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ENGLISH LEARNERS' ORAL PRODUCTION OF MATH VOCABULARY IN A
PLAY-INFUSED KINDERGARTEN CLASSROOM

by

Meagan Reissy

A Capstone submitted in partial fulfillment of the requirement
for the degree of Master of Arts in
English as a Second Language

Hamline University

St. Paul, Minnesota

May 15, 2017

Primary Advisor: Kristi Liu
Secondary Advisor: Heidi Bernal
Peer Reader: Angela Indieke

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To my family:
Mom and Dad.
My wonderful husband.
My handsome boy.
I would not be here without you.

“Play is often talked about as if it were relief from serious learning.
But for children, play is serious learning.”
-Mr. Rogers

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Table of Contents

CHAPTER ONE: INTRODUCTION	14
Angry Birds Playground.....	16
English Learner Programing	18
Kindergarten Play.....	19
Investigations Math	21
Vocabulary Instruction.....	22
Background & Role of Researcher.....	23
Guiding Questions.....	25
Summary	25
Overview	26
CHAPTER TWO: LITERATURE REVIEW	27
Academic Pressures in Kindergarten	28
Vocabulary	35
Play and Cognition.....	29
Play Theories & Approaches.....	31
Sociocultural Theory	31
Progressive European Approaches to Early Childhood Education	32
Angry Birds Playground Philosophy.....	33
Gap and Research Questions.....	39

Summary	40
CHAPTER THREE: METHODOLOGY.....	42
Overview & Rationale.....	42
Study Design	44
Research Setting.....	45
District and School.....	45
Classroom.....	45
Teacher	46
Students	46
Method.....	48
Data Collection Technique 1: Student Work Samples & Scores	49
Data Collection Technique 2: Transcriptions of Classroom Interactions	49
Data Collection Technique 3: Reflective Interviews	50
Data Collection Technique 4: Observations Using Field Notes.....	52
Data Collection Technique 5: Transcriptions of Planning Time.....	52
Elicitation Procedures.....	53
Vocabulary Instruction.....	53
Data Analysis	55
Summary	56

CHAPTER FOUR: RESULTS.....	57
Observation Schedule.....	57
Week One.....	58
Teacher Planning.....	58
Vocabulary Instruction.....	59
Word, Definition, and Visual Representation	59
Vocabulary Using Manipulatives.....	60
Kinesthetic Vocabulary	62
Vocabulary Discussion.....	62
Whole Group Vocabulary Production.....	64
Choice Time Vocabulary Usage.....	64
Need for Intentional Opportunities to Use Vocabulary.....	67
Math Center Activities	69
Reflective Interview - Students	69
Reflective Interview - Teacher	70
Infusing Play.....	71
Target Vocabulary Production	71
Week Two	71
Teacher Planning.....	71
Vocabulary Instruction.....	72

Vocabulary Production.....	74
Math Center Activities	74
Student Work.....	75
Reflective Interview - Students	80
Reflective Interview - Teacher	81
Infusing Play.....	81
Target Vocabulary Production	83
Summary	83
CHAPTER FIVE: CONCLUSION	85
Major Findings	86
Importance of Vocabulary for ELs.....	86
Importance of Play in Early-Years Education.....	88
Benefits of Play for All	89
Barriers in Vocabulary Development.....	90
Intentional Planning	91
Planning Interaction with Target Vocabulary	92
Implications for Teaching	93
Future of Vocabulary Instruction at the City Center School.....	93
Emphasis on Vocabulary.....	95
Strategies to Teach Vocabulary.....	95

Suggestions Moving Forward	96
Limitations of the Study	97
Suggestions for Future Research.....	98
Conclusion.....	99
References	101
APPENDICIES	109
Appendix A- Administration Approval Letter	109
Appendix B- Whole Class Notice of Research Letter.....	110
Appendix C- Parent and Focal Student Consent Form (English)	111
Appendix D- Parent and Focal Student Consent Form (Spanish).....	113
Appendix E- Parent and Focal Student Consent Form (Hmong).....	115
Appendix F- Teacher Consent Form	117
Appendix G- Hamline University Institutional Review Board Approval.....	119
Appendix H- Sample Transcription	120
Appendix I- Reflective Interview Questions (Teacher)	126
Appendix J- Reflective Interview Questions (Student).....	127
Appendix K- Guiding Questions for Field Notes.....	128

LIST OF TABLES

Table 3.1 Methods & Sources of Data Collection	49
Table 3.2 Student Self-Assessment	52
Table 3.3 Observation Schedule.....	53
Table 3.4 Vocabulary Teaching Template	55
Table 4.1 Observation Execution.....	58
Table 4.2 Target Math Vocabulary (Whole-Group) Oral Production: Week One	64
Table 4.3 Target Math Vocabulary (Focal Students) Oral Production: Week Two	73

LIST OF FIGURES

Figure 1.1 Strategy Used to Compose & Decompose Numbers up to 10.....	14
Figure 4.1 Roll Dice Addition.....	65
Figure 4.2 Addition Strategy Poster.....	72
Figure 4.7 Valentine Addition.....	75
Figure 4.8 Fishing Addition.....	78

Abstract

Research indicates that ELs' vocabulary knowledge is an important basis for building communication skills in a second language, as well as a strong predictor of later academic skills. High quality vocabulary instruction is crucial and the literature emphasizes direct instruction techniques with words that are intentionally selected (Anderson & Nagy, 1993; Christ, 2007; Silverman & Crandell, 2010). However, little research has been done in kindergarten classrooms that teach through a play-based curriculum which avoids extensive amounts of direct instruction. This qualitative case-study of two ELs in a kindergarten classroom using the *Angry Birds Playground (ABP)* framework to guide curriculum and instruction addresses students' math vocabulary acquisition within a play-based classroom. Specifically, it examined the ways play was infused into lessons and how students orally produced target vocabulary words during math tasks. Data collection included the following sources: (a) audio and video recordings of classroom interactions; (b) reflective interviews with the kindergarten teacher and the two focal students; (c) observational field notes; (d) audio recordings of planning time between the classroom teacher and the EL teacher, and; (e) worksheets and photographs of student work. Study results suggest that play, in this classroom, incorporated either independent practice of math concepts using manipulatives, or structured partner interactions using math manipulatives. Typically these activities did not include any kind of direct scaffolding of vocabulary. Students were most likely to produce the vocabulary when the teacher planned intentional opportunities for peer interaction that required them to use a particular vocabulary word. However, because the kindergarten teacher was new to planning vocabulary instruction and math instruction

time was limited, these intentional opportunities did not consistently happen. Recommendations address the need for teachers in play-based settings to balance indirect and direct instruction. They also describe ways that teachers of EL students can plan for purposeful interaction with target words in order to optimize young students' content vocabulary learning.

CHAPTER ONE: INTRODUCTION

Math Vocabulary Acquisition for English Learners in a Play-Based Kindergarten Classroom

It is afternoon and a teacher, Mrs. Honey, is introducing a math activity to the kindergarteners. “Today you get to play addition fishing! I’m going to make the carpet into a lake! You will get to use these magnet fishing poles to catch two numbers and add them together.” The students’ faces are of joy as they put both arms in the air and yell, “Hooray!” Their excitement is obvious. While they are getting to play a game, they are about to practice a math skill as well.

The Minnesota state standard requires that students, “use objects and pictures to represent situations involving combining and separating” (Minnesota Department of Education [MDE], 2007). In the aforementioned scenario, students fish for numbers to combine and use different strategies to complete addition tasks. Some students preferred to use their fingers, some used a ten-frame (Figure 1), and some drew dots. In this scenario, kindergarten can be fun in conjunction with learning.

The purpose of this research is to explore and describe: (a) how kindergarten English learners orally produce math vocabulary within a play-infused classroom, and (b) how to balance developmentally appropriate teaching methods with what is necessary for the academic achievement of ELs.

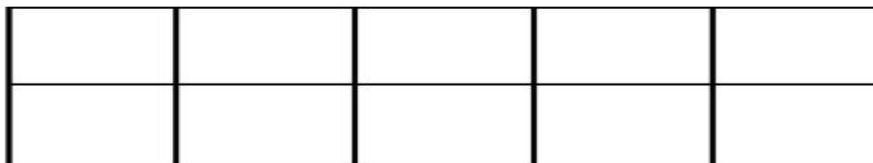


Figure 1.1. Strategy used to compose and decompose numbers up to 10.

This case study was motivated by the implementation of *Angry Birds Playground* (ABP) and by my desire to better understand how this framework influences the vocabulary acquisition of ELs in kindergarten. It is important to me as an EL teacher to ensure my students are receiving optimal language and vocabulary support. This study was designed to provide information to teachers regarding how ELs are accessing target vocabulary within the math lesson.

According to Miller & Almon (2002), kindergarten is the place that sets the stage for the rest of a child's educational love for learning. In recent years, there has been a growing pressure on schools to increase accountability in early-years education. This has caused a major change in how and what children learn in kindergarten. Instead of learning through play and exploration, it is now common for children to be spending, what may be their first school experience, in direct instruction and testing of literacy and math skills (Heidemann & Hewitt, 2010).

A strong vocabulary is a strong predictor of high academic achievement for students. Limited research exists regarding teaching vocabulary for English learners [ELs] (August, 2015; August & Shanahan, 2010). Existing research reviewed for this project revealed a relationship between a students' vocabulary knowledge and their academic achievement (Anderson & Nagy, 1992; August, 2015; August & Shanahan, 2010; Coyne & McCoach, 2009; Crevecoeur, 2008; Gass & Selinker, 2008; Gathercole & Baddeley,

1989; Pressley, 2006; Pressley, Roehrig, Rogner, Raphael, Doelezal, 2002; Rahimi & Sahragard, 2008; Roessingh & Elgie, 2009; Silverman & Crandell, 2010; Snow, Burns, Griffin, 1998; Wright & Neuman, 2014; Yesil-Dagli, 2011). In addition, a vocabulary gap existed between native English speakers and ELs. This gap negatively affected the academic achievement of ELs (Coyne & McCoach, 2009; Gathercole & Baddeley, 1989; Roessingh & Elgie, 2009). Additionally, in order to advance the language development and academic achievement of ELs, vocabulary instruction must be incorporated in the lessons and activities.

Limited research has been conducted in a play-based setting like the kindergarten classroom. Second language research supports direct vocabulary instruction for ELs while child development and play theories support a more indirect approach (Edwards, 2002; Lillemyr, Sobstad, Marder, Flowerday, 2011; Meyers, 2000; Van Oers & Duijkers, 2012). In an effort to decrease the math vocabulary gap between ELs and non-ELs, the purpose of this study is to make grade level content accessible to students by using methods that are appropriate for early-years learning environments.

Teachers face challenges when attempting to balance academic pressures with what child development theories and researchers suggest is appropriate for students. The City Center School began using the ABP framework during the 2015-2016 school year in an effort to balance the pressure of accountability with an education supported by best practices (Jarvilehto, 2014).

Angry Birds Playground

ABP was created by Rovio entertainment, the same company that developed the Angry Birds video game (Rovio Entertainment Ltd., n.d.). ABP is an early childhood

educational program (ages three to six) consisting of a teaching philosophy (*Fun Learning*), teacher training, a physical learning space, and inspiring learning materials. Rovio is a Finnish company and ABP, the early childhood education program, is based on the Finnish national education curriculum. Finland is a consistent global leader in education and many seek to replicate Finland's successful teaching methods (Sahlberg, 2007). Fun Learning is based on seven key principles (Jarvilehto, 2014; Rovio Entertainment Ltd, n.d.). Learning is fun when: (a) you love what you do; (b) you feel safe; (c) the environment is inspiring; (d) you are appreciated; (e) it is fun to fail; (f) you can choose how you learn, and; (g) learning becomes a healthy addiction. These principles are generated from research that shows that learning happens best when learners have fun; therefore, educators must move from direct instruction teaching to facilitating learning (Jarvilehto, 2014). That is, when students are engaged and intrinsically motivated learning can be fun.

Currently, the City Center School implemented ABP in the preschool and kindergarten classrooms. At this time, City Center School is the only school in the United States using ABP. The program introduces children to Fun Learning and promotes critical technological and communication skills necessary for the 21st century. Drawing on the popular Angry Birds brand, ABP promotes active participation in the learning process. Students are engaged in a positive way and become intrinsically motivated (Jarvilehto, 2015; Rovio Entertainment Ltd., n.d.)

The ABP program structure is centered around thematic units including: The Thrill of Music, Friendship, Traffic Safety, Building Blocks of the Universe, Health & Exercise, Cultures, Continents, Clean Environment & Recycling, Water, and Off to

Holidays! Each thematic unit covers six different subjects: (a) English language & communication; (b) physical education; (c) mathematics; (d) arts and crafts; (e) environmental education, and; (f) music. Each subject incorporates the theme of the unit and students are exposed to content and language in many different contexts throughout the day (Jarvilehto, 2014; Rovio Entertainment Ltd., n.d.).

At the time of this research, the City Center School was in its second year of the ABP program implementation. In the gradual transition process to the ABP program, every year teachers adapt instruction and follow the ABP program more closely. During the 2015-2016 school year, the first year of implementation, focus was on teacher training and learning the new teaching philosophy. Changes to the physical learning space and classroom design also occurred by adding class murals, rugs, and reading tents.

During the 2016-2017 school year, the second year of implementation, teachers continued teacher training and began incorporating thematic units and inspiring learning materials to current curriculum. Old programs continue to guide most of the lessons, but teachers are beginning to incorporate thematic units. The plan for the 2017-2018 school year includes continued implementation of thematic units in other areas, as well as continued development of inspiring learning materials, and classrooms.

English Learner Programing

In order to best serve the diverse ELs at the City Center School, the EL program provides instruction specifically designed to meet students' differing language, academic, and social needs. The school is dedicated to providing diverse learners with the means to attain English proficiency and to create equal access to grade-level content. EL specialists provide support to EL students in all four modalities: listening, speaking, reading, and

writing. Language support is provided in the five World-Class Instructional Design and Assessment [WIDA] English Language Development (ELD) standards: (a) social and instructional language, (b) language of language arts, (c) language of math, (d) language of science, and (e) language of social studies (WIDA, 2012).

The City Center School EL student population fluctuates between 60-75% of the student body. The EL program features English instruction, through co-teaching (inside the mainstream classroom), as well as pull-out interventions (outside the mainstream classroom). ELs acquire English proficiency through explicit language instruction and content-specific context. EL specialists at the school align language instruction using the state content standards as well as the WIDA ELD standards in instructional designs.

The City Center School believes push-in co-teaching allows EL specialists to have a direct impact on significant populations of scholars simultaneously because through pull-out groups, only small groups of students are impacted. The fundamental goal in having EL and mainstream educators co-teach is to provide all students access to content standards and activities through appropriate language supports and scaffolds. At the same time, language learners have an opportunity to interact with English proficient peers. However, co-teaching is not always sufficient to address all linguistic needs. As such, the school employs targeted pull-out language interventions at all grade levels. In this way, students receive targeted and explicit language instruction at every individual level.

Kindergarten Play

Historically, kindergarten has been dominated by play however the pressure for academic accountability has been growing (Bassok, Latham, Rorem, 2016; Miller & Almon, 2009; Pyle & Bigelow, 2015; Van Oers & Duijkers, 2012). There is a greater

pressure on educators to get children ready for grade school and many educators interpret this pressure as a need for drilling on skills and providing direct instruction. Despite this pressure, educators attempt to balance this reality with the fact that children learn best through interacting with others, and through play. It has been suggested that recent academic standards in kindergarten were previously reserved for first grade and that the disappearance of play in kindergarten has coincided with the increase in severe behavior problems among children (Miller & Almon, 2009). For example, students in many kindergarten classrooms are denied the benefits of play and are subject to testing and assessments.

In addition to a possible link between behavior and play in early childhood settings, there is a sizeable research base on the importance of play for children's cognitive development (Gmitrova & Gmitrov, 2003; Heidemann & Hewit, 2010). Theories of play are described through the sociocultural theory of Lev Vygotsky (Lillemyr et al., 2011; Van Oers & Duijkers, 2012; Vukelich, 1993). These theories were developed from observing children at play, and they gave educators an understanding about students' emotional development as well as their cognitive growth. Play is a significant factor that contributes to student growth and learning.

There are many functions of play that help facilitate the total development of children. Child development through play occurs on many different levels including language, emotional, physical, and cognitive development (Edwards, 2002; Lillemyr et al., 2011; Meyers, 2000; Van Oers & Duijkers, 2012; Vukelich, 1993). Through play, children are able to meet learning targets and continue a healthy development on all levels (e.g., the addition fishing activity in Mrs. Honey's classroom).

There are many different forms of play including both structured and unstructured play (Miller & Almon, 2009; Pyle & Bigelow, 2015; Van Oers & Duijkers, 2012; Vukelich, 1993). The teacher in each form of play has a different role. The City Center School incorporates both types of play throughout the day. Structured play occurs when students play games either alone or with a partner in order to practice a skill. This type of play is currently being used during the math block where students are playing math games from the *Investigations* math curriculum. In addition to structured play opportunities, students participate in unstructured play opportunities (*sociodramatic*) during recess and choice time, and when they have completed a task. Sociodramatic play involves the voluntary social role-taking with others (Levy, 1998). Teachers at the City Center School are learning to balance both structured and unstructured play throughout the school day because both are equally important to the total development of children.

