slight improvement on subject-verb agreement.

It is important to mention that for complexity, results showed that both groups decreased their depth of clause because they produced less subordination in the T-units of the posttest. These findings are contrary to those of Parra, et. al (2018) and Beaudrie (2006) whose results showed a gain of subordination in oral post-test samples. This decrease could stem from the differences between the oral and writing process where students can reflect, and if necessary, correct their output when writing, while the oral samples are more spontaneous. Within the tense/aspect/mood use complexity indicator,

results showed an increased use of subjunctive, but a higher reliance on present tense and a decrease of all other structures in the posttest for both groups. The increase in subjunctive during the posttest could be explained by the effect of task modality where one of the tasks called for the use of mostly certain grammatical while the other task allowed for a wider use of forms. Another reason, especially when it comes to the subjunctive, could be the order in which grammatical points were taught during the semester. For example, the last unit of the semester (unit 4) covered subjunctive, and it might have been more present in students' minds by the time they completed the posttest as opposed to the preterite and imperfect covered earlier in the semester.

Interestingly, the decrease of tense/aspect/mood use complexity even extended to the usage of "new structures" in the posttest. This category encapsulates any other structure not already measured (present, preterite, imperfect, subjunctive, present perfect) such as future and conditional. This change indicates that students stayed within their comfort structures for the posttest, contrary to the pretest where a wider variety of structures were used. The variety observed in the pretest was mostly undertaken by the increased use of the present tense. In fact, the experimental group's posttest showed that 53.34% of all verbs used were conjugated in the present tense, an increase of 7.19% from the pretest. For the control group's posttest, 68.76% of all the conjugated verbs were in the present tense, an increase of 15.91% from the pretest. This was a trend also seen in Parra, et al. (2018)'s narrated post-tests where 70% of participants used the present tense to narrate the silent video they were watching. The authors postulate that students took the position of narrators of the story as they were watching it and were therefore, narrating/reporting the story as it was unfolding.

It is also crucial to point out that the lack of changes in accuracy might be due to the extremely high accuracy levels in the pre-test for both groups, especially the number accuracy. At the beginning of the semester, the mean number accuracy was 99.27% (*SD*=1.70) and 99.71% (*SD*=0.75) for the control and the experimental group respectively. Subject-verb agreement had an accuracy mean of 96.42% (*SD*=5.94) for the control group and 94.59% (*SD*=9.27) for the experimental group. Gender agreement had a 96.82% (*SD*=4.00) and a 96.18% (*SD*=6.71) mean accuracy for the control and the experimental group respectively, indicating that participants in this study (low-intermediate Spanish proficiency) have high levels of accuracy in number and gender agreement and verbal forms. These findings contradict prior research that has discussed that HL speakers with lower proficiency tend to have low accuracy in agreement and verbal forms (Montrul, 2007; Benmamoun, Montrul, & Polinsky, 2013), while high proficiency students show a tendency towards accuracy in these aspects (Parra, et. al., 2018).

However, this high level of accuracy on the oral task can be due to the effect of the task modality. Prior research (Alarcón, 2011; Montrul, Foote & Perpiñan, 2008; Torres, 2022) points out that HL students demonstrate higher accuracy and more control of the target forms on oral than written tasks, which can be attributed to their implicit knowledge of the language. The authors argue that oral tasks are representative of implicit, and automatically processed knowledge, typically acquired early in childhood in oral communication in naturalistic environments. Whereas accuracy in written tasks can reflect metalinguistic, explicit knowledge of the language, typically acquired later and often in a classroom setting. As previous research has shown (Beaudrie, 2009; Correa,

2011; Torres, 2018), HL learners demonstrate higher levels of implicit knowledge than explicit metalinguistic knowledge of their HL.

