Navigating Problem-Based Learning Across Content Areas: A Mixed-Methods Examination of English Learner Insights of Support and Participation

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Abstract

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This mixed methods dissertation examined adolescent English learner experiences with problem-based learning in mainstream content-area high school classrooms. The research focused on three aspects of the English learner experience with problem-based learning: expectations of support from peers and instructors, participation and positioning in collaborative activities, and the affective factors and potential opportunities in mainstream math, science, and social studies classrooms.

With limited research examining the English experience with problem-based learning in mainstream high school classrooms, I used Cultural Learning Pathways (Bell et al. 2013) as the

conceptual framework to highlight expectations, positions, and sociomaterial arrangements and practices in the classroom.

Findings showed that problem-based learning is vastly differently from the banking model pedagogy (Freire, 1970) that English learners are often familiar with from prior academic experiences. Additionally, because of the shift in sociocultural shifts in the classroom, English learners expected supports from their peers and instructors to navigate the culture and activities associated with problem-based learning. English learners worked intensively to learn content through a language they were still in the process of acquiring. Reflexive English learner self-positioning during collaborative activities varied across classroom contexts. And interactive positioning by their teachers was based on the teachers' negative or positive interpretation of participation in the mainstream classrooms. Lastly, motivation, anxiety, and attitude were salient affective variables in the English learners experience with problem-based learning in their mainstream classes. There is potential for problem-based learning to be engaging for English learners if it is connected to their interests and leverages their prior knowledge and experience.

The implications for this work include increasing teacher and administrator awareness of the English learner population during the design and implementation of problem-based learning, making explicit the components and potential benefits of problem-based learning, and building community in the classroom to facilitate collaborative group work. Most importantly, teacher and administrators must look beyond the English learner label to understand and leverage the rich cultural and linguistic knowledge, as well as, the life experiences, these students bring into the classroom.

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DEDICATION

For my parents, like many other first-generation immigrants, who have sacrificed so much to provide their children with opportunities to thrive and be successful

Introduction

The English learner (EL) term is used to label students whose first language is not English. Students who are members of this population are growing in numbers in public schools around the US. The statistics around this group show a dramatic increase in the last ten years; however, what the statistics do not show is the tremendous diversity this group encompasses and the abundance of cultures, languages, nationalities, and socioeconomic backgrounds they represent (National Assessment of Educational Progress (NAEP), 2000; Office of English Language Acquisition (OELA) – United States Department of Education, 2006; Thomas & Collier, 2002).

Students who are labeled as English learners often experience a number of challenges in school while learning new academic content in a foreign language and navigating the socio-cultural aspects of American schools (OELA, 2015; Willett, Harman, Hogan, Lozano, & Rubeck, 2008). For ELs at the high school level, one-half of them fail graduation tests, do not receive their diplomas, and are unprepared for the workforce (Hopstock & Stephenson, 2003). The consequences of a significant portion of the student population being ill prepared are detrimental not only to the students themselves but also to society as a whole (Hakuta, 2011).

Research on the adolescent EL experience in US classrooms lays out the plethora of challenges these students face inside and outside of schools (Suárez-Orozco, Suárez-Orozco, & Todorova, 2008; Olsen, 1997; Portes & Rumbaut, 2001). Adjustment rate to the new environment and schools varies depending on prior academic experience, socio-economic status, and various types of supports. Suárez-Orozco, Suárez-Orozco, & Todorova (2008) explained that "ample evidence shows that a school's climate drives its students' academic experience. Strong compassionate leadership, engaging teachers, and involved counselor and other staff can set a

tone of respect, high expectations, and tolerance" (367). English learners are eager to face challenges but are not often able to do it on their own.

I used the English learner term in my dissertation to refer to students who receive English language support as designated by the state of Washington and the Washington English Language Proficiency Assessment (WELPA). I used it with an awareness that it only identifies a population of students by their lack of English proficiency and narrowly describes a population of students who come from a range of cultural and linguistic backgrounds and bring vast life and cultural knowledge to our schools.

This dissertation examined the experience of English learners with problem-based learning in mainstream classrooms at the high school level. Problem-based learning (PBL) is an approach to learning where students are asked to investigate, explain, and resolve meaningful problems through continuous collaboration with peers and others (Barron, Schwartz, Vye, Moore, Petrosino & Bransford, 2011; Evensen & Hmelo-Silver, 2000). PBL has the potential to increase knowledge retention over time as well as to promote deductive and inductive reasoning. PBL also has been shown to increase "an understanding of one's own knowledge needs, application of knowledge to problem situations, collaboration, and lifelong learning" (Evensen & Hmelo-Silver, 2000, p. 2). Historically, PBL has been widely utilized in medical school (Evensen, Salisbury-Glennon & Glenn, 2001; Hmelo-Silver, 2004; Torp & Sage, 1998). Problem-based learning has gained popularity in K-12 in recent years with foundations such as Edutopia promoting PBL usage in the content areas.

PBL shifts the traditional teacher-centered classroom to a more student-centered and collaborative environment wherein collective sense making and solution-composition are fundamental. Teachers present authentic problems associated with professional practices and ask

students to work with each other to come up with and present solutions through research. Crucial benefits for students when they work together on learning activities include improved achievement, the development of positive peer relationships, and improvement in student self-concept, social interaction, and time on task (Darling-Hammond, 2012).

The demands of the PBL environment are high due to the complexity of the problems and the process of finding solutions. The demands are even higher for students whose first language is not English. With added linguistic and social complexity of the classrooms on top of the shifting classroom environment, ELs need various types of support, such as linguistic resources, explicit explanation, and modeling of PBL, to meet the demands of the PBL classroom.

For ELs, instruction at school is provided in English, a language they are still mastering. They face the tasks of simultaneously learning academic English and content area knowledge. Researchers on language learning posit that social language—such as interactions with peers, conversations on the playground, or talking on the telephone—usually develops within six months to two years after the arrival in the US, while academic language such as comparing, synthesizing, and inferring in content areas may take five to seven years (Cummins, 2008; Haynes, 2007; Thomas & Collier, 2002). ELs at in PBL classrooms are tasked with learning the content through a developing language and grappling with the transformation of the familiar teacher-centered classroom into a student-centered and collaborative environment.

In PBL classrooms, ELs will not only face linguistics challenges such as comprehension of materials and discussions in their mainstream content areas but socialization challenges to PBL, shifting classroom culture, and social aspects. Therefore, an understanding of the EL experience across content areas will benefit the teachers and administrators in building and implementing differentiated supports to improve PBL for ELs in mainstream classrooms.

This mixed methods dissertation examined the English learner experience in mainstream problem-based learning classrooms throughout the 2013-2014 academic school year. The context of the study was Petrichor High School (PHS), a pseudonym for a comprehensive high school located in the Pacific Northwest. PBL at PHS consisted of units in each course that were designed and implemented by teachers in the content area's department. Across the content areas of math, science, and social studies, there were several design teams who created PBL units aligned to state standards and district content requirements. Units were designed with seven key elements (see Appendix B) in mind to provide an authentic and relevant real-world problem for students to tackle. Working in collaboration is a fundamental component of PBL at PHS. Students at PHS worked in small groups to make sense of the content and identify knowledge required to come up with a solution to the complex problem at hand. Many of the PBL units asked students to work collaboratively over a number of weeks to create a product and culminating solution to be presented to authentic audiences who are stakeholders or experts associated with the content.

I chose to focus on the English learner for two main reasons. First, there are a limited number of research studies that examine the EL experience with PBL in mainstream high school classrooms. Literature exists for ELs at the university level and non-ELs experience with PBL at the high school level. Through this dissertation, I hope to contribute data and analysis to the examination of the dynamics of PBL classrooms and raise questions about EL positioning and support in these spaces. Second, English learners are often marginalized in the mainstream classroom because of their label. The narrow view of the lack of English proficiency many times supersedes the abundant cultural and linguistic knowledge they bring into the classroom. PBL has the potential to provide opportunities where their rich knowledge and experience can be

positioned as tools, and ELs repositioned as competent, capable peers. This dissertation explored the following research questions:

1. What expectations of support do English learners have of their peers and teachers when studying in a mainstream PBL environment?
2. In what ways do sociomaterial arrangements mediate English learner participation in mainstream problem-based learning classrooms?
3. What are the affective dimensions of English learners towards sociomaterial practices in mainstream problem-based learning classrooms?

Synopsis

This dissertation includes three sections written in the style of stand-alone articles. I explore different aspects of the English learner experience in each to better understand the challenges and affordances of problem-based learning. With this research, I hope to aid teachers, administrators, and others who make curricular decisions in thinking about and planning for instruction to provide their English learners with alternative approaches such as problem-based learning. The abstract of each section is as follows:

Section 1: Demands in the mainstream: Adolescent English learner expectations of peer and instructor support in problem-based learning

The purpose of this first section was to understand adolescent English learner (EL) expectations of support in a comprehensive problem-based learning (PBL) high school. The participating English learner students represented an array of native languages, English language proficiencies, and prior academic and life-experience backgrounds. I conducted focus groups and

provided a space for ELs to voice their experiences and expectations of support from their peers and teachers. Findings showed that ELs expected support from their peers with social interactions and collaborative activities. From their teachers, they expected support with understanding the components of PBL and with academic language resources. Findings suggested that community building with peers, linguistic supports for comprehension and participation, and explanations of problem-based learning elements will aid English learners in the mainstream PBL classroom.

Section 2: Looking beyond labels: The spectrum of English learner participation and positioning in mainstream problem-based learning classrooms

Section two, a multiple case study, examined the ways English learners (ELs) participated in collaborative activities in their mainstream high school content area problem-based learning (PBL) classrooms. Adolescent ELs face a number of academic challenges in schools in the United States as they are learning the language of instruction, adjusting to new classroom cultures, and social norms. PBL adds an additional layer of complexity; in this learning approach students are expected to collaborate and work together over extended periods of time to understand and resolve an elaborate problem. This year-long, multiple case study focused on the experience of three ELs at the Washington state-designated intermediate English proficiency level as they navigated through their mainstream math, science, and social studies classrooms. Through fieldwork – including classroom observations, student interviews, and teacher interviews – the data provided a deeper picture of the contrasting ways ELs chose to participate in multiple settings over the course of an academic year. Findings suggested that sociomaterial arrangements in PBL shaped EL participation through agentic reflexive positioning and teacher interactive positioning.

Section 3: English learner affect in mainstream problem-based learning classrooms: A mixed methods study

This mixed-methods section explored the responses of English Learners (ELs) to problem-based learning (PBL) in their mainstream math, science, and social studies high school classrooms. Adolescent ELs face a number of academic challenges in schools in the United States as they learn a new language, familiarize themselves to different classroom cultures and social norms, and adjust to evolving environmental and family dynamics. The implementation of PBL, traditionally used in medical schools, offers many potential rewards, such as collaborative and problem-solving skills and exposure to authentic issues in the real world. The usage of PBL in K-12 has become more popular in the last decade. However, little is known about the experience of non-dominant student groups such as ELs. Using a combination of survey and focus group data (N = 51) of ELs with varying linguistic and academic backgrounds, the analysis focuses on sociomaterial practices and affective variables in PBL. Three dominant themes emerged from the results: contrasting pedagogical environments, potentially powerful social relationships, and connected interests and motivation. Results revealed mixed evaluations of PBL in mainstream math, science, and social studies classrooms. Findings suggested that the examination of three areas when planning and implementing PBL with heterogeneous mainstream classrooms improve the PBL experience: 1) having an awareness of the EL student experience; 2) leveraging the rich linguistic and prior knowledge of ELs as a strength and resource; and 3) differentiating supports for ELs.

Section 1

DEMANDS IN THE MAINSTREAM: ADOLESCENT ENGLISH LEARNER EXPECTATIONS OF PEER AND INSTRUCTOR SUPPORT IN PROBLEM-BASED LEARNING

Introduction

Public schools in the United States have experienced a dramatic change in student demographics in the two decades with a vast number of non-native English speaking students enrolled in all levels of education. By the year 2030, experts project that 40% of all public school students will be English learners (ELs) (Thomas & Collier, 2002). English learners, students whose first language is not English, are the fastest growing school-age population and a tremendously diverse group representing an abundance of cultures, languages, nationalities, and socioeconomic backgrounds. Students who are part of this population often experience a number of challenges in school while learning academic material in a new language and navigating the socio-cultural aspects of school in the United States. With the increase in diversity in our schools, the need to understand and support growth for all students is imperative.

On average, ELs tend to underperform on standardized tests and drop out of school at higher rates relative to their English-speaking peers (NAEP, 2000). For ELs at the high school level, one-half of them fail graduation tests, do not receive their diplomas, and are unprepared for the workforce (Hopstock & Stephenson, 2003). The consequences of a significant portion of the student population being ill-prepared are detrimental not only to the students themselves but also to society as a whole. “In an increasing global society, and in a nation that is linguistically and culturally diverse, it behooves us to build on our linguistic capacities and to understand ways to optimize what immigrants and their children bring” (Hakuta, 2011, p. 173). This diverse population has cultural, linguistic, and rich life experiences to contribute and is willing to work

hard to be successful; however, its members have much more to learn than do their English fluent classmates (Walqui & van Lier, 2010). Suarez-Orozco et al. (2008) explained that ELs are eager to face challenges, but are often unable to achieve academic success on their own.

In an effort to raise achievement, schools have turned to implementing alternative curricula to address the state standards, as well as to promote academic skills such as problem solving and collaboration. Problem- and project-based learning have gained popularity in K-12 in recent years with organizations such as Edutopia and the Buck Institute, promoting project-based learning. Project-based learning is popular as well in charter and alternative schools (cite).

Problem-based learning (PBL) is a type of learning environment where students investigate, explain, and resolve meaningful problems through continuous collaboration with peers and others (Barron et al., 2011; Evensen & Hmelo-Silver, 2000). PBL has the potential to increase knowledge retention over time, as well as to promote hypothetical deductive reasoning and has historically been utilized widely in medical school (Evensen et al., 2001; Hmelo-Silver, 2004; Torp & Sage, 1998). PBL promotes hypothetical reasoning as well as "an understanding of one's own knowledge needs, application of knowledge to problem situations, collaboration, and lifelong learning" (Evensen & Hmelo-Silver, 2000, p. 2). While these benefits have been show for non-EL students, knowledge of the benefits and effectiveness for ELs is limited and inconclusive; especially at the secondary level (Dolman & Gijbels 2013).

PBL is a shift from the teacher-centered, traditional banking model of education (Freire, 1970), in which the teacher deposits knowledge into the students. PBL provides a more student-centered and collaborative environment where collective sense-making and solution-composition are fundamental. Students are presented with authentic problems associated with professional practices and asked to come up with and present a solution through research. Many times,

students are asked to work with peers during the process to come up with a collective solution. The demands of the PBL environment are on students who are still learning English, the language of instruction, are high.

Research on the adolescent EL experience in US classrooms lays out the plethora of challenges these students face inside and outside of schools (Suárez-Orozco, Suárez-Orozco, & Todorova, 2008; Olsen, 1997; Portes & Rumbaut, 2001). Adjustment rate to the new environment and schools varies depending on prior academic experience, socio-economic status, and various types of supports. Suárez-Orozco, Suárez-Orozco, & Todorova (2008) explained that "ample evidence shows that a school's climate drives its students' academic experience. Strong compassionate leadership, engaging teachers, and involved counselor and other staff can set a tone of respect, high expectations, and tolerance" (367). English learners are eager to face challenges but are not often able to do it on their own. With added linguistic and social complexity of PBL classrooms, on top of the shifting classroom environment, ELs will need various types of support to meet the environmental demands.

PBL is defined differently depending on the context. PBL at Petrichor High School, a pseudonym, consists of units in each course that were designed and implemented by teachers in the content area's department. Each of the content areas, math, science, and social studies, have several design teams that created PBL units aligned to state standards and district content requirements. Units were designed with the seven key elements (listed in the Relevant Literature and Key Elements section) in mind to provide an authentic and relevant real-world problem for students to tackle. Many of the units required group work to create a product and/or culminating solution to be presented to various audiences. For many ELs, problem-based learning is a new type of learning environment with activities, content, and academic skills, which are unfamiliar.

This study examined the experience of ELs in a comprehensive high school which is adopting a problem-based learning approach and redesigning curricula to reflect PBL. PHS is located in the Pacific Northwest and had 34 courses redesigned to include PBL. Supported by a U.S. Department of Education (ED) grant under the Investing In Innovation (I3) fund, the teachers and administrators at PHS have been working with the College of Education at the University of Washington, Seattle and the Science Technology Engineering and Math (STEM) partners in the community to plan, design, and implement PBL curriculum. One of the key goals is to increase the achievement for ELs and students with Individual Education Programs (IEPs).

ELs are a diverse group of students in terms of ability, background, and life experience. They need varied supports to be successful in the classroom. At PHS, where PBL is being designed and implemented, ELs will not only face linguistics challenges such as comprehension of materials and discussions in their mainstream content areas but socialization challenges to PBL, shifting classroom culture, and social aspects. Therefore, an understanding of the EL experience across content areas will benefit the teachers and administrators in building and implementing differentiated supports to improve PBL for ELs in mainstream classrooms. This study focused on the supports ELs described as they discussed their experiences in their mainstream math, science, and social studies classes.

This study explored the following research questions:

1. What expectations of support do ELs have of their peers when studying in a mainstream PBL environment?
2. What expectations of support do ELs have of their teachers when studying in a mainstream PBL environment?

English Learner Population at Petrichor High School

To understand the EL experience, an understanding of the term English learner and the demographics of the PHS EL population are important. First, the majority of students who comprise the EL population are US citizens. Nationally, more than 75% of ELs in grades K-5 are second- or third- generation Americans, and 57% of middle and high school ELs were born in the United States (Grantmakers for Education, 2013). The belief that English learners are students who have recently moved to the US is now inaccurate because supporting language learning is not just an issue for immigrant students anymore. More and more students with parents from diverse backgrounds are growing up in the US and attending public schools with a increase in the EL population across the US.

The Washington State Legislature defines English learner (Chapter 28A.180 RCW) as "any enrollee of the school district whose primary language is (one) other than English and whose English language skills are sufficiently deficient or absent to impair learning." This definition is similar to the federal Title III term for this population, which is *limited English proficient* (LEP). Title III states, "The term limited English proficient, when used with respect to an individual – means an individual –

A. Who is aged 3 through 21 years
B. Who is enrolled or preparing to enroll in an elementary school or secondary school
    a. Who was not born in the United States or whose native language is a language other than English; or
    b. Who is a Native American or Alaska Native, or a native resident of outlying areas; or
    c. Who comes from an environment where a language other than English has

had a significant impact on the individual's level of English language proficiency; or

d. Who is migratory, whose native language is a language other than English, and who comes from an environment where a language other than English is dominant; and

C. Whose difficulties in speaking, reading, writing or understanding the English language may be sufficient to deny the individual-

a. The ability to meet the State's proficient level of achievement on State assessments;

b. The ability to successfully achieve in classrooms where the language of instruction is English; or

c. The opportunity to participate fully in society.

Both definitions indicate there is a lack of English proficiency and that English is not the first or primary language of the student. What the definitions fail to indicate is the range of academic experiences these students bring into the classroom. Some ELs at PHS are coming in with having successfully completed rigorous academic courses in their native countries, while others, because of their journeys, have had interrupted educational experiences. This overly general definition can result in a limited view of the students who are seen narrowly as not having English proficiency. This may also be a disservice to the teachers when they may be unaware of the rich academic and life experiences these students have had. For example, by failing to show what language or languages the students are able to communicate in and whether or not they are literate in the other language or languages, teachers may miss out on a positive indicator of their abilities to acquire English (Cummins, 1991; Goldenberg & Coleman, 2010).

At Petrichor High School, ELs make up 15% of the student population. 38% of PHS students speak one of the 45 different reported languages other than English at home. While the most common language is Spanish, the others include Chinese, Korean, Russian, Japanese, Vietnamese, and Tagalog to name a few. Within these language groups are varied academic, linguistic, and life experiences. The term English learner does not display the multitude of layers within the label. The aim of this article is to look beyond the state and federal definitions of English learners and recognize the breadth of needs and supports necessary to foster EL student growth and achievement.

Relevant Literature and Key Elements

There is a substantial body of research on PBL in higher education levels (Goodnough & Cashion 2006), however, there are few studies conducted with the EL population at the secondary level, especially from the student's perspective. I combined two bodies of literature and a third contextual element to contribute to a foundational understanding of the demands of PBL at Petrichor High School. Studies in the first body examined the use of PBL with students who are non-native speakers of English in higher education language contexts. The second body of literature examined PBL use in the mainstream at the secondary level. The third component incorporated the setting specific demands of PBL; the Key Elements, principles that teachers use to design PBL units at Petrichor High School. The literature reviewed explicated the complexity of PBL and offered some potential benefits and recommendations of support that focused on the teacher as a facilitator.

PBL Usage in College Language Classrooms

Research in the post secondary language classroom showed a range of expectations for students who are learning English. Allen and Rooney (1998) examined a business English course

in the US that implemented a 12-week PBL course with international students. The authors used a combination of student and faculty self reports and researcher observations to detail that communication in written, oral, and within a group/team were key stipulations of the classroom. Critical thinking and cooperative learning were also listed as expectations in successfully completing the course. Facilitators introduced self-analysis of communication behaviors and cultural norm assessments early on. Insights into their preferences and those of other students fostered positive collaborative work and healthy team dynamics. Friendships formed through collaboration and flourished because of a common goal, and the discussion and presentation components helped build confidence in students' language abilities. In a Malaysian ESL classroom, Azmin and Shin (2012) found that PBL could be successfully implemented on a small scale where students are familiar with the theory and practice of the approach. Findings showed that PBL promoted collaboration and self directed learning and increased confidence in language usage with areas of improvement in time management and equal distribution of responsibility.

In contrast, Chen et al. (2008) presented findings that showed a high level of anxiety in Taiwanese medical students when participating in the presentation portion of PBL in English. The authors recommended providing ample support to students whose language skills are not fully developed and whose learning preference is different from PBL. In another study conducted in a Malaysian university, PBL methodology was compared to a traditional lecture method in teaching argument writing (Othman & Shah, 2013). Results revealed improvement in language and content knowledge in both the control and experimental group with the PBL group having larger gains. Authors detailed that PBL may be a useful tool for teaching English to non-native speakers as it provides a context for language use. In a study done in Singapore, Le Vasan et al.

(2006) offered a glimpse into the student experience. Students who participated in the PBL units were asked to offer opinions and debate issues in the classroom. They appreciated having a voice and the ability to verbalize their thoughts. They also reported acquiring basic skills in self-directed learning, management of time, and communication.

Interestingly, for many instructors of English for Speakers of Other Language (ESOL), "completing projects is seen as a beneficial method in teaching language and content" (Stoller, 1997). In PBL environments, students engage with content and language to foster problem-solving, independent, and cooperative working skills (Beckett, 2002). Research has found that PBL approaches in language instruction can foster meaningful opportunities for students to use and practice language as well as build community and content knowledge acquisition (Beckett & Slater, 2005; Chan, 2001). PBL studies carried out with English learners, some of which were in international settings, language classrooms, and at the university and graduate levels show multiple demands including increased questioning ability, self-directed learning, and practice in oral language abilities (Allen & Rooney, 1998; Azmin & Shin, 2012; Kang et al., 2012; Vasan et al., 2006).