Investigations Math

Teachers at the City Center School are in their fourth year of the *Investigations* math curriculum implementation. *Investigations* is a math curriculum that is partially aligned to the state mathematics standards. The math curriculum includes daily opportunities for formative assessment, unit benchmarks, and a predictable structure for daily sessions. Daily sessions include three main parts: routines, math workshop, and discussions. First, routines allow students to review, revisit, and practice key learnings. Second, math workshop in kindergarten is an exploratory time when students often play math games in order to practice key skills. Third, discussions are a key piece of the curriculum allowing the lesson to close and provide time for students to think, make sense of the content, summarize, or share work.

During the 2016-2017 school year, kindergarten teachers at the City Center School began to plan thematic units to guide the math block each week. Instead of following the Investigations curriculum sessions, teachers began keeping the same theme for an entire week, even if that meant creating supplemental materials. The ABP teacher training promoted the consideration and inclusion of thematic units in lesson planning. Although the day-to-day lesson plans from Investigations are no longer followed, teachers still use some of the math games, routines, and discussion elements.

Vocabulary Instruction

Prior to conducting research, the classroom teacher and the EL teacher had been co-teaching during the math block. From September through December, the EL teacher led the vocabulary instruction and facilitated the academic conversations around the target math word and concepts. The classroom teacher led the content instruction. Both the classroom and EL teachers modeled a partnership as they introduced the center activities for the whole group.

During the data collection phase of this study, it was the classroom teacher who was facilitating the vocabulary instruction while the EL teacher (the researcher) observed the classroom and student interactions. Prior to each week, the two teachers participated in co-planning to discuss vocabulary and how to infuse fun learning into activities and learning tasks.

Vocabulary is chosen from the Investigations curriculum, a word or concept students seem to be struggling with, or a review used for reinforcement. For the past year, the team of kindergarten teachers used the same framework when introducing new math words. The vocabulary teaching template was adapted from a presentation at the

Teachers of English to Speakers of Other Languages (TESOL) conference (Byard & Mohan, 2015, 2016). Teachers focused on one target vocabulary word (in each subject) to develop over a period of four to five days. The first day the target vocabulary word was introduced and defined. Then a visual representation of the word was introduced. During the third and fourth day, there are planned in-depth opportunities for students to practice speaking and writing the word.

Background & Role of Researcher

This is my fifth year working with kindergarten language learners at the City Center School. All five years I have collaborated with the same two kindergarten teachers. Some years I co-taught with the classroom teachers leading lessons and activities to promote academic language development (writing language objectives, taking small groups, teaching vocabulary) and some years I have modeled strategies. As an EL teacher, it is my responsibility to advocate for the needs of my EL students. I can support my kindergarten team by providing information about how to best support the needs of ELs. Since the implementation of ABP last year, teachers are learning to balance our current content curriculums with the new Fun Learning framework. My goal through this research is to provide my team with information about how ELs interact with math vocabulary, and to ultimately help all teachers meet the academic and language needs of the EL students.

It is important to me to research how EL students are using math vocabulary within a play-based classroom because research has documented a relationship between a student's vocabulary knowledge and their academic achievement. A strong vocabulary is a strong predictor of high academic achievement (Brown, 2012; Coyne & McCoach,

2009; Crevecoeur, 2008; Gathercole & Baddeley, 1989; Pressley, 2006; Pressley et al., 2002; Rahimi & Sahragard, 2008; Roessingh & Elgie, 2009; Silverman & Crandell, 2010; Wright & Neuman, 2014; Yesil-Dagli, 2011). Therefore, in order to advance the language development and academic achievement of ELs, vocabulary instruction needs to be an intentional part of instruction. There is limited available research on teaching vocabulary to ELs (August, 2015; August & Shanahan 2010); however, the vocabulary gap between native speakers of English and ELs negatively affects the academic achievement of ELs (Coyne & McCoach, 2009; Gathercole & Baddeley, 1989; Roessingh & Elgie, 2009). My aim is to decrease the vocabulary gap ELs and non-ELs and make grade level content accessible to my students.

My role in this study will be as a researcher in the classroom. However, the study will take place in one of the two mainstream kindergarten classrooms where I currently collaborate with the classroom teacher in order to differentiate language and provide ELs equal access to math content. Last year, as the EL teacher, it was my job to introduce and teach students about the target vocabulary word. For the purpose of this study, I will change my usual involvement in the classroom to the role of the researcher and the classroom teacher will provide the vocabulary instruction.

As an EL teacher, my job is to understand what our young ELs need in order for them to succeed academically. I also need to provide differentiated language instruction to further develop the student's proficiency in English. Second language research (August & Shanahan, 2010; Coyne et al., 2009; Gathercole & Baddeley, 1989; Pressley, 2006; Pressley et al., 2002; Rahimi & Sahragard, 2008; Roessingh & Elgie, 2009; Silverman & Crandell, 2010; Wright & Neuman, 2014; Yesil-Dagli, 2011) supports direct vocabulary

instruction for ELs. Child development theories and play research (Heidemann & Hewitt, 2010; Lillemyr et al., 2011; Miller & Almon, 2009; Pyle & Bigelow, 2015; Van Oers & Duijkers, 2012; Vukelich, 1993) support a more indirect approach. As a co-teacher in kindergarten, I have to be up to date with current research and best practice in early-years education. Additionally, I need to continually advocate for academic language development of ELs.

Guiding Questions

This study addresses math vocabulary acquisition of kindergarten EL students within a play-based classroom. Specifically, how students orally produce target words during math tasks. The guiding questions for this case study are:

1. How is play infused in the lesson and activities in kindergarten?
2. How do ELs orally produce target math vocabulary in a play-infused classroom?

There has been significant research about play in the kindergarten classroom as well as math vocabulary acquisition in K-12 classrooms however, there is little information available about EL student math vocabulary usage within a play-based kindergarten classroom.

Summary

Due to the limited available information regarding kindergarten EL math vocabulary acquisition, it is important to explore how students orally produce the target math words within the kindergarten context. Vocabulary is a strong predictor of academic success (Brown, 2012; Coyne & McCoach, 2009; Crevecoeur, 2008; Gathercole & Baddeley, 1989; Pressley, 2006; Pressley et al., 2002; Rahimi & Sahragard, 2008; Roessingh & Elgie 2009; Silverman & Crandell, 2010; Wright & Neuman, 2014; Yesil-Dagli, 2011),

and in order to best serve EL students, teachers need to understand how students use academic language.

Overview

Chapter One provided an introduction to the research and demonstrated the importance of play in early years education. Chapter One included the rationale and need to study play in an EL setting. In addition, a summary was provided regarding the context of the current study as well as the role and background of the researcher.

Chapter Two presents a review of the literature related to child development theories and how they relate to play in kindergarten, specifically within the ABP framework. The literature review will include researchers that examined vocabulary as a predictor of literacy achievement and specific strategies to support math vocabulary acquisition.

Chapter Three includes a description of the research design and methodology. The results of the study are included in Chapter Four. Chapter Five will reflect the findings of this study, further implications for teachers, and recommendations for future research.

CHAPTER TWO: LITERATURE REVIEW

In order to address the research questions presented in this qualitative case study, this chapter will review relevant literature regarding second language research, vocabulary acquisition, the role of play in early years education, and how play in early years education has an impact on learning and cognition. This section includes a review of literature divided into two parts. The first part includes relevant research surrounding second language research and vocabulary acquisition. The second part includes research about the impact of child development theories and play theories on learning or cognition in early years education.

Second language research often supported direct vocabulary instruction for ELs (August & Shanahan, 2010; Coyne & McCoach, 2009; Gathercole & Baddeley, 1989; Pressley, 2006; Pressley et al., 2002; Rahimi & Sahragard, 2008; Roessingh & Elgie, 2009; Silverman & Crandell, 2010; Wright & Neuman, 2014; Yesil-Dagli, 2011) while both child development theories and play research often supported a more indirect approach (Heidemann & Hewitt, 2010; Lillemyr et al., 2011; Miller & Almon, 2009; Pyle & Bigelow, 2015; Van Oers & Duijkers, 2012; Vukelich, 1993). Kindergarten teachers need to find a balance of methods that are developmentally appropriate for young learners and promote the academic achievement students need when they move into the primary grades. Research suggests that in third grade, nearly three-quarters of ELs are reading below grade level and more than half are below grade level in math (Gyovai, Cartledge, Kourea, Yurick, Gibson, 2009).

Significant research exists surrounding play in early years education (Goldhaber, 1994; Heidemann & Hewitt, 2010; Jarvilehto, 2014; Lillemyr et al., 2011; Miller & Almon, 2009; Pyle & Bigelow, 2015; Van Oers & Duijkers, 2012; Vukelich, 1993), the importance of vocabulary instruction for ELs (August & Shanahan, 2010; Coyne & McCoach, 2009; Gass & Selinker, 2008; Gathercole & Baddeley, 1989; Pressley, 2006; Pressley et al., 2002; Rahimi & Sahragard, 2008; Roessingh & Elgie, 2009; Silverman & Crandell, 2010; Wright & Neuman, 2014; Yesil-Dagli, 2011), and research about math vocabulary acquisition in K-12 classrooms (Bay-Williams & Livers, 2009; Earp & Tanner, 1980; Krussel, 1998; Olivares, 1996; Rubenstein & Thompson, 2002; Usiskin, 1996). However, there is little information available about kindergarten EL students' math vocabulary usage within a play-based kindergarten classroom.

Academic Pressures in Kindergarten

Educators agree that in the past, kindergarten has been dominated by child-centered approaches, however, over the past few decades the pressure for accountability has been growing (Bassok et al., 2016; Miller & Almon, 2009; Pyle & Bigelow, 2015; Van Oers & Duijkers, 2012). Educators experience great pressure to get children ready for grade school and future academics (Bassok et al., 2016; Miller & Almon, 2009). In addition, many educators interpreted this pressure as a need for drilling skills and more direct instruction. Many early years educators believe because of theories learned in teacher training and child development courses that a child's optimal learning occurs through play and interacting with others (Miller & Almon, 2009; Lillemyr et al., 2011; Van Oers & Duijkers, 2012; Vukelich, 1993)

The increased academic pressures created a burden on teachers and students (Bassok et al., 2016; Meyers, 2000). For instance, teachers are expected to navigate and balance the expectations for accountability while they continue to facilitate discovery and teach social skills to students (often the student's first school experience). A generation ago, kindergarten students spent time playing and exploring. Now, kindergarten students are frequently assessed and expected to sit and listen to teachers for extended periods of time (Meyers, 2000). Research suggests that recent kindergarten academic standards were previously reserved for first grade students (Miller & Almon, 2009). Students in many kindergarten classrooms today are denied the benefits of play and subject to testing and assessments (Meyers, 2000). It has been suggested that the disappearance of play in kindergarten coincided with the increase in severe behavior problems among children (Miller & Almon, 2009).

Play and Cognition

For the purpose of this paper, play is defined as learning that occurs through structured and unstructured interaction (Edwards, 2002; Lillemyr et al., 2011; Meyers, 2000; Van Oers & Duijkers, 2012; Vukelich, 1993; Vygotsky, 1978). Structured interactions occur when students play a game to practice an academic skill. Unstructured interactions occur when students participate in free choice: choosing when, where, and how to interact with other students.

There are many social and academic benefits to play including facilitating the total development of children which happens on many different levels including: (a) language; (b) emotional; (c) physical; (d) cognitive; and, (e) content areas such as math and literacy

(Heidemann & Hewitt, 2010). When children are playing, they are communicating through language and gestures.

Children develop emotionally through play because when they are interacting with peers they observe the feelings of others, begin to empathize, and learn to express their feelings (Lantolf, 1994; Lantolf, 2007). Through play, children are developing cognitively when they pretend to use objects to represent other objects and create mental pictures when they act out a story. According to Heidemann and Hewitt (2010) play can enhance a child's readiness to learn and improve problem-solving skills. Children develop physically through play because they move when they are pretending to do various tasks that frequently require both gross motor and fine motor skills (e.g., running, jumping, writing, and building). Finally, through play it is possible for children to develop academically and meet state standards as seen from the "Fishing Addition" story in Chapter One. The Minnesota state standard asks students to, "use objects and pictures to represent situations involving combining and separating." Mrs. Honey's class was pretending to go fishing, but instead of catching real fish, students caught numbers. Students added the two numbers together and chose different strategies to complete the addition. Students were having fun while learning. Play can be infused into lessons and students are still able to meet state academic targets. Students can play with content (such as math, literacy, and science) participate in planned opportunities, and explore and interact with these academic tasks (Heidemann & Hewitt, 2010).

Play can provide a valuable context for learning if there is a balance between child-centered and teacher-driven approaches (Miller & Almon, 2009; Pyle & Bigelow, 2015; Van Oers & Dijkers, 2012; Vukelich, 1993). Gmitrova and Gmitrov (2003) favored the

child-centered play, and suggested this play created an increase in “cognitive manifestations” compared to teacher-driven play. That is, children need to be able to explore their world through child-initiated play and teacher guidance. Focused learning (as needed) will facilitate well-rounded development in all domains (social, emotional, and cognitive). With the increased academic pressures facing students today, teachers need to learn to create a balance between high academic standards and child development friendly, play friendly environments.

Play Theories & Approaches

Play in early-years education is supported by both Vygotsky’s sociocultural theory [SCT] (Lantolf, 1994; Lantolf, 2007; Lillemyr et al., 2011; Van Oers & Duijkers, 2012; Vukelich, 1993) as well as several progressive European approaches to early childhood education such as Montessori and Reggio Emilia (Edwards, Gandini, Forman, 1998; Edwards, 2002). Vygotsky’s SCT provides an understanding of the development and cognitive growth of children, while the progressive European approaches to education use child development research to guide the way children are learning in school. Vygotsky's theory is the most used theory in defense of play in kindergarten and early-years education (Lillemyr et al., 2011; Van Oers & Duijkers, 2012; Vukelich, 1993) because Vygotsky’s theory supports the importance of developing kindergarten students’ skills in multiple domains: social, emotional, and cognitive.

Sociocultural Theory

The cognitive theories of Vygotsky described how a child's cognitive growth and development are connected to play (Lantolf, 1994; Lantolf, 2007; Vygotsky, 1978). Vygotsky's SCT suggested that cognitive, social, and emotional domains are interrelated

and affected each other (Heidemann & Hewitt, 2010). SCT has had a significant influence on play-based frameworks and curriculum because it suggests that learning occurs through interaction, and that language is a cognitive activity. When children play with their peers, they use language to: (a) negotiate roles; (b) explore relationships; (c) question; (d) address conflicts; (e) communicate understanding; and, (f) problem solve (Heidemann & Hewitt, 1992). According to Meyers (2000), Vygotsky's SCT suggested it was through free interaction that students gained the ability to regulate their own activity. The social environments (and the interactions in a classroom) are not the context for the language development, but the source of the language development (Swain & Deters, 2007). SCT is reflective of the complex interactions that occur within a sociocultural context and how these complex interactions are the source of the development of children.

Progressive European Approaches to Early Childhood Education

Montessori and Reggio Emilia are progressive alternatives to traditional education (Edwards, 2002; Edwards et al., 1998). Both alternatives are play-based because of the amount of time students spend actively engaged in activities and the limited involvement of the teacher (Edwards et al., 1998; Edwards, 2002). Montessori and Reggio Emilia are similar in the way they create inspiring learning environments, promote student choice or self-directed learning, and assess or evaluate students based on descriptive information (Edwards, 2002).

The role of a teacher in a Montessori approach is that of an *unobtrusive director* (Edwards, 2002). In a Montessori classroom, students typically engage in self-directed activity and teachers refrain from interrupting children when they are engaged in an

activity. Interrupting children when they are engaged in an activity is thought to interfere with momentum and interest in the activity.

The role of a teacher in the Reggio Emilia approach is that of *artful balancing* (Edwards et al., 1998; Edwards, 2002). In this type of classroom, teachers work in pairs to collaborate and mentor students. At times, teachers will enter the group of working children to scaffold the learning. At other time, teachers will remain on the outside to document and observe interactions.

ABP, which will be discussed further below, has similar characteristics to the play-based approaches of Montessori and Reggio Emilia. In ABP, children are active participants in their own development and typically have aesthetically pleasing environments and materials. The assessment and evaluation techniques of ABP are similar to Montessori and Reggio Emilia. In ABP, teachers avoid giving traditional tests or grades; rather, they use authentic ways to gauge a child's ability to think critically, such as descriptive information and observation documentation (Järvilehto, 2014).

Angry Birds Playground Philosophy

Teachers all over the country face challenges in trying to balance high stakes academic pressures with what child development theories and researchers suggest is appropriate for early-years education. The City Center School, in an effort to try and balance the pressure for accountability with providing students with an education supported by best practices, began using the ABP framework during the 2015-2016 school year.

ABP was created by Rovio entertainment, the same company that developed the Angry Birds video game. ABP is an early childhood educational program (ages three to

six) consisting of a teaching philosophy (Fun Learning), teacher training, a physical learning space, and inspiring learning materials (Rovio Entertainment Ltd., n.d.). Rovio is a Finnish company, which is why ABP is based off of the Finnish national education curriculum. Finland is consistently a global leader in education and many seek to replicate their successful teaching methods (Finnish National Board of Education [FNBE], 2011; Hujala et al., n.d.; Sahlberg, 2007). The makers of ABP have combined the popularity of Rovio with the Finnish expertise in education in order to create Fun Learning.