In addition, since results showed that the PBL curriculum only had a positive impact on students' written fluency, complexity, and accuracy, but no impact on oral skills, there is no evidence of a transfer of benefits of practice in one modality to another. The results show no simultaneous language development as in Simpson (2011) whose beginner PBL students saw a gain in both oral and written skills. However, the gains that students made in their writing skills after a semester of instruction match the learning goals that they shared in the demographic questionnaire where they rated writing as the skill most in need of further development. In the questionnaire, students rated writing and speaking as the two skills they wanted to improve the most, as opposed to their receptive skills with which they felt mostly confident. This self-evaluation of HL skills is common, as oftentimes, HL students with low proficiency are more confident with their receptive than productive language skills since they typically possess significant receptive abilities but limited productive skills, especially their writing skills (Beaudrie & Ducar, 2005; Colombi & Harington, 2012; Wilson, 2022). Between the two productive skills, students showed more confidence in speaking than writing in Spanish. In fact, 100% of students responded that they were more comfortable writing in English than in Spanish.

In contrast, for speaking, while most students (76%) still chose English, 12% chose Spanish, and 12% felt equally comfortable speaking in both languages. When asked to rate their Spanish skills overall students showed more positive attitudes towards their spoken skills, than their writing skills in Spanish, which were mostly rated as neutral (mas o menos) or negative (mal, muy mal). HL students may be more confident in their

HL oral skills than written, as they are typically more accurate in their oral production (Beaudrie & Holmes, 2022; Bello-Uriarte, 2022). It is the process of composing, of arranging words into sentences and paragraphs in a manner consistent with the norms of the written language that proves challenging to HL speakers (Bello-Uriarte, 2022; Sanchez-Muñoz, 2013; Schwartz, 2003; Valdés, 1995).

5.2 Pedagogical Implications

In addition to responding to the research questions, this study has several implications for the heritage language classroom. Results from this study showed an improvement in students' written skills only, which directly relates to the participants' goals when joining the class as expressed in the demographic questionnaire. The participants in this study expressed their desire to work on their written skills more than any other language skill. The students showed a higher level of confidence in their oral than written skills and as such, are more motivated to further develop their written skills. For the heritage language learners in this study, a project-based learning approach showed to be beneficial to improve their written fluency, complexity, and accuracy. The study did not find significant effects on students' oral skills, which can indicate that the modality of the task to complete has the potential to influence the results achieved (Torres, 2022). Although the curriculum included two oral and two written projects, the projects and learning materials might need reconsideration to increase oral practice to achieve oral skills gains. Another factor with possible effect on the lack of oral skills improvement is that students could have put less effort on the oral tasks as HL learners

are usually confident in their oral skills. On the other hand, students expressed a lack of confidence in their writing skills, which could lead to higher effort to improve them.

The task of creating a project to showcase what they have learned during the unit in a creative way served as a way to practice and improve their language skills. These projects need to contain heavy cultural components where students explore content about their own culture, and its history. The projects need to also include local resources and examples so students can feel connected to the Latino/Hispanic communities surrounding them and it can be relevant to their current location and interests. Furthermore, it is important to include learning materials that prioritize their language variety and its sociolinguistic worth (Beaudrie & Loza, 2023) so students can see their language variety used as a valuable resource for the classroom. Lastly, in terms of linguistic development, a key element to go along with project-based learning to achieve language gains at the intermediate level is to still dedicate time to timely grammatical explanation as these learners can benefit from such grammar presentations (Bowles, 2021; Carreira 2004; Carreira & Potowski, 2011). Grammatical explanations in approaches such as focus on form (Long, 1991) can be beneficial for language development for lower proficiency students. Through focus on form, students are engaged in meaning-focus lessons and their attention is shifted to linguistic forms in context, practiced through discourse-level communicative activities (Lynch, 2003) and use through the projects.

The process of project creation where students turn in different drafts and get to ask questions to other students and the teacher can enhance the language learning experience. After every draft students got the opportunity to discuss the project, ask questions about content or language aspects and any challenges that they were

experiencing. These repeated and valuable interactions when creating the different versions of a project helped students practice the language and ask any questions, providing opportunities for output, input and feedback. Furthermore, the time that students spend in the class seems to be one of the main sources of Spanish contact that students have outside of their home, as the questionnaire results showed. This is especially important for students who live on campus and no longer have the daily Spanish input from their home.

