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The Effect of Technology on Student Achievement with English Language Learners in an Early  
Childhood Classroom Setting

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### **Abstract**

The purpose of this action research project was to determine if there was a correlation between the use of iPads to improve student achievement and traditional methods of teaching with four and five-year-old English language learners (ELLs). Two control groups of four ELLs were taught in math three times a week. Control group A was taught using iPad applications to support math teaching in alongside traditional teachings in math. Control group B were taught with age appropriate early childhood materials such as counting cards and manipulatives to support the traditional teachings in math. Data was collected at the end of the project through quantitative testing. Analysis of the data showed that ELLs did make improvements and welcomed the learning tools integrated with traditional teaching methods.

*Keywords:* technology, English Language Learners, student achievement, early childhood

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## Technology Integration and Student Achievement with ELLs

In the last ten to fifteen years, Early Childhood (EC) education has become the growing norm within society and schools. In turn it has catapulted teachers into a new age of experimenting with curriculums, lessons, thinking and teaching. In the early 1990's television was the only technology most homes had, homes now have anywhere from computers to smart televisions, which are quickly becoming the norms in every home. However, within this growing era of technology recommendations, ideas and guidance from the National Association for the Education of Young Children (NAEYC) help support early childhood teachers and their classrooms. NAEYC sole goal is to help aid in the journey of providing in all areas developmentally appropriate education including technology.

NAEYC along with the Fred Rogers Center created a joint position statement, which provides support to classroom teachers when it outlines that technology tools can be effective for dual language learners by providing access to a family's home language and culture while supporting English Language Learners (ELLs). It said that education must realize that digital literacy is essential to guiding early childhood educators and parents in the selection, use, integration, and evaluation of technology and interactive media. It is with these ideals in mind that teacher guides lessons and student learning with the integration and use of technology tools within my classroom among all students.

In the past five years within Urbandale Community School District and Adventuretime Preschool the staff has seen growth in the number of ELLs. In the current classroom of four and five-year-old students 18 students, 7 of whom are ELLs are currently served. Currently, the classroom has two iPads, an Elmo and a projector. In past and current lessons, the use of an iPad to enhance student learning was used. Currently, in preschool, students experience no iPad time

only computer time during learning centers at 30 minute increments on a sign-up basis. Students experience all teaching through hands-on, developmentally appropriate materials. However, curiosity about the progress students who were ELLs would make if taught by iPads in a small setting based on their educational needs. It is with that in mind, the focus on this research is to determine, what effects does technology have on student achievement among ELLs in a preschool setting when taught in small group?

### **Literature Review**

Educators are always observing, inquiring, and building relationships to gather insights about how our students learn best. Teachers never know what backgrounds their students come from or their linguistic abilities. Many times teachers have multiple languages spoken in their classrooms by their students. More often than not we ask ourselves, how can I help this student? The one thing we know for sure is that technology is not going anywhere; rather it is here to stay. Educators need to be aware, especially in a preschool setting that their teaching tools, especially technology are developmentally appropriate, in addition, to helping across different educational and linguistic abilities. McManis & Gunnewig (2012), shared that “technology needs to first be developmentally appropriate for children, second include tools to help teachers implement the technology successfully and third be integrated into the classroom and curriculum” (p.14). Teachers at times may struggle to understand their students; however, having the ability to pull up a picture, to type a sentence in google translate on an iPad to simply allow a child to answer a question or to be exposed to the question in their home language instantly opens up the communication gap for teacher and student. It allows the teacher to use the tools set before them to reach a student or many students and bridges the gap.

NAEYC and the Fred Rogers Center (2012) state that interactive media refers to digital

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and analog materials, including software programs, applications, broadcast and streaming media, some children's television programming, e-books, the internet and other forms of content designed to facilitate active and creative use by young children. Integrating technology within an early childhood classroom is not about randomly picking an application out of the iTunes store and saying it is acceptable. It is about dissecting the source and asking yourself the following key steps to evaluating educational technology according to McManis & Gunnewig (2012) shared the following information in successfully evaluating educational technology by "first establish learning goals for the children, second identify the hardware or devices you have or would like to have, third analyze features and content of the software program in meeting learning goals and finally, plan how the educational technology will be integrated into the curriculum" (p.17).

Pierce (2016) addressed three ways that technology helps support ELLs in instruction scaffolding instruction, personalizes learning and bridges communication barriers. However, when looking at digital media and tools we must remember that not all software, applications and tools may be appropriate. As educators, teachers need to remember to look at the purpose behind why we are teaching specific skills and this diligence also applies to technology. What is the purpose of the technology we are using and how does it help or improve student learning and skills? Nemeth and Simon (2013) state that technology tools allow teachers to find multilingual resources and create activities and materials that can be adapted quickly and inexpensively to meet changing language needs. It is with these recommendations in mind that we need to work to ensure that technology is supporting our students and ELLs within the classroom.