Fun Learning is based on seven key principles. Learning is fun when: (a) you love what you do; (b) you feel safe; (c) the environment is inspiring; (d) you are appreciated; (e) it is fun to fail; (f) you can choose how you learn, and; (g) when learning becomes a healthy addiction (Järvilehto, 2014; Rovio Entertainment Ltd., n.d.). These principles are generated from Finnish research that shows learning happens best when learners have fun; therefore, educators must move from direct instruction into facilitating learning (Hujala, Valpas, Roos, Elo, n.d.; Järvilehto, 2014; Rovio Entertainment Ltd., n.d.). When students are engaged and intrinsically motivated learning can be fun.

These Fun Learning key principles emerge from Finnish national education which aims to promote well-being and opportunities for success in children through education (Järvilehto, 2014). Changes in society and technology cause the FNBE to continuously review its way of structuring curricula in order to best address student learning. The FNBE (2011) suggests that tomorrow's school children need to: (a) be able to absorb new things quickly; (b) change and cope with uncertainty; (c) have the ability to distinguish between essential and unessential; (d) problem solve and think critically, and; (e) assess

their own actions as part of society. What the FNBE says tomorrow's school children need to do are similar to the 21st century skills included in the ABP Fun Learning framework. 21st century skills include: (a) problem solving; (b) collaboration; (c) creativity; (d) executive functions, and; (e) digital literacy (Rovio Entertainment Ltd., n.d.).

ABP has been implemented in the preschool and kindergarten classrooms at the City Center School, which is currently the only school in the United States using the program. The program introduces children to Fun Learning and promotes critical technological and communication skills necessary for the 21st century (FNBE, 2011; Rovio Entertainment Ltd., 2009-2014; Rovio Entertainment Ltd., n.d.). Drawing on the popular Angry Birds brand, ABP promotes students as active participants in the learning process and engages them in positive ways so that they are intrinsically motivated.

The ABP program structure is centered around thematic units and each thematic unit covers six different subjects: (a) English language & communication; (b) physical education; (c) mathematics; (d) arts & crafts; (e) environmental education, and; (f) music. Each subject incorporates the theme of the unit and students are exposed to content and language in many different contexts throughout the day (Rovio Entertainment Ltd., n.d.).

Vocabulary

Vocabulary errors are not only the most common errors when learning a language, but also the most disruptive when trying to communicate with native speakers. The lexicon (i.e., a person's vocabulary) may be the most significant component of second language acquisition (SLA) for ELs (Gass & Slinker, 2008). Vocabulary has an impact on adult ELs and is a strong predictor in the reading achievement of grade school ELs

(Brown, 2012; Coyne & McCoach, 2009; Crevecoeur, 2008; Gathercole & Baddeley, 1989; Pressley, 2006; Pressley et al., 2002; Rahimi & Sahragard, 2008; Roessingh & Elgie, 2009; Silverman & Crandell, 2010; Wright & Neuman, 2014; Yesil-Dagli, 2011). According to Biemiller (2005), decoding words through applying letter-sound correspondences would be effective only if the target word is in the learner's vocabulary, Biemiller suggested that the ability to identify words in print (or to decode words) is not predictive of reading comprehension or higher academic achievement; therefore, the focus of this paper will vocabulary words and not word recognition or phonics.

When ELs enter kindergarten, they have a smaller English vocabulary than their native speaking peers. This vocabulary gap between ELs and native speakers grows larger every year, making them an at-risk population of students (Coyne & McCoach, 2009; Crevecoeur, 2008; Gathercole & Baddeley, 1989; Roessingh & Elgie, 2009). Although it is impossible to completely close the vocabulary gap in kindergarten, research supports direct vocabulary instruction (both instructional and embedded approaches), in order to accelerate the academic achievement of ELs (Coyne & McCoach, 2009; Crevecoeur, 2008; Gass & Selinker, 2008; Pressley, 2006; Pressley et al., 2002; Rossingh & Elgie, 2009; Silverman & Crandell, 2010; Wright & Neuman, 2014; Van Oers & Duijkers, 2012).

According to Yesil-Dagli (2011) it is important to understand potential barriers that EL students face in learning vocabulary. For example, a student's socioeconomic status could be a potential barrier in vocabulary acquisition. Students from low-income homes are more likely to begin school with weaker vocabulary skills compared to middle-class peers (Christ, 2007; Rahimi & Sahragard, 2008; Wright & Neuman, 2014; Yesil-Dagli,

2011). Wright and Neuman (2014) found that teachers serving low-income schools were less likely to address sophisticated words than teachers serving in middle-class schools. Neuman and Celano (2001) noted differences between middle-class and low-income schools in their access to print. Neuman and Celano reported that middle-class schools often had a larger variety of resources, while low-income schools had unequal access across communities due to the reliance on public institutions.

Other potential barriers to learning vocabulary include: (a) lack of input or intentionality in instruction; (b) lack of exposure or frequency; (c) lack of in-depth processing time when words are presented; and, (d) multiple meanings of words, particularly across content areas (Yesil-Dagli, 2011). Yesil-Dagli stated that since students from low-income homes are more likely to come to school with weaker vocabulary than middle-class peers, it is especially important for EL teachers in high poverty schools to have high expectations, to be thoughtful, and to be intentional about vocabulary instruction.

As noted above, vocabulary learning may be the most important factor in predicting the academic success of ELs. It is a strong predictor of reading fluency and important for teachers to address in order to minimize the gap between Native Speakers (NS) and ELs as early as possible (Coyne & McCoach, 2009; Crevecoeur, 2008; Gathercole & Baddeley, 1989; Roessingh & Elgie, 2009; Yesil-Dagli, 2011). Not only does having a strong vocabulary predict strong reading skills, a student's first language vocabulary skills transfer to the second language (Gorman, 2012). Gorman (2012) suggested that teachers include a direct instruction approach to explicitly teach possible cognates and cultural connections.

Vocabulary instruction needs to be an intentional and pre-planned part of an EL teacher's lesson (Coyne & McCoach, 2009; Crevecoeur, 2008; Gass & Selinker, 2008; Pressley, 2006; Rossingh & Elgie, 2009; Silverman & Crandell, 2010; Wright & Neuman, 2014; Van Oers & Duijkers, 2012). The likelihood of learning a word from context is relatively low. Instead of learning a word in context, teachers should help students build word consciousness for several reasons: to provoke curiosity about words, promote independence in word analysis, and develop an appreciation for nuances of meaning (Anderson & Nagy, 1993; Bay-Williams & Livers, 2009; Christ, 2007). According to Coyne and McCoach (2009), and Silverman and Crandel (2010), vocabulary instruction in kindergarten should be a priority, use varying instructional practices, and should focus on breadth versus depth.

Instead of teaching as many vocabulary words as possible, teachers should instead focus on the quality of instruction for each selected word, and help students to see words across content and meanings of multiple meaning words (Anderson & Nagy, 1993; Christ, 2007). When teachers provide students with the opportunity to interact with words outside of the lesson (extended instruction) students encounter multiple exposures to the target words in varied contexts, which will result in a full and refined knowledge of the words. Through extended instruction, students begin to encounter words in more situations and begin to generalize and apply words across contexts (Silverman & Crandell, 2010).

Strategies used to teach vocabulary often include: (a) saying the word out loud; (b) having students pronounce the words; (c) discussing graphophonemic or semantic properties of the words; (d) defining the words; (e) demonstrating word meanings

visually and kinesthetically; and, (e) helping students make connections to the words by including students' experiences (Coyne & McCoach, 2009; Silverman & Crandell, 2010). Although it is impossible to teach students all the words they will need to know in school, teachers can use multidimensional approaches (instructional and embedded approaches) to vocabulary instruction in order to optimize the understanding and connections students make

Gap and Research Questions

This literature review has shown that vocabulary is a strong predictor of ELs reading achievement. Therefore, it is important to me, as an EL co-teacher in kindergarten, to ensure my students are receiving as much vocabulary support as possible. There has been significant research about play in the kindergarten classroom and significant research to support the Fun Learning approach of the ABP. There is, however, no research about EL math vocabulary acquisition within an ABP or a Fun Learning classroom. The purpose of this study is to investigate how kindergarten ELs orally produce math vocabulary within a Fun Learning classroom. This research will aim to explore the ABP Fun Learning framework and the degree of oral math vocabulary production in order to help teachers to balance explicit language instruction within a fun learning classroom. The questions I want to investigate are:

1. How is play infused into the math lesson?
2. How do ELs orally produce the target math vocabulary within a play-infused classroom?

Summary

This chapter presented research in two key areas for kindergarten ELs who learn vocabulary in a play-based context. First, it provided an overview of academic pressures in kindergarten and an overview of vocabulary instruction for ELs (Miller & Almon, 2009; Pyle & Bigelow, 2015; Van Oers & Duijkers, 2012). Research indicates that ELs vocabulary knowledge is an important basis for building communication skills in a second language (Coyne & McCoach, 2009; Crevecoeur, 2008; Gass & Selinker, 2008; Pressley, 2006; Pressley et al., 2002; Rossingh & Elgie, 2009; Silverman & Crandell, 2010; Wright & Neuman, 2014; Van Oers & Duijkers, 2012), as well as a strong predictor of later academic skills (Brown, 2012; Coyne & McCoach, 2009; Crevecoeur, 2008; Gathercole & Baddeley, 1989; Pressley, 2006; Pressley et al., 2002; Rahimi & Sahragard, 2008; Roessingh & Elgie, 2009; Silverman & Crandell, 2010; Wright & Neuman, 2014; Yesil-Dagli, 2011). Because vocabulary learning is so crucial, the literature emphasizes direct instruction of vocabulary that is intentionally selected (Anderson & Nagy, 1993; Christ, 2007; Silverman & Crandell, 2010). Strategies to introduce vocabulary include a focus on breadth versus depth: (a) saying the word out loud; (b) having students pronounce the words; (c) discussing graphophonemic or semantic properties of the words; (d) defining the words; (e) demonstrating word meanings visually and kinesthetically, and; (e) helping students make connections to the words by including students' experiences (Coyne & McCoach, 2009; Silverman & Crandell, 2010). Potential barriers to vocabulary learning may include: (a) socioeconomic status; (b) lack of input or intentionality in instruction; (c) lack of exposure or frequency; (d) lack of in depth processing time when words are presented, and; (e) multiple

meanings of words, particularly across content areas (Wright & Neuman, 2014; Yesil-Dagli, 2011).

Second, this chapter reviews literature on the benefits of play in early learning classrooms. For the purpose of this study, play is defined as learning that occurs through structured and unstructured interaction (Edwards, 2002; Lillemyr et al., 2011; Meyers, 2000; Van Oers & Duijkers, 2012; Vukelich, 1993; Vygotsky, 1978). Play has many social and academic benefits including facilitating the total development of children which happens on many different levels including: (a) language; (b) emotional; (c) physical; (d) cognitive, and; (e) content areas such as math and literacy (Heidemann & Hewitt, 2010). Play also can provide a valuable context for learning if there is a balance between child-centered and teacher-driven approaches (Van Oers & Dijkers, 2012; Miller & Almon, 2009; Pyle & Bigelow, 2015; Vukelich, 1993). The teacher in the ABP classroom is a mix between Montessori and Reggio Emilia approaches (Edwards, 2002). Children are active participants in their own development, there is an aesthetically pleasing environment and materials, and assessment and evaluation techniques use descriptive information and observation documentation (Järvilehto, 2014).

This study will explore how to balance the developmentally appropriate teaching methods (ABP, Montessori, Reggio Emilia) with what is necessary for the greater academic achievement for ELs (direct vocabulary instruction). In chapter Three, the methods used for this study will be described including an overview and rationale for this study, a description of the design and method, elicitation procedures, description of the vocabulary instruction, and details about how the data were analyzed.

CHAPTER THREE: METHODOLOGY

The purpose of this case study was to explore how kindergarten EL students orally produce the target math vocabulary within a play-infused classroom. A qualitative design was used and the method used was a case study method. The research questions in this study include:

1. How is play infused in the lesson and activities in kindergarten?
2. How do ELs orally produce target math vocabulary in a play-infused kindergarten classroom?

This chapter begins with an overview of why a qualitative case study was the best design for this research, followed by a detailed description of the study design including descriptions of the research site, participants, as well as, the data collection process and methods.

Overview & Rationale

This case study was motivated by the implementation of the ABP Fun Learning program in kindergarten during the 2015-2016 school year and by my desire to better understand how this framework influences the vocabulary acquisition of ELs in kindergarten. My role in this study was as a researcher and a participant observer. The study took place in one of the two mainstream kindergarten classrooms where I collaborate with the classroom teacher in order to differentiate language and provide ELs equal access to the math content.

Since vocabulary is a strong predictor of reading achievement (Coyne & McCoach, 2009; Gathercole & Baddeley, 1989; Pressley, 2006; Pressley et al., 2002; Rahimi & Sahragard, 2008; Roessingh & Elgie, 2009; Silverman & Crandell, 2010; Wright & Neuman, 2014; Yesil-Dagli, 2011) it is important to me as an EL teacher to ensure my students are receiving as much vocabulary support as possible. This study was designed to provide information to teachers regarding how ELs are accessing the target vocabulary in kindergarten, specifically in math and to ultimately help optimize student oral language development in the classroom.

I selected a qualitative research paradigm because of the reliance on observational data and the use of descriptive data interpretation rather than numerical (Mackey & Gass, 2016). The design used in this research was an ethnographic case study because a holistic description of what EL students were doing in the classroom was more important than trying to prove a relationship between instructional strategies to teach vocabulary and student oral production (Hancock & Algozzine, 2011). The goal of this research was to present the classroom context from the inside and to be as authentic as possible. I have been a collaborating EL co-teacher the entire school year. The students are familiar with their language and me and work was authentic. Students selected as primary participants were purposely chosen based on their language proficiency level, their relationship with the researcher, and their willingness to speak with and around the researcher. Through looking in detail at only two students, I was able to document an in-depth picture of what was happening in this classroom.

There are many potential benefits of this study for the primary participants. First, the teacher could potentially improve her instruction because the findings here will include

data about how the ELs in her class were responding to the vocabulary instruction. These data could inform future planning to structure lessons in order to provide rich opportunities for vocabulary practice. The students could also benefit because they will be given one-to-one opportunity to self-assess their knowledge of target math vocabulary. The opportunity to self-assess is a valuable tool used to help students develop ownership in their own learning (Byard & Mohan, 2015, 2016).

Study Design

Prior to submitting an application for human subject's approval, I received written approval from administration at the school to conduct the research (Appendix A). The human subjects application included: (a) detailed description of the study, (b) description of the nature of involvement of the participants, (c) the plan to keep participant information confidential during data collection, (d) informed consent forms for both the primary (a teacher and two focus students) and the secondary participants (the Educational Assistant [EA] and other students in the classroom), with translations included when necessary, and (e) description of the potential risks and benefits to participants (Appendix B-F). The Hamline University Institutional Review Board (IRB) reviewed the dimensions of the study and approved this research in November, 2016 (Appendix G). I did not contact any potential student participants about the study until after I had received written permission from the school and IRB to begin the research. All participants (primary and secondary), and the parents or guardians of the children, were aware that they had the right to withdraw from the study at any point during the research, as well as to be seated off camera. No one chose to withdraw from the study at any point during the research.

Research Setting

District and School

This study took place at the City Center School, a charter school located in a highly diverse urban neighborhood in a large metropolitan area in the Midwest. The City Center School has two campuses; a primary school and a middle school located four blocks from each other. During the 2016-2017 school year there was a total of 435 students enrolled PreK-8, with about 98% of students qualifying for free and reduced lunch, and about 65% qualifying for EL servicing. The EL population includes 63% Hispanic students, 33% Hmong students, and 1% Vietnamese students. The charter school employs many bilingual speaking staff in order to communicate and facilitate relationships with families. Staff available to translate included a Hispanic parent liaison, as well as, three Spanish-speaking staff and 12 Hmong-speaking staff, all of whom are located at the primary school.

Classroom

This classroom case study took place in one of the two kindergarten classrooms at the City Center Primary School and occurred during the math block. The math block is a period of 30 minutes immediately after recess. The classroom is a large open room shaped like a square. It has tall ceilings so there is a lot of vertical space with large windows along the backside of the room. When you enter the classroom, on the left, there is a coat hallway for students to keep their backpack and coats. On the right is the student bathroom that is shared between the other kindergarten rooms. There are four circular student tables in the room, each table seats six students (there are 24 students total). The carpet rug where students gather for whole group instruction is in front of an interactive

whiteboard, a small teacher easel, and table where the classroom teacher instructs. In the back of the classroom is a library space with circle carpets, stuffed animals, bookshelves to separate the reading space from the larger space, and books at various reading levels. The back of the classroom is also, where the teacher's desk is located. Along the wall that is the backside of the coat closet, is a full vinyl mural with an Angry Birds themed landscape. This mural sets the stage for the classroom, guiding everything from color scheme of the other classroom materials, as well as, a backdrop for student play. The classroom also has a mini play kitchen, toys, art supplies, and manipulatives for students to explore during free choice time.