PBL Use in Mainstream Secondary Classrooms

Research done at the secondary level with PBL revealed content related and peer collaboration expectations. In a PBL study conducted with a high school economics class linking student backgrounds to learning outcomes, which used pre-post test of content knowledge and self reports of background, Ravitz and Mergendoller (2005) determined that while the largest gains in learning were among students who reported low prior achievement, the students who appeared to perform less well than expected based on prior achievement were students for whom English was a second-language. The authors' explanation linked the low achievement to the

language intensive demand aspects of PBL curriculum, which included reading documents, negotiating tasks, and making oral presentations. Grant (2009) examined an eighth-grade geography PBL classroom from the student's perspective and found the students understood that they were expected to direct their own learning. Because many tasks are collaborative and student driven, the students took charge of their learning and teachers took on the role of facilitators who are guiding their students through the process.

Goodnough and Cashion (2006) conducted an action-based inquiry study in a high school science classroom that explored the complexities of the design and implementation process of PBL. Data included student generated work, classroom observation, student interviews, and audio-taped planned meetings. The outcomes of the study highlighted that understanding PBL was one of the keys in the successful usage from the teacher's perspective with the adoption process encompassing multiple layers of planning. Student perceptions through interviews indicated that the majority liked PBL because it promoted active learning, made science relevant, provided variety, and supported group work. The study also pointed out the importance of contextualizing PBL to meet the learning needs of diverse student groups. In another science study, Lee & Bae (2008) examined an 8th grade classroom, which used a structured PBL unit to study volcanoes. The unit was implemented over ten class periods to study two real-life volcanic phenomena. Findings showed that teachers' questions and group dynamics guided and facilitated the students' course of learning, teacher support was necessary in helping students building supportive evidence. Both science studies highlight the important role teachers play in facilitating collaborative work and understanding the expectations of the PBL setting to effectively participate in the classroom.

Kang, DeChenne, and Smith (2012) studied EL students' inquiry abilities in relation to science literacy while experiencing a PBL environmental health science curriculum. In this study, students were asked to go through an inquiry process in order to explore and find the sources of contaminants to the water quality concern in an imaginary town. Examining the pre- and post-unit written responses to environmental health issues, the students using PBL performed significantly better in posing active inquiry questions and generating hypothesis-driven approaches to inquiry into their questions. Belland, Glazewski, and Ertmer (2009) conducted a case study of how members of a small group in a mainstream seventh grade science class interacted while completing a PBL unit on the human genome project. The small group consisted of one student with special needs and two average students. Students were asked to plan and assume a position based on their stakeholder perspective on the human genome project. The tasks for the unit included research on their positions and arguing in favor of their views during a debate at the end of the unit in front of a panel of judges. In analyzing the conversation along with video and interview data, results showed that each group member filled a unique role and suggested that mainstreamed EL students have the potential to effectively engage with PBL when given a specific set of responsibilities. PBL may also increase motivation and social confidence of students with special needs. The authors recommended three key ideas when implementing PBL in the mainstream: teachers must facilitate effective group interactions and provide additional scaffolds; and students should reflect on each day's work especially around the roles they fulfilled.

The studies conducted in the mainstream classroom at the secondary level show PBL asks students to meet a number of expectations including self-directed learning, group interactions, and research in order to foster deeper learning through interaction and collaboration

(Grant, 2009; Goodnough & Cashion 2006). However, they also make clear that it is important for teachers to support diverse student groups and contextualize PBL (Ravitz & Mergendoller, 2005). Additionally, students and teachers will benefit more from PBL if they are familiar with elements of the learning environment and purposeful scaffolds (Belland et al., 2009; Lee & Bae, 2008).

Petrichor PBL Key Elements

The third component of understanding the demands of the PBL environment stems from the context. Petrichor High School has adopted the PBL approach and redesigned content area curriculum to reflect problem-based learning. The foundation of the curriculum is based on seven key components (see Table 1).

Table 1
Petrichor High School PBL Key Elements

Key Element	**Explanation**
Authentic Problems	Students work on problems that resonate with the student world as well as with powerful developments in the broader world
Authentic Assessment	Authentic assessment provides regular opportunities for students to reflect on, articulate, and present what they've learned
Culturally Responsive Pedagogy	Culturally responsive pedagogy begins with a mindset that student differences are valued and a curriculum that reflects the diversity of PHS students
Use of Expertise	Students and teachers are encouraged to take intellectual risks in accessing novel forms of expertise to inform their learning.
Student Voice	Student participation and choice in the planning, execution, and evaluation of their work increases their engagement

Collaborative Groups	Just like their teachers, students work in collaboration with their peers to identify and explore problems and to develop their ideas into solutions
Academic Discourse	Students learn the appropriate styles and norms of communication true to disciplines/subjects they are studying, including ways of talking and representing ideas in writing, graphically, and visually

Teachers in each content area, math, science, and social studies, formed design teams wherein they collaborated on redesigning the content for the courses in each of the content areas. The goal of the design team was to design PBL curricula that encompassed the seven key elements while addressing specific content for each course. The design teams varied in their productively depending on their understanding and beliefs around PBL. The math department had the least amount of success according to self-assessment and PHS administrators with designing and implementing PBL courses while science and social studies were able to develop and carry out a number of units that incorporated the key elements. The key elements were incorporated into each of the PBL units the teams designed. Each element represented a component of PBL administrators and teachers thought were important in helping prepare students for the real world, college, and beyond.

In synthesizing literature on PBL use with ELs and PBL use at the secondary level with the contextual PBL elements of Petrichor High School, the range of expectations for ELs span from linguistic tasks such as sharing opinions in written and verbal form, presentations and working with peers in groups to research associated with specific content and self-directed learning. Recommended supports included an explanation of PBL elements and facilitation of group work. This study builds on the previous literature in focusing on the specific supports that

are beneficial for ELs in PBL. I extend the literature by examining supports across multiple content areas. Specifically, I focused on what English learners expected from their peers and instructors across mainstream math, science and social studies PBL classrooms.

Conceptual Framework

Given the importance of expectations in the PBL mainstream settings, I am using part of Bell's et al. (2013) cultural learning pathways (CLP) framework to account for the elements and influential factors of the context where ELs are participating in PBL.

CLP draws from situated learning (Lave & Wenger, 1991) and the diversities of situations of social practice theory (Drier, 2009). Lave and Wenger (1991) viewed learning as a social process that is situated in a particular context. The CLP framework highlights situated events, or a sequence or constellation of situated events as multiple events that occur over time, where learning transpires between places, actions and positions. Drier's social practice theory (2008) also contributed to the CLP framework by accentuating that the participants are shaped by the culture of their context, meaning they bring and contribute previous experience, interests, identities, and materials, defined as *sociomaterial practices* that influence their participation in the situated events.

For this study, understanding the environment through expectations presented is key to understanding the EL experience. Drier (2008) also added that participants should be studied in a variety of contexts to gain a fuller understanding of cross-setting connections. This study took a holistic view of the EL experiences in the mainstream classrooms by examining their experience in math, science, and social studies classrooms. I am using the places portion of the CLP framework, which is composed of the expectations and sociomaterial arrangements of the context. "Places are not neutral settings. They are politicized, culturally relative, historically

specific and socially constructed, and are perceived by us through our own cultural lenses and value systems" (Bell et al., 2013, p. 276). The places for this study are the mainstream content area PBL classrooms at Petrichor High School.

Figure 1. Conceptual framework adapted from Cultural Learning Pathways.

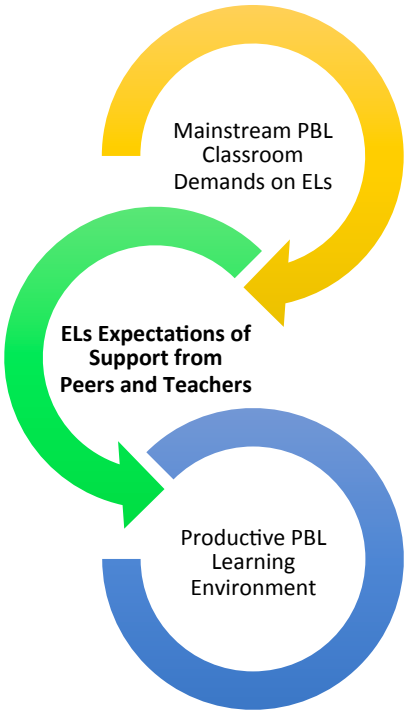


Figure 1 above shows the framework for the study in emphasizing three components. The top circle is understanding the demands of the mainstream PBL classroom on ELs, which stems from the literature as well as the PBL specific to Petrichor High School. Understanding the expectations of the environment provides context to understand the EL experience within the environment. The middle circle is the focus of the study, which is the types of supports ELs need from their peers and teachers. With added linguistic and social complexity of the mainstream content-area classrooms on top of the PBL shifting classroom environment, ELs will need various types of support to meet the environmental demands. The bottom circle represents the goal of creating a productive learning environment for ELs and their peers.

The CLP structure shapes the examination of EL expectations because it both captures the student experience and accounts for expectations. Focusing on the connection between the demands of the mainstream classroom, the PBL environment, and the student experiences will contribute to a better understanding of the experience and challenges adolescent ELs face within this particular learning environment. "Organizational and institutional activities often shape very specific social expectations for participation and learning" (Bell et al., 2013, p. 276). The combination of PBL and mainstream expectations while setting the bar high for students also presents a number of challenges for ELs to navigate. Without proper scaffolding and support, ELs are unlikely to reap the potential benefits non-ELs do in PBL learning environments.

Study Design

This study aimed to better understand the expectations of English learners have of their peers and teachers in the mainstream PBL environment. I conducted focus groups with ELs at Petrichor High School to gain a robust picture of the participation of ELs. Each student's unique backgrounds, prior academic experience and knowledge, interests, and language proficiency contributed to their involvement in the classroom**.** I met with groups of two to five students during their English Language Development (ELD) class and engaged in a conversation, sometimes using their native languages or translators, to gain a deeper understanding about their engagement with PBL classes and units.

Selection of Site

The setting of my study was Petrichor High School, a pseudonym, located in the Puget Sound area of Washington. I chose this particular site because of the diverse student population and its adoption and redesign of curriculum to reflect PBL used across content areas. Forty percent of the student body speaks a language other than English at home, with 15% of the 1050

students having an EL designation. There are over 45 languages spoken in student homes, and 40% of student qualify for free and reduced lunch.

I was part of the research team working in collaboration with the school during the design and implementation of novel problem-based learning units, and had a working relationship with many of the classroom instructors the ELs were in. I was also involved in implementing pilot units at PHS from a previous curricular development project, where I worked together with a number of PHS teachers in using a blended digital curriculum. During my time in the classrooms at PHS, many of the classroom teachers expressed concern around their ELs participation and inquired about how to better support their learning. The ELs had also expressed their frustrations with challenges in passing conversations. The focus group provided an opportunity for the ELs to share their concerns and voice their opinions with their EL peers.

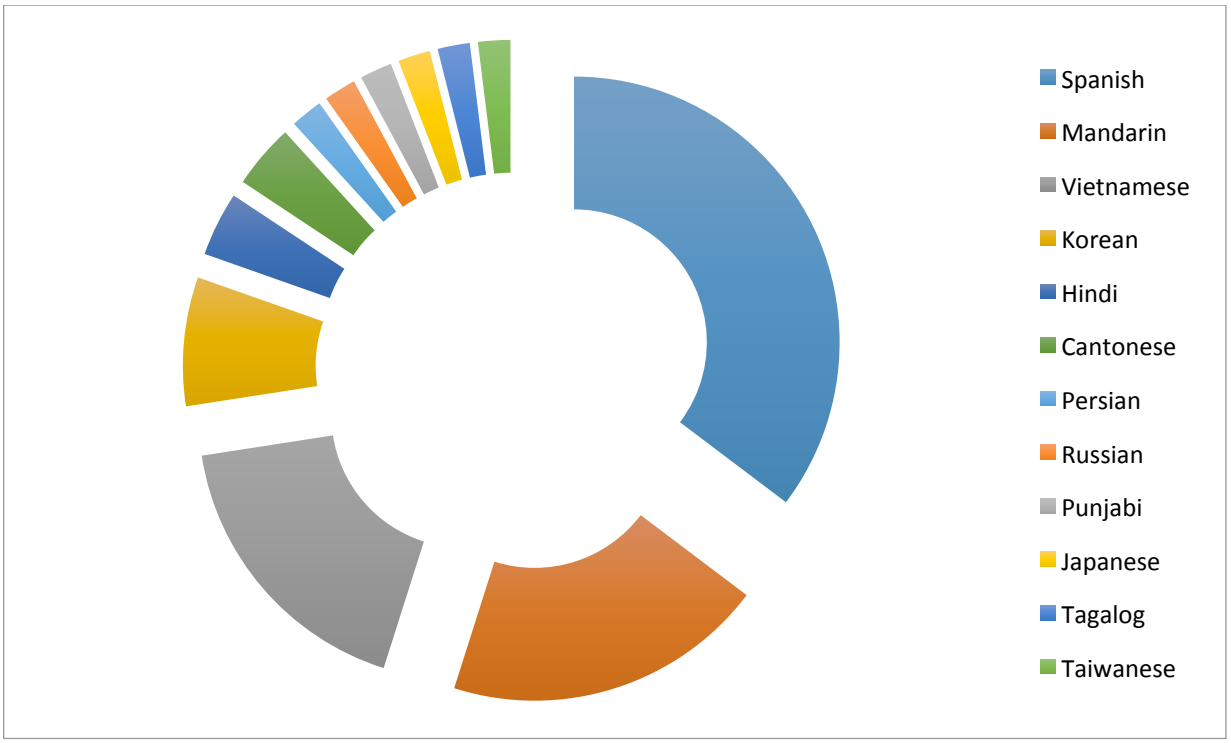
Selection of Participants

The participants in the study were selected through purposeful sampling to reflect the overall PHS context and to include various backgrounds, academic, linguistic, and life experiences (Merriam, 2009). The selection was aided by the English language development (ELD) instructors at PHS: Duke Slater and Kim Sarafian, both pseudonyms. Duke and Kim taught the 11th and 12th grade and 9th and 10th grade English development courses respectively. Duke taught an additional English course for ELs who needed additional language support. Both are experienced instructors and have been with the school district for over five years.

Focus groups. I selected a wide variance of language background and proficiency level among the participants intentionally to encompass the scope of academic, linguistic, and life experiences that the English learner label does not illustrate. Fifty students made up the 13 focus groups, which were conducted during the ELD classes. I configured the groups based on advice

from Duke and Kim with regards to peer dynamics since the focus groups conversations took place during their class. Each group's demographics are detailed in Appendix 1. The participants in the focus groups consisted of 23 females and 27 male students. There were eight ninth-grade, nine tenth-grade, and 33 eleventh- and twelfth-grade students. The range of stay in the US was from two to 60 months with 13 students at the beginning Washington English Language Proficiency Assessment (WELPA) level, 17 at the intermediate WELPA level, and 20 at the advanced. The participants spoke ten different native languages shown in Figure 2. In order of quantity, there were 18 Spanish, 10 Mandarin Chinese, nine Vietnamese, four Korean, two Hindi, two Cantonese, one Persian, one Punjabi, one Japanese, one Tagalog, and one Taiwanese speaker.

Figure 2. Native languages of participants in the focus groups



Data Sources and Collection

The data for this article comes out of a larger, year-long qualitative multiple case study of the EL experience in problem-based learning across mainstream contexts.13 focus groups were conducted with the average length 25 minutes. The format was semi-structured with the following focal questions:

1. Describe an experience or a time when you were engaged in something fascinating that you were interested in.
2. Have you experienced something that was engaging and interesting at PHS? If yes, in which class?
3. Do you like working with other students in your math/science/social studies class? Why or why not?
4. Do you like working on problems/projects in your math/science/social studies class? Why or why not?
5. Do you feel connected to the problems/projects? Why or why not?
6. What would you change to help better your experience at PHS?

Responses and analysis for question 3 is not included in this study and will be analyzed and discussed in a separate article. Focus groups were held at the end of the 2013-2014 school year to ensure that each participant had some experience with PBL during her/his mainstream classes. Each focus group session was audio- and video-recorded. The student grouping of each session was done with consultation from the ELD instructor with language consideration and classroom dynamics and relationships. The number of students ranged from 2 to 6 per focus group, and the focus groups were conducted over a period of three weeks in their ELD class.

Each focus group began with my explaining the purpose of the activity, which was to

better understand the EL experience and attempt to improve their experience at PHS. I provided a copy of the focus group questions to the participants in English and their native languages and gave them a few minutes to look it over and think about the questions. During the conversation with the participants, I encouraged each EL to provide a response to each of the questions and to talk to each other instead of directly at me. Participation varied among the focus groups with some ELs offering more responses and explanations than others. At times, the participants would translate oral responses for each other in their native languages to English for me to understand and some ideas were exchanged in Mandarin Chinese. I ended the focus groups by asking if the participants had anything else they wanted to share and thanking them for their willingness to participate.

Data Analysis

Because grounded theory is foundational in this study, I started the analysis when data collection began (Charmaz, 2014). The focus questions were the starting point of the conversation; however, students guided the topics. There was variation in the topics that were covered in each of the focus groups. With previous studies having highlighted ELs performing less well than non-EL students in a PBL setting (Ravitz & Mergendoller, 2005), this study aimed at delving deeper into the EL experiences in math, science and social studies classrooms when PBL instruction was the dominant mode of instruction.

After the completion of data collection, I began the analysis with the videos and the content logging and transcription of the focus groups' dialog. The focus groups conducted in a language other than English were translated into English. In examining the logs, I started with the first research question: "What expectations do immigrant ELs have of their peers when studying in a PBL-rich environment?" The data were examined for descriptions of the classroom

experience related to PBL. These moments were flagged and given a category label (Merriam, 2009). Upon further inspection, categories were grouped into threads. These steps were repeated with the second research question: "What expectations do immigrant ELs have of their teachers when studying in a PBL-rich environment?" Throughout, I wrote analytic memos and charts to organize and collate evidence. I detailed my process, codes, and verified claims in order to have a credible path of analysis. After coming to conclusions, I searched for counter evidence in the focus group transcripts and content logs to validate the claims.

Findings

With little known about the adolescent EL experience with PBL (Dolman & Gijbels 2013), the focus groups provided a space for ELs to voice their journeys, struggles, and triumphs in the mainstream classrooms. The findings address the study's two research questions: What expectations of support do ELs have of their peer when studying in a PBL-rich environment? What expectations of support do ELs have of their teachers when studying in a PBL-rich environment?

English learner expectations of peer support in the mainstream PBL environment

High school can be a minefield to navigate academically and socially as a non-EL teenager. With the added element of language and cultural barriers, the process compounds in complexity for English learners. At Petrichor High School, where problem-based learning is being implemented in all content areas, ELs struggled with the various demands of the PBL environment. When ELs were asked about the changes they would make to better their experience at PHS, the two most frequent responses were for more support from their peers and from their teachers. Other responses included structural adjustments, such as school schedules and standardized tests and the regulation of technology use in the classroom, more field trips,

and less homework.

Seventeen of 50 (34%) EL participants said they wanted non-EL students to be more helpful in navigating the PBL environment. When asked to be more specific about the types of peer support, the examples ELs provided were sorted into two major categories: social interactions and collaborative activities. Each of these s discussed below.

Negative peer interactions. English learners at PHS are immersed in an environment where the language, culture, and classroom norms are often unfamiliar. Many ELs are anxious in the mainstream classroom and become reticent as a result. In PBL where students are frequently asked to work collaboratively, social interactions forced ELs to engage with their non-EL peers, who made up the majority of the mainstream classrooms. When EL participants discussed their social interactions with non-EL peers, a number of students shared negative experiences in the mainstream classroom with non-EL peers:

Lourdes from Mexico in the US for 7 months	"Sometimes American students just ignore you" (when I ask for help)."
Veronica from Taiwan in the US for 24 months	"Most of them are nice, but some of them just making fun of you."
Ting from China in the US for 36 months	"Students (non-ELs), some of them, they don't know what to talk to us about, we just, sometimes I feel like I'm annoying them because I don't know what's going on."

Kasey from Guatemala in the US for 42 months	"For me, I have Algebra II and some of the students are racist. I asked one of them for help and one of the white boys was like you don't know how to do this? It's really easy. You should pay attention. I was pay attention, and I was like ok, Sorry, I was not going to be bothering you anymore."

Adjusting to a new environment takes time and guidance, and ELs are in a vulnerable position when asking for help and are often not received kindly. Ngoc from Vietnam who has been in the US for 18 months explained with an optimistic attitude, "US students need to communicate more with ELs. Really hard to tell them to do that. We should be positive and say hi. We need effort from both sides." ELs from all countries with varying length of residence expressed wanting to understand what is going on during class. However, their requests for support from their non-EL peers were often declined or redirected. Elena from Guatemala in the US for 36 months explained, "Help us understand what to do instead of telling us to ask the teacher." Because ELs are still learning the language of instruction, seeking support in comprehending activities, directions, and content is to be expected.

Collaborative activities. Group work emerged as the second most discussed issue ELs expected their peers to provide support with. One major component of PBL is collaborative activities where students are asked to work together to complete a project or to provide a solution to a problem. Students were asked to work together on several PBL units across the content

areas. Because ELs come with a range of academic backgrounds, the idea of working extensively with other students on an assignment was a new classroom norm in comparison to their previous academic experiences:

Jae from Korea in the US for 4 months	"I work by myself in Korea. I use textbooks and take tests. And listen to the teacher."
Anjula from India in the US for 30 months	"We never worked in groups or projects in my country. The teacher gave you a question and the answer and you copy in a notebook. And then the next day, they give you a test."

Despite their unfamiliarity with group work, ELs understood the potential benefits of having peers to aid in participation. Chen from China who has been in the US for 48 months explained, "I prefer to work in groups because I know other people can help me." A tension existed between understanding the potential benefits of working in groups and the social anxiety around interacting with non-EL peers.

ELs expressed that they felt a lot of pressure when working with non-EL peers to tackle complex tasks as part of group work even though they could not always perform at the level of non-ELs. ELs provided reasons for anxiety with group work including challenges with language, the responsibility of completing their portion of the project, and the weight of their component of group project on the group members' grade. ELs expressed their frustration with collaborative work:

Nelly from Iran in the US for 9 months	"Some students (non-ELs) they help you. They want you to want you to understand. Some other type of students, they don't want you to waste their time and their grade, so in that time, they are just so hard."
Mimi from Japan in the US for 18 months	"It seems like (non-EL peers) they are saying, I don't like you because you are not helpful, and then we don't want to participate anymore."
Suraj from India in the US for 20 months	"If the work is distributed equally, it's ok. If not, I would rather do by myself."
Thy from Vietnam in the US for 48 months	"We can do group work. (Non-EL peers) know the English, so they can explain sometimes. It still hard to understand."
Zhong from China in the US for 48 months	"I don't like working in groups here. I feel like my language is not good, so sometimes I'm shamed with talking to people, because it's so hard to explain my ideas. They may not understand."