Finally, it is important that the class offers resources for students to involve themselves in the language outside of the classroom. These can be events with the department, in an effort to create community among the students since, according to the questionnaire, most do not speak Spanish with people other than family. The class is a valuable asset in presenting students with authentic resources in Spanish such as different types of music, books and authors in Spanish. This is particularly important as most participants the survey results showed that they have a strong preference for consuming media (television, music, books) in English.

5.3 Study Limitations and Future Directions

The unforeseen circumstances of the semester such as the change in class format (in-person to remote) along with the economic and personal effects of the COVID-19 pandemic could have been a key factor in students' engagement in the course and as such, also affected their performance. Although the courses kept meeting at the regular scheduled times, the classes and all interactions were held through Zoom. Bi-weekly 75-minutes Zoom sessions (a total of 2.5 hours per week) were an important aspect of

maintaining instructor presence, which is a driving force for student engagement (Rubio, Thomas & Li, 2018), and gives a sense of normalcy in this new format. In addition to its role as a part of instructor presence, these synchronous sessions provide social interactions that are an integral process in foreign language learning (Cheon, 2008). However, despite these benefits, if students were enrolled in four to six classes that relied on synchronous instruction, they were obliged to spend around 10 to 15 hours of weekly "classroom" instruction, which can lead to fatigue (Ross & DiSalvo, 2020).

These 10-15 weekly hours of synchronous instruction estimates are calculated considering only courses like Spanish 204 that are four credit hours and use the flipped learning method where students interact with asynchronous material before and after class, and only meet synchronously for a total of 2.5 hours a week. A four-credit class does not follow a flipped learning method, might have been meeting synchronously three to four hours a week, effectively elevating students' fatigue. Wiederhold (2020) states that even when online sessions are just as long as the in-person sessions, the overuse of video conferencing platforms has resulted in tiredness, anxiety and worry, a phenomenon described as "Zoom fatigue". This fatigue is the result of an increased need to concentrate (when students have reported limited attention spans), reduced ability to interpret body language and difficulty to relax into a natural conversation, making the use of video platforms more psychologically demanding than face-to-face interactions (Mukhtar, Javed, Arooj, & Sethi, 2020; Williams, 2021).

It must also be recognized that, in light of the unprecedented circumstances, universities focused on preparing instructors to teach remotely. However, the students might not have been necessarily prepared to learn in those circumstances (Quezada,

Talbot & Quezada-Parker, 2020; Ross & DiSalvo, 2020; Trust & Whalen, 2020). In the first place, just as many teachers were unfamiliar with teaching online classes, many students were unfamiliar with taking them (Xie & Rice, 2021). Although the current generation of learners has been described as digital natives (Prensky, 2001) in reference to their apparent ease and familiarity with digital technology, oftentimes, students are underprepared regarding e-learning competencies. Parkes, Sten and Reading (2015) found that while students were prepared for e-learning activities such as reading and writing, they very much lacked preparedness in other areas, in particular time-management, planning strategies, critical thinking skills and collaborating with others (Parkes, Stein, & Reading, 2015), all necessary skills for PBL.

Additionally, the pandemic brought new demands for students such as the unavoidable need of technology access and study space for remote learning, further highlighting economic inequalities in our student population. These circumstances contribute to teachers' concern about disenfranchised students and growing disengagement from those who face the extra challenges of limited technology access and study space available at home (Lucas, Nelson & Sims, 2020; Ross & Disalvo, 2020). Active participation in all aspects of the class, including the online portions, has been linked as a strong predictor of success in the course (Rubio et al., 2018). However, some students do not possess the resources to engage with their remote courses at full capacity, hence the decrease in engagement which could even be reflected in students' success in the class (Rubio et al., 2018). These effects are especially felt by minority groups, such as Hispanic students, and those lower-income learners, who are less likely to have a quiet space with minimal distractions, devices they do not need to share, and high-speed

internet (Dorn, Hancock, Sarakatsannis, & Viruleg, 2020). Students had to manage and improvise learning environments with the spaces and resources that surrounded them, adding to the pressures and worries for their own and their loved ones' safety due to the Covid-19 pandemic.