Teacher

Mrs. Honey was the only adult primary participant in this study. She is in her fifth year as a kindergarten teacher at the school and is a native English speaker. She received her teaching license in 2012. The City Center School was her first licensed teaching position. She has received professional training on using the Investigations math curriculum and is in her fourth year of implementing the curriculum. Typically, she co-teaches math with an ESL teacher (the researcher). In addition to her math training, Mrs. Honey is currently in her second year of using the ABP program in her classroom. She has been participating in online ABP professional development throughout the current school year provided by the trainers at the Fun Learning Company.

Students

The primary student participants in this study were two kindergarten ELs from different proficiency levels. One student was a level one and one student was a level four. Proficiency levels are based on the following criteria: (a) language complexity, (b)

vocabulary usage, and, (c) language control. These three criteria are used to describe the increasing quality and use of student language processing across the six levels of language proficiency (WIDA, 2016).

Annie is a five-year-old girl and is a native Hmong speaker. According to the WIDA MODEL screener administered in September, 2016 she scored at a level four. A level four student is able to listen to descriptions and stories, find matching pictures, tell what comes first and next, retell stories with pictures with details, sing songs/chants independently, and tell what is the same or different in things (WIDA, 2016). She speaks both Hmong and English at home. She is the third youngest child with two older brothers who are in middle school, and one younger brother. Annie was born in the United States and attended preschool at the City Center School the year before.

Britney is a five-year-old girl and is a native Spanish speaker. She scored a level one on the WIDA MODEL screener in September 2016. A level one is able to match oral language to and name classroom/everyday objects, point to pictures in context, respond non-verbally to oral commands, find familiar people and places named orally, identify people/objects in illustrated stories, repeat words or simple phrases, and answer yes/no questions (WIDA, 2016). She speaks only Spanish at home. She is the third child with one older brother and sister in high school, and one younger brother. Britney was born in Mexico and came to the United States in the summer of 2016. She received a kindergarten education in Mexico before coming to the United States.

I obtained written consent from each student and their guardian prior to the students' participation. In-house translators were used to call home to discuss plans for research and the desire to include their child in the study. After verbal consent, written consent

forms were sent home for a signature. Parents were encouraged to speak with their child about participating in the study and to obtain the student's verbal permission as well.

In addition to the two focus students, there were also 24 additional secondary participants in this case study, including 23 students and one EA. All secondary participants were sent letters that included notification about the research and a notice that if they did not want to be on camera I would arrange to move the camera. Nobody requested to have the camera moved or removed.

Method

This research was a case study designed to explore how a kindergarten math teacher includes play lessons, as well as, to explore how EL students are learning and orally producing the target words during independent work time in the math block. Research occurred in two cycles with each cycle being one week in duration, and new target vocabulary taught during each cycle. Data collection included several methods such as, collection of samples of student work, transcriptions of classroom interactions, reflective interviews, and documentation of classroom observations using field notes.

The research questions were addressed using an ethnographic case study design and several methods of data collection (Hancock & Algozzine, 2011). Research question one was addressed using audio and video recordings (and transcriptions) of the two focus students, as well as, researcher field notes. Research question two was addressed using audio recording (and transcriptions) of teacher planning times, as well as, short teacher reflection interviews. Table 3.1 shows the research questions along with the corresponding data sources.

Table 3.1

Methods and Sources of Data Collection

Research Question Addressed	Method	Source
2	Student Work	Worksheets and photographs
1, 2	Transcription of classroom interactions	Audio and video recordings
1, 2	Reflective interviews	Interviews with both the teacher and the students
1, 2	Observations (Field Notes)	Classroom instruction and interactions
1	Transcription of teacher planning time	Planning between the EL teacher and the classroom teacher

Data Collection Technique 1: Student Work Samples & Scores

Collection of student work samples was one method used to describe how students were using math vocabulary. Photographs were taken of student work during the math center activities to document how students were playing math games and to document how and if students were using any math vocabulary. Hard copies of student work were also collected and photographs relevant to answering the research questions will be included in Chapter 4.

Data Collection Technique 2: Transcriptions of Classroom Interactions

Two planning sessions were recorded and transcribed in order to help describe how we planned to teach the target math vocabulary as well as how we decided to include play into the activities and centers. I recorded audio from two weekly co-planning sessions between the classroom teacher and myself (the EL teacher). During these 60-

minute planning sessions, we discussed what the theme of the week would be and how play activities would be structured to support the learning. Because other content areas were also discussed during the planning period, the time spent on talking about math was usually 10 minutes. I only recorded the conversation about math.

I recorded audio from the two focal students using a small digital recorder that the students wore around their necks on a lanyard. Prior to the data collection, Mrs. Honey and I spent two weeks as an introduction letting other students in the class wear the recorder lanyard to record all their math words. The recorder was not turned on during the two-week introduction period and was only used as a tool to get students comfortable wearing and seeing the device in the classroom. The audio from the two focal students was transcribed. The audio included other conversations in close proximity to the student (Appendix H). These additional conversations helped to determine how often, and in what context, the focal students were using the math vocabulary.

In addition to the audio recordings, I recorded video of the focal students' interactions during the math block. The camera was set up in the corner of the room, out of the way, pointed at the target student. After transcribing the audio recordings, I went through the video to add details to the transcripts such as nonverbal behavior and describing the classroom context.

Data Collection Technique 3: Reflective Interviews

The third data collection technique used was a collection of reflective interviews from both the teacher and the two focus students. The primary participants' answers were used to document their perspectives and understandings surrounding the lessons. At the end of each week, I sat down with the teacher to discuss the instruction, student interactions, and



oral production of target vocabulary (Appendix I). I recorded Mrs. Honey's answers to the following questions:

1. How do you feel about the week's instruction?
2. What was the goal this week? Was the goal accomplished?
3. How did you notice students interacting with the target vocabulary?
4. How was play and fun learning infused in the lesson and activities?
5. How did we differentiate for ELs?

I also reflected on my own answers to these questions and my reflections will be included in Chapter 5. At the end of each week, I also briefly sat with each student to have him or her assess his or her own understanding of the target math vocabulary. First, I asked students to circle either "I know it!" or "I don't know it!" with the corresponding hand gesture. Then I orally asked them what they thought the word meant in order to document their explanation of the target vocabulary words' meaning and to see if they truly understood the target math word (Appendix J). Table 3.2 provides a copy of the student self-assessment.

Table 3.2

Student Self-Assessment

Word	I know it!	I don't know it!
Equals		

Data Collection Technique 4: Observations Using Field Notes

Field notes taken during classroom observations provided further information about what was happening in the classroom. I used field notes to document students' nonverbal behaviors and to describe the classroom context (Appendix K). The questions guiding the field notes included:

1. Who is in the group? How many students? Who is there/not there?
2. What is happening? What are they doing? Saying? Using the target vocabulary?
3. What is the setting? Describe the physical environment.
4. What did the teacher/EL co-planning time look like? How was the vocabulary intentionally taught? How was play infused into the lesson?

Data Collection Technique 5: Transcriptions of Planning Time

Planning between the EL teacher and the classroom teacher occurs weekly. On Monday, we plan for the following week, discussing not only math, but other content areas as well. The other kindergarten teacher attends as the weekly plans are discussed. Typically, the time spent on discussing the math block is less than 10 minutes. This is our team's fifth year together so we do not spend time talking about the lessons because we have taught the same lessons for several years in a row. Prior to this research, it was the EL teacher's responsibility to lead the vocabulary lesson. During this study, the classroom teacher planned and taught the target vocabulary. Planning for week one of data collection did not occur because of illness. Planning for week two of data collection included about five minutes of conversation about math.

Elicitation Procedures

In order to provide information to other teachers regarding how well the ELs are accessing the target vocabulary, I chose to explore the instructional strategies the teacher planned and used in order to teach the math vocabulary, as well as, to describe how classroom activities took place in real time. Observational field notes and reflective interviews with the teacher were used to document the instructional strategies she used to teach vocabulary and incorporate play into the lesson.

In addition to documenting how the teacher led the vocabulary instruction and incorporated play into the lesson, I also documented how students were interacting with the target words during independent work time. I planned to observe each of the two students on alternate days for a two-week period, for five observations each. However, Britney was absent on days 8-10, resulting in only four days of observation for her (see Table 3.3).

Table 3.3

Observation Schedule

	Monday	Tuesday	Wednesday	Thursday	Friday
Week One	Day 1- Britney	Day 2- Annie	Day 3- Britney	Day 4- Annie	Day 5- Britney
Week Two	Day 6- Annie	Day 7- Britney	Day 8- Annie	Day 9- Britney	Day 10- Annie

Vocabulary Instruction

Prior to conducting research, the classroom teacher and the EL teacher had been co-teaching the math block. During the period of September through December, the EL teacher led the vocabulary instruction and facilitated the academic conversations around

the target math word and concepts while the classroom teacher led the content instruction. The classroom and EL teachers modeled the math center activities together for the whole group.

During the two-week cycle of this research, this routine changed. The classroom teacher facilitated the vocabulary instruction, while the EL teacher (the researcher) observed the classroom and student interactions. The two teachers still participated in one hour of co-planning prior to each weeks' lesson to discuss vocabulary and how to infuse Fun Learning into activities and learning tasks.

Vocabulary words are chosen based on a combination of what Investigations says are key words, and what we teachers decide are better thematic words for the week. As mentioned in Chapter One, our team decided to plan thematic units to guide the math block. Instead of following the Investigations curriculum day-by-day lessons, we began keeping the same theme for an entire week, even if that meant creating supplemental materials. Although the day-to-day lesson plans from Investigations are not used, we still use some of the math games, routines, and discussion elements including vocabulary word choice.

For the past year, the team of kindergarten teachers at the City Center Primary School have used a common method of introducing new math words (see Table 3.4). This vocabulary-teaching template was adapted by the kindergarten and first grade teachers from a conference presentation (Byard & Mohan, 2015, 2016). Byard and Mohan reference from work by well-known researchers in the field (e.g. Jeff Zwiers, Janet Allen, Kate Kinsella, & Kevin Feldman).

Table 3.4

Vocabulary Teaching Template

Day 1	Day 2	Day 3	Day 4	Day 5
Target vocabulary Word introduced and defined	Picture/What does it look like?	Speaking practice/Use it in a sentence	Writing practice	Speaking and/or writing practice

Note. Adapted from Byard & Mohan (2015, 2016)

Data Analysis

After collecting audio and video recordings of classroom interactions and reflective interviews, the recordings were transcribed. The transcriptions were examined in order to look for patterns and themes. Words and phrases related to the research question were highlighted and sorted into categories following procedures described by Hancock & Algozzine (2011). First, I revisited my research question to determine the categories. I looked for language having to do with “play” and “fun learning” from the teacher, and “equals” and “addition strategies” from the students. Then, I determined how I would sort the data into chunks within each category. I also started looking for other keywords having to do with “play” from the teacher and other words having to do with “equals” (same) or “addition strategies” (fingers, dots, pictures, ten-frame) from the students.

There were several methods of data collection and analysis in this case study and I attempted to ensure reliability of the information. As the researcher, I made every effort to be transparent about key aspects including my role as a researcher, the selection of participants, my rationale for using this research paradigm, and the methods used for data collection and analysis.

Summary

This chapter included an overview and rationale for this study, a description of the design and method, elicitation procedures, a description of the vocabulary instruction, as well as, a description of how the data were analyzed. A qualitative research paradigm was selected and methods for data collection included audio and video recording, reflective interviews and observational field notes. Recordings were transcribed and data were sorted into chunks in order to categorize the words students were using during the math block. Chapter Four will include the results obtained from the research.

CHAPTER FOUR: RESULTS

This chapter presents the results of this case study, which explored how EL students were orally producing target math vocabulary within a play-infused classroom. The results presented in this chapter address the following research questions:

1. How is play infused in the lesson and activities in kindergarten?
2. How do ELs orally produce target math words within a play-infused classroom?

Results are presented for the two research cycles, and within each cycle results from student work, audio and video transcriptions of student interactions, reflective interviews, and observation field notes are described. The chapter will conclude with a discussion of patterns in overall vocabulary usage for the two cycles.

Observation Schedule

The two cycles of vocabulary instruction will each be described below, however are not equal because the observation schedule did not allow for equal observations each week (Table 4.1). During the first week, Britney was the focal student three times and during the second week, she was the focus once because of absences. During the first week, Annie was observed twice, and during the second week, she was the focus three times. Data were collected from Britney a total of four times and Annie five times. Neither student was observed on day 10.

Table 4.1

Observation Execution

	Monday	Tuesday	Wednesday	Thursday	Friday
Week One	Day 1- Britney	Day 2- Annie	Day 3- Britney	Day 4- Annie	Day 5- Britney
Week Two	Day 6- Annie	Day 7- Britney	Day 8- Annie	Day 9- Annie	Day 10- None

The data below were analyzed based on what Vygotsky's sociocultural theory says about learning and the seven key principles from the ABP framework. Sociocultural theory says that learning occurs through interaction (Meyers, 2000). When teachers plan for interaction, they are also optimizing the learning for students because play and interaction have many cognitive benefits. The seven key principles from ABP state that learning is fun when: (a) you love what you do, (b) you feel safe, (c) the environment is inspiring, (d) you are appreciated, (e) it is fun to fail, (f) you choose how you learn, and (g) learning becomes a healthy addiction. During the two weeks of data collection for this study, I observed elements that both support and go against sociocultural theory and the key principals from ABP.

Week One

Teacher Planning

Prior to the first week of data collection, the classroom teacher and the EL teacher (Researcher) had plans to meet on Monday to discuss the following week's lessons, but were unable due to illness. It was not an option for us to reschedule our planning day that week because we had training scheduled with our Angry Birds trainer from Finland. We discussed that the target math vocabulary would be *equal* but we did not discuss exactly

how that would occur. The execution of the vocabulary instruction during the first week of data collection was solely the classroom teacher's responsibility and was the first opportunity that the classroom teacher had to lead vocabulary during this school year. Prior to this data collection period, the EL teacher would lead the vocabulary instruction while the classroom teacher would lead the content instruction. The classroom teacher led both language and content instruction the first week of data collection because the EL teacher assumed the role of researcher.

Vocabulary Instruction

The kindergarten teachers at the City Center School have adapted the vocabulary-teaching template from Byard & Mohan (2015, 2016) to better suit our early childhood needs. We use a five-day vocabulary framework in order to guide students to a deeper understanding of key words for the week. On the first and second days, the target word is introduced, defined, and students are given a visual representation of the word. The third, fourth, and fifth days are spent going deeper with the word, with opportunities for students to practice speaking and writing using the word.

Word, Definition, and Visual Representation

The first week of data collection, the target math vocabulary of the week was equal. On Monday, the target word was introduced, defined, and visually represented. In Excerpt 4.1, students were introduced to the new target math vocabulary for the week. On this first day of the week, the teacher introduced and defined the word.

Excerpt 4.1

- | | | |
|---|--------------|--|
| 1 | Mrs. Honey | We have a new word this week. Our word is equal (pointing to |
| 2 | | the word and the symbol on the poster). What is it? |
| 3 | All Students | Equal. |
| 4 | Mrs. Honey | Equal. What is it? |
| 5 | All Students | Equal. |
| 6 | Mrs. Honey | Whisper it to a neighbor. |
| 7 | All Students | (Whispering) Equal. |
| 8 | Mrs. Honey | Okay good. Equal means that it's the same. What is it? |
| 9 | All Students | Same. |

Students were given three opportunities to repeat the target vocabulary word in different ways as seen in lines 3, 5, and 7. Both focal students were observed saying the word along with the whole class. Students repeated the word after the teacher twice and once they whispered the word to a friend. In line 9, students also repeated the word meaning (same) after the teacher.

Vocabulary Using Manipulatives

On Tuesday, students used manipulatives to copy and show a number that was equal to, or the same as the teacher. This activity, illustrated in Excerpt 4.2, was adapted from the Investigations curriculum. Students each had their own ten-frame and counters to visually represent the numbers the teacher showed.

Excerpt 4.2

- 1 Mrs. Honey Alright, you have three (counters on the ten-frame). Here's
2 your next number, are you ready?
3 (Shows students a new number).
- 4 All Students Four.
- 5 Mrs. Honey Good job. I started with three. What did I have to do to make it
6 equal four? Thanks for raising your hand Benny, what did I have
7 to do?
- 8 Benny You have to put one more.
- 9 Mrs. Honey I had to put one more, yeah. Am I taking one away or adding
10 one here?
- 11 All Students Adding.
- 12 Mrs. Honey I'm adding one, so I can say three plus one equals...
- 13 All Students Four.
- 14 Mrs. Honey (Writes the equation on the board).

In this excerpt, students were building the beginning skills necessary for addition.

Students start with a number of counters on their ten-frame as seen in line 1. Next, students need to add or take away counters to make the next number. As seen in line 10, students knew that in order to go from three to four, they needed to add a counter. Also seen in lines 11 and 13 of this excerpt, the teacher connected this game to the target math word of the week by creating a number sentence, or equation from the work students do on their ten-frames. The vocabulary instruction occurred as a whole group and was very teacher directed.

Kinesthetic Vocabulary

On Wednesday, students reviewed the target math word and its meaning, then the teacher had the students represent the word kinesthetically. Students put their arms parallel in order to make an equal sign. On Thursday, students practiced as a whole group, making equations equal or balancing each side of the equation. The teacher wrote a number sentence on the poster without the answer, and then asked the students what was needed on the other side of the equal sign to make it equal or the same. For one example, the teacher wrote a number, another she drew a picture, and the last example she wrote an equation. In all three examples, students had to think about what to put on the other side of the equal sign in order to make both sides the same.