Similar to social interactions, ELs revealed wanting support from their peers to help them contribute to the collaborative project. They see their non-EL peers as capable, knowledgeable and having language proficiency, but often unhelpful. Some ELs expressed a preference for working with EL peers instead of non-ELs because of the common understanding of struggles with language. Expectations of support of non-EL peers were rooted in social aspects of the classroom and PBL.

English learner expectations of teachers in the mainstream PBL environment

Teachers played an important role in the implementation of PBL at Petrichor High School from identifying and defining the meaningful problems associated with their content area to planning out units, resources, and assessment. Their role also included the facilitation of PBL components such as group work and supporting a diverse range of learning needs including that of English learners.

When asked about the types of supports the ELs wanted in the classroom, 39 of 50 (78%) students talked about the need for more assistance from teachers. ELs found a number of teachers to be accommodating and extra helpful to them. Ting from China explained, “Teachers are nice and they help me a lot this year, especially Duke Slater (pseudonym for ELD teacher). We need to have a lot of writing, and I always bother him to help me, and he always so patient and explain to me a lot and give me so many helps.” Many of the ELs turned to their ELD instructor because they felt comfortable asking them for help, as the instructors fully understood the challenges they faced in the classroom and believed in their potential. Maria from Guatemala explained, “Teachers can be nice to everyone, not all the time, sometimes you need do the job for students to understand, need to make sure the students understand what is going on, check homework all the time.”

Unfortunately, the ELs did not find all teachers to be friendly and helpful. Quach from Vietnam explained, “Some teachers are not helpful. They know about you (EL status), but if you ask them questions, they don’t care.” Another student in the same group expanded, “Teachers, some are so mean. They don’t want to help you. You ask them questions and they don’t answer.” ELs were able to sense that some of their teachers did not want to support their learning if it meant having to provide additional supports beyond their required teaching load.

The teacher support ELs asked for were grouped into two major categories: understanding PBL and language assistance. Assistance with aspects of PBL such as grouping during collaborative activities and regulation of technology use were mentioned while slower and clearer teacher explanations and more time to complete work were given as examples for language support.

Understanding PBL. PBL at PHS consists of units in each course that are designed and implemented by teachers in the content area’s department. Each of the content areas, math, science, and social studies, have several design teams that create PBL units aligned to state standards and district content requirements. Units are designed with the seven key elements (listed in the Relevant Literature and Key Elements section) in mind to provide an authentic and relevant real world problem for students to tackle. Many of the units require group work to create a product and/or culminating solution to be presented to various audiences. For many ELs, problem-based learning is a new type of learning environment with activities, content and academic skills which unfamiliar.

When asked whether ELs connected to the PBL in their content area classes, 28 of 50 (56%) said no. Many ELs felt overwhelmed by PBL while some did not see the value of PBL. ELs were accustomed to classroom environments that where teachers are positioned as

knowledgeable and where teachers present the knowledge to the students. Anya from Russia explained, “I don’t like working on PBL because I prefer to be writing things, and the teacher to be explaining.” Part of the ELs’ disconnect with PBL is their lack of comprehension of its structure and components.

Lourdes from Mexico in the US for 7 months	“Teachers provide more support. She should go around an say you have to participate.”
Nelly from Iran in the US for 9 months	“I just, I really hate PBL. Maybe the teachers can give us easier and say you can do this because you can’t speak really well English and another student, like (non-ELs), they are really mean.”
Sonya from Mexico in the US for 10 months	“(PBL) is hard because I don’t understand, and the teacher said oh you have this project and you need to do this, but it’s still hard.”
Anjula from India in the US for 30 months	“Explain things easily. They ask do you understand, everyone stays quiet but we don’t really understand.”

Guo from China in the US for 36 months	"Help us more. Guide us through the PBL activities."

For ELs who are unfamiliar with the norms and rules of PBL activities, they asked for clear instructions for and encouragement of participation from the instructors.

The demands of PBL in the mainstream include collaboration with peers to complete a range of activities from worksheets to complex projects that present a solution to a problem related to the content area. ELs find this challenging because they must communicate in a language they are still learning. Maria from the Philippines explained, "There are issues when working with other students because we speak different languages." ELs found peer collaboration to be overwhelming at times without proper facilitation.

Group member selection was also an issue of concern for English learners. Alvarez from Colombia explained, "Teachers should set up groups because it is hard to find other team members." Suraj from India provided another example, "More teammates. Like everyone chose their group first. Nobody knows me there, so I'm the only person left and the other two students in my group never shows up to class." Yuan from China said, "When doing PBL, teachers will set up the groups. I don't want to find my group members because I won't be able to find someone to work with me." Collaborative activities including projects that required multiple class periods and ELs and non-ELs to work together to complete the requirements was the most discussed aspect of PBL for ELs. Expectations of teachers to help facilitate this process was salient in the conversations.

Language assistance. Instruction, interactions, and assignments at SHS were all conducted in a language ELs are still mastering. Engaging with content specific concepts in

math, social studies, and science in a new language coupled with PBL components can be immensely challenging. ELs who enjoyed learning in a particular content area in their native countries were turned off by components of PBL. Anya from Russia explained that "I don't like projects in there, the words are really hard and I can't understand the words, I love(d) geography in my country." In this case, the student enjoyed social studies in her home country but is unable to feel the same way her because of the language barriers. ELs provided a number of suggestions for support with language from teachers:

Hao from China the US for 5 months	"Slow down a bit when explaining important in in concepts."
Alejandro from Peru in the US for 7 months	"When teachers are explaining, if they could write it down. I don't always understand it, but I am trying."
Ngoc from Vietnam in the US for 18 months	"The biggest problem for ELs in the mainstream class is communicating. ELs are going to be on their phone because they cannot talk with anyone. They just put themselves in a small spot because they can't do nothing. Teachers can help."
Vera from Taiwan in the US for 24 months	"When I try to ask (another EL) in Mandarin what going on in class, my (teacher) says to be quiet, but

	I say I'm translating, and he says not now, and he talks really fast. If he doesn't want me to translate for her, how will she understand? And because we are speaking Mandarin, one of the (non-ELs) will say speak English, and I said I try but she can't understand."
George from Guatemala in the US for 24 months	"Little more support around learning English."
Chen from China in the US for 48 months	"Give (ELs) time in class to know what we need to learn and the assignments. Help us know which part is the most important thing to understand. If we don't understand the main concepts, we won't be able to understand others."
Elena from El Salvador in the US for 72 months	"Help us more, not just give us stuff, not just oh you have to do this, we don't understand what we are supposed to do."

ELs communicated that they wanted a number of teacher supports with regards to language including the use of native language, additional check in time to ensure comprehension, and understanding foundational concepts related to content. Luis from Mexico stated that is he is

engaged with content “when I understand what is going on in class.”

Many students expressed anxiety with presentations as part of PBL. Suraj from India explained, “I learned a lot from every project, but it’s hard to do the presentation part.” Speaking in front of an audience of peers can be a nerve-wracking experience for many. For students who are still learning English, the experience can be paralyzing. However, there are moments of relief as Mimi from Japan conveyed, “I liked the broadcast project (in social studies) because when we presented, we could hide behind a poster board because it was a radio broadcast.”

ELs address desiring support from peers and teachers with socialization with PBL components and the learning environment. They also wanted linguistic assistance in comprehending activities and content.

Discussion

Problem-based learning can be a powerful means of learning when implemented well (Darling-Hammond, 2012). PBL provides a text rich and authentic environment that challenges students to engage deeply with a content related problem. Students have opportunities to choose their topic, learn and practice collaborative and problem solving skills with peers, and contact with disciplinary experts outside of the school.

The central goal of this study was to understand the experience of English learners with problem-based learning in mainstream classrooms specifically focusing on the expectations of support ELs have of their peer and teachers. Through focus groups, ELs of various linguistic and academic backgrounds at differing levels of English proficiency expressed their interactions and frustrations with PBL. Findings suggested that ELs face a number of linguistic, socialization, and environmental challenges and want teachers and peers to help mitigate these barriers through providing guidance and resources.

The study contributes the growing research on problem-based learning in K-12 with specific focus on the experience of students who are still acquiring English. The findings of this study showed that English learners expect support from their peers with social interactions and collaborative activities and support from their instructors with understanding and scaffolding problem-based learning and linguistic resources to participate in mainstream PBL classrooms. The shifting of instructional approach to problem-based learning was unfamiliar many of the ELs. The findings of this study extend and refine the extant literature regarding English learners and problem-based learning and provide several salient suggestions as follows. These suggestions are particularly aimed at teachers and educators who are designing and utilizing problem-based learning with a heterogeneous population of students including English learners.

First, non-EL peers in the mainstream can be a powerful source of support in building inclusive mentoring communities (Lave & Wenger, 1991), however, they can also be an equally powerful source of distress. The EL participants in this study shared painful anecdotes of being ignored to teasing and bullying by their non-EL peers. Because many of the activities in PBL require students to work collaborative with their peers, interacting productively with peers is a main component in succeeding academically. Teachers play an essential role as a facilitator of community building to promote a productive group work in a heterogeneous classroom environment (Cohen, Lotan, Scarloss, & Arellano, 1999; Cohen, Lotan, Scarloss, Schultz, & Abram, 2002).

Second, the demands of problem-based learning on English learners are high. Understanding the classroom demands alongside the expectations of ELs to meet these demands are the focus of this study. The cultural learning pathways framework (Bell et al., 2013) was used to highlight the importance of investigating the places of learning, which encompasses the

expectations. The seven key elements at PHS frame the PBL units that are designed and implemented across content areas classrooms. Students were asked to collaborate, conduct research, present to an authentic audience, and use a variety of knowledge and skills to solve real-world problems. English learners who are unaccustomed to learning through problems, research, and collaboration, were confused and had mixed reactions to PBL.

Finally, English learners are in the process of acquiring the language of instruction in most, if not all of their classes at PHS. The task of simultaneously processing linguistic and content knowledge while grappling with a different type of instructional approach can be overwhelming. This means that they will most likely need additional time to process content and need additional linguistic support. Guidance and resources have shown to help ELs acculturate to a new environment that includes a new language and in this case a new instructional approach (Suarez-Orozco & Suarez-Orozco, 2001).

Guidance

English learners possess a range of academic knowledge and background, linguistic proficiencies, and life experiences and need varying types of guidance to be successful in the mainstream PBL classroom. ELs have expressed the need for teacher and peer support in order to participate productively.

Teachers can help guide ELs through thoughtful planning of PBL curriculum, facilitation of activities, and building community in the classroom. Because PBL requires a number of academic skills such as research, collaboration, and presentation, ELs would benefit from teacher assessment of whether their ELs possessed the skills to be successful in the PBL environment. And if not, teachers will need to teach and equip them with the skills and opportunities to practice these skills. In addition to academic skills, teachers will want to identify what language

skills are needed to participate in the PBL environment and how can they prepare ELs to productively engage. Walqui (2008) explained the importance of explicitly teaching academic strategies, sociocultural expectations, and academic norms to ELs because they are new to the environment and culture. The planning and teaching of ELs through problem-based instructional approaches will require additional effort. Studies have shown that ELs are most successful when teachers are prepared and willing to teach them (ex. Coady et al., 2008). Providing an explanation of PBL practices and norms, and its benefits would provide ELs with a better understanding of the structure and potential rewards of engaging with a more complex type of instruction and learning environment.

Another aspect teachers can guide ELs in is becoming part of the classroom community by fostering peer relationships and facilitating community building activities. Wilhelm (1999) recommended modeling and explicitly explaining collaborative activity roles because most students are uncomfortable with launching into self-directed work. Fostering effective collaborative techniques and behavior are pivotal in ensuring students are working efficiently and productively and feeling supported by the team for ELs and non-ELs. Using classroom culture to develop a community of learners "to which all students belong" (Walqui, 2008, p. 104) is important to alleviate ELs' anxiety with group work. Non-EL peers can also contribute to engaging in productive peer work by showing compassion to their EL peers. ELs mainstream classmates can offer support in the form of encouragement, answering comprehension questions, and providing advice in navigating the class and PBL units.

Resources

PBL has shown to be challenging for students who are still learning English, however, allocating resources may mitigate some of the difficulties. ELs need resources to aid in

comprehension of the content and activities. In order for ELs to participate productively in mainstream PBL classrooms, they need to understand the content being presented. Migliacci and Verplaetse (2008) outline providing accessible content as one of the key components to whether ELs are successful in the mainstream classroom. The concepts and ideas that are part of the specific content area need to be presented in a way that ELs are able to comprehend it or ELs to need to be provided the strategies to access the content. Resources such as native language materials, videos, and websites can provide a foundational understanding of content. Other ELs who have higher levels of English proficiency and similar home language can also be used as a resource.

Teachers can also use ELs themselves as a resource. Because ELs have assorted academic, linguistic, and life experiences, Walqui (2008) recommends "us(ing) students' experiential background as a point of departure and an anchor in the exploration of new ideas" (p. 107). ELs also bring in their own strategies and resources which teacher can leverage for future PBL planning and other learners. Other resources that may be helpful include strategies to complete extended reading assignments, abridged or summary versions of extended readings, and sample projects and products students are expected to complete. Connections to prior knowledge and current interests also be turned into resources.

English learners cannot perform at the level of non-EL peers without support because instruction is provided in a language they are still learning. Also, the PBL environment demands are different than many ELs' previous academic experiences, therefore, support around understanding the components and expectations and how to be successful in this classroom will be key aiding their participation. In addition, guidance around content comprehension and with linguistic resources will alleviate anxiety ELs have with mainstream PBL classrooms.

Researchers can use this study as a springboard for additional investigations into PBL and English learners. This study was completed in a public high school that is in the process of redesigning all courses to reflect problem-based learning. More research is needed to elucidate what happens in the classroom and how, if at all, this type of curriculum contributes to content and language learning for ELs.

Questions such as the language proficiency necessary for successful participation and the solutions to overcome challenges will contribute to better supporting students. With cited benefits of increased motivation, autonomy, and critical thinking skills gained through authentic projects, additional research on PBL is necessary to determine whether its potential applies to ELs in the mainstream setting.

Limitations

Although this study contributes to the growing understanding of the experience of adolescent ELs in a PBL setting, it is limited in a few ways. First, it would have been beneficial to include non-ELs for comparison in exploring the types of expectations and challenges students face in determining whether certain adversities are EL specific or experienced by both populations. Second, because the students are still learning English, having most of them give an account their classroom experience in English may have limited the depth and breadth of explanation. If they were all able to depict their experience using their native language, more subtleties and precision may have been achieved.

Despite these limitations, the study revels important data on the EL experience as teachers and administrators continue to improve curriculum and instruction to address student needs. Challenges that ELs face must be addressed, as they require language and contextual support as they navigate through mainstream classrooms (Janzen 2008).

Conclusion

Problem-based learning has the potential to provide a rich learning environment for English learners to engage in content and academic language learning. Components of PBL such as collaborative group work and interactions with authentic problems offer opportunities for language input and output. ELs, however, will not naturally benefit with mere opportunity to explore problems in the classroom. Incorporating resources and scaffolding content, activities, and concepts will one of the keys in supporting the participation of this population of students. While not definitive by any means, the findings of this study allude to a need for teachers to thoughtfully plan differentiated supports for ELs and the ways non-EL peers can aid ELs in the PBL mainstream environment.

With the increased number of English learners in public schools, teachers and administrators will need to be more purposeful in planning and supporting this population that represents a vast range of backgrounds, culture, and knowledge, which are resources to be leveraged in the classroom. De Jong and Harper (2005) explained, "Until ELLs are explicitly included at all levels of educational policy and practice, we can expect them to remain outside the mainstream in educational achievement. If, on the other hand, we recognize and include these students and their needs, we have a greater chance of meeting the needs of *all* learners" (18). English learners have much to offer, especially in the PBL environment where student expertise is valued, and need to be provided with appropriate resources and skills by teachers to be successful in schools and beyond.

SECTION 2

LOOKING BEYOND LABELS: THE SPECTRUM OF ENGLISH LEARNER PARTICIPATION AND POSITIONING IN MAINSTREAM PROBLEM-BASEDLEARNING CLASSROOMS

Introduction

Problem-based learning (PBL) is an approach to learning where students are asked to investigate, explain, and resolve meaningful problems through continuous collaboration with peers and others (Barron, Schwartz, Vye, Moore, Petrosino & Bransford, 2011; Evensen & Hmelo-Silver, 2000). PBL has the potential to increase knowledge retention over time as well as to promote deductive and inductive reasoning. PBL also has been shown to increase "an understanding of one's own knowledge needs, application of knowledge to problem situations, collaboration, and lifelong learning" (Evensen & Hmelo-Silver, 2000, p. 2). Historically, PBL has been widely utilized in medical school (Evensen, Salisbury-Glennon & Glenn, 2001; Hmelo-Silver, 2004; Torp & Sage, 1998). Problem-based learning has gained popularity in K-12 in recent years with foundations such as Edutopia promoting PBL usage in the content areas.

PBL shifts the traditional teacher-centered classroom to a more student-centered and collaborative environment wherein collective sense-making and solution-composition are fundamental. Teachers present authentic problems associated with professional practices and ask students to work with each other to come up with and present solutions through research. Crucial benefits for students when they work together on learning activities include improved achievement, the development of positive peer relationships, and improvement in student self-concept, social interaction, and time on task (Darling-Hammond, 2012).

PBL is defined differently depending upon the context. PBL at Petrichor High School, a pseudonym, consists of units in each course that were designed and implemented by teachers in

the content area's department. Across the content areas of math, science, and social studies, there were several design teams who created PBL units aligned to state standards and district content requirements. Units were designed with seven key elements (see Appendix A) in mind to provide an authentic and relevant real-world problem for students to tackle. Working in collaboration is a fundamental component of PBL at PHS. Students at PHS worked in small groups to make sense of the content and identify knowledge required to come up with a solution to the complex problem at hand. Many of the PBL units asked students to work collaboratively over a number of weeks to create a product and culminating solution to be presented to authentic audiences who are stakeholders or experts associated with the content.

The demands of the PBL environment are high due to the complexity of the problems and the process of finding solutions. The demands are even higher for students whose first language is not English. English learners (ELs) comprise a tremendously diverse group representing an abundance of cultures, languages, nationalities, and socioeconomic backgrounds. Students who are part of this population often experience a number of challenges in school while learning academic material in a new language and navigating the socio-cultural aspects of school in the United States (Walqui & van Lier, 2010). With added linguistic and social complexity of the classrooms on top of the shifting classroom environment, ELs need various types of support, such as linguistic resources, explicit explanation, and modeling of PBL, to meet the demands of the PBL classroom.

For ELs, instruction at school is provided in English, a language they are still mastering. They face the tasks of simultaneously learning academic English and content area knowledge (e.g., Scarcella, 2003). Researchers on language learning posit that social language—such as interactions with peers, conversations on the playground, or talking on the telephone—usually

develops within six months to two years after the arrival in the US, while academic language such as comparing, synthesizing, and inferring in content areas may take five to seven years (Cummins, 2008; Haynes, 2007; Thomas & Collier, 2002). ELs at PHS are tasked with learning the content through a developing language and grappling with the transformation of the familiar teacher-centered classroom into a student-centered and collaborative environment.

With a limited number of studies on ELs and PBL in mainstream high school classrooms, the challenges and affordances of this type of instruction for ELs are unclear. Research on PBL usage with language learners in higher education has shown mixed reactions and outcomes from the students (Allen & Rooney, 1998; Azmin and Shin, 2012; Chen et al., 2008). While the potential benefits of PBL are to increase knowledge comprehension and retention over time to help students develop problem-solving and collaborative skills, and to prepare students for real-world situations, the process for ELs is more complicated and requires a better understanding of the EL experience and needs in order to reap the benefits.

The purpose of this study was to explicate the English learner experience with PBL in a high school setting in order to provide teachers and other educators with a better understanding of the dynamics in the classroom. I specifically focused on the ways English learners chose to participate in collaborative activities in their mainstream math, science, and social studies problem-based learning classrooms as collaborative skill is a foundational component of PBL. In this year-long multiple case study, I used cultural learning pathways (Bell, Tzou, Bricker & Baines, 2013) to frame the participation of three English learners at the intermediate proficiency level. The places, actions, and positions elements of cultural learning pathways (CLP) highlighted the ways sociomaterial arrangements mediated EL participation. Using ethnographic, fieldwork methodologies, I conducted classroom observations across PBL classrooms and

interviewed the students and their mainstream and English language development (ELD) teachers to provide robust descriptions of the situated events.

This study explored the following question:

1. In what ways do sociomaterial arrangements mediate English learner participation in mainstream problem-based learning classrooms?

Definitions of Key Terms

Collaboration

This study focused on the element of collaborative group work as a key component of PBL and one that has a limited body of research (e.g., Barron et al., 1998; Hmelo-Silver, 2004). Petrichor High School defines *collaboration* as the collective action of groups to solve problems. To develop collaborative skills, students must gain practice with working in teams (Barron & Hammond, 2008). Students engage in collaborative problem solving through the PBL units in their math, science, and social studies classes in various forms at PHS. Collaborative activities include partner work and small group work during everyday classroom activities as well as over extended periods of time in finding solutions to the problems presented. The term *collaborative activities*, as used in this study refers to classroom work completed jointly by two or more students and is used synonymously with *group work*.

Intermediate Proficiency Level

The Washington English Language Proficiency Assessment (WELPA) is a state-wide assessment given to students whose families answer "a language other than English" on the home language survey that asks what language the student first learned to speak and what language the student uses most at home. The home language survey is completed by every family who intends on enrolling their child in a public school in the state of Washington. The

WELPA placement test determines the student's language proficiency and whether she or he will receive additional language services. The WELPA annual test measures the student's progress in four language domains: listening, speaking, reading and writing. Table 1 lists the listening/speaking, reading, and writing abilities of an intermediate high school EL, the level of the three study participants, according to the State of Washington Office of Superintendent of Public Instruction.

Table 1
Grade 9-12 Performance Level Descriptors for Level 2 Intermediate Proficiency Students

Language Domain	**Descriptors**
Listening/Speaking	• Uses simple sentences with inconsistent use of syntax, tense, plurals, and subjective/verb agreement • Participates in social discussions • Participates in academic discussions • Begins to use root words, affixes, and cognates to determine the meaning of new words • Begins to support main idea with details • Uses appropriate social and academic vocabulary for different audiences with teacher guidance (register) • Retells stories with at least five story elements • Paraphrases expository text read aloud with teacher guidance • Asks questions to clarify
Reading	• Expresses self using descriptive sentences • Understands roots and affixes • Produces unfamiliar sounds • Decodes multi-syllabic words • Uses word-meaning strategies • Begins to read new text fluently • Increases vocabulary through reading across content areas • Uses text features to gain meaning, monitors for comprehension, visualizes and describes images from text, connects text to prior knowledge • Distinguishes between fact/opinion and fantasy/reality, infers and makes generalizations from text • Reads text containing compound sentences, yes/no questions, negative, simple past and future tense, and pronoun referents across content areas

Writing	• Writes simple sentences, compound sentences, and paragraphs
	• Demonstrates increasing control of:
	  • Capitals
	  • Punctuation
	  • Correct Spelling
	  • Syntax
	• Uses reference tools to self-edit conventions
	• Develops own voice in writing
	• Organizes paragraphs using a topic sentence and supporting details
	• Begins to adjust registered for different audiences
	• Uses basic transitions
	• Chooses and maintains a focus, utilizing a topic sentence, and supporting details
	• Writes individually and in a group process

Note. The descriptors for the intermediate level 9-12 English learner student were found on the OSPI website in the WELPA Interpreter's Guide. Retrieved April 2015 from http://www.k12.wa.us/migrantbilingual/eld.aspx.