Finally, the challenge of having to convert the planned in-person PBL curriculum to an online format to adjust to remote education is another limitation of this study. While the instructor had ample experience teaching online, it is necessary to draw a clear contrast between a well-planned online learning experience and courses offered online as a response to a health crisis, also referred to as emergency remote teaching (Gacs, Goertler & Spasova, 2020; Hodges, Moore, Lockee, Trust, & Bond, 2020). Online language learning has been studied for decades, and when carefully planned, it is as effective as face-to-face language learning, engaging students and extending language learning opportunities in ways that would be difficult to orchestrate in a traditional classroom setting (Blake, 2016; Moneypenny & Aldrich, 2016). An online curriculum is designed with adaptations in content, assignments and pace that is appropriate for online students, this was not the case for the PBL curriculum for this study. Despite the familiarity to online teaching that the teacher-researcher had and the fact that Spanish 204 has an online aspect (flipped learning), instructors had 4 days to change their courses to accommodate remote teaching. This situation created a disruption in the PBL curriculum implementation and possibly affecting its effect on student learning and engagement.

For future research, it would be beneficial to study the long-term effects of project-based learning on learners' language skills. As evidenced, one semester of instruction led to some significant changes in written skills, but it was not enough to draw

conclusions regarding oral gains, as these were minimal. As Moritoshi (2017) found, greater language gains may require longer PBL interventions. Another point of consideration for future research would be an expanded analysis on the type of subordinate clause gains. In the present study, all subordinate classes were counted to measure the depth of clause, one of the complexity indicators used. However other studies (Parra et al., 2018; Torres, 2020) also discriminate among types of subordinate and coordinate clauses, and they have shown gains in certain types of clauses depending on proficiency level (Kisselev & Alsufieva, 2017; Kisselev, Klimov & Kopotev, 2021).

Further studies can also test the effects of group versus individual projects on students' oral and written skills. The project-based approach already has an integrated step of class discussion between the project drafts, but it would be beneficial to know if prolonged group interaction can provide further language benefits or if it would affect the experience. To obtain qualitative data, subsequent to the submission of each project, the instructor could implement post-project questionnaires to gather students' opinions and perceptions of the experience after completing the project as done in Moritoshi (2017). This process can be a functional element to raise student voice and reconcile the mismatch that can often be found between student and educator positions (Beaudrie, 2012; Wilson, 2022). Obtaining student perspectives on the projects can provide valuable information for curriculum and program designers (Wilson, 2022). This questionnaire can also include a self-evaluation section where students assess their perceived language skills before and after the project. Additionally, to raise students' metalinguistic awareness, the questionnaire can also include an overview of the main linguistic learning outcomes achieved through the completion of the project. It could be useful as a

reflection specific to language development, since as Becket (1999) found, although students felt like they learned through the projects, they were not sure of what it is that they learned.

Finally, an important piece of research that would be beneficial to further study are the effects of project-based learning on Spanish HL students' linguistic confidence and engagement. When compared to research on PBL's effect on linguistic development, more research has been carried out that delineates the non-linguistics effects of PBL (Bas, 2011; Eyring, 1989; Nor, 2008; Oh, 2012; Raof & Yusof, 2006; Santhi, Suherdi & Musthafa, 2019; Simpson, 2011). However, new studies with specifically the Spanish heritage population are still needed. One of the main goals of heritage language classes is to raise students' positive attitudes towards both their heritage language and various dialects of the language and its cultures. Therefore, studying the effects of following a project-based curriculum at the beginning, middle and end of the semester would be a great addition to the current literature. If project-based learning can raise students' engagement in class, positive linguistic effects can follow.

