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Universal Design for Learning: Inclusivity with Technology in Multicultural and Special Education Classrooms

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Universal Design for Learning:

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by

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A culminating thesis submitted to the faculty of Dominican University of California in partial fulfillment of the requirements for the degree of Master of Science in Education

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Abstract

This research explored the impact that technology has on students with special needs, some of whom are English Language Learners (ELL). Previous studies have found that technology brings “inclusion in the classroom helps meet the students' needs and improves academic success” (Lowrey et al., 2017). Literature has also shown the value of including students and ensuring that students understand how they learn best (Brown et al.,1998). This research was conducted at an elementary school in Northern California, and included eight students with special needs, two of whom were English Language Learners. Three district personnel were also interviewed. The students' participation focused on empowering them to co-create lessons amongst themselves and exploring the use of technology to learn and then teach a lesson to the class. The findings from the research showed that technology created a “fun” and inclusive environment that facilitated self-learning. It also brought awareness to the students' knowledge and creativity of submitting assignments, that students could recognize multiple ways for completing work. This research has important implications toward the types of professional development and video tutorials that districts could offer teachers to help them learn new technology programs to support students with learning disabilities and who may be classified as language learners. In addition, the findings provide support to increase funding for technology, including iPads and Apple pencils, to support equity, inclusion, and the realities of learning climates for all students.

Acknowledgments

This project was possible thanks to my significant other and my four furry friends. Esta meta que complete se la dedico a mis padres, Rafael and Cristina Hernandez who have let me chase my dreams and have been supportive since I knew what I wanted to be. Esta tesis es para todos los niños que tienen sueños que son grandes o que son pequeños. Hechele ganas, TODO ES POSIBLE! No se den por vencidos. Si, va a ser difícil, pero al final cuando tengas todo va a ser la mejor parte. “Lo bueno cuesta papá” is something my parents would say, which is stating that good things cost hard work. Which is something they have taught me. To never give up and to always try my best. The reason I have had the opportunities to be where I am is due to my parent’s hard work. To my godparents that I miss greatly, this one's for you, I hope you’re watching me from up above and allowing me to complete all my dreams. I also dedicate this one to all my nephews and nieces because I want them to know anything is possible when you put your mind to it.

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Esta es para todas las personas que pensaron que no iba hacer nada con mi vida, ¡Si, se pudo! Con el apoyo de las personas correctas todo se puede.

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Chapter 1: Introduction

The researcher is a first-generation Latina, who went to a school that was predominantly Caucasian. That made her feel "different," and she didn't understand why she felt left out. She felt "different," and she could not relate to anyone in the class or shared common interests. The researcher remembered not liking school because the teachers were teaching in ways that she did not feel like she understood which made her feel left out of the learning process. She remembered going to school and not being able to express how she learned best. When the class was learning division with pictures it was a hard concept for the researcher to grasp because she had been learning division the "long" way with her older brothers. She knew how she learned best, but the teacher disregarded her work and told her, "we aren't learning that way," which made the researcher want to become a teacher and advocate for students who also learned in different ways. The researcher found that different learning styles can promote inclusivity and equity in the classroom.

Statement of Purpose

Students with disabilities have policies in place to help them have the best education possible because in the past they have been left behind and abused (Adams, 2022). Universal Design Learning is learning with inclusion and for equity (Headrick, 2021). Inclusive learning means having different types of learning styles, which is important to have in the classroom especially if you have students with disabilities. One emergent field of practice for UDL is the application of technology (Frumos 2020). Technology now plays an important role in special education and in general education. Technology brings culturally relevant power and inclusivity to the classroom (Tucker 2022). Instead of being a distraction, it can be a transformative learning

tool for special needs students, English Language Learners, or even general education students (Tucker, 2022).

The purpose of this study was to explore the impact that Universal Design Learning had on students with learning disabilities and English Language Learners, to determine if the engagement of students would increase or if students would participate more in class. A secondary purpose was to identify if students knew how they learned best and made strategies to make shortcuts to be a faster learner.

Overview of the Research Design

This study involved nine students with all different types of learning disabilities and three educational professionals. The researcher used a qualitative approach with a constructivist worldview. The research was focused on these questions:

a. How are students able to understand their own ways to learn best?
b. What strategies or tools do students use, or would they like to use?
c. How do students with disabilities experience their own agency and empowerment with learning and technology?