Literature Review

In this section, I review the three fields of research on which this study builds. These include studies of English learner experience with PBL, cooperative learning at the secondary level, and positioning of ELs in the mainstream classroom.

Mixed Reactions to PBL from ELs

PBL research with students whose first language is not English is limited in the K-12 context; however, PBL usage has been documented with English learners at the university level in the US and internationally. The studies I reviewed showed mixed student reactions to PBL and pointed out tensions in the instructional approach. Allen and Rooney (1998) examined a business English course in the US that implemented a 12-week PBL course with international students. The authors used a combination of student and faculty self-reports and researcher observations to detail that communication in written, oral, and within a group/team were key stipulations of the classroom. Critical thinking and cooperating learning were also listed as expectations in

successfully completing the course. The researchers highlighted that in order for positive interactions to occur, many international students require additional skill building and practice in oral, written, and group/team communication. Both students and faculty needed time to adjust to facilitating this style of learning.

In a Malaysian ESL classroom, Azmin and Shin (2012) found that PBL could be successfully implemented on a small scale when students were familiar with the theory and practice of the approach. Findings showed that PBL promoted collaboration and self directed learning and increased confidence in language usage. The areas of improvement were in time management and equal distribution of responsibility. In another study conducted in a Malaysian university, PBL methodology was compared to a traditional lecture method in teaching argument writing (Othman & Shah, 2013). Results revealed improvement in language and content knowledge in both the control and experimental group with the PBL group having larger gains. Authors detailed that PBL may be a useful tool for teaching English to non-native speakers as it provided context for language use.

In contrast, Chen et al. (2008) presented findings that showed a high level of anxiety in Taiwanese medical students when participating in PBL using English with Taiwanese, U.S., and other Asian peers. The presence of anxiety implies the necessity for developing effective strategies to deal with students' performance anxiety and their acquaintance with PBL. The authors recommended providing ample support to students whose language skills are not fully developed and whose learning experiences are different from PBL.

In summary, research that examines PBL usage with ELs show that familiarity with PBL and support with language activities may alleviate anxiety and provide opportunities for students

to engage with this type of instructional approach with potential improvement in time management and increased confidence in language abilities.

Complex Picture of Cooperative Learning

Research around collaborative activities covers a vast variety of methods, contexts, and purposes. I chose to examine cooperative learning at the secondary level as it is the most similar to the collaborative activities in PBL at PHS. Cooperative learning is defined by Johnson and Johnson (1987) as a formal system of group work where each member has a role to play. In the context of PBL, collaborative activities are implemented with characteristics of cooperative learning as students are working in groups to conduct research and produce a solution to a multi-layered problem presented in relation to their content area subjects. During collaboration, students take on roles to fulfill the requirements. In reviewing previous research, I searched for studies focused on the student experience with collaborative activities, especially from the English learner's perspective. I found a limited number of studies on the EL experience in the mainstream; therefore, I included mixed abilities groups and English as a Second Language (ESL) classrooms to provide examples of the varying ways students participate in group work.

In a study focused on the acquisition of academic English in cooperative learning groups, Jacob et al. (1996) observed in multiple learning groups in one cooperative learning classroom at the sixth grade level in social studies. The study analyzed video and teacher and student interview from one classroom. Eight of the 23 students were identified as ELs with seven of eight having exited English for Speakers of Other Languages classes. The context of the study was a school that focused on cooperative learning with the focal teacher using this methodology on a regular basis. At the beginning of the school year, the teacher provided rules and a rewards system for the cooperative learning structure. Findings showed a complex picture of cooperative

learning. Many of the positive opportunities consisted of decoding academic terms. Collaboration in mainstream classrooms presented some opportunities for language input and output but did not reach its full potential for the ELs. There were missed opportunities and some negative input from peers.

Phuong-Mai, Terlouw, Pilot, and Elliott (2009) conducted a quasi-experimental study on the student experience with cooperative learning at a high school in Vietnam. The treatment group received cooperative learning lessons, wherein culturally appropriate structures such as role definition and group composition based on peer friendships were included. Four classes comprised of 181 student participants completed a newspaper project in small groups. The data sources included observations, interviews, a questionnaire, and learning outcomes. Findings showed that students favored the adjustment of cooperative learning to cultural values over the control group. Peer relationships played an important role serving to guide and direct, with most students preferring to work in groups with their friends.

In a study that examined Chinese immigrant high school students in British Columbia, Liang (2004) found a complex picture of cooperative learning in their ESL classes. Data sources included interviews and observations of 49 student participants. The interview results demonstrated that Chinese students had multiple contradictory views of cooperative learning. The dilemmas these students encountered during cooperative learning tasks seemed to derive from the conflicting values and practices of the cultural, socio-economic, and educational worlds that these students lived in. The author suggested that additional research to be from the student's perspective to contribute to a first hand understanding of the curriculum (Liang 2004).

Thus, research that examines cooperative learning with ELs showed missed opportunities when facilitation failed to support the linguistic needs of English learners. However, when

adjusted for student backgrounds and cultures, opportunities to collaborate were favored by students with a call for more research from the student perspective.

The current study builds on the literature by investigating the English learner student experience with PBL at the K-12 level, focusing on participation with collaborative activities, and examining the positioning of ELs within the mainstream classrooms. This study contributes to the limited literature on the English learner experience in mainstream problem-based learning classrooms with collaborative activities.

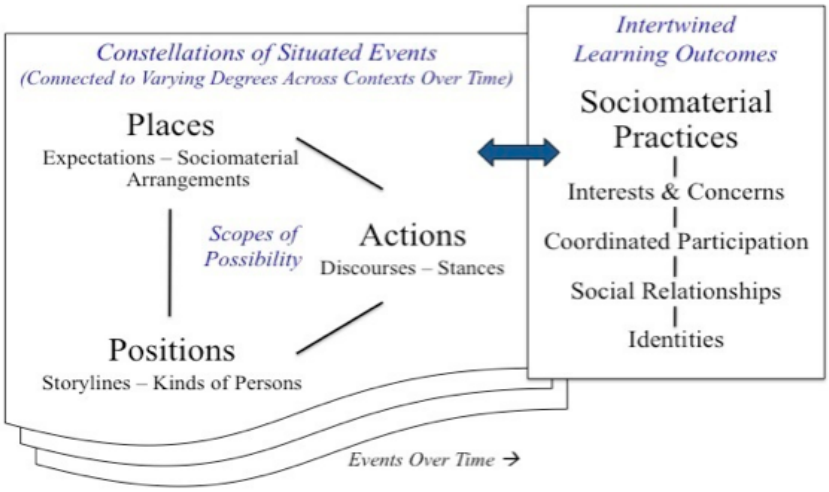
Conceptual Framework

To better understand the ELs participation, I used Bell et al.'s (2013) Cultural Learning Pathways (CLP) framework (see Figure 1) to account for sociomaterial arrangements in problem-based learning classrooms. CLP draws from situated learning (Lave & Wenger, 1991) and the diversities of social practice theory (Dreier, 2009). Lave and Wenger viewed learning as a social process that is situated in a particular context. The CLP framework highlights situated events, or a sequence or constellation of situated events as multiple events occurring over time and across multiple settings, where learning transpires between places, actions and positions. For this study, the sequence of events is the group activities across content areas for ELs.

Dreier's (2009) social practice theory also contributed to the CLP framework. One component of social practice theory addressed by this study is how participation is shaped by the students' previous experiences and how it influences their participation in the situated events. Drier also added that participants should be studied in a variety of contexts to gain a fuller understanding of the events. For this study, data from the ELs' mainstream math, science, and social studies and English language development classes were included in the data collection and data analysis to contribute to a broader understanding of collaborative activities in problem-

based learning. Capturing participation across multiple settings allowed for numerous sources of comparison and contributed to validity for the ways the English learner participants chose to participate.

Figure 1. *Cultural Learning Pathways framework*



In an ethnographic study of how high school students with social and learning disabilities participated across educational contexts around project-based pursuits (Baines, 2011), CLP was used to highlight the socially and materially arranged contexts and the scopes of possibility for meaningful participation. Similarly, CLP is utilized in my study to lay out the sociomaterial arrangements and accentuate the scopes of possibility in the actions and positions English learners can take when participating in their math, science, and social studies mainstream classrooms.

Positioning of ELs in the Mainstream

There were two types of positioning that are pertinent to this study: 1) *reflexive positioning* where there is intentional self-positioning (Davies & Harré, 1990); and 2) *interactive positioning* (Davies & Harré, 1990) where "what one person says positions another" (p. 48). The characteristics of positioning by both the student and her/his teachers help us understand the

dynamics in the classroom and social interactions and activities associated with PBL. I draw on these conceptual points to analyze how and why ELs chose to participate in collaborative activities across mainstream problem-based learning classrooms.

The concept of *positioning* allows researchers to makes sense of the dynamics of evolving social interactions and how people position themselves and how they are positioned by others (Harré & van Langenhove, 1999). For adolescent ELs in the mainstream classroom, positioning is often defined by social status, English language proficiency, and the ability to negotiate re-positioning. Yoon (2008) conducted a study which focused on teacher beliefs and positioning of ELs in the mainstream classroom. Using collective case study methodology, she conducted in-depth interviews with three focal teachers and six focal students at a middle school in a suburban city in New York State, along with extensive classroom observations and analysis of classroom dialogue to determine positioning. Yoon found the way teachers viewed their roles varied depending on whether they positioned themselves as teachers for all students, teachers for mainstream/non-EL students, or teachers of a single subject. The teachers' varying approaches were related to the EL levels of participation and the students' positioning themselves as powerful or powerless students. The ELs who positioned themselves as active participants and who were accepted as part of the community were part of a teacher's classroom where she believed she was an instructor of all students and built an inclusive community. The ELs who felt powerless and uneasy in the classroom were part of a teachers' classroom where he did not see himself as an EL teacher and did not play an active role in assisting ELs in his classroom.

Teachers play influential roles in the classroom in determining student positions, community, and activities. ELs who are unfamiliar with classroom and cultural norms of U.S.

schools and are still learning the language of instruction are vulnerably positioned in the mainstream classroom when they do not receive proper support.

Methods

This multiple case study (Starks & Trinidad, 2007) focused on collaborative activities and how students and teachers viewed participation in mainstream problem-based learning classrooms. The data collection took place during the 2013-2014 school year. The following sections provide a description of the setting, the participant selection process, the data collection, and the analysis procedures.

Setting

The setting of this study was Petrichor High School, a pseudonym, located in the Puget Sound area of Washington. I chose this particular site for the diverse student population and its adoption and redesign of curricula to reflect PBL across content areas. Forty percent of the student body speaks a language other than English at home, with 10% of the 1050 students having an EL designation. There are over 45 languages spoken in student homes, and 40% of students qualify for free and reduced lunch.

I was part of a research team, who were working in collaboration with the school during the design and implementation of novel problem-based learning units, and had a working relationship with many of the classroom instructors of the ELs. During my time in the classrooms at PHS, many of the teachers expressed concern around their ELs participation and inquired about how to better support their learning. The ELs had also expressed their frustrations with challenges in passing conversations. One of the main topics was collaborative activities. This led naturally into selecting the same setting for this phenomenological study.

Participants

Three English learner students and eight teachers were selected using purposive sampling for this study (Merriam, 2009). I selected the students based on their English language proficiency level and with the recommendation of their English language development instructor, The teachers were selected because they were the mainstream math, science, and social studies instructors of the ELs. Data from the teachers were triangulated with student interviews and classroom observations to provide a thick description of the ways ELs participated in their mainstream classrooms. All of the teacher and student names used are pseudonyms.

Student participants. The English learners were chosen by three characteristics: Washington English Language Proficiency Assessment (WELPA) proficiency level, country of origin, and length of time in the US. All three participants had an intermediate WELPA level designation. I chose one proficiency level to show the potential range of participation at the same language level. Varying countries of origin was intentional to represent the types of EL students at Petrichor High School. This also attempted to show the diversity that exists within the English learner population. Lastly, the three student participants had been in the US for a similar length of time, 16-20 months. Fernando was from Mexico, Tian was from China, and Daksa was from India.

Data Collection and Analysis

Three types of data were collected for this study: teacher interviews, student interviews, and classroom observations. I collected the data during the 2013-2014 school year at Petrichor High School. I used phenomenonology (Simms & Starwarska, 2013; Smith, 2013; Starks & Brown, 2007; Starr, 2014) with collaborative student activities as the focus.

Teacher interviews. The semi-structured teacher interviews took place at the beginning of the second quarter in the late Fall. This was purposeful to allow the teachers time to get to know students in their classrooms from the beginning of the academic year. Each teacher was interviewed individually, and the responses were audio recorded. The questions focused on the particular ELs in their classes and how the ELs participated and engaged with collaborative activities in their classrooms.

Student interviews. I conducted four semi-structured interviews with each student every three months over the course of the school year. I was able to conduct Tian's interview in her first language, Mandarin Chinese and had a translator who spoke Spanish present for Fernando's interviews. The interviews were conducted individually and lasted 25-45 minutes. The interview questions (Appendix B) consisted of background, current school experience, and group work questions. Questions about their background focused on prior academic, linguistic, and life experiences in their native countries. Current school experience questions asked about their experience in their mainstream math, science, and social studies classes. And group work asked about the type of group work in each of the classes.

Classroom observations. I observed in each of the EL's content area classrooms over the course of the 2013-2014 school year. My role in the classroom was a participant observer (Merriam, 2009) since I was an active supporter of the curriculum and the teacher and students understood my role as a researcher. During classroom observations, I took field notes focused on the ELs' interactions, especially in collaborative activities. Table 2 provides the number of classroom observations for each EL. I began my classroom observations in the English Language Development (ELD) classes to build rapport with the students and to gather baseline

observations of participation and periodically during the year to track changes in participation. The classroom observations were conducted during non-testing days.

Table 2
Number of Observations in Each Content Area Classroom for the Participants

	Math	Social Studies	Science	ELD
Fernando	7	6	4	8
Tian	6	6	5	6
Daksa	5	5	4	6

Analysis. Phenomenology is employed "to understand and describe a given phenomenon in-depth and arrive at the essence of humans' lived experiences of that phenomenon" in disciplines across the social sciences and medicine (Cilesiz, 2011). In this case, the interest is in the EL experience with collaborative activities across PBL classrooms: their feelings, reactions, and thoughts related to participating. For phenomenologists, "Reality is comprehended through embodied experience… and data from only a few individuals who have experienced the phenomenon—and who can provide a detailed account of their experience—might suffice to uncover its core elements" (Starks & Trinidad, 2007).

Audio recordings of interviews were content logged and transcribed. The interviews conducted in Mandarin and Spanish were translated into English during the transcription process. The transcripts and field notes from classroom observations were open coded (Strauss & Corbin, 1990) and by themes related to the actions, discourses and stance from the CLP conceptual framework and content area. Open coding resulted in four large themes: projects, group work, language, and teachers. The findings unpack the connections between the themes related to collaborative activities. Throughout my immersion in the data, I wrote analytic memos and

charts to organize and collate evidence. I detailed my process, codes, and verified claims in order to have a credible path of analysis. After coming to conclusions, I searched for counter evidence within interview transcripts, field notes, and analytic memos to validate the claims and to explore potential alternative claims.

Findings

Overall, my findings suggest that sociomaterial arrangements in problem-based learning shaped English learner participation through agentic reflexive positioning and teacher interactive positioning. Even though Fernando, Tian, and Daksa, the EL participants, were at the same intermediate proficiency level, their participation varied across contexts. The triangulation of classroom, student, and teacher data provided a deeper picture of the contrasting ways the ELs chose to participate. In this section, I first present background on each student and descriptions of their school experience in their native countries. Second, I provide classroom observations with portraits of each participant's actions and interactions in the mainstream with peers coupled with teacher interpretations of each EL participant's participation. While the descriptions of EL participation between classrooms observations and teacher views matched, the intention and reasoning behind the actions were not fully understood by the teachers. Quietness was positioned negatively by the teachers, while being vocal was positioned positively.

EL Backgrounds

Fernando. Fernando had been in the US for 18 months at the time of data collection. He was born and raised in Sacatacas, Mexico in a large family. Spanish was his first language. He is the youngest of ten siblings. Fernando worked nights at a restaurant to help support his family. Because of his work schedule, Fernando was not involved in any sports or extra curricular activities at PHS and had little opportunity to interact with peers outside of school. Fernando

found school in the US to be "so different" from school in Mexico. He explained that in Mexico, he had one instructor for all of his subjects and they stayed in one room the whole day. Fernando wants to be a policeman because he likes helping people. He watches Mexican and American shows that are funny in his free time. Fernando says he does not have any real friends at school and does not hang out with anyone in particular outside of school except for his family.

Tian. Tian had been in the US for 16 months at the start of data collection. Tian's parents moved to the US a few years before her and lived in Alaska with a relative before moving down to Washington. Tian lived with an uncle in China until she was able to join her family. Mandarin Chinese was her first language. Tian said she learned English from attending church and watching TV shows such as *The Walking Dead.* She feels like school is in the US is harder than in China, especially when it comes to making friends due to differences in communication, and fewer shared interests and topics for conversation. Tian volunteered on the weekends with a few other ELs at a nearby Chinese school. She did not interact with non-EL peers outside of school and mostly hung out with EL peers of similar background.

Daksa. Daksa grew up in a small town in India and had been in the US for 20 months at the start of data collection. His family moved back and forth from Los Angeles to Washington before settling in the Seattle area. Daksa has a younger sister who also goes to PHS. He says he tells all of his friends to come to the US and leave India behind because "the teachers beat up children really bad in India, the hands and cheeks." Daksa says that there are only seven subjects in school here compared to thirteen in India where school started at 6:45 a.m. and ended at 4 p.m. There were 40-50 students in his classes back in India. Punjabi and Hindi are his first languages. His school also taught English and used it as a language of instruction. Daksa described himself as friendly to ELs and non-ELs. He frequently attempted at engaging socially with his non-EL

peers in the mainstream classroom.

Storylines of Classroom Participation

Fernando. Fernando's participation in collaborative activities fluctuated depending on the context. During my classroom observations in his mainstream math, science, and social studies classes, Fernando was consistently quiet and reserved in his demeanor. He never raised his hand to answer questions and rarely spoke without being asked, even in small groups. There were four classroom observations in the mainstream where Fernando did not speak a single word during the class period to any students or the teacher. His focus was either on the paper on his desk, the board, or the teacher. Fernando also did not engage socially with his mainstream peers in terms of making small talk. When there were verbal exchanges, they were focused on the task; the exchanges were brief and consisted of delegation by the mainstream students. When asked about his behavior in his mainstream classes, he said, "I'm scared. I don't feel comfortable." Fernando also explained that he does not like raising his hand because "sometimes I don't think I have the word, or (I have) the wrong answer." Fernando also shared that he felt tired in class at times because he works nights and does not get home until midnight and sometimes is unable to "make the homework."

During a collaborative PBL unit in his social studies class where students were asked to work in groups to create and pitch a children's book on the Haitian or French revolution to a publisher, Fernando was grouped with two non-ELs. His group members assigned him the task of finding pictures including the map and making the table of contents for the book. He was not asked and did not participate in the conversation when the two other students decided on which revolution to focus on and what the arc of the story would be. He was positioned by his peers as only capable of contributing to and completing low-level tasks. In contrast, during a different

PBL unit in social studies called History Day where students were asked to select, research, and present a significant event or person in history, Fernando collaborated with another Spanish speaking EL and jointly selected Pancho Villa as the topic. They conducted research and made a poster, which they presented to the class at the end of the unit. At the end of the academic year, Fernando shared that the History Day unit was his favorite because he knew a lot about Pancho Villa, which he shared with the class and was proud that his hometown in Mexico has historical connections to Pancho Villa.

In comparison to the mainstream classes, Fernando appeared to be a fundamentally different student in his ELD class. When I observed Fernando in his English class with other English learner peers, he attempted to greet some his peers in their native language such as Vietnamese and Mandarin and would participate in social conversation including telling jokes and taking pictures with their cell phones with his EL peers. Fernando was gregarious, outgoing, and funny. He also engaged in informal conversation with Duke Slater, the ELD instructor, about school and his job, which he did not do with his mainstream content-area instructors. Fernando was also a source of support for his EL peers who had a lower level English proficiency on numerous occasions. Fernando actively supported them by reading assigned texts aloud in class with them, translating terms, and explaining concepts, which were difficulty for his peers with lower English language proficiency to comprehend. He would often use his native language Spanish as a resource. When asked about the difference in behavior, he said, “I know everyone [in the ELD English class], so I feel better.” For Fernando, knowing his peers and feeling knowledgeable and helpful contributed to his participation in the ELD classroom.

In all four interviews, Fernando expressed dislike for group work. He said, “I don’t understand sometimes, so I would like to work alone.” His dislike and hesitancy to participate in

collaborative activities stemmed from the lack of comprehension. Fernando explained, "I [didn't] understand exactly what (his non-EL group members) are talking about." He felt confused and tended to remain silent in his mainstream classrooms. When asked what kind of help he sought out, Fernando explained, "I don't like ask to people [non-EL peers]. Maybe they don't want to tell me or explain. I asked teacher for help, but [the teacher] said "never ask the teacher." Fernando's search for help conflicted with the teacher's desire to foster a peer support network in the classroom. As a newcomer and EL student, he also had weak relationships with his mainstream peers, further limiting access to student support. Fernando's experience in PBL was quite constrained by the very practices set in place to maximize student engagement and to structure richer student to student collaborative learning.

Teacher interpretation: Quiet and disengaged. Two of Fernando's mainstream teachers viewed him as a quiet and disengaged student. Andrea, Fernando's social studies' instructor, described him as unmotivated. She explained, "Fernando is not the most motivated because I can be standing right next to him and explain something and tell him what to write down and then he'll write it down, but I walk away and he kinda of just doesn't do anything… It was very hard for me to figure out if that was 'I'm frustrated because I don't understand and this is exhausting,' or 'I just don't really like this subject so I'm not really applying myself like any English speaking student.'" She assumed his lack of motivation due to his disengagement with an activity.

Evan, Fernando's math teacher, also commented that Fernando does not say much in class. He first made the assumption that because Fernando was an upper classman in a traditionally lower classmen class, he must be embarrassed; Evan did not know that Fernando was an English learner who had only been in the country for 18 months. Evan explained,

"Fernando is a senior in a tenth grade class, so he is probably struggling from embarrassment from having to be in the class… (After understanding his EL status) I didn't realize that he has only been in the country for one and a half years."