5.4 Concluding Remarks

The intent of this dissertation was to study the effects that a macro-based approach such as project-based learning can have on students' oral and written linguistic development. The field of heritage language classroom instruction has extremely limited empirical studies on the best teaching practices. Thus, this dissertation aimed at adding to this body of literature. Project-based learning has the potential to deliver to the HL population due to its naturalistic learning approach and countless opportunities to use authentic materials for students to linguistically develop while immersed in artifacts from

their culture. Project-based learning also makes space to implement different grammar approaches if needed as well as opportunities to use them in the context of the projects. I believe that utilizing the language in authentic contexts can also increase students' engagement and confidence as their language and their communities are used as the point of departure for further development as well as valuable resources in the classroom.

It was unfortunate that the present study could not test the effects of an entire semester of fully in-person project-based learning, but it is my hope that future researchers will look into its effects and bring new empirical studies to life. While understanding the complexities of empirical research, I am hopeful that future scholars will see the wide opportunities that macro-based approaches can bring for heritage language classrooms due to their flexible nature. It is also my hope that materials and approaches empirically tested can get to different levels of education and reach the K-12 educational system so that all heritage language students can benefit from the research carried out.

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APPENDIX A

PRE AND POST WRITING TASKS PROMPTS

Pre-intervention writing prompt
Escribe tres párrafos respondiendo a las siguientes preguntas.

En los Estados Unidos muchas veces se usan los términos hispano y latino de forma intercambiable (interchangeable), ¿crees que estos términos significan lo mismo o crees que son diferentes? ¿te identificas con alguno de estos términos? ¿con cuál? Si no, ¿con cuál otro término te identificas (mexicano, dominicano, peruano-americano, mexicanoamericano, chicano, etc.). ¿Piensas que el lenguaje que hablas te ayuda a definir tu identidad? ¿por qué sí y por qué no? ¿Qué otros elementos pueden intervenir en la definición de la identidad de las personas?

Post-intervention writing prompt
Escribe tres párrafos respondiendo a las siguientes preguntas.

El uso del spanglish es un tema bastante debatido en la comunidad de hablantes de español e inglés. Muchos críticos han hablado en contra del uso del spanglish mientras que otros lo han defendido. En tu opinión, ¿Qué es el spanglish para ti y cómo lo explicarías? ¿Crees que el spanglish está ligado a la identidad de los hispanohablantes en los Estados Unidos? ¿Lo usas en tu vida diaria en tu casa, la escuela y el trabajo? ¿Defenderías el uso del spanglish en todos los contextos o piensas que se debe utilizar en sólo algunos contextos? Explica tu respuesta

APPENDIX B

PRE AND POST ORAL TASKS PROMPTS

Pre-intervention oral prompt

Tu tarea es ver el video compartido abajo. El video es de menos de tres minutos y lo puedes ver con el sonido apagado (hay música, pero no es importante para la tarea). Debes ver el video una sola vez, poniendo mucha atención. Después de ver el video, por favor graba un video hablando del contenido del video. El video puede ser tan largo como quieras, solo trata de hablar naturalmente como si le estuvieras contando a un amigo lo que pasó en el video. Por favor entrega tu video como respuesta a la tarea en Canvas.

https://www.youtube.com/watch?v=iTWuZav-elY&feature=emb_title

Post-intervention oral prompt

Tu tarea es ver el video compartido abajo. El video es de menos de tres minutos y lo puedes ver con el sonido apagado (hay música, pero no es importante para la tarea). Debes ver el video una sola vez, poniendo mucha atención. Después de ver el video, por favor graba un video hablando del contenido del video. El video puede ser tan largo como quieras, solo trata de hablar naturalmente como si le estuvieras contando a un amigo lo que pasó en el video. Por favor entrega tu video como respuesta a la tarea en Canvas.