According to Neumann and Neumann (2013) over a third of children have used touch screen devices for zero to one year olds, 39% of two to four year olds and 52% of five to eight

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year olds. Touch screen devices such as tablets may play an important role in the cognitive development of children today and in the future. Tablets such as iPads and other small handheld devices have become the norm due to the small-in-size features, accessibility and easy usage among small children. Their capabilities are endless and can be used by one child or a small group of children working together on a common task. English language learners we know learn best when their learning is reinforced through a variety of visuals, graphics, repetition, consistency and even video. Technology allows for all these learning tools to be utilized in teaching. As shared by Brozek and Duckworth (2011) research shows that it can take more than five years for the average child learning a new language to acquire the academic language necessary to succeed in school. Successful acquisition requires two types of skills: Basic Interpersonal Communication Skills (BICS) and Cognitive Academic Language Proficiency (CALP). BICS refers to the social and conversational language and CALP targets more of the language needed to comprehend and analyze books and presentations. In order to allow for success in these areas when using iPads to support ELLs in the area of literacy Neumann and Neumann (2013) recommended that applications be age appropriate and linked to literacy curriculum, have a high level of interactivity that stimulates all the senses, build on previous knowledge, encourage child creativity, problem solving and critical thinking, connect children with printed screen symbols so that meaning is constructed, provide a clear understanding of tasks, provide opportunities for peer collaboration, provide regular feedback and guide the child's performance rather than concluding with a success or failure outcome. In addition, if we look at what the overall research tells us in regard to technology, it says that drill and practice along with tutorials increase students' mathematical achievement by developing their understanding of concepts, applications and problem solving skills (Valle, Waxman, Diaz, &

Padron 2013). However, with every helpful tool there are also pitfalls as to what is considered appropriate, useful and supportive of ELLs. NAEYC along with the Fred Rogers Center have stated that technology can lead to inappropriate uses in an early childhood setting. Often teachers see technology as just what it is -- technology. Some teachers do not have the background knowledge on how to appropriately integrate technology in their classrooms and they see it as just a toy rather than a tool. Technology becomes part of children's routine. All students thrive on consistency and structure in a classroom setting; and it is within that environment that ELLs also learn. Using technology within a classroom to help support routines, learning and a student's home language can be a powerful tool; but teachers have to be properly educated about how to implement technology appropriately. Nikolopoulou and Gialamas (2013) shared four barriers that teachers found in integrating technology into the classroom first lack of support, second lack of confidence, third lack of equipment and lastly class conditions. These factors are not surprising being an educator myself because many times educators are given the tools but look at the bigger picture of just one more thing to use. Research has shown that teachers struggle with finding the time and motivation to use technology with their students. Many times districts try to support the new era of technology without thinking about the bigger picture of, whether teachers can successfully implement, integrate and support student learning with technology. When school districts realize the benefits for increased student achievement through careful adoption of technology tools embedded in appropriate skills teaching we will be able to decrease the gap for our ELLs.

### **Methods**

#### **Data Collection**

This action research project was conducted in a four- year- old inclusive preschool

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program. The class meets Monday through Friday from 9:00 a.m. to 3:30 p.m., serving a maximum of 20 students in each of the two sections of preschool in the building. The classroom currently has 18 students, 16 students are full time and two students are half day, where their day ends at 11:30 a.m. The classroom currently has one student on an academic Individualized Education Plan (IEP) and six students are ELLs whose native language is Spanish. In the program as a whole within the building the preschool teachers have two students on IEP's, and 12 out of 36 students are ELLs, 7 students are half day, 28 are full time.

The focus of this action research project is to determine if technology affects student achievement in the area of Mathematics in an early childhood setting with ELLs. In order to assimilate data a range of quantitative data was collect through formal testing to establish a baseline in the area of number identification and connecting numbers to their quantities. Based on the age and grade level of the students, collecting of quantitative data was the best route to check for understanding and progress with both control groups. The purpose behind using quantitative data was because it offered a concrete collection of data in regards to consistency of answers with four-year-old students. Whereas, questionnaires and/or surveys would not allow for observation to be left up to perception of what was being observed between teacher and associates in the classroom. In addition, due to the age and language of the students' other forms gather data with integrity in a way that was consistent in what they were learning.

The entire data collection process took place for about a month from February to mid-March 2017. Throughout the year visuals have been an essential component in the classroom to support all students off ELLs in the form of visual schedules, learning center labels, independent work areas and learning maps. The teacher also modeled work and provided instructions in both in English and Spanish for students in regards to control group A. It was evident from the

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beginning of the year that with the number of ELLs that were in the classroom supports were going to be a necessity in regards to the backgrounds and linguistic abilities of the students in the English language. In regards to control group B, all teaching within the classroom was done in English by their teacher. All materials used in everyday teaching are age and developmentally appropriate for students in both classrooms. Lessons in the classroom are taught in both large, small and individual settings between the classroom teacher and associates.