Helen, his science teacher, provided an encouraging glimpse beyond the reticence that Fernando exhibited. She said, "The ELs are all quiet, of course. I've gotta figure out how to break the culture of this class to start asking questions because they just don't. In general, they don't, and I'm guessing if the kids who are ELs aren't asking questions, then I am guessing the ELs would feel real awkward asking." And regarding Fernando, she said, "Fernando actually even asked me during class if [he was] doing [his assignment] right, and I thought that was great."

In summary, Fernando's positioning in the mainstream was influenced by unfamiliarity with his non-EL peers and types of collaborative activities, and the language. However, he positioned himself differently in the ELD class and was engaged and active, utilizing his home language, and interacting with the classroom community. While his teachers positioned Fernando as quiet and disengaged, Fernando explained that he was a shy student and confused about how to and when to participate in his mainstream classes. The differing perceptions present a tension that exists with many ELs in the mainstream due to their reserved and reticent behavior.

Tian. Tian's participation appeared to be minimal as she was quiet and reserved in her mainstream and ELD classes. She did not engage in social conversation with her non-EL peers in the mainstream environment and only with a few of her EL peers in the ELD class. Tian's ELD instructor, Duke, frequently encouraged her to speak louder when she was called on to share her opinion and when she presented in front of the class. Tian explained that when she first arrived in

the US, she was "really scared to talk, but [she] is a lot better now." She characterized herself as being a "pretty quiet student" in general and did not volunteer to answer questions in class even in her home country.

Tian, like Fernando, did not raise her hand in any classes to provide answers or ask questions during whole group discussions and activities. For instance, in Tian's science class, Rebecca, her instructor, frequently used a common strategy to gauge moment-to-moment student comprehension during lessons where she asked students to hold up the number of fingers to indicate the level of understanding of the current concept. Tian did not participate in this type of activity in her science or other content area classes. Even though she rarely spoke in a whole class setting, she pushed herself to participate in small group collaborative activities.

During a collaborative PBL unit in her biochemistry class in the late fall, students were asked to work in groups to make a game that would help students understand the periodic table; Tian worked with two non-EL students to create a flashcard game. Tian was absent during the day that the group formulated the game concept but was present and shared responsibilities during the creation of the cards and the culminating presentation. When the group presented their game to another class, Tian was the first to present the rules and explain the game to another small group of students. This was unlike the reserved and passive behavior I had consistently observed in class. She explained afterwards that she wanted to practice her English and positioned herself accordingly.

When I observed Tian in her social studies classes where she also completed the children' book unit based on the Haitian or French revolution, she was also grouped with two non-ELs. At the start of the unit, her two group members discussed the storyline and selected a theme amongst the two of them. Afterwards, the two group members did explain the plot to Tian.

During the explanation, Tian asked two clarifying questions in a soft voice. They then asked her if she wanted to create illustrations for the book or "type stuff up." Tian responded that she wanted to draw. She was also provided with a choice of drawing the first or second half of the book. Even though Tian was not asked and did not participate in the conversation when the two other students decided on which revolution to focus on and what the arc of the story would be, she was included in the process of completing the book. Tian was positioned by her peers as capable of completing the project components but not in determining the plot. Tian exercised her own positioning power by making choices with regards to the tasks.

While Tian was observed to be a generally quiet student, she was actually pushing herself to contribute to collaborative activities more and wanted to work on her language proficiency through practice. She said, "Before, I would just sit there, and I would listen to everyone talk. But now, every so often, I [will] say something, what I'm thinking. Sometimes it's me saying it automatically, other times, [my group members] will ask me to contribute." Tian's response to what helped her participate in collaborative activities was her own motivation to improve her language skills. Even though Tian said she probably would not raise her hand in class to speak since "[she] doesn't really like talking in front of other students," she was proactive in increasing her participation in the mainstream classes.

Tian explained her continuous repositioning of herself in the mainstream, "If I'm in a group, before when I first got here, my English was bad. I didn't understand and didn't know how to ask for help. And when I ask [the other students], I didn't understand their explanation. I just didn't understand anything really, but now, when I ask them questions, I ask on my own." Tian also shared that even though she did learn from working collaboratively and conducting research on complex problems, she preferred the teacher to be teaching, especially in math. Her

frustration with the PBL stemmed from the in-class research since "all of the research is in English, so I spent a lot of time reading it and trying to understand it." When asked what would prohibit participation in collaborative activities, Tian said that when her group members kept talking to each other, there would no room for her to contribute. She also said that she prefers to work with others on PBL units because of the complexity of the topics and activities.

Teacher interpretation: Just quiet. When Tian's teachers talked about her participation, they all commented about how quiet she was in the classroom. In contrast to Fernando's negative positioning of being reserved, Tian's teachers had a more positive interpretation of her behavior. Rebecca, her science teacher, said, "Tian is very quiet. She sits next to a mainstream student who is sharp. I haven't paid attention as much to how much they actually work together when they are doing partner stuff, or how much the mainstream student just sort of does the stuff." Rebecca physically positions Tian next to a competent non-EL in hopes of providing Tian with a source of support.

Andrea, Tian's social studies teacher, provided a similar observation, "Tian sits next to (another EL), so they're a pretty good pair. I think Tian is comfortable with the other EL, so that works out really well. It is nice when we do turns and talks and she talks to the other EL because then [I] know [I] can call on Tian and she will have an answer. But she is still so quiet." Having positioned Tian next to another EL, Andrea has observed that they are able to talk to each other during collaborative activities, and Tian will have an answer when called on. However, that does not change Andrea's view of Tian.

Tian's math teacher, Tammy, had a less positive observation and said, "Tian seems really reserved and hesitant to ask questions. I'm quite concerned about her. She isn't doing well in class, and I think part of it is her inability to ask questions and feel comfortable asking questions

and to get help when she is really lost." Tammy also positioned Tian as quiet and made the connection between Tian's grade in the class to her not asking questions in class or seeking help.

Tian's gradual increase in participation in the mainstream was influenced by her desire to practice English and position herself as a proficient speaker and user of the language. While Tian's teachers positioned her as quiet, Tian explained that even though she was a shy student, she was pushing herself to contribute more in the mainstream classroom. In Tian's case, the teacher perceptions presented a surface level understanding of her behavior.

Daksa. Daksa's participation in collaborative activities was different from Tian and Fernando, even though they were at the same language proficiency level. Unlike Tian, who was consistently quiet and reserved, Daksa socialized with his peers and was proactive in trying to help plan and figure out the details during collaborative work during his classes. He greeted his non-EL peers and attempted to engage in social conversations in the mainstream classrooms. Daksa said that because "[he was] an EL, he [had] difficulty with some of the words the teachers said, but everything [was] good for [him]." He had a positive attitude and approach to working with others in the mainstream classrooms. Daksa felt especially comfortable working with other ELs because "I have a little bit of English and they have a little bit of English, and we just get each other." He actively supported other ELs by explaining concepts and terms in the mainstream and ELD classrooms.

In small group activities in the mainstream classroom, Daksa actively engaged in conversations with his small group mates, other non-EL peers, and teachers in the classroom. He frequently raised his hand to answer questions in his social studies and math classes in a whole group setting without hesitation. During a collaborative geometry PBL unit, when students were asked to build a model home by scaling up dimensions from sample blueprints, Daksa took on

the role as group leader. He facilitated discussion around the calculation of the dimensions and divided the activities for each of his group members to complete. Daksa frequently positioned himself as an active group member and one who helped to make decisions. He was not shy about asking questions of his peers and teachers, and he would also offer help to his non-EL peers.

During the independent research project in his biochemistry class where students were asked to select and conduct research on a topic of their choice to understand the science behind it, Daksa chose to work with another EL peer, who ended up missing a few weeks of school during the completion process due to illness, on the science behind the bicycle kick in soccer. Daksa was frustrated by the amount of work he had to complete on his own but understood the project needed to be completed. He chose to have a conversation with his instructor about the progress and laid out the components of the project he thought he could complete without his partner. Daksa positioned himself as a problem-solver and was proactive in negotiating his responsibilities, which would significantly affect his academic outcome in the class.

When asked about his feelings toward working with other students, Daksa said he "loved group work in all of his classes… if we were to work by ourselves, and I was stuck on a question, I can't get help easy." He saw his group members as resources. Daksa also explained, "If another children don't laugh at me, then I'm doing well. And if they laugh, then I'll be like this isn't good." Daksa shared a few incidences where non-ELs made fun of his accent and the way he spoke English and how he tried to ignore them. He said he was bullied frequently by seniors when he was a freshman, usually in the hallway and sometimes in class. He did not understand what they were saying, but they would imitate the way he spoke English and point at him and laugh. Other times, they would pat his backpack or knock off his hat. Even though Daksa looked happily engaged and socialized well with his peers, he still experienced the barbs

and criticism of his peers.

Towards the end of academic year, Daksa volunteered to share his experience as an immigrant student in a two different capacities. First, he and two other ELs attended an orientation for incoming ninth graders where he spoke about life as a high school student and some of the challenges he faced as an English learner. He also gave some advice to an audience of 25 parents and their children because he thought it would be important to those families whose members were in a similar situation. The second event was at an all-school assembly where he gave a short speech about what it meant to be a student at PHS. In both experiences, Daksa said he was extremely nervous because he was not sure how the audience would react, especially an audience of his peers. But he was elated afterwards and received positive feedback from his peers and teachers. This encouraged him to want to be more involved with school government and the student planning committee.

Teacher interpretation: Active and engaged. All three of Daksa's mainstream teachers spoke positively about his participation and behavior in the classroom. Rachel highlighted his diligent work ethic even though he struggled with content, "Daksa is a really good self-advocate. He struggles but he really works hard at the same time. He is a leader. He is an upper classmen, and he really tries to be a leader in his class because he knows there's a lot of freshman." Rachel positioned Daksa positively in her classroom and recognizes his work ethic and leadership skills.

Yasmin, Daksa's social studies teacher, pointed out challenges with writing but not the verbal and social aspects of the classroom, "Daksa is very out going. I do notice that writing is more difficult for him; but as far as participating with the class, I don't particularly worry about him." Yasmin shows concern for his writing language skills but sees him as an active participant in classroom activities.

Daksa's science teacher, Melissa said, "Daksa is really comfortable, and he has an outgoing personality. I don't know that he sees his language difficulties as a hindrance to participation." Melissa recognizes Daksa as an EL and sees that he feels comfortable with participating in activities the classroom.

Daksa's positioning in the mainstream was positively influenced with increased exposure to opportunities that built his confidence. His positioning was not altered by negative experiences with peers. Daksa was resilient and had a positive attitude towards school and working with others. He positioned himself as a social, proactive, and helpful peer and leader at times. Daksa's teachers' account of his participation matched with his own account of active participation in the mainstream classrooms. While Daksa's teachers positioned him as outgoing and social, they also saw that he lacked other language skills such as writing and content.

Discussion

The central goal of this study was to understand how English learners participated in collaborative activities in mainstream problem-based learning classrooms. Through student and teacher interviews and classroom observations, the participation of three intermediate level ELs and the perceptions of their eight mainstream content area teachers contributed to the complex picture of participation in collaborative activities. The varying experiences at one state designated language proficiency level draws attention to sociomaterial arrangements in PBL classrooms and the way it shapes participation of English learners.

Through agentic reflexive positioning, ELs positioned themselves differently depending on context and sociomaterial arrangements. Using interactive positioning, teachers and peers altered the positions of ELs. Teachers and non-EL peers were positioned with more authority and power in the classroom setting.

The study contributes our understanding of the complex interactional classroom dynamics that influence participation and the teaching and learning of ELs. The results suggest that a close examination of the EL experience and an awareness of the variation and implications of EL positioning in the classroom requires training and self-reflection.

Understanding the EL Experience

Much research (e.g. Kanno & Applebaum, 1995; Harklau; 2000) posits that EL language proficiency is a chief indicator of EL participation in classroom activities. However, participation cannot be explained by their proficiency alone; otherwise, the three EL participants in this study would have participated in similar ways. The English learner and language proficiency labels are placed on a heterogeneous population of varying cultural, linguistic, and academic backgrounds which has a tendency to oversimplify the interventions and supports put into place. Teachers play a pivotal role in the classroom in providing instruction and support. In problem-based learning classrooms, where students engage in collaborative activities, the teachers also become facilitators. Thus, the teachers' roles are shifted from being a dispenser of knowledge in the classroom to a facilitator.

Having an awareness of the varying ways English learners contribute in the classroom can be powerful in building and differentiating supports for them in the mainstream. English learners represent a range of cultural and linguistics backgrounds and come into the classroom with a mixture of academic and life experiences. Olsen (1997) in her book *Made in America,* provided an in-depth examination of administrator, teacher, and student experience at a high school that saw a dramatic change in population with an increase in English learner students. "The newcomer students at Madison High School, entering school and bringing with them the world's cultures and languages (literally) have much to offer… and need help in affirming their

broad identities in claiming the multiple human dimensions of their heritage, language and culture" (p.153). ELs arrive with immense knowledge of the world, which often goes invalidated in the classroom. Olsen goes on to explain "this responsibility falls on the adults and educators who have the task of remaking schools into institutions of equal opportunity and places of support for diversity" (p.153). Understanding how they choose to participate will contribute to a better understanding of more support practices.

Getting to know the individual ELs and their vast array of backgrounds and experiences can also contribute to building better scaffolds in the mainstream classroom. Problem-based learning offers many opportunities for language and content learning. Teachers can take advantage and build on these opportunities by first understanding the EL experience.

Positioning and Repositioning of ELs

Positioning in the classroom is dynamic and can potentially shift participation. ELs' positioning of themselves in the classroom is shaped partly by sociomaterial arrangements within each PBL context. Repositioning occurs through interactions with peers and by teachers. This study focuses on the teacher and EL self-positioning. While some ELs are agentic in their reflexive positioning, such as Daksa in his active participation during PBL units and collaborative group, others, such as Fernando who faced linguistic challenges in understanding the activity and content, would benefit from support from peers and teachers.

Teachers play a powerful role in interactive positioning of students in the classroom. The teachers in this study positioned quietness as negative, and socialness as positive. Fernando's social studies teacher, Andrea, positioned his silence as disengagement, but the same teacher viewed Tian's quietness as acceptable as long as she has the answer when called upon. Tian's math teacher, Tammy, positioned her quietness as concerning because she did not ask questions.

Daksa's teachers positioned him positively as they consistently noted his participation positively because he was vocal and active in the classroom. The negative views by teachers did not match the students' accounts as the teachers' views did not dig deeply enough into why. The positive view teachers had towards Daksa included his language challenges but did not hinder their favorable opinion due to his active engagement. Although all three students participated, their actions were interpreted under the teacher positioning of them as certain types of students.

In a study focused on teacher and student positioning, Yoon (2008) found teacher roles to be linked in the ways ELs were supported and positioned as powerful or powerless in mainstream classrooms. Teachers have strong influences in the classroom and can shift the dynamics in a strategic manner to position ELs differently, especially in building an inclusive community in the classroom.

In PBL classrooms where student expertise is often valued, positioning students as having different types of expertise allows for more opportunities for student participation, especially English learners who come into the classroom with a range of linguistic and cultural knowledge.

Conclusion and Future Research

This study has shown the range of English learners actions and explanations of participation through case studies of three adolescent learners within one proficiency level. I have raised questions about positioning in the mainstream classrooms and incongruous student and teacher views of participation. English learners are the fastest growing school-age population in the US; however, their academic learning outcomes are among the lowest (Office of English Language Acquisition, United States Department of Education, 2006; NAEP, 2000; Slama, 2014, Capps, Fix, Murray, Ost, Passel, & Herwantoro, 2005; Thomas & Collier, 2002). While ELs can

be resilient and hardworking in schools, they do not always have the resources to be successful (Suárez-Orozco, Suárez-Orozco, & Todorova 2008). Teachers have the opportunity and ability with PBL to not only support the acquisition of content and academic skills but provide authentic opportunities for language practice and growth.

Collaborative activities in PBL offer opportunities for ELs to engage with in content and practice language. These opportunities can contribute to content knowledge acquisition and language learning and the chance to build cross-cultural relationships through interactions (Jacob, Rottenberg, Patrick, & Wheeler, 1996). However, there are also challenges associated with collaborative activities for ELs because they are still learning English and may have difficulty with verbal communication as well as the variety of social norms across cultures. At the secondary level where ELs have several teachers with a variety of instructional methodologies and curricula, the student participation in these activities varies depending on the teacher facilitating and the context (Harklau, 1999). Teachers play an important role in guiding the ELs participation and success in the classroom.

Additional research on peer to peer interactions, especially between EL and non-EL students, in mainstream PBL classrooms is needed to understand the dynamics and positioning that occurs both in reflexively and interactively. Also, a closer examination of how teachers facilitate collaborative activities and specific strategies and moves will be beneficial in future implementation of PBL to support English learners. Questions such as the language proficiency necessary for successful participation and the solutions to overcome challenges will potentially contribute to better supporting students. With cited benefits of increased motivation, autonomy, and critical thinking skills gained through authentic projects, more research on PBL is necessary to determine how its potential applies to ELs in the mainstream setting.

Section 3

AFFECTIVE DIMENSIONS OF ENGLISH LEARNER EXPERIENCE IN MAINSTREAM PROBLEM-BASED LEARNING CLASSROOMS: A MIXED METHODS STUDY

Introduction

English learners (ELs), students whose first language is not English, are the fastest growing school-age population and a tremendously diverse group representing an abundance of cultures, languages, nationalities, and socioeconomic backgrounds (National Assessment of Educational Progress (NAEP), 2000; Office of English Language Acquisition (OELA)-United States Department of Education, 2006; Thomas & Collier, 2002). By 2020, estimates have indicated that half of all public school students will have non-English speaking backgrounds (Grantmakers for Education, 2013). All ELs are at increased threat for academic failure because they face the task of simultaneously learning academic English and content area knowledge (e.g., Scarcella, 2003).

Students who are members of this population often experience a number of challenges in school while learning academic material in a new language and navigating the socio-cultural aspects of school in the United States (OELA, 2015; Willett, Harman, Hogan, Lozano, & Rubeck, 2008). On average, ELs tend to underperform on standardized tests and drop out of school at higher rates relative to their English-speaking peers (NAEP, 2000). In comparison to the national graduation average of 80%, only 59% of ELs are graduating from high school within four years (OELA, 2015). The consequences of a significant portion of the student population being ill-prepared are detrimental not only to the students themselves but also to society as a whole: “In an increasing global society, and in a nation that is linguistically and culturally diverse, it behooves us to build on our linguistic capacities and to understand ways to optimize

what immigrants and their children bring" (Hakuta, 2011, p. 173). ELs arrive at schools in the US with rich cultural and familiar traditions of international countries and multiple languages. They bring with immense potential, strengths to build on, and dreams for their future into the classrooms (Walqui & van Lier, 2010).

Suarez-Orozco et al. (2008) explained that ELs are eager to face challenges, but are often unable to achieve academic success on their own. At the secondary level, where ELs have several teachers with a variety of instructional methodologies and curricula, student participation in the classroom varies depending on the teacher who is facilitating and on the context (Harklau, 1999). Context includes the environmental and the interpersonal relationships within the classroom and school.

English learners in this study were secondary students in a school context where problem-based learning (PBL) was the instructional approach in the classrooms. PBL is a type of learning approach where students are asked to investigate, explain, and resolve meaningful problems through continuous collaboration with peers and others (Barron, Schwartz, Vye, Moore, Petrosino & Bransford, 2011; Evensen & Hmelo-Silver, 2000). PBL shifts the traditional banking model, teacher-centered classroom to a more student-centered and collaborative environment where collective sense-making and solution-composition are fundamental (Freire, 1970). PBL adds an additional layer of complexity to the existing linguistic, social, and cultural challenges ELs face.

The comprehensive high school context, Petrichor High School, a pseudonym, is adopting a problem-based learning approach and revising curricula to reflect PBL. Supported by a U.S. Department of Education (ED) grant, the teachers and administrators at PHS are working with the College of Education at the University of Washington, Seattle and the Science

Technology Engineering and Math (STEM) partners in the community to plan, design, and implement PBL curriculum. At PHS, the PBL approach is anchored in seven key elements (see Table 1 in the next section) and highly collaborative for students and teachers. One of the key goals is to increase the achievement for ELs and students with Individual Education Plans (IEPs).

Ten percent of the student population has an EL designation and receives English language support at PHS. Thirty-eight percent of students speak a language other than English at home, and 44 different languages are spoken by the student body. For many ELs, problem-based learning is a new approach to learning, different from the classrooms in their native countries. Research that examines PBL use in K-12 is growing steadily with mixed results (e.g. Goodnough & Cashion, 2006; Kang, DeChenne & Smith, 2012; Ravitz & Mergendoller, 2005); however, there is a limited number of studies that provide details on the non-mainstream population.

For ELs, instruction at school is provided in English, a language they are still mastering. They face the tasks of simultaneously learning academic English and content area knowledge. Researchers on language learning posit that social language—such as interactions with peers, conversations on the playground, or talking on the telephone—usually develops within six months to two years after the arrival in the US, while academic language such as comparing, synthesizing, and inferring in content areas may take five to seven years (Cummins, 2008; Haynes, 2007; Thomas & Collier, 2002). ELs at PHS are tasked with learning the content through a developing language and grappling with the transformation of the familiar teacher-centered classroom into a student-centered and collaborative environment.

This study focused on how the English learners experienced problem-based learning across the mainstream content areas including a broader understanding of affect. Attention to

aspects of affect can lead to more effective learning (Arnold & Brown, 1999; Lemke, 2000). It is important to consider student perceptions of teaching and learning, especially ELs who are often marginalized in the mainstream classroom. By using student voices, I am able to more accurately represent ELs' in-depth perceptions and experience of PBL. Drawing from the cultural learning pathways (Bell, Tzou, Bricker, & Baines, 2013) framework in combination with affect variables, I examine the specific components of sociomaterial practices and affective variables in PBL across multiple classroom settings. I highlight the EL experience with PBL units and working with peers as those components differ from the traditional teacher-centered classroom that ELs may be accustomed to in their home countries. While there is significant diversity among the participants in linguistic proficiency, length of stay, and prior academic experience, the perspectives included are not meant to be exhaustive or representative of students from the same country of origin or first language. These perspectives are a sampling of the perceptions, feelings, and insights about problem-based learning of 51 unique high school English learners.

This study explored the following research question:

1. What are the affective dimensions of English learners towards sociomaterial practices in mainstream problem-based learning classrooms?

PBL at Petrichor High School

PBL is defined differently depending upon the context. PBL at Petrichor High School consists of units in each course that have been designed and implemented by teachers in the content area's department. Across the content areas of math, science, and social studies, there were several design teams who created PBL units aligned to state standards and district content requirements. Units were designed with seven key elements (see Table 1) in mind to provide an authentic and relevant real-world problem for students to tackle. Students at PHS often worked

in small groups to make sense of the content and to identify the knowledge required to come up with a solution to the complex problem at hand. Many of the PBL units required students to work collaboratively over a number of weeks to create a product and culminating solution to be presented to authentic audiences who are stakeholders or experts associated with the content.