https://www.youtube.com/watch?v=Rp30_gF1GcY

APPENDIX C

IRB APPROVAL

ASU Knowledge Enterprise Development

APPROVAL: MODIFICATION

Sara Beaudrie
CLAS-H: International Letters and Cultures, School of (SILC)
480/965-1110
Sara.Beaudrie@asu.edu

Dear Sara Beaudrie:

On 1/27/2020 the ASU IRB reviewed the following protocol:

Type of Review:	Modification / Update
Title:	Project-Based Learning in a University Spanish as a Heritage Language Class: A Pilot Study
Investigator:	Sara Beaudrie
IRB ID:	STUDY00011316
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	• Consent form 27-1-20, Category: Consent Form; • Linguistic questionnaire 27-01-20.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Oral Prompts 27-01-20.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Protocol 27-01-2020.docx, Category: IRB Protocol; • Recruitment methods 27-01-2020.pdf, Category: Recruitment Materials;

The IRB approved the modification.

When consent is appropriate, you must use final, watermarked versions available under the "Documents" tab in ERA-IRB.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely,

IRB Administrator

cc: Nayibe Azzad
Nayibe Azzad
Melissa Negron

APPENDIX D

T-UNIT SEGMENTATION GUIDELINES (ORTEGA ALVAREZ-OSORIO, 2000)

A terminal-unit (or T-unit, see Hunt, 1965) is an independent clause together with all its dependent clauses. Thus, coordinated clauses count each as a different T-unit and subordinated clauses count all as a single T-unit together with their main clause. Below is an example o f a excerpt segmented into T-units. Each line starting with *LRN has been counted as a new T-unit. *LRN stands for "learner" and is a generic identification term for subject:

*LRN: a tita la gordita le encantaba leer mucho.
*LRN: podia leer periodicales todo el dia sin levantarse la mano para hacer ningun otra cosa.
*LRN: asi vivia ella hasta el dia en que su esposo, paco el flaco, se sentio harto de la cocina sucia.
*LRN: el decidio cambiar como vivia su esposa.
*LRN: fue al supermercado .
*LRN: y compro jabones para fregar los platos.
*LRN: paco el flaco regreso a su casa .
*LRN: y dejo caer todos los jabones en el suelo delante de tita la gordita.
[13-P06]

In Spanish, a pro-drop language, T-units can have a finite (conjugated) verb without an overt subject, so each main verb should be counted as a different T-unit, regardless of whether an overt subject is present. In addition, linguistic accuracy is not a concern for the purposes of the present research. Hence, all independent clauses, whether target-like or not, should be counted as T-units. For example:

*LRN: mi familia no tuvieron mucho dinero.
*LRN: y mi papa tener una accidente a su trabajo.
[09-D04]

1. DIFFERENT T-units: PARATAXIS and COORDINATION

1.1. Independent clauses joined by periods, commas, or simple juxtaposition are each one T-unit:
, Uno es gordo, // el otro es flaco
Se acabo la funcion. // Fue muy buena.
juxtaposed Juan se graduo en navidades // se escapo con su no via.
Note that cases o f simple juxtaposition without punctuation often correspond to non-prescriptive usage o f punctuation and capitalization.

1.2. Independent clauses joined by coordinating conjunctions are each one T-unit:
y (or e) Despues la mujer lleva la cartera del hombre //y fue a las tiendas.
o (or u) Puede cambiar la vida mucho, // o solamente lo hace m as emocionante.
pero Unfortunadamente, ellos ganaron la batalla. // Pero no ganaron la guerra
sino (que) Los nifios no solo ven al mundo por la television // sino ellos experimentan la vida.

1.3. Count as a separate T-unit main clauses starting with the following linking words (similar in meaning to English "so" "therefore"):

asi Nadie lo fijo al perro, asi el disfruto una manzana.
asi queEs una dia importante, asi que celebramos lo mucha.
pues La nina, que se llama rosa, dice que ella no comprende la filosofia. // Pues, ella preguntAo' su papa por un explinacion [: explicacion] de la filosofia.
por lo tanto Al correr mucho musculos son envolver, // por lo tanto dolores occurre.
por eso Y despues una coche me fue mojado. // Por eso yo estaba enojado.