The the data collection began by collecting a baseline for each of the eight students through individualized formalized testing on both number identification and counting sets. Once data was collected it was analyzed to determine the needs of each students and where to target mathematical instruction. Students were pulled three times a week for ten minutes each and in whole group teachings.

Control Group A was taught using both traditional and technology integrated teachings. Teacher and student would do traditional teaching with number mats and small counting manipulatives. Students were asked the number on the mat and had to count out the number of appropriate manipulatives on the mat. Teacher would then play number memory with numbers on a mini iPad. Students would have to turn over cards one at a time and name the number, if they did not match it would be turned back over. Students had to name the number once it was turned over by the application.

Control group B was taught using traditional teachings just as in Control Group A. Students were also given a mat with numbers according to their learning goals. Students also had to name the number on the mat and then count the number of manipulatives to the mat. Students also had pipe cleaners with numbers attached to them and had to link the correct number of beads onto the pipe cleaners. As a group we also played number memory with numerical cards.

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When students flipped a card they would have to name the number for each card turned over. If the students found a pair of numbers they would have to name, the number they flipped to keep the set. Students were taught with these methods for a little over a month and then were tested with the same formalized testing to collect data if the teachings were beneficial to all students; and ultimately to determine if technology helped with student achievement of ELLs.

### Findings

The researcher found it difficult in the beginning stages of the project due to the limited amount of research available that pertained to technology support for the curriculum and learning in the Early Childhood classroom. There was a significant amount of research based on older students learning or that which spoke to the bias involved with integrating technology appropriately into the Early Childhood setting, but very little that spoke to improving student understanding of academic concepts. Both the district and building promote the use of technology within the classroom to support student learning and is highly encouraged. In addition, the researcher has worked with technology integration before in an early childhood setting and has seen first-hand the level of enhanced education, skills and support it offers all students. It is with this support that the researcher believes that technology integration in teaching of ELLs can affect student achievement.

**Table 1: Baseline Date- Number Identification (I.D)**

<b>Control Group A</b> (Technology Teachings)	<b># I.D.</b>
Student A	12
Student B	6
Student C	1
Student D	11
<b>Group Average</b>	<b>7.5</b>

<b>Control Group B</b> (Traditional Teachings)	<b># I.D.</b>
Student A	6
Student B	7
Student C	10
Student D	6
<b>Group Average</b>	<b>7.25</b>

**Quantitative data analysis.** Due to the age and population being evaluated, quantitative data was collected through the form of individualized formalized testing to collect baseline and final data. Then researcher collect a baseline on number identification and counting sets to twenty.

The baseline for number identification data and counting sets showed the following:

**Table 2: Baseline Data- Counting Sets**

<b>Control Group A ( Technology Integrated)</b>	<b>Baseline- Counting Sets</b>	<b>Control Group B ( Traditional Teachings)</b>	<b>Baseline- Counting Sets</b>
Student A	12	Student A	10
Student B	10	Student B	10
Student C	10	Student C	10
Student D	13	Student D	11
<b>Group Average</b>	<b>11.25</b>	<b>Group Average</b>	<b>10.25</b>

In the current preschool setting students are expected to identify numbers up to twenty in random order. Indicators from the baseline data indicated that the majority of students in both control groups are having difficulty identifying numbers greater than six through twenty with one student having difficulty with zero to five. Each students learning target was differentiated by learning need; however, they were close in group average in the final summation.

When analyzing the control groups baseline for counting sets the biggest surprise for the researcher was how well students could make sets for numbers one through ten while making sets for eleven through twenty was the major weak point for all students. A second interesting point was how the students could identify the number to create the set for numbers one through ten; but when identifying numbers at random during testing, students struggled to generalize numbers to another skill set like counting sets. These numbers indicate that the students in both control groups need some support in number identification up to twenty and counting sets from

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ten to twenty. The baseline helped to guide instruction for the researcher when working with the control groups.