Vocabulary Discussion

On Friday, students were given a post-it with a number sentence without an answer. Students had to complete the equation at their table and then add their post-it to the vocabulary poster. Names were not written on the post-it because a whole class discussion about correct and incorrect examples occurred. Discussion is an important element in the Investigations math curriculum. Through discussion about correct examples, as well as an incorrect example, students are able to have rich conversation to practice explaining their thinking. Excerpt 4.3 shows what it sounded like to discuss an incorrect example:

Excerpt 4.3

- 1 Mrs. Honey Alright, last one. Are you ready? Ten is the same as three plus
- 2 three (reading a student's equation off their post-it).
- 3 All Students (Thinking, then showing thumbs down on their hands) No.

- 4 Mrs. Honey How come? John? What is three plus three?
- 5 John Six.
- 6 Mrs. Honey Lets try it, ready?
- 7 All Students (Putting three fingers on one hand) One, two, three. (Putting three
8 fingers on the other hand) One two three.
- 9 Mrs. Honey Put them together.
- 10 All Students One, two, three, four, five, six.
- 11 Mrs. Honey What is three plus three?
- 12 All Students Six.
- 13 Mrs. Honey Six. So is six the same as ten?
- 14 All Students No.
- 15 Mrs. Honey Remember, equals means it has to be the ...
- 16 All Students Same.
- 17 Mrs. Honey The same. On both sides of the equal sign.

This excerpt shows that incorrect examples are just as important to discuss as correct examples because it is an essential skill for students to be able to explain and tell reasons to defend their thinking. Most of the explaining of thinking occurred as a whole class, with scaffolding and structure to provide guidance and support. The teacher did not require students to do it independently yet. As seen in lines 6-17 students are guided by the teacher to break down the problem. First, students were able to find what is $3+3$ by using their fingers. Then, in line 13, the teacher asks if six is the same as 10. Even though neither of the two focal students directly participated in this discussion, they were still exposed to this thinking and indirectly participated by following along with each step.

The level four student, Annie, participated in the conversation independently, while the level one student, Britney was more an observer in the conversation.

Whole Group Vocabulary Production

During the whole group mini lessons at the start of math, throughout the week, students had many opportunities to repeat the word orally. Table 4.2 shows the number of times students were given the space to say the word aloud or repeat after the teacher during the whole-group instruction.

Table 4.2

Target Math Vocabulary (Whole-Group) Oral Production: Week One

Word	Number of times orally produced
equal or equals	16
same	4

All students had the opportunity throughout the week to orally produce the word “equal(s)” or “same” 20 times throughout the week. Outside of the whole-class opportunities built in to say the word, the two focal students were observed using the word “equal(s)” during choice time and with teacher prompting, but not independently during center activities.

Choice Time Vocabulary Usage

When students finished with their independent work early, they could choose math manipulatives to play with for the remainder of the math block. Annie finished early one

day and played with the math manipulatives. All 10 of the times she used the word “equal(s)” during this week were inside this choice time at the end of her independent work time. The choice time this particular day had students rolling two large dice, reading the numbers in equations, and completing the equation (Figure 4.1). The sentence frame read, “ $_ + _ = _$ ” Students rolled two dice and read the sentence. For example, if the student rolled a two and a five, they would read the sentence, “Two plus five equals blank.” Then they would answer the addition sentence. Students could count the images on the dice or use their fingers to solve the equation. Annie preferred to count the images on the dice and used the word *equals* more times during this game than she did the whole week during her independent work time.

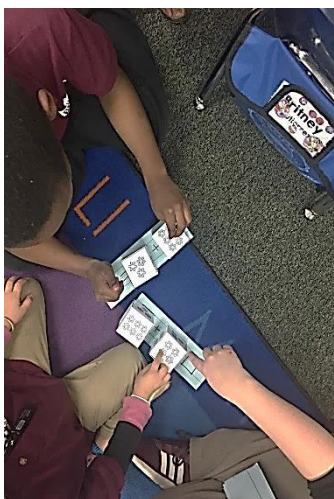


Figure 4.1. Roll Dice Addition

Excerpt 4.4 shows how the teacher could provide prompting that encouraged students to use the vocabulary term.

Excerpt 4.4

- 1 Mrs. Honey Roll your dice Mark. Put them on the first two spots.
- 2 Mark How? I don't got nothing.
- 3 Mrs. Honey Put them on the first two spots. So let's read it. How many are
- 4 here?
- 5 Annie One, two, three, four, five, six.
- 6 Mrs. Honey Six plus...
- 7 Annie Plus six. One, two, three, four.
- 8 Mrs. Honey Equals...how many altogether?
- 9 Annie One, two, three, four, five, six, seven, eight, nine, ten. Ten!
- 10 Mrs. Honey So six plus four equals?
- 11 Annie Ten.
- 12 Mrs. Honey (Asking Mary) What's yours?
- 13 Mary Nine.
- 14 Mrs. Honey Six...
- 15 Mary Plus three equals nine.
- 16 Mrs. Honey Good! Shake them again. Then read it when you put it on there.
- 17 Don't forget to say plus and equals. (Walks away)
- 18 Mary (Rolled the dice) Three. Three plus three equals six.
- 19 Annie Five plus one, two, three, four, five, six, seven, eight, nine, ten,
- 20 eleven. (Rolling her own dice)
- 21 Mary One, two, three, four, five, six, seven, eight, nine, ten, eleven,
- 22 twelve. Twelve. I'm done.

- 23 Annie Two plus one equals three. Two plus one equals three! Two plus
 24 two equals four.
- 25 Mary Three plus three equals five equals.
- 26 Annie One equals one, no. One plus one equals two.
- 27 Mark You're cheating. You counted. How about we mix them up so we
 28 don't know which one. People, people.
- 29 Annie Two equ...two plus two equals four. Two plus six equals - one,
 30 two, three, four, five, six, seven, eight. Eight.

In this excerpt, after the reminder from the teacher to use the target word, Annie used the target word seven times. She used the target math word more times during this particular excerpt than she did the rest of the lessons combined. The teacher reminded students to read the equations they make out loud in line 17. Before that, Annie was just counting aloud the number of objects as seen in lines 5, 7, and 9. After the teacher reminder, Annie would roll her dice, and read the equation, making sure to say the words *plus* and *equals* as seen in lines 23, 24, 26, and 29.

Need for Intentional Opportunities to Use Vocabulary

On day five, illustrated in Excerpt 4.5, Britney completed the "One Less, One More" activity (Image 4.3). The teacher sat at Britney's table to help her complete the worksheet.

Excerpt 4.5

- 1 Mrs. Honey Let's do this one. What number is this?
- 2 Britney Seven.
- 3 Mrs. Honey Seven. Find seven on our number line. What is one less than

- 4 seven?
- 5 Britney Eight.
- 6 Mrs. Honey What is one less?
- 7 Britney Eight.
- 8 Mrs. Honey That means go backwards.
- 9 Britney Six.
- 10 Mrs. Honey Six. Yup. What's our number again?
- 11 Britney Seven?
- 12 Mrs. Honey Seven. Find seven on our number line. Okay, what is one more
- 13 than seven?
- 14 Britney Eight.
- 15 Mrs. Honey Yup. Eight.

This excerpt shows that this particular activity did not have any planned opportunities for students to use or produce the target math vocabulary word. Students were, instead, using the number line to find numbers that were one more or one less than a given number. Students needed to know the words “more” and “less” in order to complete the worksheet. In line 6, the teacher asked Britney “What is one less?” Britney was unable to answer the question because the words “more” and “less” were not discussed. With prompting and support, as seen in line eight, Britney was able to answer the question.

During this first week of data collection, outside of the whole group opportunities to repeat the word, Britney did not use the target math vocabulary without teacher prompting. Outside of the whole group opportunities, Annie only used the target math

word on day four, during the game she played when she was finished with her given math task.

Math Center Activities

All four of the centers this week were introduced as games. Although they were independent worksheets, students were using many manipulatives (number line, counters, and color tiles) to complete their work. The centers this week planned for structured play opportunities. Students played games while also practicing a skill. Students played the games alone and not with partners. There were no planned opportunities for students to interact with the target math vocabulary outside of the whole group vocabulary lesson.

Reflective Interview - Students

At the end of week one, on Friday at the end of the day, each focal student was given the opportunity to sit down with the researcher and self-assess her understanding of the target math vocabulary (Table 3.2). Annie, the level 4 student, circled a thumbs-up, because she thought she knew what the word meant. The student reflective interviews were not recorded or transcribed, but I did write down students answers verbatim. When I asked her to verbally tell me what equal means, she said, “I think equals means one more.” This is not correct, but happened to be the center activity she had worked on during math that day.

Britney, the level one student also circled a thumbs-up, because she thought she knew what the word meant. When I asked her to verbally tell me what equal means, she said, “Equals means that (pause) yes (pause) all (pause).” Then I prompted her with, “We did it all week for math.” Britney then looked at the math poster and said, “The same.”

She was able to tell me what equals means after teacher prompting to refer back to the math poster we made this week.

Reflective Interview - Teacher

After the week's instruction, I sat down with Mrs. Honey to ask her opinion about how she thought the week went (see excerpt 4.6).

Excerpt 4.6

- | | | |
|---|------------|--|
| 1 | Researcher | How do you feel about the week's vocabulary instruction? |
| 2 | Mrs. Honey | It didn't go as well as I hoped it would. I don't know. I just, I |
| 3 | | kind of felt by the end of the week some of them understood |
| 4 | | it. They were very confused by what same meant. This was |
| 5 | | the first time I've done vocab by myself this year. I wish we |
| 6 | | had more time to dedicate to it. The time is so short. I feel like |
| 7 | | I have to get vocab in five minutes. When they finish their |
| 8 | | work some of them would read their equations. Or roll the |
| 9 | | dice and fill in the numbers into the sentence frame. |

In lines 5 and 6 she mentioned that it was the first week doing the vocabulary instruction by herself this year and she wished that there had been more than five minutes to work on vocabulary. The math block is only 30 minutes and there is not much time to spend on direct instruction of target math words.

In lines 8 and 9, Mrs. Honey noticed that students were not using the target math vocabulary, unless they were reading their equations in the dice game. She also noticed in line 9, that students had a sentence frame to use after rolling the dice.

Infusing Play

To analyze these data, I focused on the classroom activities that supported Vygotsky's SCT and the ABP key principles in order to determine which activities support the Fun Learning framework and/or included interactions. Planning for the week between the EL teacher and the classroom teacher did not occur because of illness, so it was the classroom teacher who was solely responsible for the lessons. During this first week of data collection, the only interaction that occurred between students was when they were finished with their independent math tasks, during their free choice time. The math center activities this week were structured games in which students played alone and completed a worksheet in order to practice the math skill.

Target Vocabulary Production

Data showed that the majority of the oral vocabulary production occurred during whole group instruction and not during center time. The level one student only produced the target math vocabulary during whole group instruction and during times when repeating after the teacher. The level four student produced the target math vocabulary during her free choice time, but not during the planned center activities. Neither student used the target math word during centers.

Week Two**Teacher Planning**

During week one of data collection, on Monday, the kindergarten team met to plan for the following week. The theme for math was addition and a majority of the five minutes spent discussing math, was spent discussing the center activities and not the vocabulary. We decided that the target math vocabulary for week two of data collection

would be *addition strategies* so we could talk about all the different ways we can do addition. Instead of focusing on one word, we decided it best to create a poster about different ways to add and what students can use to help them do addition.

Vocabulary Instruction

Throughout the week, six different addition strategies were introduced to students (Figure 4.6). Since the target math vocabulary for week two incorporated several different ideas, secondary vocabulary words were also included to address the six specific addition strategies taught (e.g., fingers, number line, ten-frame, dots/pictures, objects, and counting on). Each day, students had an opportunity as a whole group to orally repeat the target math word addition strategy after the teacher and an additional two to three opportunities to repeat the secondary vocabulary words throughout the week.

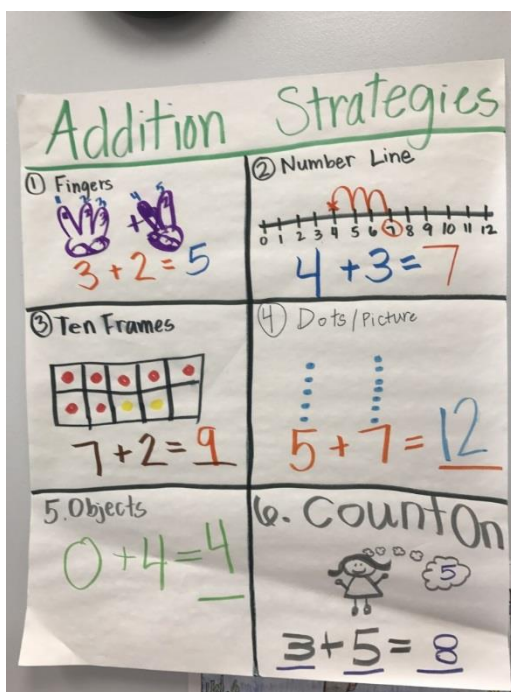


Figure 4.2 Addition Strategies Poster

On Monday, Mrs. Honey introduced two addition strategies; fingers and number line. Students used their fingers to complete the addition equation $3 + 2$. They put three fingers on one hand and two fingers on the other. Then they put their hands together and counted five in all because $3 + 2 = 5$. Next, they saw how they could use a number line to help them add. They started at the first number then counted up the next number. For example, for $4 + 3$ we started at the four and jumped three spots forward, landing on the seven because $4 + 3 = 7$.

On Tuesday, students saw that they could use a ten-frame to help add. They could use the red counters to represent one number, and yellow counters to represent the other. Then they could count all the counters together to find how many in all. This strategy works best for addition equations less than 10, otherwise students need to use two ten-frames.

On Wednesday, students learned about drawing dots or pictures to help with addition equations. Teachers tend to encourage drawing dots rather than pictures because it is quicker and this is math class not art class. Thursday, students learned about using objects to help. A favorite object to use is counters because they are double sided and each side is a different color making it easy to use to add numbers together. Friday, students were introduced to the counting on strategy. Students put the larger number in their head, and counted up by the next number. For example, for $7 + 4$ they put the seven in their brains and counted up by four (e.g., eight, nine, ten, eleven) because $7 + 4 = 11$.

Vocabulary Production

Outside of the whole-group opportunities to orally produce the target vocabulary, the two focal students were observed orally producing the words “plus”, “add”, and “strategy” (Table 4.3). Annie used the word “*plus*” 13 times and 69% of those times occurred during the choice time when her center activity was complete. Britney used the word “plus” 12 times and 83% of those times occurred through teacher prompting. Annie used the word “add” once and “strategy” twice, but Britney did not use either at all.

Table 4.3

Target Math Vocabulary Oral Production: Week Two Focus Students

Word	Annie	Britney
plus	13	12
add	1	0
strategy	2	0

I chose to look for these particular words in the transcripts during week two because there was no mention by the students of the target word addition strategy. I wanted to look more broadly and see if students were using any related math vocabulary. The words plus and add are related to addition, and strategy is related to addition strategies.

Math Center Activities

The math center activities during week two of data collection were mostly game-based rather than independent based like week one. Two of the four centers were planned partner activities (Valentine Addition and More or Less), one center was planned an

independent but interactive activity (Fishing Addition), and one center was an independent worksheet (Roll and Record 2). Both “More or Less” and “Roll and Record 2” were taken and adapted from the student work pages in Investigations.

Week two of data collection included more play-based center activities than week one. Angry Birds Playground framework promotes 21st century skills including: (a) participation; (b) negotiation; (c) communication, and; (d) collaboration. These four skills were all addressed through the partner activities (Valentine Addition and More or Less) and the interactive game (Fishing Addition) planned for this week. Students needed to participate and communicate with their partners in order to collaborate and negotiate to complete the math center activity.

Student Work

Week two of data collection included the following four math center activities: (a) Valentine Addition; (b) “Fishing Addition, (c) Roll and Record 2, and; (d) More or Less. The theme for the week was addition and strategies for solving addition problems. The classroom teacher created “Valentine Addition” and “Fishing Addition”. These two games were specifically designed to be interactive or fun ways for students to practice the skill of combining two amounts.

“Valentine Addition” (see Figure 4.3) was played similar to BINGO. This game is not from the Investigations curriculum, but was created by the classroom teacher to incorporate the week’s theme of addition as well as the holiday at the time. Students worked with a partner, to take turns covering numbers to see who could get five in a row first. Students rolled two dice and added the two numbers together. The dice had dots on

them so students could count the dots (addition strategy) to add the two numbers together. Then they covered the answer on the game board.

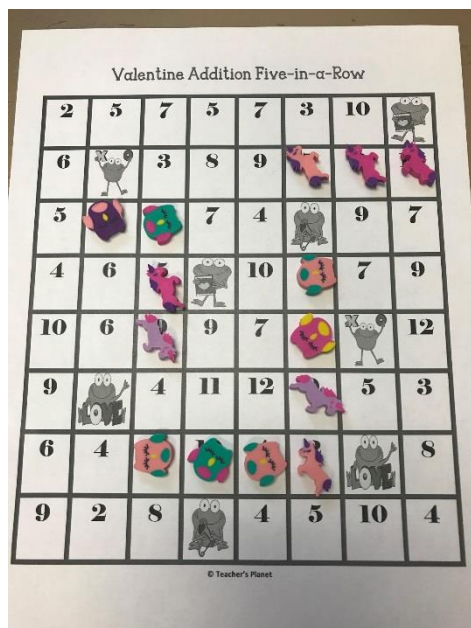


Figure 4.3. Valentine Addition

Excerpt 4.8 is taken from day eight, when Annie, the level four student, was playing “Valentine Addition” with her partner. Students used valentine’s themed erasers to play this version of math BINGO to practice adding two numbers together.