1.4. Occasionally a normally subordinating conjunction (typically "porque," because, or "aunque," although) is used in an independent clause separated from the previous clause by a period (or by a preceding intonation contour which is clearly terminal, in spoken data). Count such a case as independent clause or 1 T-unit. Here are two examples with "porque" after a period, indicated in bold; they were counted as a separate T-unit each:

Necesitas ser mas claro con tus ideas. Por ejemplo, eres hablando sobre los sweatshops solamente en los EEUU o tambien en otros paises como Guatemala o Mexico? Porque yo pienso que hay mas problemas con sweatshops en otros paises. [07-D10]
Me gusta hablar con el {mi papa} porque es intiligente [: inteligente] y puede ayudarme con muchas cosas. (Porque necesito mucha ayuda\) [11-D03]

2. Same T-unit; SUBORDINATION

2.1. Count 2 (or more) subordinate clauses to a main clause which are coordinated (possibly with elided complementizer) as 1 T-unit:
creer/imaginar/esperar/pensar... que A y (que) B = 1 T-unit
resultar/parecer/suceder... que A y (que) B = 1 T-unit

Pienso que el esta enamorado con la vecina ahora y mueve con ella en su apartamento. = 1 T-unit

Note that in some cases the deletion of the complementizer in the second subordinate clause may sound unnatural in Spanish and might bias a first-sight interpretation of the proposition as a new independent clause. However, consider such cases as coordinated subordinates (that is, 1 T-unit) if the subordination interpretation is plausible semantically and syntactically. Here is an example:

Creo que mis mayores virtudes son mi pronunciacion y yo soy alta con mi voz.
= 1 T-unit

NOTE 1-- Be careful with false "A & B" cases. For example, in the case below, it is unlikely that the dog thinks that the food smells good and that he wants to eat (i.e., a case

of main clause +A&B subordination). It is more plausible that the dog thinks the food smells good and (therefore) the dog wants to eat the food (i.e., a case of main clause + subordination-^main clause):

El perro piensa que la comida esta oler a gloria // y desea comer.

NOTE 2—Sometimes it may be ambiguous whether the second dependent clause is still subordinated to the main verb or is a new thought. In such (few) ambiguous cases, use your best judgment in interpreting the intended meaning:

Todo el tiempo habia un perro que no le gusla Juan y siempre le mordaba y, los coches trataba de atropellar a Juan cada manana.

Interpretation 1(1 T-unit): all the time there was a dog which didn't like Juan and (which) kept biting him; Interpretation 2: all the time there was a dog which didn't like Juan and (the dog) kept biting him (2 T-units).

2.2. When a subordinate clause is followed by two or more main clauses, always count each clause after the first main clause as a separate T -unit:

si A entonces B, y C, y D, y E = 4 T-units
cuando A entonces B y C = 2 T-units
Cuando el perro empezo salir, el hombre gordo dio cuenta al perro y peleo el perro.
= 2 T-units
Entonces, cuando el continuaba que correr, un coche casi lo atropello a el y el se le tiro el agua de la calle.
= 2 T-units

3. Treatment of REPORTED SPEECH in T-unit analysis

3.1. Indirect reported speech, which is marked by a shift of verbal morphology and/or pronoun reference, and by syntactic embeddedness, is counted as belonging to the same T-unit:

me dijo que estudiara mas en el futuro. = 1 T-unit

3.2. By contrast, direct reported speech which is identifiable by the use of quotation marks in writing (or by intonational boundaries in speech) is counted as separate independent T-units. For example, each line starting with *LRN represents a different T-unit in the excerpt below:

*LRN: era un dia de verano cuando recibi una llamada por telefono.
*LRN: era mi amiga connie.
*LRN: "tiene un regalo para ti.
*LRN: y te dare a la fiesta de grant."