Table 1
Petrichor High School Key Elements

Key Element	**Explanation**
Authentic Problems	Students work on problems that resonate with the student world as well as with powerful developments in the broader world.
Authentic Assessment	Authentic assessment provides regular opportunities for students to reflect on, articulate, and present what they've learned.
Culturally Responsive Pedagogy	Culturally-responsive pedagogy begins with a mindset that student differences are valued and a curriculum that reflects the diversity of PHS students.
Use of Expertise	Students and teachers are encouraged to take intellectual risks in accessing novel forms of expertise to inform their learning.
Student Voice	Student participation and choice in the planning, execution, and evaluation of their work increases their engagement.
Collaborative Groups	Just like their teachers, students work in collaboration with their peers to identify and explore problems and to develop their ideas into solutions.
Academic Discourse	Students learn the appropriate styles and norms of communication true to disciplines/subjects they are studying, including ways of talking and representing ideas in writing, graphically, and visually.

PBL Units

To provide a clearer picture of the PBL at PHS, I provide descriptions of a unit from each of the content areas that were included in the study: math, science, and social studies. Each description represents a typical PBL unit that students at PHS would experience in the mainstream classroom.

Math. The math courses that were redesigned at PHS were Algebra I, Geometry, Algebra II, and Pre-Calculus. In geometry, students participated in a week-long unit using proportions and blueprints to build model homes using paper. Students worked in groups of four or five to first select a blueprint of a house. They then modified the blue-print to either make the house bigger or smaller using proportions. Student then began drawing the blueprint on paper to the new scale and then built walls using construction paper to represent the perimeter and walls within the house. They were given the option to decorate and furnish the houses with time permitting. The unit culminated in a gallery walk where student walked around the classroom and wrote comments on a feedback form for each other's models. The students were assessed on accuracy of their proportion, completion of the model, and their feedback forms from the gallery walk.

Science. The science courses that were redesigned were Biochemistry I, Biochemistry II, AP Environmental Studies, and Physics. In Biochemistry II, students participated in a 3-quarter-long unit titled "The Independent Research Project." Students were asked in this unit to select and research a scientific topic of their choice. Some topics included the science behind a bicycle kick in soccer, genetically modified organism (GMO) foods, and the effects of music on the brain. Students were also given a choice of working independently or in small groups. Topic

choice and groups had to be approved by the instructor at the beginning of the unit. The components of the unit were split up into parts and completed over several months. Students were given some time in class to work on their topics. The unit culminated in a science night where fellow students, parents, and members of the community were invited to the classroom to learn about each of the topics. Students had a choice of making a poster or building a model paired with a written report. The students were assessed on the components leading up the final product, as well as the final product and report. Attending science night was recommended but not required.

Social studies. The social studies courses that were redesigned to reflect PBL were AP Human Geography, World History, U.S. History, and Government. In World History, students participated in a week-long unit where they were asked to make a children' book based either on events from the Haitian or the French revolution. The unit was implemented after the students had learned about each of the revolutions and served as a summative assessment. Students worked in groups of three or four to make a book with specific requirements such as a timeline, map, and pages with pictures and text. The unit culminated in a presentation during which student groups pitched their books to "publishers" in the audience. The students were assessed on the completion of their book with the required components and were awarded extra points if the publishers selected their book.

Relevant Literature

In this section, I review the two fields of research on which this study builds: the adolescent English learner experience and English learner experience with PBL. The body of research on the adolescent EL experience showed the importance of a supportive learning environment that validates and leverages the diversity of English learner knowledge and

background while studies that examined the EL experience with PBL revealed the expertise while

Adolescent English Learner Experience

The adjustment rate among adolescent immigrants to a new environment and schools varies depending on the reason for immigration. Suárez-Orozco, Suárez-Orozco, and Todorova (2008) conducted the Longitudinal Immigrant Student Adaptation Study (LISA); They followed 400 English learners who had arrived from the Caribbean, China, Central America, and Mexico for five years. The authors were careful not to generalize for an entire population of ELs from a specific country or background. The study revealed details of high achievers and low achievers. ELs who were able to resist total submersion at a loss of home culture identification and who sustained agency were often found among the high achievers. Part of resisting total submersion was the validation of their home culture, experience, and language. The conscious disposition of teachers in the classroom through compassion, understanding potential, and advocacy also aided in the student achievement. "Ample evidence shows that a school's climate drives its students' academic experience. Strong compassionate leadership, engaging teachers, and involved counselor and other staff can set a tone of respect, high expectations, and tolerance" (Suárez-Orozco et al., p.367). Immigrant students are eager to face challenges but are not often able to manage change on their own. With purposeful planning and implementation, PBL has the flexibility to incorporate different types of student expertise and various types of linguistic and prior experiences.

Olsen (1997) provided an in-depth examination of administrator, teacher, and student experiences at a high school that saw a dramatic change in population with an increase in English learner students. "The newcomer students at Madison High School, entering school and bringing

with them the world's cultures and languages (literally) have much to offer… and need help in affirming their broad identities in claiming the multiple human dimensions of their heritage, language and culture" (Olsen, 1997, p.153). ELs arrive with immense knowledge of the world, which often goes invalidated in the classroom. Olsen goes on to explain "[the responsibility of validating students' home culture and life experiences] falls on the adults and educators who have the task of remaking schools into institutions of equal opportunity and places of support for diversity" (Olsen, 1997, p.153). Similar to Suárez-Orozco et al. (2007), legitimizing home language and culture and providing a safe and welcoming classroom space aids in the success of English learner students. Feeling secure in a new environment allows for student growth and intellectual risk-taking.

In *Ethnicities*, edited by Portes and Rumbaut (2001), various contributing authors provide analyses that probed systematically the adaption patterns and trajectories of English leaners from various countries including Cuba, Vietnam, Philippines, Haiti, Jamaica, and Nicaragua. The data came from the Children of Immigrants Longitudinal Study. Findings showed that some ELs are on a clear upward path, moving quickly into society's mainstream, while others are struggling and on a path of blocked aspirations and downward mobility. The authors laid out a clear solution to support ELs by "backing up immigrant parent and the sense of self-worth and ambition grounded in their cultural past" (Portes & Rumbaut, 2001, p.316). Teachers in school can contribute to respecting and honoring the cultures of immigrant parents and children by learning about the ELs' backgrounds, providing a welcoming space in the classrooms, and showing that they believe in the student's potential.

In summary, research that has examined the adolescent EL experience showed that the validation of home language and the vast life and academic knowledge they bring into the

classroom can aid in adjusting to the new environment. Acknowledging and repositioning EL expertise can also provide additional support in increasing academic success with teachers and administrators playing pivotal roles.

Mixed Reactions to PBL by ELs

PBL research with students whose first language is not English is limited in the K-12 context; however, PBL usage has been documented with English learners at the university level in the US and internationally. The studies I reviewed showed mixed student reactions to PBL and pointed to tensions in the instructional approach. Allen and Rooney (1998) examined a business English course in the US that implemented a 12-week PBL course with international students. The authors used a combination of student and faculty self-reports and researcher observations to detail that communication in written, oral, and within a group/team were key stipulations of the classroom pedagogy. Critical thinking and cooperative learning were also listed as expectations in successfully completing the course. The researchers highlighted that in order for positive interactions to occur, many international students required additional skill building and practice in oral, written, and group/team communication. Both students and faculty needed time to adjust to this style of learning.

In a Malaysian ESL classroom, Azmin and Shin (2012) found that PBL could be successfully implemented on a small scale when students were familiar with the theory and practice of the approach. Findings showed that PBL promoted collaboration and self-directed learning and increased confidence in language usage. The areas of improvement were in time management and equal distribution of responsibility. In another study conducted in a Malaysian university, PBL methodology was compared to a traditional lecture method in teaching argument writing (Othman & Shah, 2013). Results revealed improvement in language and content

knowledge in both the control and experimental group, with the PBL group having larger gains. Authors detailed that PBL may be a useful tool for teaching English to non-native speakers as it provides context for language use.

In contrast, Chen et al. (2008) presented findings that showed a high level of anxiety in Taiwanese medical students when participating in PBL using English with Taiwanese, U.S., and Asian peers. The presence of anxiety implies the necessity for developing effective strategies to deal with students' performance anxiety and their acquaintance with PBL. The authors recommended providing ample support to students whose language skills are not fully developed and whose learning experiences are different from PBL.

In summary, research that has examined PBL usage with ELs show that familiarity with PBL and support with language activities may alleviate anxiety and provide opportunities for students to engage with each other and the content, resulting in outcomes of potential improvement and increased confidence in language abilities.

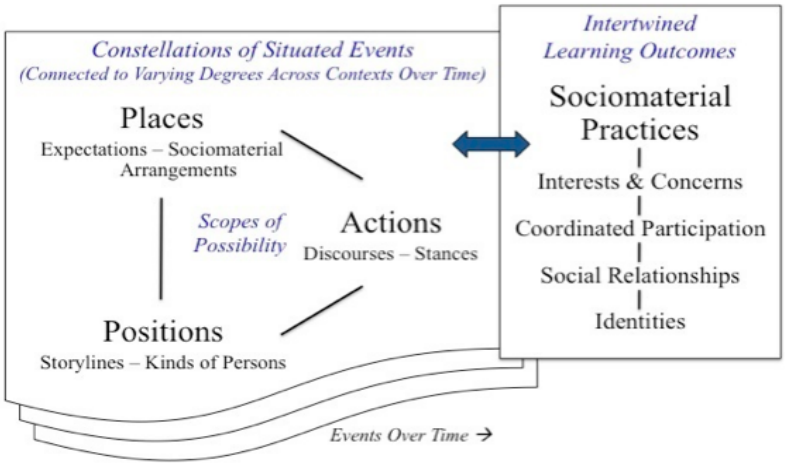
The current study builds on the literature by investigating the English learner student experience with mainstream PBL at the K-12 level and examining the challenges and affordances PBL presents. This study contributes to the limited literature on the English learner experience in mainstream problem-based learning classrooms.

Conceptual Framework

I used Bell et al.'s (2013) Cultural Learning Pathways (CLP) framework to account for the components of sociomaterial practices to explain the EL affect in mainstream PBL classrooms. CLP draws from situated learning (Lave & Wenger, 1991) and the diversities of social practice theory (Drier, 2009). Lave and Wenger viewed learning as a social process that is situated in a particular context. The CLP framework highlights situated events, or a sequence or

constellation of situated events as multiple events occur over time, where learning transpires between places, actions, and positions (Figure 1).

Figure 1. *Cultural Learning Pathways framework*



For this study, I specifically focused on the interests and social relationships with an overlay of affective variables. With PBL providing more student choice, an exploration of EL interests may shed light on the components of PBL that are relevant and engaging to them and why. In addition, examining the social relationships within the mainstream classroom between ELs and their peers provide insights into a substantial component of the PBL classroom that is one of the most complex, collaborative group work. Sociomaterial practices for this study are defined as practices students engage in while in the mainstream PBL classrooms, such as collaborating with peers and utilizing technology to complete tasks.

The overlay of affective variables aids in describing the EL experience. Affective variables – factors in language learning – are defined as aspects associated with a student's emotional being (Damasio, 1994). When experiencing negative emotions, such as anxiety or fear, a student's optimal learning potential may be compromised; whereas, if a student experiences positive emotions, such as motivation or self-esteem, it can greatly facilitate the

language learning process (Arnold & Brown, 1999). I used three prominent affective factors in language learning (Arnold, 1999) as lenses to examine the EL experience: attitude, anxiety, and motivation.

Attitude is one of the most powerful determinants of behavior (Henter, 2014). Learning events can cause positive or negative reactions depending on the attitude of the student. Anxiety is associated with negative feelings such as uneasiness, frustration, and self-doubt (Andres, 2002). According to Arnold and Brown (1999), anxiety is "quite possibly the affective factor that most pervasively obstructs the learning process" (p. 8). Figuring out what causes anxiety in the mainstream PBL classrooms may provide teachers and administrators with valuable insights into the EL experience. Brown (1994) defined motivation as "an inner drive, impulse, emotion or desire that moves people to a particular action" (p. 25). Research in language learning has found motivation to be a main determinant in predicting performance (e.g. Henter, 2014) and crucial to successful language learning (e.g. Crookes & Schmidt, 1991). I draw on these conceptual points to analyze the EL experience with PBL in mainstream classrooms.

Methods

This mixed methods study used Likert-type surveys and focus groups to examine the English learner experience across problem-based learning classrooms. I used the explanatory design (Creswell & Clark, 2011) to collect quantitative data in order to inform the follow-up qualitative data collection. The data was collected at the end of the 2013-2014 school year to ensure that every English learner participant had had some exposure to problem-based learning in the mainstream classroom. The following sections describe the context, the participants, the data collection, and the analysis procedures.

Context

The setting of this study was Petrichor High School located in the Puget Sound area of Washington. This particular site has a diverse student population. Redesigned PBL curriculum has been implemented across content areas. Thirty-eight percent. 399 students, of the 1050 student body speaks a language other than English at home. Forty-four different languages are spoken in student homes at PHS. Moreover, 40%, 420 students, of the student population qualify for free and reduced lunch due to low socio-economic status. (Note: Readers should not infer a correlation between EL status and low SES, as these data were unavailable.)

Ten-percent, 105 students, have an EL designation. The designation is provided when the student qualities for additional English language services. This is assessed first through the home language survey. When the student first arrived in the district, their parents or guardians completed a survey, which included two language specific questions: "What language did your student first learn to speak?" and "What language is used most at home?" If they responded with a language other than English to either of the questions, the student is assessed by the taking the Washington English Language Proficiency Assessment (WELPA).

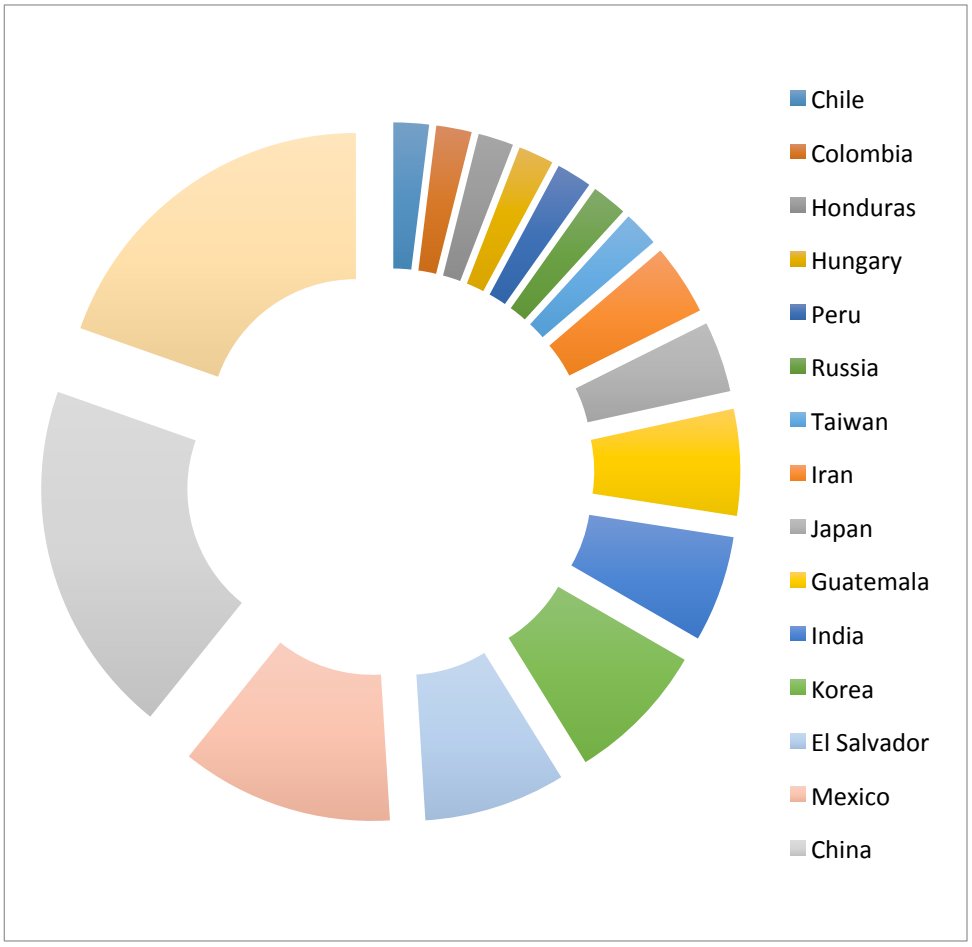
PBL at PHS consisted of units in each course that were designed and implemented by teachers in the content area's department. Each of the content areas–math, science, and social studies–had several design teams, who created PBL units aligned to state standards and district content requirements. Units were designed with seven key elements in mind to provide an authentic and relevant real-world problem for students to tackle. A number of the units required group work to create a product and culminating solution to be presented to authentic audiences, comprised of stakeholders and experts associated with the content.

Participants

The participants (N=51) in the study were selected through a convenience sample based on attendance on the day the survey was implemented in their English language development (ELD) class. They were selected based on their WELPA designation as an English learner receiving English language support services, meaning they had a beginning, intermediate or advanced level status. A wide variance in language backgrounds and proficiency levels among the participants was intentional to encompass the scope of academic, linguistic, and life experiences that the English learner label does not illustrate. Fifty-one ELs completed the survey and participated in the focus groups. The sample consisted of 24 females and 27 males. There were nine ninth-grade, nine tenth-grade, and 31 eleventh- and twelfth-grade students. There were six students at the beginning WELPA level, 19 at the intermediate level, and 26 at the advanced level.

The participants spoke nine different languages and came from 17 different countries as shown in Figure 2. The different countries in order of number of students in the study were: 10 from China (19.6%), 10 from Vietnam (19.6%), six from Mexico (11.8%), four from El Salvador (7.8%), four from Korea (7.8%), two from Guatemala (3.9%), two from India (3.9%), two from Iran (3.9%), two from Japan (3.9%), one from Chile (2%), one from Colombia (2%), one from Honduras (2%), one from Hungary (2%), one from Peru (2%), one from Russia (2%), and one from Taiwan (2%). The first languages were: Spanish (n=17, 29.3%), Chinese (n=14, 24.1%), Vietnamese (n=10, 17.2%), Korean (n=4, 6.9%), Punjabi (n=3, 5.1%), Hindi (n=2, 3.4%), Japanese (n=2, 3.4%), Farsi/Persian (n=2, 3.4%), Cantonese (n=1, 1.7%), French (n=1, 1.7%), Hungarian (n=1, 1.7%), and Taiwanese (n=1, 1.7%) speakers.

Figure 2. Countries of origin of the EL participants



Data Collection and Survey

Survey. The survey (Appendix A) was given to the participants at the end of the 2013-2014 academic year prior to the focus groups. The survey had four items that asked for demographic information and class schedule at the start of the survey. Then, the survey had 31 Likert-type scale items and six open-ended items. The participants were asked to rate each item/question by the content area: English language development and mainstream math, science, and social studies. The survey was given during their English language development class. I explained the purpose of the survey to English learners and was present to answer and clarify any

questions that arose while they completed the paper survey. Participants were provided the options of using their native language and drawing pictures in their responses to the open-ended items.

Focus Groups. The data for this article comes out of a larger, year-long qualitative multiple case study of the EL experience in problem-based learning across mainstream contexts. Thirteen focus groups were conducted with the average length 25 minutes. The format was semi-structured with the following focal questions:

1. Describe an experience or a time when you were engaged in something fascinating that you were interested in.
2. Have you experienced something that was engaging and interesting at PHS? If yes, in which class?
3. Do you like working with other students in your math/science/social studies class? Why or why not?
4. Do you like working on problems/projects in your math/science/social studies class? Why or why not?
5. Do you feel connected to the problems/projects? Why or why not?
6. What would you change to help better your experience at PHS?

Each focus group session was audio- and video-recorded. I consulted the English language development instructors to configure each focus group session. Characteristics of first language, classroom dynamics, and peer relationships were taken into consideration. The number of students ranged from two to six per focus group, and the focus groups were conducted over a period of three weeks in their ELD class.

Each focus group began with my explaining the purpose of the activity, which was to

better understand the EL experience and attempts to improve their experiences at PHS. I provided a copy of the focus group questions to the participants in English and in their native languages and gave them a few minutes to look them over. During the conversation with the participants, I encouraged each EL to provide a response to each of the questions and to talk to each other instead of directly at me. Participation varied among the focus groups with some ELs offering more responses and explanations than others. At times, the student participants would translate oral responses for each other in their native languages to English for me to understand and some ideas were exchanged in Mandarin Chinese. I ended the focus groups by asking if the participants had anything else they wanted to share and thanking them for their willingness to participate. There was variation in the topics that were covered in each of the focus groups.

Analysis

The participants' responses on the survey were typed into Excel spreadsheets and entered into SPSS. The data was analyzed to produce descriptive statistics that included the mean and standard deviation. Responses were also coded, revealing five key items for the study:

1. How different are classes here at PHS compared to your home country?
2. How much do you like working on problem-based learning?
3. Do you like working with other students?
4. Do you think group work is valuable?
5. Do you think group work helps you learn?

From the survey results, focus group questions were crafted to provide a description and deeper understanding of the numerical value obtained from the survey results.

For the focus groups, I began the analysis with the videos and the content logging and transcription of the focus groups' dialogs. The focus groups conducted in a language other than

English were translated into English. The data were examined for descriptions of the classroom experience related to PBL. These moments were flagged and given a category code (Merriam, 2009). The codes were math, science, social studies, peers, language, presentation, challenges, resources, emotions, and PBL units. Upon further inspection, codes were grouped into categories. Categories included elements of PBL, collaborative activities, content areas, language, challenges, and supports. Throughout, I wrote analytic memos and charts to organize and collate the evidence. I detailed my process, codes, and verified claims in order to have a credible path of analysis.

Findings

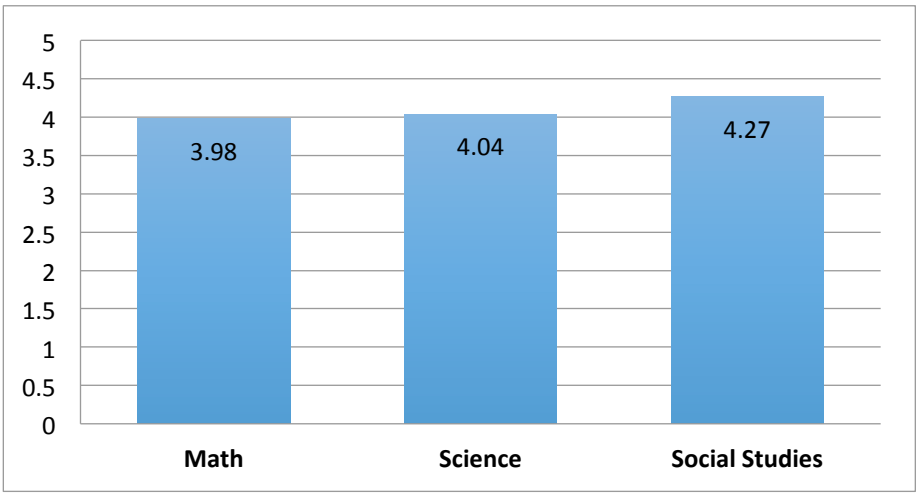
Findings reveal mixed evaluations of PBL in mainstream math, science, and social studies classrooms. The results generated three dominant themes: contrasting pedagogical environments, potentially powerful social relationships, and connected interests and motivation. Survey data provided a general picture of EL reactions, while focus group data provided the details and nuances of their perceptions. In this section, I present each of the three themes with affective variables of language learning.