Excerpt 4.8

- 1 Annie (Rolled two dice) Oooh, yay! One, two, three, four, five, six.
- 2 Zoe Stop! I put it on 12.
- 3 Annie I’m gonna go right.
- 4 Zoe (talking to another student) I’m the bacon man, ha ha ha boo boo.
- 5 Ka ka ka boo coo.
- 6 Annie Two and a six.
- 7 Zoe You already went, right?

- 8 Annie Yeah.
- 9 Zoe (Rolled two dice) One, two, three, four, five, six, seven.
- 10 Annie Ooh, this time you should use this. (Pointing to another eraser).
- 11 Zoe Where do you want me to put the seven? I got seven. Where do
12 you want me to put the seven?
- 13 Annie Umm...right here. This time you...
- 14 Zoe You have to get the dice.
- 15 Annie This time you should use this pretty one. (pointing to an eraser)
- 16 Zoe Then-then this one. Which one is prettiest?
- 17 Annie This one. (Rolled two dice) Got six and a six. One, two, three, four,
18 five, six, seven, eight, nine, ten, eleven, twelve. I got 12!
- 19 Zoe (Rolls the dice) Three and a three that adds. I don't know.
- 20 Annie Six.
- 21 Zoe (Counts the dots on the dice) One, two, three, four, five, six. Where
22 do you want me to put the beautiful things? Right here?
- 23 Annie No. Yeah, right here. (Rolls the dice and counts the dots) One, two,
24 three, four, five, six, seven. Got seven again.
- 25 Zoe (Rolls the dice and counts the dots) Thirteen.

Annie and her partner were very excited to use the Valentine's Day erasers as seen in lines 15 and 22. In line 4, Annie's partner was talking with someone else and not focused on her math task. However, in line 6, Annie kept playing by herself, not concerned that her partner was not paying attention. This interaction is important because the students were able to practice negotiating their roles during the activity and practice

their math skill of addition. This particular math game was engaging because students were able to use themed erasers and the new manipulatives were fun to use.

“Fishing Addition” (Image 4.4) was the game that was described at the beginning of Chapter One. This particular game is not from the Investigations curriculum, but something the classroom teacher found to supplement the theme of addition. Students used sticks with magnets on the end to pick up magnetic numbers on the carpet. When students caught two numbers, they wrote them in on their worksheet, and then solved the equation. Students were able to use any addition strategy we talked about this week that they preferred.

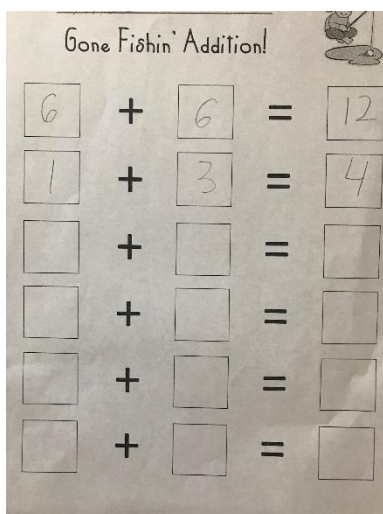


Figure 4.4 Fishing Addition

Excerpt 4.7 is from day seven, when the level one student, Britney, was playing the “Fishing Addition” game. Annie struggled to get started, so with support, the teacher was able to guide her through her first example.

Excerpt 4.7

- | | | |
|---|---------|---|
| 1 | Teacher | What two numbers did you get? |
| 2 | Britney | Three first and eight plus and six first. |

- 3 Teacher Okay, you only need to pick two fish.
- 4 Britney Okay.
- 5 Teacher Okay, so let's throw one back. (Britney throws one card back
6 onto the carpet) Good! What do we have? We have a three?
- 7 Britney Three.
- 8 Teacher And an eight.
- 9 Britney Eight. (She writes the three and eight into her equation on her
10 worksheet).
- 11 Teacher Can you read this equation? (pointing to Britney's worksheet)
- 12 Britney Three plus eight equals six.
- 13 Teacher No, six is not right. Can you find out what three plus eight
14 equals?
- 15 Britney (Counting her fingers) One, two, three, four, five Eight nine.
- 16 Teacher Show me eight on your fingers.
- 17 Britney (Counting her fingers) One, two three, four, five. No. One, two,
18 three, four, five, six, seven, eight.
- 19 Teacher Okay, and here is three on mine. So count them all.
- 20 Britney One, two, three. One two three.
- 21 Teacher Can we draw a picture? Okay, I'm going to draw three dots,
22 okay? Here is three dots. (Points to the number eight). How
23 many dots should I draw here?
- 24 Britney Eight. (Draws eight dots)
- 25 Teacher Can you count all of them?

- 26 Britney One, two, three, four, five, six, seven, eight, nine, ten, eleven.
- 27 Teacher Eleven. Very good. Can you read the whole thing now?
- 28 Britney Three plus eight equals eleven.

In lines 15 and 17, Britney counted her fingers as a strategy. As seen in line 20, she was struggling to count $8+3$ because she could not fit all the numbers on her fingers. In line 21, the teacher suggested the drawing a picture strategy. In line 26, Britney was able to successfully add the two numbers together using the dots strategy. Although Britney did not use the target vocabulary addition strategies, with teacher prompting and support she was able to use several different strategies to help guide her to the answer. She was able to complete the math content without orally using the target math vocabulary. Finally, in lines 27 and 28, Britney was able to use secondary vocabulary, “plus” and “equals”, to read her equation after teacher prompting.

Reflective Interview - Students

At the end of week two, on Friday at the end of the day, each focal student was given the opportunity to self-assess their understanding of the target math vocabulary. Annie, the level four student, circled a thumbs-up, because she thought she knew what the word meant. When I asked her to verbally tell me what addition strategies were, she said, “I think is another strategy to work and to learn.” I then asked her to tell me one addition strategy. She said, “I don’t know. Oh! I remember! Spoons. Count the spoons. You make two piles, not whatever you want. Then you add it together when you are all done counting. Same as fork.” She was referring to the strategy of using objects. Annie preferred to count objects, and later mentioned her favorite was using the Valentine’s

Day heart erasers. Although she did not use the language “addition strategy”, she was able to recall one of the six strategies discussed.

Britney, the level one student, also circled a thumbs-up because she thought she knew what the word meant. When I asked her to verbally tell me what “addition strategies” were, she looked at the math poster and said, “You can count the number line. You can count your hands. You can make dots.” I then asked her why we use addition strategies, to which she said, “Because you need to use it, you can count.” Britney’s favorite addition strategy to use was her fingers. She, also, did not use the target math vocabulary, but she was able to recall the several strategies discussed during the week.

Reflective Interview - Teacher

Mrs. Honey did not think that the vocabulary instruction went well for the week because she did not hear students using the words “addition strategy” (excerpt 4.9).

Excerpt 4.9

1	Researcher	How do you feel about the week’s vocabulary instruction?
2	Mrs. Honey	Every day, I would ask them, “What are we doing for our
3		word this week?” Students would struggle to say, “adding?
4		add?” I don’t think it went that well. They couldn’t even
5		remember addition strategies. And then, they couldn’t
6		remember any of the directions, so I’m running around to four
7		different tables teaching them how to play every game.

As seen in lines 5-7, she also thought that it was difficult to facilitate productive conversations in groups because she was busy going around the room helping students get started with their math centers. Mrs. Honey noticed that the students were struggling

remembering what to do in their activities and she had to go around reintroducing the centers to each group.

Infusing Play

To analyze these data, I focused on the classroom activities that supported Vygotsky's SCT and the ABP key principles in order to determine which activities support the Fun Learning framework and included interactions. SCT suggests that a child's cognitive growth and development are connected to play, and learning occurs through interaction (Meyers, 2000; Vygotsky, 1978). ABP Fun Learning principles suggest that learning is fun when: (a) you love what you do; (b) you feel safe; (c) the environment is inspiring; (d) you are appreciated; (e) it is fun to fail; (f) you can choose how you learn, and; (g) learning becomes a healthy addiction (Jarvilehto, 2014; Rovio Entertainment Ltd., n.d.).

Weekly planning between the EL teacher and the classroom teacher included a discussion about what vocabulary to focus on, but did not include discussion about how to make the learning fun or interactive. Center activities were chosen based on the theme for the week, which was addition. During week one of data collection, students independently practiced beginning skills necessary for addition. Week two of data collection built off of week one. Students worked with partners to continue practicing putting numbers together and adding. Although the centers for the week were structured play activities, students played addition games with partners to practice their math skills. Three of the four week-two centers included planned opportunities for interacting with peers, and thus they support what SCT says about early years learning.

Target Vocabulary Production

Although the centers planned for math during week two of data collection included more interactive activities than week one, students still did not use the target math vocabulary during their work time. Students were able to repeat the target words after the teacher during whole group instruction, but did not know how to use the words when working on their centers.

The level one student was observed producing the target math vocabulary when prompted by the teacher as seen in line 28 of Excerpt 4.7. The level four student was not observed producing the target words while working on her centers. Neither student used the target math word independently during centers. One barrier the teacher noted was limited processing time for new vocabulary (Yesil-Dagli, 2011). As Mrs. Honey stated in her reflective interview, students had a difficult time remembering what to do in their center activities. As a result, most of the teacher's time was spent going around re-teaching the games.

Summary

The results collected from the audio transcriptions of the team planning time and the reflective interviews with the classroom teacher allowed me to see how play was infused in the lesson and activities. For the purpose of this study, play was defined as structured interactions to practice academic skills. During week one of data collection, I observed that the center activities were not infused with play opportunities because they were independent and not interactive. In comparison, week two had more play infused because 75% of the activities were played with a partner.

During week one of data collection, Annie used the word “equal(s)” seven times, and all of those occurred during choice time at the end of independent work time. Britney, did not finish her independent work in time to have choice time, but was still able to orally produce some secondary target words when prompted by the teacher (Excerpt 4.7). The results of the data collected from the audio/video transcriptions, student work, and reflective interviews with the students, show that the students tended to orally produce the most vocabulary during times of play or interaction.

During week two of data collection, Annie orally mentioned the term “addition strategy” once during a time she was working with a partner. Britney mentioned “addition strategy” twice through teacher prompting and questioning. The data indicate that students orally produced target math vocabulary more often in times during play or partner interaction, and they did not use the target math words when they were working independently.

In this chapter I presented the results of my data collection which suggest that ELs tended to produce more language when teachers plan intentional opportunities to interact with target vocabulary. Students tended not to produce language when working independently. In Chapter Five I will discuss my major findings, their implications, and suggestions for further research.

CHAPTER FIVE: CONCLUSION

Kindergarten teachers across the country face challenges in trying to balance academic pressures with what child development theories and research suggest is appropriate for young students. At the City Center School, in an effort to try integrating the pressure for accountability with providing students with an education that is supported by best practice, we began using the ABP framework during the 2015-2016 school year. Due to the school's high EL population, it is also important for teachers to know, not only what research suggests best practice for early-years education, but also what best practice is for ELs. The ABP framework is well supported by early-years research, but because a majority of our students is ELs, it is important to learn about and practice how to balance a child-centered approach with the explicit vocabulary instruction ELs need. After the completion of this study, the classroom teachers and I will continue our exploration of using curriculum that focuses on direct instruction of vocabulary and using curriculum that facilitates learning through Fun Learning.

This qualitative case study was conducted to address two questions. First, how is play infused into the math lessons and activities in kindergarten? Second, how do ELs orally produce target math vocabulary within a play-infused kindergarten classroom? This final chapter will address the major findings from this study, implications for teaching ELs, limitations of this study, and suggestions for future research.

Major Findings

In order to present the major findings, I will first revisit the ideas presented in Chapter Two, which included an overview of the academic pressures in kindergarten, an overview of vocabulary instruction for ELs, and a review of the literature on the benefits of play in early learning classrooms. Then, I will describe how my data reflect the research and how I was able to grow as an educator from this study.

Importance of Vocabulary for ELs

Research indicated that ELs vocabulary knowledge is an important basis for building communication skills in a second language (Coyne & McCoach, 2009; Crevecoeur, 2008; Gass & Selinker, 2008; Pressley, 2006; Pressley et al., 2002; Roessingh & Elgie, 2009; Silverman & Crandell, 2010; Wright & Neuman, 2014; Van Oers and Duijkers, 2012), as well as a strong predictor of later academic skills (Brown, 2012; Coyne et al., 2009; Crevecoeur, 2008; Gathercole & Baddeley, 1989; Pressley, 2006; Pressley et al., 2002; Rahimi & Sahragard, 2008; Roessingh & Elgie, 2009; Silverman & Crandell, 2010; Wright & Neuman, 2014; Yesil-Dagli, 2011). Because vocabulary learning is so crucial to the academic success of ELs, the literature also emphasizes direct instruction of vocabulary be intentionally selected (Anderson & Nagy, 1993; Christ, 2007; Silverman & Crandell, 2010).

The data collected in this study show that neither the level four student nor the level one student used the target math vocabulary during the independent math center activities. The level four student did, however, use the target vocabulary word when she was playing a game with another student (interaction) and had a sentence frame to use (scaffolding from the teacher). The level one student only produced the target math

vocabulary when prompted by the teacher. This leads me to believe that without planned opportunities to interact with vocabulary during the work time, teachers cannot expect to see students using the target words. We need to think about what exactly we want to hear the students say in order to determine if they understand and can use the target vocabulary. It is also important to know that the oral production of level one students will be different from level four students, and lack of oral production in a level one student does not necessarily mean a lack of understanding.

According to WIDA Can-Do Descriptors (WIDA, 2012) a level one student is able to point to pictures in context, match oral language to and name everyday objects, respond non-verbally to oral commands, answer yes/no questions, and repeat words or simple phrases. In the case of the level one student in this study, she relied heavily on the visual aid poster created by the teacher about the target vocabulary in order to answer the reflective interview questions about what she thought the target word meant. She also was able to repeat words and simple phrases when reading the equations after being prompted by the teacher. This is why it is important for teachers to provide many supports to lower level proficiency students such as sensory supports, graphic supports, or interactive supports.

In comparison, a level four student, according to WIDA (2012) is able to tell what comes first and next, retell stories with pictures with details, sing songs/chants independently, and tell what is the same or different in things. In this case study, the level four student did not rely on the visual aid posters to recall answers during the reflective interview. Also, after the teacher reminder to read equations, she was able to

independently read her equations during her game even after the teacher left. I found that the level four student needed less prompting and support than the level one student.

Importance of Play in Early-Years Education

For the purpose of this study, play was defined as learning that occurs through structured and unstructured interaction with other students (Edwards, 2002; Lillemyr et al., 2011; Meyers, 2000; Van Oers & Duijkers, 2012; Vukelich, 1993; Vygotsky, 1978). Data were analyzed by looking at which lessons and activities infused either structured or unstructured interaction with other students. Play was intentionally planned for in into different parts of the day in both structured and unstructured ways. I found that the interactions during the math block specifically were structured in order to facilitate practice of particular content (math) skills. The unstructured play occurred during recess and free choice time. The classroom teacher tried to balance both structured and unstructured play opportunities within each day.

The data collected from this study lead me to believe that students do not need to use target vocabulary during independent work tasks. When students were working alone, they were not interacting with other students and tended not to be producing any language. Similar to what Vygotsky's sociocultural theory says about learning (Meyers, 2000), students might not have been using target vocabulary for independent activities because they were not interacting with others. Although students were given the space to repeat target vocabulary (and the definition) after the teacher, students were not given the opportunity in their center activities to interact with other students and use the target math vocabulary with their peers. Having sentence frames available during work time might

have given students the framework needed to produce the target language which I will discuss further below.

Benefits of Play for All

Play has many social and academic benefits including facilitating the total development of children which happens on many different levels including: (a) language, (b) emotional, (c) physical, (d) cognitive, and, (e) content areas such as math and literacy (Heidemann & Hewitt, 2010). Play also can provide a valuable context for learning if there is a balance between child-centered and teacher-driven approaches (Van Oers & Dujikers, 2012; Miller & Almon, 2009; Pyle & Bigelow, 2015; Vukelich, 1993).

I think that Mrs. Honey is good at balancing both child-centered and teacher-driven approaches because both are utilized at different points in the day. During math, there were times for students to lead their own learning when it was time to practice skills and reinforce content knowledge. There were also times, when teaching new content and ideas, where a teacher driven approach was best. During the first week of the data collection there were not many opportunities for play or interaction with others because students were just beginning to practice addition. During the second week of data collection there were more opportunities for play and interaction because students already had one week to practice on their own and it was then time to explore the content further with others.

The math center activities during week one were independent activities and did not include planned opportunities for interaction with other students or times to purposely use the target math vocabulary. The math center activities during week two were mostly partner games, rather than independent games like those in week one. Just playing is not

enough for sufficient development, ELs need intentional opportunities build in to use and practice the language to grow their vocabularies.