*LRN: ella dijo.
*LRN: “oh, ok; es bueno.”
*LRN: yo dije.
*LRN: yo daba cuenta que el regalo es probablemente para anadir al otro regalo me dio para mi fiesta de graduacion.
*LRN: “tal vez, ella penso que no me dio bastante.”
*LRN: yo pensi.
[10-D09]

4. Some other special cases to consider: DISCOURSE issues

4.1. All T-units by definition have an overt main verb in the native grammar. Thus, propositions which otherwise are fully meaningful and grammatical, but which for stylistic reasons do not have a main verb, are tagged as FRG (“fragment”). Typical fragments in the data are exclamations such as:

Que bien!
Lastima!
Dios mio!
Que barbaridad!
Que horrible que el hombre sea malo!
Que horrible yo soy gordo!

4.2. Count parenthetical phrases or added phrases as attached to the preceding T-unit if they weren’t separated with a period by the writer and are logically connected to the preceding idea:

Quieren tener dos hijos, un nino y una nina. = 1 T-unit

4.3. Occasionally a clause that is subordinated to the previous T-unit was separated through minor punctuation (e.g., colon, semicolon, dash) by the writer. Draw an arrow pointing back at the previous line to indicate that this subordinated clause should be counted together as part of the previous T-unit:

El contenido de este trabajo es: si queremos una tierra mejor debemos cuidar el medio ambiente = 1 T-unit

4.4. Count parenthetical clauses that are center-embedded as 1 T-unit, and mark them clearly by surrounding them with squared brackets. (Often, although not always, such clauses are marked by parentheses, indicated by # in the transcript.)

No se lo que ocurrira [[, pense,]] si Mari aparece ahora. = 2 T-units

5. NON TARGETLIKE issues

Because we are dealing with IL data, what constitutes a governing main verb can sometimes be tricky. Indeed, it is important to code according to what we judge to be the INTENDED or ATTEMPTED syntax, regardless of whether the outcome is targetlike or not, using our best judgment when interpreting the predications.

5.1. Some T-units may be verbless because of nontargetlike omission o f a copula, an auxiliary verb, or even a full verb. If a verb would be supplied by the native speaker in order to make sense of the elocution, then count as T-unit. Similarly, a nontargetlike infinitive or subjunctive verb can be the main verb of a T-unit:

Juan a la izquierda de el foto. = 1 T-unit
yo querer comprar eso. = 1 T-unit
tenga cuatro hermanos. = 1 T-unit

5.2. A particularly common case is that of relative clauses that lack a relative pronoun. Code such cases as subordinated clause attached to a T-unit:

A tiempos, no doy mis padres o mis hermanas el respeto ellos merecen. = 1 T-unit
[Intended target: ... el respeto que ellos se merecen]

5.3. Whenever possible, count "se llama" (or any variations thereof) as a nontargetlike relative clause or participial adjective ("llamado/a") and thus part of the same 1 T-unit (often you can see it takes the place of "called" in English). For example:

Ellos se casaron en mayo, y dio a luz a una nina en septiembre se llama Estella del Carmen. [25-T02] [Likely intended target: ...y dio a luz a una nina en septiembre que se llama Estela del Carmen]

5.4. Some words that may appear to be verbs are simply nontargetlike adjectives or nouns, they do not constitute new clauses:

enoja:
Pepe no esta alegre pero muy enoja.
Un dia un hombre fue muy enoja con su esposa porque ella no hice nada .
diverti:
Tuve mucho diverti con ello.
Era un nino muy simpatico y diverti.

5.5. In a very few instances, production will be so nontargetlike that the intended meaning becomes uninterpretable, so that no "translation" into the target system can be proposed. If you find such a case, try to nevertheless divide the line into T-units following any syntactic clues, then add a star mark (*) to indicate the string is utterly uninterpretable.