Contrasting Native Country and PHS Pedagogical Environments

To begin understanding the EL experience in PBL, I started with how different classes are in their home country versus classes at PHS. The 5-point Likert-scale item "How different are classes at PHS compared to your home country?" with 0 representing "the same" and 5 representing "completely different" was asked for each of the content areas, math, science, and social studies. Overall, ELs thought classes at PHS were substantially different from classes in their home countries (Figure 3). In math, the mean was 3.98 (n = 50, SD = 1.03). In science, the

aggregate mean was 4.04 (n = 48, SD = 1.00. And in social studies, the aggregate mean was 4.27 (n = 51, SD = 0.85).

Figure 3. EL rating of "How different are classes at PHS compared to your home country?"



PBL presented a stark contrast to the EL's prior academic experiences in school. Their individual responses during the focus groups expressed reaction to the new type of instruction and some preference for the familiar ways schools in their home countries operated:

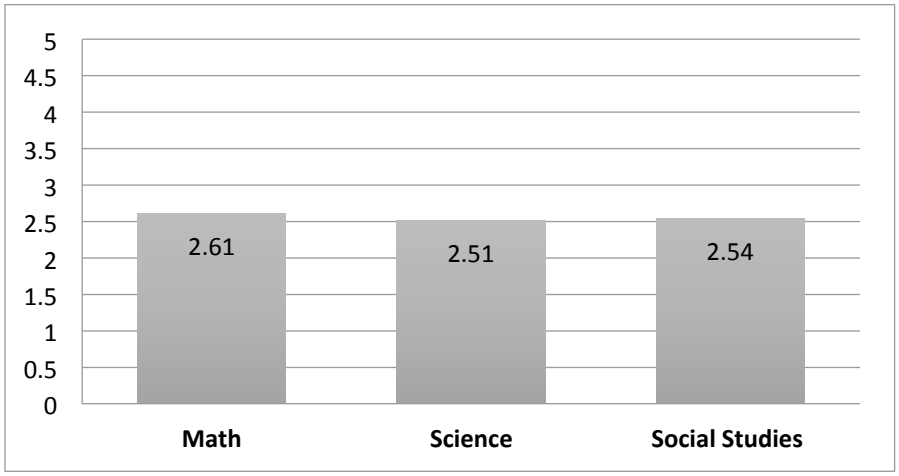
Anya from Russia in the US for 7 months Beginner level	"I prefer to be writing things and the teacher explaining"
Mario from Columbia in the US for 24 months Intermediate level	"I don't like PBL because it's too much work. I would rather the teacher talk and take a test."

Jae from Korea in the US for 4 months Advanced level	"I don't like PBL because it's hard to understand. I prefer to read a textbook and take a test. I don't feel connected to the PBL."

The attitudes of the ELs from different language proficiency levels and lengths of stay in the US showed a distinction between the type of instruction they received in their home countries versus the PBL at PHS. The components and instructional approach of PBL were a departure from the type of learning and the expectations of performance they were used to in their home countries.

Affinity Towards PBL in Content Areas. In exploring EL attitudes towards PBL, I looked at their affinity towards PBL in each of their mainstream content area classes. The 5-point Likert-scale item "How much do you like working on problem-based learning?" with 0 representing "not at all" and 5 representing "all the time" was asked for each of the content areas, math, science, and social studies. Overall, ELs responded to liking PBL between some of the time and half of the time (Figure 4). In math, the mean was 2.61 ($n = 47$, $SD = 1.46$). In science, the aggregate mean was 2.51 ($n = 43$, $SD = 1.36$. And in social studies, the aggregate mean was 2.54 ($n = 48$, $SD = 1.36$).

Figure 4. EL ratings of "How much do you like working on problem-based learning?"



While the survey data revealed similar levels of affinity for PBL across the mainstream content areas, ELs in the focus group talked about PBL with mixed reactions:

Ngoc from Vietnam in the US for 18 months Intermediate level	"I think PBL helps you learn more."
Lourdes from Mexico in the US for 7 months Advanced level	"If I would speak English, I would love it but since I'm not, I don't like it because the grade of all the team also depends on me."
Veronica from Taiwan in the US for 18 months Advanced level	"PBL feels miserable sometimes, not sometimes, most of the time."

Chen from China in the US for 48 months Advanced level	"If English is my home language, then I better like PBL."

Language was a prominent theme when ELs discussed PBL in the mainstream. Since they are still learning the English language, ELs struggled at times with comprehending the content, the PBL learning style, on top of the language that the instruction and activities were facilitated in. There were some ELs who saw benefits to PBL such as engaging and grappling with the content and applying it to creating solutions.

ELs also responded specifically to the PBL in each content area:

Math. ELs expressed not experiencing much PBL in their math classes, except for geometry, where there were several PBL units implemented.

Pablo from Mexico in the US for 24 months Intermediate level	"I don't think we did any PBL in math (Algebra II)."
Quach from Vietnam in the US for 30 months Advanced level	"I liked the parking lot project in math (Geometry). That was fun."
Jae from Korea in the US for 4 months Advanced level	"There is no PBL in math (Algebra I). We sit in groups, but we don't really do group work."

Science. In the focus groups**,** many ELs expressed enthusiasm for PBL in science. They found some the PBL units to be engaging and connected to their interests. Others found PBL to be challenging due to language constraints.

Sonya from Mexico in the US for 10 months Beginner level	"I don't really like PBL in science (Biochem I). But I need it because I like studying nursing. It's very difficult when I understand little in class."
Elena from El Salvador in the US for 72 months Intermediate level	"Best (PBL unit) was in science. I got to research about soccer. I liked it a lot."
Qi from China in the US for 5 months Advanced level	"Science PBL (units) are most connected to every day life. And it has more meaning to my life. "

Social Studies. Attitude towards PBL social studies was mostly positive. Student had different types of motivation for completing activities in their classes.

Cheng from China in the US for 36 months Intermediate level	"I think there is the most PBL in social studies. I like all the PBL units in that class. I share what I learn about WWII with my father."

Edurado from Mexico in the US for 48 months Advanced level	"PBL in social studies (AP Human Geography) is interesting because the people we present the solution to can actually go and try to fix the problem (of not enough affordable housing in the community)."
Veronica from Taiwan in the US for 24 months Advanced level	"I liked the Broadcast project in (US History) because we can just hide and not face the people and say what we want. We hide behind a board, and they just listen. We can put on some music, and we are doing live radio."

Overall, ELs' attitudes toward PBL in general were mixed, but they connected with some of the science and social studies units. Language challenges can be a barrier to comprehension and participation. ELs also communicated that social studies and science had more PBL than math during the focus groups.

Tensions and Benefits in Social relationships

PBL presents many opportunities for building social relationships in the classroom due to the collaborative nature of the units. The potential rewards of peer support can be powerful, especially in acculturating to new environments. However, there were missed opportunities. In exploring EL perceptions of social relationships in PBL, I looked at their affinity towards group work through three 5-point Likert-scale items in each of their mainstream content area classes. The first asked "Do you like working with other students?" with 0 representing "not at all" and 5 representing "all the time" was asked for each of the content areas, math, science, and social studies. Overall, ELs responded to liking working with others slightly more than half of the time.

In math, the mean was 3.25 (n = 48, SD = 1.26). In science, the aggregate mean was 3.22 (n = 44, SD = 1.15). And in social studies, the aggregate mean was 3.10 (n = 49, SD = 1.12).

The second item asked "Do you think group work is valuable?" with 0 representing "not at all" and 5 representing "all the time." ELs responded to valuing group work between half the time and most of the time. In math, the mean was 3.42 (n = 47, SD = 1.11). In science, the aggregate mean was 3.50 (n = 44, SD = 1.08. And in social studies, the aggregate mean was 3.44 (n = 50, SD = 0.99).

The third item asked "Do you think group work helps you learn?" with 0 representing "not at all" and 5 representing "all the time." ELs responded to thinking group worked helped them learn between half the time and most of the time. In math, the mean was 3.42 (n = 50, SD = 1.32). In science, the aggregate mean was 3.58 (n = 46, SD = 1.27). And in social studies, the aggregate mean was 3.60 (n = 48, SD = 1.26).

During the focus groups, ELs articulated concern with working with non-EL peers in the mainstream classroom:

Nelly from Iran in the US for 9 months Beginner level	"It makes me sad because if they go to Mexico or Iran, I'm sure they can't speak very good. Makes me angry they are not nicer and want to help more."
Alex from Guatemala in the US for 36 months Intermediate level	"I like working in groups, not all the time. It depends on the people. I don't want to work with little kids. I want to work with people who want to get it done."

Lin from China in the US for 48 months Intermediate level	"I prefer to work in groups because I know other people can help me."
Zhong from China in the US for 48 months Advanced level	"I don't like working in groups here. I feel like my language is not good, so sometimes I'm shamed with talking to people, because it's so hard to explain my ideas. They may not understand."

Overall, there was anxiety around building social relationships and working collaboratively for ELs. While some ELs saw the positive benefits of working with others, other ELs felt anxious about working with English fluent peers and the pressure of not being able to complete his/her portion of the group work. Struggling with language challenges presented a barrier to peer interactions. Without appropriate facilitation and proper support, ELs may miss opportunities to authentically connect with their non-EL peers.

Connected Interests and Motivation

Overall, in the PBL units ELs connected to, they were able to use their native language, tap into their prior knowledge, and choose their interests to explore. When asked what piqued their interests and kept them engaged in their mainstream academic PBL classes, the ELs responded with the units they found to be the most interesting and why:

Silvia from El Salvador in the US for 12 months Beginner level	"I like making children's book (in World History). My group help me, and I use Spanish in presentation."

Pablo from Mexico in the US for 24 months Intermediate level	"I enjoy the History Day project. I worked with another EL who speak Spanish. We pick Pancho Villa because I know about him from school in Mexico. He was important in my town."
Ngoc from Vietnam in the US for 18 months Intermediate level	"I like History Day project the best. You need to find something about the past. It let me know more about the past in the US, like WWI and WWII."
Mimi from Japan in the US for 18 months Advanced level	"The best PBL was for science. It was the Independent Research project. I was interested in learning more about cancer research and my teacher connected with a Japanese researcher. I interviewed him in Japanese and got a lot of good information. I translated everything into English for the report. I learned so much."

For Silvia, the opportunity to utilize her home language alleviated anxiety during a potentially stressful presentation in front of peers. Mimi was able to use her home language to communicate with an outside expert who provided pertinent and stimulating information. Pablo was able to use prior knowledge of a prominent figure in his hometown to share with his class. Ngoc was excited to choose a topic to learn more about the country he lived in. Their motivation in these PBL units stemmed from the ability to select topics they were interested in.

Discussion

The purpose of this study was to examine the attitude and experience of English learners towards PBL in mainstream math, science, and social studies classrooms. Through survey and focus group analysis, the findings advance our understanding of affective factors and sociomaterial practices in PBL for students whose first language is not English. The salient affective factors were attitude, anxiety, and motivation.

The results suggest the examination of three areas when planning and implementing PBL with heterogeneous mainstream classrooms: an awareness of the EL student experience, leveraging the rich linguistic and prior knowledge of ELs as a strength and resource, and differentiating supports for ELs.

Awareness for the EL Student Experience

The findings showed varied EL responses to PBL, its components, and connection to the content area. This is not a surprise considering ELs represent a variety of backgrounds, first languages, and countries of origin, as shown by the demographics of the participants. Some ELs found PBL to be connected to their interests because it offered opportunities for them to use their prior knowledge and experience while others found PBL to be challenging and different from what they were used to in their native countries. What this means for teachers and other educators is to gain a broader and deeper picture of the ELs in their classrooms. For ELs, the journey to the US is not always a pleasant one or one taken by choice (Portes & Rumbaut, 2001; Suárez-Orozco, Suárez-Orozco, & Todorova, 2008). Understanding where the student is coming from as well as why the student is here may provide vital information in how they will respond and adjust to the new environment.

Anxiety plays a significant role in adapting to new surrounding and learning a new language. Having a positive and safe learning environment to thrive in is one of the chief elements in fostering growth (Arnold, 1999). Some ELs may also experience anxiety and stress in their homes as their families also adjust to the new environment and dynamics. Therefore, having an awareness of each EL as an individual and their experiences can be crucial in providing the appropriate supports. Garza (2009) explained that cultivating a relationship with student as individuals and making a conscious effort to understand their community rather than generalizing what he or she may need can alleviate anxiety and show care.

Leveraging Rich Linguistic and Prior Knowledge of ELs

ELs come into the classroom with a breadth of cultural and linguistic knowledge as shown through the demographic data and responses to PBL. This study helped to illustrate opportunities in PBL for ELs to leverage resources they bring when presented with choice. When ELs were given a choice during PBL units, they chose topics based on their interests and knowledge and were excited and motivated to conduct research and share their findings. Some ELs used their home languages while others used prior knowledge. More opportunities to leverage the EL resources can be beneficial in increasing their motivation and participation. Motivation plays a key role in successful learning for ELs (de Andres, 2002). When students are motivated by their interest or desire to share their expertise, learning and engagement can increase.

Differentiating Supports

ELs at PHS are faced with learning a new language, adjusting to new social and academic norms, and attempting to be academically successful. As this study as shown, PBL presents a dramatically different type of learning environment than the ones ELs have experienced.

Providing supports in navigating the new classroom demands through thoughtful planning, facilitation of activities, and building community in the classroom may alleviate anxiety and promote participation. Walqui (2008) explained the importance of explicitly teaching academic strategies, sociocultural expectations, and academic norms to ELs because they are new to the environment and culture. The planning and teaching of ELs will require additional effort. Studies have shown that ELs are most successful when teachers are prepared and willing to teach them (ex. Coady et al., 2008). Providing an explanation of PBL and its benefits would provide ELs with a better understanding of the structure and potential rewards of engaging with a more complex type of instruction and learning environment.

Differentiation of support for English learners can begin with a focus on language. How is language used in each content area? What type of language is appropriate and acceptable? Participation in discussion or a writing assignment may not look the same in social studies versus math. Each EL has a state designated language proficiency level, which provides instructors with a general understanding of the student's English linguistic abilities. However, since the label does not provide any historical academic or linguistic information, it is up to the teacher to gather additional data in order to understand and provide appropriate supports for their ELs.

Conclusion and Future Research

This study has shown the span of EL student perspectives on PBL in the mainstream classroom with focus on affective dimensions of their experience. While classroom research is often conducted from the teacher's point of view, it is important to consider the student side, especially from a growing population in US schools who have great potential but face significant academic challenges. It is also important to consider student interpretations and experience based on their own language and words and exploring to determine solutions to challenges they face in

high schools (Parris, Varjas, Meyers, & Cutts, 2012). Awareness of the English learner experience and building specific supports may alleviate anxiety with learning a new language and understanding and adapting to a new instructional approach. Leveraging ELs' native languages and prior knowledge and experiences may also increase motivation and engagement with the content.

While this study has provided data and analysis of affective dimensions of the English learner experience with PBL in the mainstream, future research should examine similar dimensions with non-EL students to be able to further understand the student experience and differentiate support. Another suggestion for future research is to analyze the tools and strategies English learners utilize to navigate PBL in mainstream classrooms. In gathering this data, researchers may be able to provide additional suggestions to teachers and administrators as they are designing and implementing PBL.

References

Allen, R., & Rooney, P. (1998). Designing a problem-based learning environment for ESL students in business communication. *Business Communication Quarterly*, *61*(2), 48-56.

de Andres, V. (2002). The influence of affective variables on ESL/EFL learning and teaching. *The Journal of Imagination in Language Learning and Teaching. 7*, https://www.njcu.edu/cill/journal-index.html.

Arnold, J. (1999). *Affect in language learning* (Cambridge language teaching library). Cambridge, U.K.; New York, NY: Cambridge University Press.

Arnold, J. & Brown, H.D. (1999). A map of the terrain. In Arnold, J. (1999). *Affect in language learning* (Cambridge language teaching library). (pp. 1–24). Cambridge, U.K.; New York, NY: Cambridge University Press.

Azmin, N. & Shin, L. (2012). Problem-based learning in English for a second language classroom: Students' perspectives. *The International Journal of Learning, 18*(6), 109-126.

Barron, B. J., Schwartz, D. L., Vye, N. J., Moore, A., Petrosino, A., Zech, L., & Bransford, J. D. (1998). Doing with understanding: Lessons from research on problem- and project-based learning. *Journal of the Learning Sciences*, *7*(3-4), 271-311.

Barron, B. (2003). When smart groups fail. *The Journal of the Learning Sciences*, *12*(3), 307–359.

Barron, B. & Darling-Hammond, L. (2008). Teaching for meaningful learning: A review of research of inquiry-based and cooperative learning. Excerpted from Darling-Hammond, L., Barron, B., Pearson, P.D., Schoenfeld, A.H., Stage, E.K., Zimmerman, T.D., Cervetti, G.N., & Tilson, J. *Powerful learning: What we know about teaching for understanding*. San Francisco: Jossey-Bass. PDF retrieved from http://www.edutopia.org/pdfs/edutopia-teaching-for-meaningful-learning.pdf.

Beckett, G. H. (2002). Teacher and Student Evaluations of Project-Based Instruction. *Tesl Canada Journal*, 19, 2, 52-66.

Beckett, G.H. (2006). Beyond second language acquisition: Secondary school ESL teacher goals and actions for project-based instruction. In Beckett, G. H., & Miller, P. C. (Eds.), *Project-based second and foreign language education: Past, present, and future* (55-70). Greenwich, Conn: Information Age Pub.

Beckett, G. H., & Slater, T. (2005). The Project Framework: A Tool for Language, Content, and Skills Integration. *Elt Journal*, 59, 2, 108-16.

Bell, P., Tzou, C., Bricker, L., & Baines, A. D. (2013). Learning in diversities of structures of social practice: Accounting for how, why and where people learn science. *Human Development*, *55*(5-6), 269-284.

Belland, B. R., Glazewski, K. D., & Ertmer, P. A. (2009). Inclusion and Problem-Based Learning: Roles of Students in a Mixed-Ability Group. *Rmle Online: Research in Middle Level Education, 32*, 9, 1-19.

Berg, B. L., & Lune, H. (2012). Qualitative research methods for the social sciences (8th ed.). Boston, MA: Pearson.

Boothe, D., Vaughn, R., Hill, J., & Hill, H. (2011). Innovative English language acquisition through problem-based learning. Paper presented at The Future of Education International Conference. Florence, Italy. June 2011. Retrieved from http://conference.pixel-

online.net/edu_future/common/download/Abstract_pdf/pdf/ITL27-Boothe,Vaughn,Hill,Hill.pdf

Brown, H. (1994). *Principles of language learning and teaching*. White Plains, NY: Longman.

Bunch, G. C. (2006). "Academic English" in the 7th grade: Broadening the lens, expanding access. *Journal of English for Academic Purposes, 5*, 4, 284-301.

Chan, V. (2001). Fostering Learner Autonomy in an ESL Classroom. *Tesl Canada Journal, 18*, 1, 75-91.

Charmaz, K. (2014). *Constructing grounded theory*. Thousand Oaks, CA: Sage.

Chen, C. S., Lai, C. S., Lu, P. Y., Tsai, J. C., Chiang, H. C., Huang, I. T., & Yu, H. S. (2008). Performance anxiety at English PBL groups among Taiwanese medical students: A preliminary study. *The Kaohsiung Journal of Medical Sciences*, *24*(3), S54-S58.

Cilesiz, S. (January 01, 2011). A phenomenological approach to experiences with technology: current state, promise, and future directions for research. *Educational Technology Research and Development, 59*, 4, 487-510.

Cohen, E.G. (1994). *Designing groupwork: Strategies for heterogeneous classrooms.* Revised Edition. New York, NY: Teachers College Press.

Cohen, E., Lotan, R., Scarloss, B. & Arellano, A. R. (1999). Complex instruction: Equity in cooperative learning classrooms. *Theory into Practice, 38*(2), 80-86.

Cohen, E., Lotan, R., Scarloss, B., Schultz, S., & Abram, P. (2002). Can groups learn?. *The Teachers College Record*, *104*(6), 1045-1068.

Coleman, R., & Goldenberg, C. (2010). What Does Research Say about Effective Practices for English Learners? Part III: Promoting Literacy Development. *Kappa Delta Pi Record, 46*, 3, 106-111.

Creswell, J., & Plano Clark, Vicki L. (2011). *Designing and conducting mixed methods research* (2nd ed.). Los Angeles: SAGE Publications.

Crookes, G. & Schmidt, R.W. (1991). Motivation: Reopening the research agenda. *Language Learning: A Journal of Applied Linguistics, 41*(4), 469-512.

Cummins, J. (1991). Conversational and Academic Language Proficiency in Bilingual Contexts. *Aila Review, 8*, 75-89.

Cummins, J. (2008) BICS and CALP: Empirical and theoretical status of distinction. In Street, B. & Hornberger, N. H. (Eds.). (2008). Encyclopedia of Language and Education, 2nd Edition, Volume 2: Literacy. (pp. 71-83). New York: Springer Science + Business Media LLC.

DaCosta, K. (2006). Dress Code Blues: An Exploration of Urban Students' Reactions to a Public High School Uniform Policy. *Journal of Negro Education, 75*(1), 49-59.

Darling-Hammond, L. (2012). *Powerful teacher education: Lessons from exemplary programs*. John Wiley & Sons.

Davies, B., & Harre, R. (1990). Positioning: The discursive production of selves. *Journal For The Theory Of Social Behaviour, 20*(1), 43-63.

Dolmans, D., & Gijbels, D. (January 01, 2013). Research on problem-based learning: future challenges. Medical Education, 47, 2, 214-8.

Dreier, O. (2009). Persons in structures of social practice. *Theory & Psychology*, *19*(2), 193-212.

Evensen, D. & Silver, C. (2000). *Problem-based learning: A research perspective on learning interactions.* Mahwah, NJ: Lawrence Erlbaum Associates.

Evensen, D. H., Salisbury-Glennon, J. D., & Glenn, J. (2001). A qualitative study of six medical

students in a problem-based curriculum: Toward a situated model of self regulation. *Journal of Educational Psychology*, *93*(4), 659.

Freire, P. (1970). *Pedagogy of the oppressed*. New York: Herder and Herder.

Garza, Ruben. (2009). Latino and White High School Students' Perceptions of Caring Behaviors: Are We Culturally Responsive to Our Students? *Urban Education, 44*(3), 297-321.

Gillies, R. M. (2008). The effects of cooperative learning on junior high school students' behaviours, discourse and learning during a science-based learning activity. *School Psychology International*, *29*(3), 328-347.