Barriers in Vocabulary Development

This study explored how to balance the developmentally appropriate teaching methods (ABP, Montessori, Reggio Emilia) with what is necessary for the greater academic achievement for ELs (direct vocabulary instruction). It is essential for teachers to begin teaching vocabulary to start with first knowing and understanding barriers students face in acquiring vocabulary.

Potential barriers to vocabulary learning may include: (a) socioeconomic status; (b) lack of input or intentionality in instruction; (c) lack of exposure or frequency; (d) lack of in depth processing time when words are presented, and; (e) multiple meanings of words, particularly across content areas (Wright & Neuman, 2014; Yesil-Dagli, 2011). After knowing and understanding barriers in learning vocabulary, teachers can begin to overcome one barrier at a time.

The barriers students faced when learning vocabulary within this study were presented in Chapter Four and included lack of input, lack of exposure, and lack of in depth processing time. Two things might have contributed to the lack of input. First, planning time was limited because the classroom teacher was new to the role of teaching vocabulary, and a key staff member was sick. During the first week of data collection, students were new to the content and needed a lot of one-on-one help getting started on activities, which reduced the time for vocabulary use. Second, activities were structured to be completed independently and did not require students to use the vocabulary which might have contributed to a lack of processing time. The data collected from week one

showed that students received a lack of input and exposure to vocabulary. Mrs. Honey noted in her reflective interview that she felt there was not enough time to cover vocabulary within a short five minutes. Therefore, there was also lack of processing time and applying the word across content areas. In order to combat these barriers the classroom teacher and I have decided to create a vocabulary center activity during math to increase the amount of time students are given opportunities to use the target vocabulary.

Intentional Planning

As described in the story at the beginning of Chapter One, through careful planning and preparation by the teacher, it is indeed possible for students to have fun while also learning or practicing a skill. The results from the data collected in this study emphasize the importance of the teacher's role in planning for and creating intentional opportunities for play in lessons. Although there are times for teacher-driven approaches as well as child-centered approaches, I think that taking the time to intentionally think about how to include play or interaction should happen regardless of whether or not the content is new.

In addition to thinking about infusing play and interaction into as many lessons as possible, classroom teachers should also ask their team questions about how to best serve the varying levels of EL proficiency. Even during the partner activities, the data collected in this study did not show students producing target math vocabulary. Providing language support will not only help the low level proficiency students, but also the higher level proficiency students.

Planning Interaction with Target Vocabulary

Vocabulary is overwhelmingly researched as a strong predictor in children's reading achievement (Brown, 2012; Coyne & McCoach, 2009; Crevecoeur, 2008; Gathercole & Baddeley, 1989; Pressley, 2006; Pressley et al., 2002; Rahimi & Sahragard, 2008; Roessingh & Elgie, 2009; Silverman & Crandell, 2010; Wright & Neuman, 2014; Yesil-Dagli, 2011). Entering kindergarten, ELs have less English vocabulary as their native speaking peers and the gap between ELs and native speakers grows larger every year making them an at-risk population of students (Coyne & McCoach, 2009; Crevecoeur, 2008; Gathercole & Baddeley, 1989; Roessingh & Elgie, 2009). Although it is impossible to completely close the vocabulary gap in kindergarten, there are many proponents for and research to support direct vocabulary instruction in the classroom (both instructional and embedded approaches), especially for ELs, in order to accelerate their academic and reading achievement (Coyne & McCoach, 2009; Crevecoeur, 2008; Gass & Selinker, 2008; Pressley, 2006; Pressley et al., 2002; Rossingh & Elgie, 2009; Silverman & Crandell, 2010; Wright & Neuman, 2014; Van Oers & Duijkers, 2012).

After an interview with the teacher, Mrs. Honey and I reflected on our conversation and decided that when I return from data collection, I will plan a center activity with a language focus. That way we will be better able to fit the vocabulary and language instruction into the short math block time. Creating a vocabulary center will help address the barriers of lack of instructional time, lack of input and lack of processing time.

Implications for Teaching

The findings of this study are not only directed to EL teachers specifically, but are also directed to any teacher who has an EL student in their classroom and wish to optimize student's language development. This section includes a plan of how my team will improve our vocabulary instruction through intentionality and changes to our math block.

Future of Vocabulary Instruction at the City Center School

The classroom teacher and I both agreed that we currently do not plan for opportunities to interact with vocabulary as well as we could. Based on the findings of this study, we have decided to experiment with a language center during the math block in order to allow students to participate in language related activities for a full 20 minutes in a small group rather than for five minutes once a day in a whole group. A vocabulary center might help to address the barrier of lack of instructional time time that we have noticed. In a small teacher-directed group, students might have more opportunities to interact with the target math words.

In addition to creating more intentional opportunities for students to interact with target math vocabulary, the classroom teacher and I will continue to implement ABP principles in our activities. The old curriculum (Investigations) currently guides many activities and lessons. We will continue to include structured play during math (teacher-created games based on the theme or math games adapted from Investigations), but we intend to create more interactive activities and more opportunities for students to produce language within their center activities. We might consider including a visual in each center with a sentence frame for students to see as they are working, or include the target

word with a visual at their table so students can refer back to the target vocabulary often while they are working. Our goal is also to become more thematic and develop activities that are more aligned to the Fun Learning principles: Learning is fun when: (a) you love what you do; (b) you feel safe; (c) the environment is inspiring; (d) you are appreciated; (e) it is fun to fail; (f) you can choose how you learn, and; (g) when learning becomes a healthy addiction (Järvilehto, 2014; Rovio Entertainment Ltd., n.d.).

If we reteach some of the same lessons, or revisit some of the same activities as in this study, we could change a few things about how we plan for students to interact using the target vocabulary. For example, for any of the addition games students played with a partner, we could have modeled for and taught students to use the following frame:

Partner A: What is your equation?

Partner B: ____ plus ____ equals ____.

Or

Partner A: What strategy did you use to get the answer?

Partner B: I used the strategy _____.

Either of these two sentence frame examples give space for students to interact with a partner and to use the target vocabulary. In addition to the sentence frames, I would also suggest that the target vocabulary be displayed during the work time, along with pictures or a visual, because lower proficiency students tend to need more supports (sensory, graphic, interactive). We might consider including a small copy of the word with a visual at each table and in each center activity.

Emphasis on Vocabulary

There is a significant need for the direct instruction of vocabulary for ELs.

Vocabulary instruction needs to be an intentional and pre-planned part of an EL teacher's lesson. The likelihood of learning a word from context is relatively low. Instead, teachers should help students build word consciousness to provoke curiosity about words, promote independence in word analysis, and develop an appreciation for nuances of meaning (Anderson & Nagy, 1993; Bay-Williams & Livers, 2009; Christ, 2007). Rather than teaching as many vocabulary words as possible, we should focus on the quality of the instruction, and help students to see multiple meanings of words across content areas.

Vocabulary instruction in kindergarten should be a priority. It should use varying instructional practices and focus on breadth versus depth (Coyne et al., 2009; Silverman & Crandell, 2010). When teachers provide students opportunity to interact with words outside of the read-aloud (extended instruction), students are provided with multiple exposures of the target words in varied contexts. This will result in a more full and refined knowledge of the words. Through extended instruction, students begin to encounter words in more and more situations and begin to generalize and apply words across contexts (Silverman & Crandell, 2010).

Strategies to Teach Vocabulary

Strategies used to teach vocabulary often include: (a) teacher's saying the words out loud; (b) students pronouncing the words; (c) discussing graphophonemic or semantic properties of the words; (d) defining the words; (e) demonstrating word meanings visually and kinesthetically, and; (e) help students make connections to the words by including students' experiences (Coyne et al., 2009; Silverman & Crandell, 2010).

Although it is impossible to teach students all the words they will need to know in school, teachers can however, use multidimensional approaches to vocabulary instruction in order to optimize the understandings and connections students make. Both instructional and embedded approaches are equally important.

Teachers not only need to be intentional about direct vocabulary instruction because research says it is important for ELs, early-years educators also need to think about and intentionally plan how to incorporate play into the activities and vocabulary instruction. I believe there needs to be a balance between both structured and unstructured play in order to create a successful learning environment in kindergarten. Unstructured play (sociodramatic) will still occur outside of the math block, during recess and choice time at the end of the day. Structured play will still occur in order to practice math skills. This study showed that without built-in, intentional opportunities for students to produce target vocabulary, students did not use the target words during the structured play in math.

Suggestions Moving Forward

In order to help create intentional opportunities for students to use target words, one suggestion I had is for teachers to include sentence frames for the students who are at levels 1-3 English proficiency. As observed in these data, Annie, the level four student, was able to use the target words while playing, while Britney, the level one student, needed prompting from the teacher in order to produce the language. According to the WIDA Can-Do Descriptors, a lower proficiency student needs more supports (graphic, sensory, interactive) than a higher proficiency student. If Britney was given a sentence

frame to use (such as ___ plus ___ equals ___) including a visual support, she might have produced more oral language while working.

Another suggestion I had for teachers moving forward is to intentionally plan opportunities for students to have academic conversations. This might help students build off each other's ideas and use the target language. After completing this study, moving forward, I intend to be more of an advocate for the language development of my ELs by helping my team of teachers to create sentence frames for the lower proficiency students within their center activities, as well as incorporate planned opportunities to use target language through (teacher-directed) facilitated academic conversations. We need to always be thinking about what language we want to hear students produce and give them plenty of opportunities to do so.

If my team were to teach this same unit again, I don't think that I would advocate for the same target vocabulary as in week two of data collection (addition strategies). I observed students recognizing the word and the different strategies introduced, but did not observe students using the language "addition strategies." Maybe students didn't see the need to use the target vocabulary. Maybe there was no planned opportunity for students to use the target word. Next time we teach this unit I might advocate for students to use a different strategy in their math centers each day, followed by a discussion at the end of the week about which strategy was their favorite and why.

Limitations of the Study

Several limitations to this study make it difficult to generalize the findings beyond this particular case. First, not every student was there every day and the number of data points was limited. Second, although both student participants were female, they had

different home languages and different proficiency levels. The results of this study may have varied had there been more student participants at varying levels of proficiency. Third these data are a snapshot of one point in time in one particular classroom, and there might be different findings in other classrooms. Fourth, this study took place in a school only in its second year of ABP implementation and the findings may have been different had this study took place in a more veteran school. Fifth, this study might have had different findings had it taken place during a different point in the school year. Last, I as the researcher impacted the data collection because although I stepped out of my typical role, I was still a familiar face within the classroom and students were comfortable with me being there.

Suggestions for Future Research

Considering the major findings of this study, I would recommend continued research exploring how play is infused into lessons as well as how kindergarten ELs are interacting with target math vocabulary within play-infused classrooms. It is important that there continues to be further research about how EL are acquiring vocabulary within play-infused classrooms to ensure that language and literacy needs of all students are being met. Further research about how target vocabulary is selected is also needed because teachers should move students from word recognition to oral production. ELs tend to produce more language when teachers plan intentional opportunities to interact with target vocabulary so intentional choosing of the words is necessary to ensure optimal oral production. Also, this study was limited in that it only included two students. Future research is suggested to look at multiple students at varying levels of proficiency.

Conclusion

This study attempted to answer the following questions: How is play infused in the lesson and activities in kindergarten? How do ELs orally produce target math vocabulary within a play-infused kindergarten classroom? As shown throughout these data, students only used target vocabulary when prompted by the teacher or when provided a sentence frame to play a game. I think that sentence frames to use target math vocabulary are a good start moving forward, but ultimately my team would like students to support each other in peer interactions. My team and I need to work together to figure out how to do this. My thought is that by teaching students how to have academic conversations, giving them the space to use academic language, and creating the routines to do so, the native speakers and the higher proficiency students will begin to take the lead and model for the lower proficiency students.

Direct instruction of vocabulary is an important part of language development and there needs to be many opportunities built into the lessons for students to interact with and use target words. Through planned play opportunities, students are given the space and time to explore and use the language. Teachers should plan for purposeful interaction with target words and themes in order to optimize student learning.

This capstone process has been a more enlightening experience than I ever could have imagined. This study helped me to enlighten my teaching philosophies. My research went deep into several different directions, from play, to Finnish education, to second language acquisition, to vocabulary instruction, to early-years education. All of these topics helping me understand my context even more. Focusing on a small case encouraged me to see in detail what each student was experiencing in the classroom. This

research gave me the chance to step outside of my traditional role as the EL teacher and observe student language from a different perspective.

The results of my findings have led me to begin prioritizing the way I teach vocabulary and focus more on furthering the language development of my students. I believe this research has made me a significantly better educator, and increasingly prepared to meet my students where they are both academically and socially. Mrs. Honey and I decided that for the remainder of this school year, I (as the EL teacher) would plan a center activity that has a language focus. This way we will have an extended time to fit the vocabulary and language instruction within the short math block and help address the barrier of time, lack of input and lack of processing time. Within my new vocabulary centers I will be very intentional about planning for ways for students to use and practice target math words. This study has allowed me to see the need for students to be speaking and using target vocabulary. To start I plan to provide sentence frames, modeling, and time to practice using the language, but my ultimate goal is for students to scaffold for each other in peer interactions.

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APPENDICIES

Appendix A- Administration Approval Letter

October 1, 2017

To Whom It May Concern,

I am aware that Meagan Reissy, an ESL teacher at XXXXX School, is a student working on an MA in ESL at Hamline University, in St. Paul, Minnesota. She has informed me about her plans to do research in Mrs. Smith's kindergarten classroom this winter, ideally in January. This letter is to make known that I am aware of Meagan's research and am in support of her completing her study XXXXX School.

Meagan's research will be to observe two English learner students for approximately three weeks during math instruction to see how they use math vocabulary. She will take notes during her observations and record classroom interactions both with an audio recorder and a video tape. She will also do some quick oral assessments of the two students' vocabulary comprehension. She may take photographs of relevant writing or drawings the selected students create. Meagan will get written parent permission for these two students to participate in her study. The forms parents sign will be translated into the languages parents speak. All of the students' parents, including those who will be in the classroom but are not the focus of the study, have signed forms allowing school staff to take photographs and make video and audio recordings in classroom. These permission forms are on file in the school office.

In addition to observing students, I am aware that Meagan will also make digital recordings of weekly co-planning sessions with the kindergarten teacher to better understand the teacher's instructional goals and planned instructional activities. The teacher will give written permission to participate in the research.

Meagan's research findings will be helpful to our school staff and may support our educators in improving their use of the Angry Birds play-based curriculum that was adopted in kindergarten classrooms last year. We have many English learners in our classrooms and we value her insight about ways to increase their math learning. We look forward to having her share her study with us.

If you have questions, please email or call me at school.

Sincerely,

date

Appendix B- Whole Class Notice of Research Letter

December 1, 2017

Dear Parent,

I am an English as a Second language teacher at XXXXX School. I am studying at Hamline University in St. Paul, Minnesota. To get my Master's Degree I will do research in Mrs. XXXXX kindergarten classroom for two weeks this winter. Hamline University & XXXXX School both gave me permission to do this research.

For about three weeks this winter I will watch two students while they are working independently in math class. I want to see how they use math vocabulary. I will make videotapes and digital recordings of classroom instruction. I want to listen to the words these two students use to talk about math. Your child is not the focus of my study. I am not collecting any information about your child, but they will be in the classroom. Your child may appear on the videotapes and digital recordings. If you do not want your child to be on the recordings, that is ok. You just need to tell me. I will work with Mrs. XXXXX to make sure your child sits away from the digital recorder and the video camera.

All information I collect will be private. I will keep the videotapes and recordings in a safe place at my home. I will not share them. When I write or talk about my research I will not give your child's name or any information that will identify the teacher and the school. I will erase the videotapes and recordings after I write my final paper.

If you have questions, please email or call me at school.

Sincerely,
 Meagan Reissy
 XXXXX
 XXXXX
 mreissy@ XXXXX.org

If you would like this message interpreted, please call for Hmong at XXXXX or for Spanish at XXXXX

Yog koj tsis totaub daim ntawv no, thov hu rau Ntxawm ntawm XXXXX.

Si usted necesita asistencia para este mensaje, llame a al XXXXX.

Appendix C- Parent and Focal Student Consent Form (English)

December 1, 2017

Dear Parent,

I am your child's English as a Second language teacher at XXXXX School. I am studying at Hamline University in St. Paul, Minnesota. To get my Master's Degree I will do research in Mrs. XXXXX kindergarten classroom for two weeks this winter. Hamline University gave permission for this research. XXXXX School gave permission for the research. I also need your permission.

I will watch students while they are working independently in math class. I want to see how they use math vocabulary. I will take notes when I am watching students. I will also make videotapes and digital recordings of classroom instruction so I can listen to the words students use to talk about math. I will make a copy of your student's work in math class. I will also ask your student a very short (5 minute) question about the math vocabulary. When I am finished, I will write a paper about my research. People can look online to see the paper at Bush Library Digital Commons. I might also talk to other teachers about my research.

There is no risk for your child to be part of this research. Your child will not miss any classroom instruction. No one will know your child participated in my research. I will not use your child's real name in anything I write or when I talk to other teachers. I will keep information about the study in a safe place at my house. I will not share the videotapes and digital recordings. I will destroy the videotapes and the digital recordings when my paper is finished.

You decide if your child will participate in the research. If you do not want your child to be in the research, that is ok. If you want your child to leave the research later, that is ok. You just need to tell me.