During the little over a month of working with the students in a one on one setting the following data was collected:

**Table 3: Final Data Collection**

<b>Control Group A (Technology Integrated)</b>	<b>Final - # ID</b>
Student A	13
Student B	8
Student C	8
Student D	12
<b>Group Average</b>	<b>10.25</b>

  

<b>Control Group B (Traditional Teachings)</b>	<b>Final - # ID</b>
Student A	10
Student B	10
Student C	14
Student D	9
<b>Group Average</b>	<b>10.75</b>

  

<b>Control Group A (Technology Integrated)</b>	<b>Final- counting sets</b>
Student A	13
Student B	12
Student C	8
Student D	14
<b>Group Average</b>	<b>11.75</b>

  

<b>Control Group B (Traditional Teachings)</b>	<b>Final- counting sets</b>
Student A	10

Student B	7
Student C	12
Student D	9
<b>Group Average</b>	<b>9.5</b>

After reviewing the data, the researcher noted that each individual child had made improvements from their baseline data. As a whole, Control Group A improved by a group average of 2.75 numbers and Control Group B improved by 3.5 numbers in being able to identify numbers to twenty. The data for counting sets for Control Group A improved overall by .5 and Control Group B decreased by .5 numbers. The negative side is that Control Group B went down by .75 from their initial baseline in counting sets.

Observing the students while they participated in the lessons the researcher could notice that the students in Control Group A were excited and engaged to use the iPads. They stayed on task well when transitioning from traditional teaching to the iPad. The researcher began to notice students were beginning to generalize their learning to all skill areas being taught. Although, Control Group B made academic gains through the testing period with the traditional teaching methods, the students appeared to be less motivated and were just completing task. Some students began to notice that the methods of teaching were different and questioned when they would be able to use the iPad. While the final data seems to indicate that the average for counting sets has decreased, the actual learning was still increasing because the students continued to make progress from accurately counting sets less than 10 to counting sets greater than 10 with more accuracy. With additional time for the students to practice these skills, the researcher predicts that the average would increase accordingly.

### **Discussion**

### **Challenges to Data**

One of the challenges in this research project was to gather numerical data when working with a four-year-old age group. While quantitative data is easier to chart, qualitative data and observation offers more insightful information about how ELLs learn. Offering a tool that could level the playing field for ELLs presented an exciting option in our classroom and closed the communication gap. Since the students were from two different classrooms another challenge was coordinating the time to conduct the research that didn't conflict with their teacher collaboration time. The small number of students available who are ELL limited the amount of data collected. A larger district with a larger ELL population would allow for more reliable data to be collected.

### **Challenges to Implementation**

Since preschool programs are not mandated by the state that puts budget restraints on areas such as technology. In order to facilitate this project, the researcher provided their own personal iPads for student use. It could be difficult to obtain funding for a project such as this even when learning goals show good improvement. Additional funding would be required for training so teachers and staff to appropriately integrate technology into the preschool setting and to support the changing language needs of our ELLs. Having only one bilingual teacher in Spanish provided challenges when giving instruction and collecting data. In this particular instance, the researcher was bilingual in the Spanish language which facilitated presenting directions and instruction for all students at a comfort level that made learning a positive experience.

### **Conclusion**

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The findings collected from the data suggested that ELLs benefited from the use of integrated technology blended with traditional learning methods. The qualitative data suggests that ELLs had a positive experience with the technology and welcomed the learning. In an effort to increase student achievement in ELLs, technology should be integrated more via small and/or large group, one on one teachings, learning centers and literacy times. Valle, Diaz, Waxman and Padron (2013) shared that “research has demonstrated that technology based drill and practice and tutorials increase students’ mathematics achievement by developing their understanding of concepts, applications and problem solving skills” (p.174). This project clearly helped the researcher understand that technology facilitates improving the achievement gap; all the while, supporting student learning. Technology allows ELLs an outlet for communicating, understanding, and making connections to their learning.

**References**

- Brozek, E., & Duckworth, D. (2017, February). Supporting English language learners through technology. *Educator's Voice*, 4, 10-15.
- McManis, L. D., & Gunnewig, S. B. (2012, May). Finding the education in educational technology with early learners. *Young Children*, 2(3), 14-24.
- Nemeth, K. N., & Simon, F. S. (2013, March). Using technology as a teaching tool for dual language learners in preschool through grade 3. *Young Children*, 2(3), 48-52.
- Neumann, M. M., & Neumann, D. D. (2014). Touch screen tablets and emergent literacy. *Early Childhood Education Journal*, 42, 231-239. Retrieved February, 2017.
- Nikolopoulou, K., & Gialamas, V. (2015). Barriers to the integration of computers in early childhood settings: Teacher's perceptions. *Journal of Information Technology Education*, 20, 285-301.
- Pierce, D. (2016). 3 Ways technology supports ELL instruction. *T H E Journal*, 43(2), 26-31.
- Technology and Interactive Media as Tools in Early Childhood Programs Serving Children from Birth through Age 8. (2012, January). Retrieved February, 2016, from <http://www.naeyc.org/content/technology-and-young-children>
- Valle, M. S., Dias, Z., Waxman, H. C., & Padron, Y. N. (2013). Classroom instruction and the mathematics achievement of non-English learners and English learners. *The Journal of Educational Research*, 106, 173-182.