Goldenberg, C. (2013). Unlocking the research on English learners: What we know and don't know about effective instruction. *American Educator*, *37*(2), 5.

Goodnough, K., & Cashion, M. (2003). Fostering Inquiry through Problem-Based Learning. *Science Teacher*, 70, 9.

Grant, M. (2009). *Understanding projects in project-based learning: A student's perspective*. Paper presented at Annual Meetings of the American Educational Research Association. San Diego, CA. April, 2009. Retrieved from http://www.bie.org/research/study/students_perspective.

Grantmakers for Education (2013). *Educating English language learners: Grantmaking strategies for closing America's other achievement gap.* Retrieved from http://www.edfunders.org/sites/default/files/Educating%20English%20Language%20Learners_April%202013.pdf

Jacob, E., Rottenberg, L., Patrick, S., & Wheeler, E. (1996). Cooperative Learning: Context and Opportunities for Acquiring Academic English*. *TESOL Quarterly*, *30*(2), 253-280.

Johnson, D., & Johnson, R. (1990). Cooperative learning and achievement. In S. Sharan (Ed.), *Cooperative learning: Theory and research* (pp.23-37). New York: Praeger.

Hakuta, K. (May 01, 2011). Educating language minority students and affirming their equal rights: Research and practical perspectives. Educational Researcher, 40, 4, 163-174.

Harklau, L. (1999). The ESL learning environment in secondary school. *So much to say: Adolescents, bilingualism, and ESL in the secondary school*, 42-60.

Harklau, L. (June 06, 2000). From the "Good Kids" to the "Worst": Representations of English Language Learners across Educational Settings. Tesol Quarterly, 34, 1, 35-67.

Harré, R., & Lagenhove, Luk van. (1999). *Positioning theory: Moral contexts of intentional action*. Oxford ; Malden, Mass: Blackwell.

Haynes, J. (2007). Explaining BICS and CALP. Retrieved from http://www.everythingesl.net/inservices/bics_calp.php

Henter, R. (2014). Affective factors involved in learning a foreign language. *Procedia - Social and Behavioral Sciences, 127*, 373-378.

Hmelo-Silver, C. E. (2004). Problem-based learning: What and how do students learn? *Educational Psychology Review*, *16*(3), 235-266.

Hopstock, P. & Stephenson, T. (2003). *Descriptive study of services to LEP students and LEP students with disabilities. Special topic report#2: Analysis of Office of Civil Rights (OCR) data related to LEP students.* Washington, DC: U.S. Department of Education, Office of English Language Acquisition, Language Enhancement, and Academic Achievement for Limited English Proficient Students (OELA).

Janzen, J. (January 01, 2008). Teaching English Language Learners in the Content Areas. *Review of Educational Research, 78*, 4, 1010-1038.

Kang, N.H., DeChenne, S. E., & Smith, G. (2012). Inquiry Learning of High School Students through a Problem-Based Environmental Health Science Curriculum. *School Science and Mathematics, 112*, 3, 147-158.

Kanno, Y., & Applebaum, S. D. (June 06, 1995). ESL Students Speak up: Their Stories of How We Are Doing. *Tesl Canada Journal*, 12, 2, 32-49.

Lee, H., & Bae, S. (2008). Issues in Implementing a Structured Problem-based Learning Strategy in a Volcano Unit: A Case Study. *International Journal of Science and Mathematics Education*, 6, 4, 655-676.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge university press.

Le Vasan, M., Venkatachary, R., & Freebody, P. R. (2006). Can collaboration and self direction be learned? A procedural framework for problem-based learning. *Planning & Changing*, *37*(1&2), 24-36.

Lotan, R. A. (2003). Group-worthy tasks. *Educational Leadership*, *60,* 72-75.

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

Miles, M. B., & Huberman, A. M. (1994). Qualitative data analysis: An expanded sourcebook (2nd ed.). Thousand Oaks, CA: Sage.

National Center for Education Statistics., & Institute of Education Sciences (U.S.). (2000). NAEP year-at-a-glance. Washington, D.C.: U.S. Dept. of Education, Office of Educational Research and Improvement, National Center for Education Statistics.

Office of English language Acquisition (U.S.) (2015). English learners. Washington, D.C.: U.S. Dept. of Education, National Center for Education Statistics, Common Core of Data.

Olsen, L., & Edwards, R. (1997). Made in America: Immigrant students in our public schools. New York: New Press.

Othman, N., & Shah, M. I. A. (2013). Problem-Based Learning in the English Language Classroom. *English Language Teaching*, *6*(3), p125.

Parris, L., Varjas, K., Meyers, J., & Cutts, H. (2012). High School Students' Perceptions of Coping With Cyberbullying. *Youth & Society, 44*(2), 284-306.

Pease, M. A., & Kuhn, D. (2011). Experimental analysis of the effective components of problem-based learning. *Science Education*, *95*(1), 57-86.

Ravitz, J. & Mergendoller, J. (2005). *Evaluating implementation and impacts of problem based economics in U.S. high*. Paper presented at the annual meeting of the American Educational Research Association. Montreal, Canada. April 14, 2005. Retrieved from http://www.bie.org/research/study/pbe_AERA_2005/.

Rumbaut, R. G., & Portes, A. (2001). Ethnicities: Children of immigrants in America. Berkeley: University of California Press.

Scarcella, R. (2003). *Academic English: A conceptual framework* (Tech. Rep. No. 2003-1). University of California Linguistic Minority Research Institute, University of California, Irvine.

Simms, E. & Stawarska, B. (2013). Introduction: Concepts and methods in interdisciplinary feminist phenomenology. In *Janus Head* (pp. 6-16). Pittsburgh, PA: Trivium.

Slavin, R. E. (1980). Cooperative learning. *Review of educational research*,*50*(2), 315-342.

Smith, D. W. (2013/2014). Phenomenology. In Stanford Encyclopedia of Philosophy. Palo Alto, CA: The Metaphysics Research Lab, Center for the Study of Language and

Information (CLSI), Stanford University.
Starks, H., & Brown, T. S. (2007). Choose Your Method: A Comparison of Phenomenology, Discourse Analysis, and Grounded Theory. Qualitative Health Research, 17, 10, 1372-1380.
Starr, L. J. (2014, Fall). Informing educational research and the praxis of leadership through the use of autoethnography and phenomenology. Canadian Journal for New Scholars in Education, 5(3), 71-81.
Stoller, F. L. (1997). Project work: A means to promote language content. *Journal for the Teacher of English Outside the United States, 35*, 4, 2.
Strauss, A., & Corbin, J. (1998). Basics of Qualitative Research. 1998.*Thousand Oaks*.
Suárez-Orozco, C., & Suárez-Orozco, Marcelo M. (2001). *Children of immigration* (Developing child). Cambridge, MA: Harvard University Press.
Suárez-Orozco, C., Suárez-Orozco, M. M., & Todorova, I. (2008). *Learning a new land: Immigrant students in American society*. Cambridge, Mass: Belknap Press of Harvard University Press.
Telese, J. (1999). Mexican American High School Students' Perceptions of Mathematics and Mathematics Teaching. *Hispanic Journal of Behavioral Sciences, 21*(2), 154-169.
Thomas, W. P., & Collier, V. P. (2002). *A national study of school effectiveness for language minority students' long-term academic achievement.* Retrieved from Institute of Education Sciences website: http://files.eric.ed.gov/fulltext/ED475048.pdf
Torp, L., & Sage, S. (1998). *Problems as possibilities: Problem-based learning for K-12 education*. ASCD.
Thomas, J.W. (2000). *A review of project based learning*. Prepared for The Autodesk Foundation, San Rafael, CA. Retrieved from http://www.bie.org/research/study/review_of_project_based_learning_2000/
United States Department of Education. (2006). *Building Partnerships to Help English Language Learners.* Washington, DC: Retrieved from http://www2.gov.edu/nclb/methods/english/lepfactsheet.html.
Verplaetse, L. S., & Migliacci, N. (2008). Inclusive pedagogy for English language learners: A handbook of research-informed practices. New York: Lawrence Erlbaum Associates.
Walqui, A. (2008). Development of teacher expertise to work with adolescent English learners: A model and a few priorities. In Verplaetse, L. S., & Migliacci, N. (2008). *Inclusive pedagogy for English language learners: A handbook of research-informed practices*. New York: Lawrence Erlbaum Associates.
Walqui, A., Van, L. L., & WestEd (Organization). (2010). Scaffolding the academic success of adolescent English language learners: A pedagogy of promise. San Francisco, CA: WestEd.
Wenger, E. (1998). *Communities of practice: Learning, meaning, identity.* New York, NY: Cambridge University Press.
Wilhelm, K. H. (1999). Collaborative Dos and Don'ts. *Tesol Journal, 8,* 2, 14-19.
Willett, J., Harman, R., Lozano, M. E., Hogan, A., & Rubeck, J. (2007). Generative routines: Using the everyday to create dynamic learning communities for English language learners. In L. Verplaetse, & N. Migliacci (Eds.), *Inclusive pedagogy for English language learners: Research informed practices* (pp. 33–53). Mahwah, NJ: Lawrence Erlbaum.
Yoon, B. (2007). Offering or Limiting Opportunities: Teachers' Roles and Approaches to

English-Language Learners' Participation in Literacy Activities. *The Reading Teacher*, 61, 3, 216-225.

Yoon, B. (2008). Uninvited Guests: The Influence of Teachers' Roles and Pedagogies on the Positioning of English Language Learners in the Regular Classroom. *American Educational Research Journal*, 45, 2, 495-522.

Appendix A – Focus Group Composition and Demographics for Section I

Focus Group	Number of ELs (n)	First Languages (n, language)	Grade Level	Gender? (n, female / male)	WELPA Language Level (Beginning – Advanced)	Length of time in the U.S.
A	4	1 – Russian 1 – Spanish 2 – Vietnamese	9th	4 - Female	2 – Beginning 1 – Intermediate 1 – Advanced	7-30 months
B	3	1 – Korean 2 – Spanish	9th	3 – Male	2 – Beginning 1 – Intermediate	2-48 months
C	5	2 – Korean 1 – Mandarin and Cantonese 2 – Vietnamese	11th 12th	3 – Female 2 – Male	3 – Intermediate 2 – Advanced	24-48 months
D	5	2 – Spanish 3 – Vietnamese	11th 12th	5 – Male	2 – Beginning 1 – Intermediate 2 – Advanced	12-24 months
E	2	2 – Vietnamese	11th 12th	2 – Male	2 – Advanced	24 months
F	4	1 – Cantonese 3 – Mandarin	10th	3 – Female 1 – Male	2 – Intermediate 2 – Advanced	5-24 months
G	4	3 – Spanish 1 – Tagalog	10th	2 – Female 2 – Male	2 – Beginning 1 – Intermediate 1 – Advanced	6-24 months
H	5	1 – Japanese 1 – Korean 1 – Mandarin 1 – Mandarin and Taiwanese 1 – Punjabi	11th 12th	5 – Female	1 – Intermediate 4 – Advanced	18-36 months
I	3	1 – Cantonese 1 – Mandarin 1 – Punjabi and Hindi	11th 12th	3 – Male	2 – Intermediate 1 – Advanced	18-36 months
J	2	1 – Persian 1 – Spanish	9th 10th	2 – Female	1 – Beginning 1 – Intermediate	5 to 9 months
K	2	2 – Mandarin	11th	2 – Male	2 – Advanced	42 months
L	5	1 – Mandarin 4 – Spanish	11th 12th	2 – Female 3 – Male	2 – Beginning 3 – Intermediate	5 to 36 month
M	6	6 – Spanish	11th 12th	1 – Female 5 – Male	2 – Beginning 1 – Intermediate 3 – Advanced	3 to 24 months

Appendix B – Petrichor High School Key Elements

Key Element	**Explanation**
Authentic Problems	Students work on problems that resonate with the student world as well as with powerful developments in the broader world
Authentic Assessment	Authentic assessment provides regular opportunities for students to reflect on, articulate, and present what they've learned
Culturally Responsive Pedagogy	Culturally responsive pedagogy begins with a mindset that student differences are valued and a curriculum that reflects the diversity of PHS students
Use of Expertise	Students and teachers are encouraged to take intellectual risks in accessing novel forms of expertise to inform their learning.
Student Voice	Student participation and choice in the planning, execution, and evaluation of their work increases their engagement
Collaborative Groups	Just like their teachers, students work in collaboration with their peers to identify and explore problems and to develop their ideas into solutions
Academic Discourse	Students learn the appropriate styles and norms of communication true to disciplines/subjects they are studying, including ways of talking and representing ideas in writing, graphically, and visually

Appendix C – Student Interview Questions

The questions marked with * are ones that were repeated in the second, third, and fourth interviews. The responses to the following questions were analyzed for the study:

1. Tell me a little about your background.

2. How long have you been at this school?

3. How is school different from the last place that you lived?

4. How did you learn English? Where and from whom?

5*. Tell me about your current science class.

    5a. What type of group work do you do?

    5b. Who do you work with?

6*. Tell me about your math class.

7*. Tell me about your history class.

8*. How do you like working with your group members?

Appendix D – English Learner Experience Survey

Thank you for taking time to answer the following questions for the University of Washington! This survey is an opportunity for you to share what school is like for you, both good and bad experiences. Your name will be taken off before the answers are analyzed. **Please use a dictionary or translator to help you answer the questions or ask your teacher or Annie if you don't understand something**. She can be reached at anniekuo@uw.edu or 626.755.1726. UW values your responses and appreciates your **honest** answers and descriptions of your school experience. You can also write answers in your native language.

Name:

What country are you from:

What languages do you speak:

How long have you been in the US:

Check the classes that you are in this semester:

Math	**Science**	**Social Studies**	**Language**
____ Algebra I	____ Biochem 1	____ AP Human Geo	___ ELD 9
____ Geometry	____ Biochem 2	____ World History	___ ELD 10
____ Algebra II	____ AP Env Scie	____ US History	___ ELD 11/12
____ Pre-Calc	____ Physics	____ Government	___ Other:
____ Calculus	____ AP Physics	____ Other:	
____ Other:	____ Other:		

Petrichor HS uses a special way of teaching called problem-based learning where you and the students in your class work together to try to solve a problem related to the subject that you are through making a project that presents the solution.

Here are a few examples from your classes to help you remember:

Math
Geometry:
-Parking lot project: students made designs of parking lots for Sammamish High School using angles and measurements
-Blue print / house project: students enlarged blue prints for a house using ratios and built a model home using cardboard and decorations

Pre-Calc:
-Robotics project: students picked a math concept from the text book and designed a lesson using the robots available in the classroom

Science
Bio/Chem1:

-Micelle project (cancer drug delivery): students chose a molecule to test whether it could deliver a drug (dye) and release it in response to ultrasound, UV light, or acid
- Create a game: students designed their own game to teach about atoms/periodic table
- Food addiction: collecting data & proposing a healthy product to carry at the student store that would still be appealing to students; presentation on and plans to reduce food addiction

Bio/Chem 2:
- Determine cause of death: students had one of two scenarios where a dead body was found. They analyzed autopsy and toxicology reports and learned about the nervous and endocrine systems. They had to come up with their hypothesized cause of death for their victim. A medical examiner from King County came to judge their explanations.
- Boys lost at sea: design a treatment for someone who is severely dehydrated (based on a true story of three boys who were lost in the Pacific Ocean for 50 days)
- CO2 challenge: choose something you could do to decrease your carbon footprint (eat less meat, take shorter showers, etc.). Collect data to determine how much CO2 you saved. Figure out which interventions (across the class) were most effective.
- Plan aquarium fieldtrip: at end of ocean acidification unit, plan a trip to the Seattle Aquarium, design assignment to be completed there

Social Studies
World History:
-Children's book: in groups, students wrote and drew pictures to make a children's book based on the French or Haitian revolution and presented it to "publishers."
-Video: in groups, students made videos based on the industrial revolution which were shown on the big screen at a theater

US History:
-Textbook authors: in groups, students create a middle school textbook for the 1920s with sections such as tension, politics, pop culture, and traditional vs. modern and interactive activities.

How would you define Problem Based Learning, or PBL? Image a typical class period when you are engaged in a PBL experience. What words, images, and/or feelings come to mind that you associate most with that experience? Jot down as many ideas as you can in the box below.

1. How much PBL do you do in each of the following classes? (Check one box for each row)

	No PBL	1 (one) PBL unit	Less than 50% PBL	50% PBL	More than 50% PBL	Mostly PBL	All PBL
Math							
Science							
Social Studies							
English							

2. How much do the problems (group projects, assignments, activities) connect to what is important in your life?

		0%	25%	50%	75%	100%
	N/A	Not at all	Some of the time	Half of the time	Most of the time	All the time
Math						
Science						
Social Studies						
English						

3. How much do the problems connect to what you want to do after high school?

		0%	25%	50%	75%	100%
	N/A	Not at all	Some of the time	Half of the time	Most of the time	All the time
Math						
Science						
Social Studies						
English						

4. How accurately does your grade represent what you know about the subject?

		0%	25%	50%	75%	100%
	N/A	Not at all	Some of the time	Half of the time	Most of the time	All the time
Math						
Science						
Social Studies						

English						

5. How much do you like each of the following classes?

		0%	25%	50%	75%	100%
	N/A	Not at all	Some of the time	Half of the time	Most of the time	All the time
Math						
Science						
Social Studies						
English						

6. How welcome do you feel by your teacher in each of the following classes?

		0%	25%	50%	75%	100%
	N/A	Not at all	Some of the time	Half of the time	Most of the time	All the time
Math						
Science						
Social Studies						
English						

7. How much do you think your teacher knows about your background (ex. where you are from, the languages you speak, and more)?

		0%	25%	50%	75%	100%
	N/A	Not at all	Some of the time	Half of the time	Most of the time	All the time
Math						
Science						
Social Studies						
English						

8. How often does your teacher adjust the class to help you better participate?

		0%	25%	50%	75%	100%
	N/A	Not at all	Some of the time	Half of the time	Most of the time	All the time
Math						
Science						
Social Studies						

English						

9. Do you think your teacher thinks you are smart?

		0%	25%	50%	75%	100%
	N/A	Not at all	Some of the time	Half of the time	Most of the time	All the time
Math						
Science						
Social Studies						
English						

10. Do you feel your teacher thinks the experiences you had in your home country is valuable in class?

		0%	25%	50%	75%	100%
	N/A	Not at all	Some of the time	Half of the time	Most of the time	All the time
Math						
Science						
Social Studies						
English						

11. How often do you raise your hand in class?

		0%	25%	50%	75%	100%
	N/A	Not at all	Some of the time	Half of the time	Most of the time	All the time
Math						
Science						
Social Studies						
English						

12. How often are you called on to speak?

		0%	25%	50%	75%	100%
	N/A	Not at all	Some of the time	Half of the time	Most of the time	All the time
Math						
Science						
Social Studies						

English						

13. How much choice do you have in what you learn?

		0%	25%	50%	75%	100%
	N/A	Not at all	Some of the time	Half of the time	Most of the time	All the time
Math						
Science						
Social Studies						
English						

14. How often do you show what you know to your entire class?

		0%	25%	50%	75%	100%
	N/A	Not at all	Some of the time	Half of the time	Most of the time	All the time
Math						
Science						
Social Studies						
English						

15. How often do you show what you know to your small group?

		0%	25%	50%	75%	100%
	N/A	Not at all	Some of the time	Half of the time	Most of the time	All the time
Math						
Science						
Social Studies						
English						

16. Do you feel that you have knowledge and skills to contribute?

		0%	25%	50%	75%	100%
	N/A	Not at all	Some of the time	Half of the time	Most of the time	All the time
Math						
Science						
Social Studies						

English						

17. How often are outside experts brought into the class?

		0%	25%	50%	75%	100%
	N/A	Not at all	Some of the time	Half of the time	Most of the time	All the time
Math						
Science						
Social Studies						
English						

18. How often do you work with small groups?

		0%	25%	50%	75%	100%
	N/A	Not at all	Some of the time	Half of the time	Most of the time	All the time
Math						
Science						
Social Studies						
English						

19. How often do you work with small groups on projects?

		0%	25%	50%	75%	100%
	N/A	Not at all	Some of the time	Half of the time	Most of the time	All the time
Math						
Science						
Social Studies						
English						

20. Do you like working with other students?

		0%	25%	50%	75%	100%
	N/A	Not at all	Some of the time	Half of the time	Most of the time	All the time
Math						
Science						
Social Studies						

English						

21. How much do you like working on problem-based learning?

		0%	25%	50%	75%	100%
	N/A	Not at all	Some of the time	Half of the time	Most of the time	All the time
Math						
Science						
Social Studies						
English						

22. How successful are you when completing tasks with a small group?

		0%	25%	50%	75%	100%
	N/A	Not at all	Some of the time	Half of the time	Most of the time	All the time
Math						
Science						
Social Studies						
English						

23. Do you think group work is valuable?

		0%	25%	50%	75%	100%
	N/A	Not at all	Some of the time	Half of the time	Most of the time	All the time
Math						
Science						
Social Studies						
English						

24. Do you think group work helps you learn?

		0%	25%	50%	75%	100%
	N/A	Not at all	Some of the time	Half of the time	Most of the time	All the time
Math						
Science						
Social Studies						

English						

25. Do you think other students think you are smart?

		0%	25%	50%	75%	100%
	N/A	Not at all	Some of the time	Half of the time	Most of the time	All the time
Math						
Science						
Social Studies						
English						

26. If you could choose, how often would you want to work in a small group?

		0%	25%	50%	75%	100%
	N/A	Not at all	Some of the time	Half of the time	Most of the time	All the time
Math						
Science						
Social Studies						
English						

27. If you could choose, how often would you want to work by yourself?

		0%	25%	50%	75%	100%
	N/A	Not at all	Some of the time	Half of the time	Most of the time	All the time
Math						
Science						
Social Studies						
English						

28. When you are grouped with American students, how often do they help you?

		0%	25%	50%	75%	100%
	N/A	Not at all	Some of the time	Half of the time	Most of the time	All the time
Math						
Science						
Social Studies						

English						

29. When you are grouped with students who are learning English, how often do they help you?

		0%	25%	50%	75%	100%
	N/A	Not at all	Some of the time	Half of the time	Most of the time	All the time
Math						
Science						
Social Studies						
English						

30. How often did you work with small groups at school in your home country?

		0%	25%	50%	75%	100%
	N/A	Not at all	Some of the time	Half of the time	Most of the time	All the time
Math						
Science						
Social Studies						
English						

31. How often did you work on projects at school in your home country?

		0%	25%	50%	75%	100%
	N/A	Not at all	Some of the time	Half of the time	Most of the time	All the time
Math						
Science						
Social Studies						
English						

32. How different are classes here at PHS compared to your home country?

		0%	25%	50%	75%	100%
	N/A	Not at all	Some of the time	Half of the time	Most of the time	All the time
Math						
Science						
Social Studies						

English						

33. What helped you learn the most in your home country?

34. What helps you learn here at Sammamish High School?

35. What do American students do to help you in class?

36. What do students who are learning English do to help you in class?

37. Is there anything else you would like to share about your experience at Sammamish High School?