If you agree that your child may be a part of my research, please talk with your child about participating. I need your child to agree to be a part of my research in addition to you. If you both agree, please sign page two. Give the signed page to me or Mrs. XXXXX no later than December 1, 2016.

If you have questions, please email or call me at school.

Sincerely,

Meagan Reissy

XXXXX

XXXXX

mreissy@XXXXX.org

Informed Consent to Participate in Classroom Observation
Sign this page. Give it to Mrs. Reissy or Mrs. XXXXX by December 1.

Mrs. Reissy,

I understand you will do some research about vocabulary learning in my child's math classroom. I give permission for my child to be in the research. I understand you will not use my child's name when you write and talk about the research. I know that I can remove my child from the project at any time. I have also spoken with my child and he/she agrees to be a part of the research

Parent Signature

Date

Student Signature

Researcher Copy
I will give you a photocopy of this page.

Appendix D- Parent and Focal Student Consent Form (Spanish)

Estimados Padres:

Yo soy la maestra de su niño de las clases de Inglés segunda lengua de XXXXX School. Yo estoy estudiando en la Universidad de Hamline en St Paul, Minnesota. Para obtener mi maestría yo estaré haciendo investigación dentro del salón de la Sra. XXXXX en la clase de Kindergarten por dos semanas en el invierno. La Universidad de Hamline me dio permiso para esta investigación. XXXXX School dio permiso para esta investigación y además yo necesito su permiso.

Yo estaré observando a los estudiantes cuando ellos estén trabajando independientemente en clases de matemáticas, yo quiero observar como ellos usan el vocabulario en las matemáticas. Yo estaré tomando notas cuando observe a los estudiantes. Además yo estaré filmando y grabando dentro de las instrucciones de la clase así yo estaré escuchando cuando los estudiantes usen palabras acerca de las matemáticas. Yo estaré haciendo una copia de sus estudiantes cuando estén trabajando en matemáticas en clase. Yo también le estaré preguntando a su estudiante por lo menos cinco minutos para hacerle una pregunta corta con el vocabulario de matemáticas. Cuando yo termine, yo estaré escribiendo mi reporte acerca de mi investigación. Personas pueden ver en línea los papeles de la Librería Bush commons. Además yo también estaré hablando con los otros maestros acerca de mi investigación.

Quiero informarles que esto no es un riesgo para sus niños que sean parte de esta investigación. Su niño no estará perdiendo ninguna clase de instrucción, ninguno sabrá que su hijo participo en mi investigación yo no estaré usando su nombre real del niño nada que lo comprometa lo que yo escribo o cuando hablo con otros maestros. Yo mantendré la información de estudio en un lugar seguro en mi casa. Yo no estaré mostrando nada de filmación y grabación. Yo estaré destruyendo toda la información después que termine de hacer mis trabajos.

Usted decide si su niño estará participando dentro de la investigación. Si usted no quiere que él participe dentro de la investigación, está bien. Si usted quiere que su niño participe en el futuro está bien, solo necesita informarme.

Si usted está de acuerdo que su niño participe, por favor firme la hoja y mande la hoja de regreso firmada con su estudiante para que me la de o se la puede dar a la maestra Mrs. XXXXX al más tardar el 1ro. De Diciembre del 2016.

Si tiene preguntas al respecto, por favor envíe un correo electrónico o llame a la escuela

Sinceramente,

Meagan Reissy

XXXXX

XXXXX

XXXXX

Esta hoja , por favor entreganla con la Sra. Reissy o con la Sra. XXXXX el 1ro. De
Diciembre

Mrs. Reissy,

Yo entiendo que usted estara haciendo una investigaciòn acerca del aprendizaje de
vocabulario de mi niño en la clase de matemáticas. Yo doy permiso para que mi niño
este dentro de la investigaciòn. Yo entiendo que usted no estara usando el nombre de
mi niño/a cuando usted esta escribiendo o hablando acerca de la investigaciòn. Yo
entiendo que puedo mover a mi niño del Proyecto en cualquier momento.

Firma de los
padres

Fecha

Appendix E- Parent and Focal Student Consent Form (Hmong)

Lub Kaum Hlis tim 1, 2016

Nyob zoo niam txiv/tus saib xyuas,

Kuv yog koj tus me nyuam tus xib fwb qhia lus Aaskiv. Tam sim no kuv tseem kawm ntawv tim Hamline University nyob rau hauv St. Paul, Minnesota. Kuv tseem tab tom mus kawm ntawv qib siab kom tau kuv daim Master's Degree, ib nqe kuv yuav tau ua kom kawm tiav yog los kawm tshawb fawb rau ib hoob kawm. Li ntawd kuv yuav los tshawb fawb rau Xib Fwb Mrs. XXXXX qib Kindergarten hoob rau kuv txoj kev kawm mus li ob lub asthiv rau thaum lub caij ntuj no. Lub tsev kawm ntawv Hamline University thiab XXXXX twb tso cai tiamsis koj yuav tsum tso cai thiab. Kuv yuav saib cov me nyuam thaum lawv saib ntawv laij lej. Kuv xav saib lawv yuav siv cov lus laij lej li cas. Kuv yuav sau ntawv pab kom kuv nco nstooov lawv ua dab tsi thaum kuv saib lawv. Ntxuas ntxiv, kuv yuav kaw yeej yab kiab thiab kaw cov tub kawm tej lus hauv hoob kom kuv tau mloog saib lawv siv cov lus dab tsi los tham txog kev kawm lej. Kuv yuav muab koj tus me nyuam cov ntawv saib laij lej luam. Kuv yuav muaj ib cov lus nug tsis ntev li 5 na this, txog cov lus laij lej.

Thaum kuv tiav lawm, ces kuv yuav sau ib tsab ntawv qhia txog tej yam uas kuv kawm tau txog me nyuam thiab cov lus laij lej. Yog koj xav nyeem tsab ntawv no koj mus nrhiav tau rau qhov website Bush Library Digital Commons. Ntxiv mus, tej zaum kuv yuav tham nrog lawm tus xib fwb txog kuv tsab ntawv.

Nej tus me nyuam txoj kev koom rau qhov kev kawm tshawb fawb no yuav tsis muaj kev txhawj xeeb dab tsi rau lawv. Koj tus me nyuam yuav tsis tas tawm lawv lub hoob kawm. Yuav tsis muaj leej twg paub tias koj tus me nyuam koom ua rau kuv tsab ntawv. Kuv yuav tsis siv koj tus me nyuam lub npe thaum kuv sau dab tsi los tham nrog lwm tus xib fwb. Kuv yuav khaws cov ntaub ntawv ruaj ntseg nyob rau huav kuv lub tsev. Kuv yuav tsis pub lwm tug siab cov video tapes. Thaum kuv sau kuv tsab ntawv tag lawm ces kuv yuav muab cov videos rhuav thiab pov tseg. Koj yuav tsum txiav txim siab seb koj tus me nyuam puas yuav koom this research. Yog koj tsis xav kom koj tus me nyuam koom the research, ces tsis ua li cas. Yog koj xav kom koj tus me nyuam koom the research tom qab ces, ua tau li ntawm thiab. Thov kom koj qhia kuv koj xav li cas xwb.

Yog koj xav kom koj tus me nyuam koom the research, ces thov kom koj kos npe rau daim ntawv tom qab. Muab daim ntawv rau kuv los Mrs XXXXX tsis pub dhau lub Kaum Ob Hlis tim 1, 2016.

Yog koj muaj lus nug, thov hu rau kuv los xav ib daim email.

Sincerely,
 Meagan Reissy
 XXXXX
 XXXXX
[mreissy@XXXXX .org](mailto:mreissy@XXXXX.org)

Daim Ntawv Tso Cai Rau Me Nyuam Koom Qhov Kev Kawm Saib Xyuas Lawv Rau
HauvHoob Kawm

Kos npe. Xa rov tuaj rau Mrs. Reissy los Mrs. XXXXX kom tsis pub dhau lub 12 Hlis
tim 1, 2016.

Sign this page. Give it to Mrs. Reissy or Mrs. XXXXX by December 1.

Mrs. Reissy,

Kuv to taub tias koj yuav muaj kev tshawb fawb txog cov lug laij lej hauv kuv tus me
nyuam lub hoob kawm ntawv. Kuv tso cai rau kuv tus me nyuam koom koj txoj kev
tshawb fawb. Kuv to taub tias koj yuav tsis siv kuv tus me nyuam lub npe thaum koj
sau los sib tham txog koj txoj kev tshawb fawb. Kuv to tau tias kuv tshem tawm tau
kuv tus me nyuam thaum twg kuv xav.

Mrs. Reissy,

I understand you will do some research about vocabulary learning in my child's math
classroom. I give permission for my child to be in the research. I understand you will
not use my child's name when you write and talk about the research. I know that I
can remove my child from the project at any time.

Kos Npe

Hnub Tim

Researcher Copy

I will give you a photocopy of this page.

Kuv yuav muaj daim ntawv no luam thiab muaj ib daim rau koj.

Appendix F- Teacher Consent Form

December 1, 2017

Dear Teacher,

To get my Master's Degree from Hamline University I would like to do research in your kindergarten classroom during math instruction for about three weeks this winter (probably in January). Both Hamline University and XXXXX School gave permission for this research. I will get permission from the parents of students I want to study. I also need your permission.

My research has two parts. First, I will audio record our weekly co-planning times when we are talking about math lessons. Later, I will listen to the recordings to review your thoughts about lesson goals, important math vocabulary to teach, play activities that you will use during math time, etc. Second, I will observe two students every day in math class for approximately three weeks. I will take field notes, make audio and video recordings of instructional activities, and talk with students briefly to see how well they understand the targeted vocabulary words. I will also take photographs of any writing or drawings these students create that are related to math vocabulary. You will be on the video and audio recordings, and may be included in my field notes, because you will be in the classroom talking with students while I am observing.

When I am finished collecting information, I will write a paper about my research. The paper will be available online through Hamline University's Bush Library Digital Commons. I may also talk with other educators, especially at our school, about what I have learned from doing the research.

There is no risk for you to be part of this research. We will hold our co-planning meetings in a private room. You will control the digital recorder and you can turn it off if you want to speak about something that is not part of my research study. No one will know you participated in my research. I will not use your real name in anything I write. I will keep the information I collect, including the audio and video recordings, in a safe place at my house. I will not share the recordings and I will destroy them when my paper is finished.

You decide if you want participate in the research. If you do not want to be in the study, that is ok. If you want to leave the research later, that is ok. You just need to tell me. If you agree to be a part of my research, please sign page two. Give the signed page to me no later than December 1, 2016. I will give you a copy of the signed form for your records.

If you have questions, please email or call me at school.

Sincerely,
Meagan Reissy
XXXXX
XXXXX

Informed Consent to Participate in Classroom Research

Sign this page. Give it to Mrs. Reissy by December 1.

Mrs. Reissy,

I understand you will do some research about vocabulary learning in my math classroom.

I give permission to be in the research. I understand you will not use my name when you write and talk about the research. I know that I can remove myself from the project at any time.

Teacher/Participant Signature

Date

Researcher Copy

I will give you a photocopy of this page.

Appendix G- Hamline University Institutional Review Board Approval

TO: MEAGAN C. REISSY

FROM: Hamline University Institutional Review Board (IRB)

Re: Review and Approval

The IRB reviewed and approved your proposal. No further modifications or reviews are necessary. Good Luck with your project.

Appendix H- Sample Transcription

Day 7

Teacher: Is it on? Okay, don't touch it, alright? Can you tell me your name?

XXXXX: XXXXX.

Teacher: Perfect.

Teacher: Can you wait or is it an emergency?

tudent: Wait.

Teacher: Emergency? Why don't you go to pre-k. Go in Ms. XXXXX door. You're wiggling a lot. Alright friends - who remembers what is this (inaudible).

Unknown student: Adding.

Unknown student: Adding number.

Teacher: Addition strategies. What is it?

Everyone (including XXXXX): Addition strategies.

Teacher: Or ways to help us add. So let's think of another way to help us add. We talked yesterday about how our...

Everyone (including XXXXX): Fingers.

Teacher: Help us add. What do our fingers do?

Everyone (inaudible)

Teacher: Help us add and we talked about how a...

Everyone (including XXXXX): Number line.

Teacher: Can help us...

Everyone: Add.

Teacher: And today we're going to talk about how a...

(multiple inaudible comments)

Teacher: Ten-frame can help us add. So what if I had this problem? Seven plus two equals...

Student: What?

Teacher: How can I use a ten-frame to help me figure out what seven plus two would equal? What could I do? XXXXX?

XXXXX: Use counters.

Teacher: I could use counters to count them.

XXXXX (whispering): One, two, three, four, five, six, seven.

Teacher: Sure.

Student: One, two, three, four, five, six...

Teacher: So let's do our first number. What is our first number?

Everyone: Seven.

Teacher: And I'll use red counters for seven. Ready?

Everyone (including XXXXX): One, two, three, four, five, six, seven.

Teacher: Seven. Plus how many more?

Everyone (including XXXXX): Two.

Teacher: Two. Should I use the same color for the next number?

Everyone (including XXXXX): No.

Teacher: Or different color?

Everyone (including XXXXX): Different.

Teacher: Different color. It helps us see the two numbers. Seven plus how many more do I need to color?

Everyone (including XXXXX): Two.

Teacher: Let's color in two more.

Everyone: One, two.

Teacher: How many is that all together?

Student: Nine.

Student: Six.

Student: Eight.

Student: Seven, seven.

Teacher: XXXXX is raising his hand. Thanks XXXXX.

Student: Nine.

Teacher: XXXXX, how many?

XXXXX: Nine.

Teacher: Nine. Let's double check to see if he's right. Count them all.

Everyone (including XXXXX): One, two, three, four, five, six, seven, eight, nine.

Teacher: So we need to go seven plus two equals?

Everyone: Nine.

Student: Ten.

Everyone: Nine.

Teacher: Nine, um-hum. Let's try that on the number line and see if we would get the same answer. Are you ready? What's our first number?

Everyone (including XXXXX): Seven.

Teacher: Seven. So let's start on seven.

Everyone (including XXXXX): One, two, three, four, five, six, seven.

Teacher: How many more jumps do I have to do?

Student: Three.

Everyone: Two.

Teacher: Seven plus?

Student: Eight, nine.

XXXXX: Two.

Teacher: So let's do two jumps.

Everyone (including XXXXX): One, two.

Teacher: Did I still get nine?

Everyone: Yeah.

Teacher: Yeah, so see, it gets you the same answer. Let's try seven plus two on our fingers. What's our first number?

Student: Seven.

Teacher: Seven. Put seven on your fingers.

Everyone (including XXXXX): One, two, three, four, five, six, seven.

Teacher: Now do two more.

Everyone (including XXXXX): One, two.

Teacher: How many fingers are up?

Unknown Student: Nine.

Everyone (including XXXXX): One, two, three, four, five, six, seven...

XXXXX: Eight.

Everyone: Eight, nine.

Teacher: Nine. Seven plus two still equals?

Everyone: Nine.

XXXXX (whispering): One, two, three, four, five, six...

Teacher: Nine. Does it matter what strategy we use?

Multiple students: No.

Teacher: No, we're always going to get the same answer okay?

XXXXX (whispering): One, two, three, four, five, six, seven, eight, nine.

Teacher: So these are just different ways to help you add. Can you do any of these ways?

Multiple students: Yeah!

Teacher: Yeah, you can do any ways that you want.

XXXXX (whispering) Uno, dos, tres, cuatro, cinco, seis, siete, ocho, nueve.

Teacher: I have number lines if you want to use them and there's the ten-frames and
counters under here.

XXXXX (whispering): One, two, three, four, five, six, seven, eight.

Teacher: Alright, are you ready for math?

Everyone (including XXXXX): Yeah.

Teacher: Yellow group - you're playing roll and record two. How many dice do you
need?

XXXXX: Two.

Teacher: Two dice.

XXXXX: (coughing)

Teacher: Red group - you're playing more or less (inaudible) with a partner.

Student: Partner.

Teacher: And green group you are playing the valentine's addition game - five in a row with a partner. XXXXX was carrying it. Why would you take it away from her?

She's very capable of doing it. You friends get to play fishing addition.

Multiple students: Yay!

Teacher: So get out of the lake.

(multiple inaudible conversations)

Teacher: Ms. XXXXX, can you untangle these while I put the fish out? Okay, you need a clipboard and pencil.

Appendix I- Reflective Interview Questions (Teacher)

1. How do you feel about the week's instruction?
2. What was the goal this week? Was the goal accomplished?
3. How did you notice students interacting with the target vocabulary?
4. How was play and fun learning infused in the lesson and activities?
5. How did we differentiate for ELs?

Appendix J- Reflective Interview Questions (Student)

WORD	I know it!	I don't know it!
<p>Week One: Equals</p> <p>Week Two: Addition Strategies</p>		

Week One:

Tell me what you think “equals” means.

What is another word for “equals”?

Week Two:

Tell me what “addition strategies” are.

What are some addition strategies?

Why do we use them?

Appendix K- Guiding Questions for Field Notes

1. Who is in the group? How many students? Who is there/not there?
2. What is happening? What are they doing? Saying? Using the target vocabulary?
3. What is the setting? Describe the physical environment.
4. What did the teacher/EL co-planning time look like? How was the vocabulary intentionally taught? How was play infused into the lesson