The data came from observations, pre-survey, discussions, co-creating lessons, and interviews. The interviews were conducted in-person and in the classroom. The purpose of the qualitative approach was to listen to students' perspectives of their own learning. The research site was a public elementary school in Northern California. The researcher acknowledges positional bias, having worked with students for several months preceding the start of research.

Significance of the Study

The findings of this research revealed remarkable engagement and participation through the process of letting the students pick how they wanted to showcase their work. Specifically, the

primary themes included: catching attention instead of daydreaming, pictures beyond words, students already having expertise, and the students have agency in asking for help when working in teams.

Students demonstrated a love for being able to showcase what they can use to improve their own learning which addresses the gap in the literature. The findings also indicate that students find it engaging if there is a role of technology blended with the learning done every day. Through the findings the researcher saw students come out of their hidden shell and showcase all their expertise in both knowledge and presentation.

Research Implications

The findings of this research further support that the flexibility in assignments doesn't just engage students, but it allows students to showcase what they already know in a way that feels comfortable for them. There is an importance between allowing students access to their prior knowledge and not being shy to commit a mistake.

The students also find it more fun when there is “play” in the teaching and want them to continue learning about the matter. For example, some of the kids who had previously had a hard time sharing their learning through writing, were able to present their work in a presentation.

Future educational policies for all students will be beneficial for not just the students but the teachers and for kids that have special needs, and flexibility is one the key UDL design principles. Ultimately, UDL is framed to promote inclusivity and equity in the classroom, and the student participants in this research illuminated diversified and self-identified pathways for their own learning.

Chapter 2: Literature Review

This literature review seeks to explore how technology could increase the student's sense of inclusion in the classroom and make sure that all students feel like they are being listened to. Inclusion in the classroom helps meet students' needs and improves academic success (Lowrey et al., 2017). Inclusivity provides all students with appropriate learning as it recognizes every individual's differences and uniqueness (Headrick, 2021). As such, this literature review will explore inclusive learning, Culturally Relevant Teaching (CRT), and Universal Design for Learning (UDL).

Inclusive Learning

Inclusive learning, "allows students of all backgrounds to learn and grow side by side, to the benefit of all," (UNICEF, 2019). Inclusive learning can be emphasized in many different forms. Examples include: co-teaching, Universal Design for Learning (UDL), differentiated instruction, providing support to all students, and having high expectations for students (The Understood Team, 2019).

Co-teaching is when at least two teachers work together, by planning, organizing, and working with students. When there are two teachers in the classroom, one teacher can focus on the larger group, while the other teacher is able to give a more specialized support to students who may need it. This split dynamic allows time to facilitate small group work, similar to one-on-one teaching. Co-teaching emphasizes collaboration between teachers, while also splitting the work between two people rather than just one. Co-teaching also allows students with special needs to be in a general education setting more often, as opposed to a modified day classroom where they are pulled out of the mainstream classroom. Studies have shown that this setup creates the conditions in which "students with disabilities may feel more connected with their

peer group" (Melissa, 2013 p. 2). Co-teaching provides another way of differentiating instruction.

Differentiating instruction allows "students the opportunity to be taught in an individualized manner" (Melissa, 2013, p. 2). By definition, differentiated instruction is a "teaching approach that tailors instruction to students' different learning needs" (Tucker, 2022, p. 1). Differentiated instruction strategies could look like: having learning stations, think-pair-share, using visuals and manipulatives and encouraging discussion, among other strategies. Differentiated instruction is modified instruction for all students.

Culturally Relevant Teaching

Culturally Relevant Teaching (CRT) is, "a pedagogy that recognizes the importance of including students' cultural references in all aspects of learning" (Kristin, 2020, p. 3). Kristin (2020) notes that there are many benefits of CRT, like strengthening students' sense of identity, promoting equity and inclusivity in the classroom, engaging students in the course material, and supporting critical thinking.

There are many CRT strategies teachers can implement to engage students in their own learning. The five main strategies involved in CRT are activating students' prior knowledge, making learning contextual, encouraging students to leverage their cultural capital, reconsidering classroom setup, and building relationships (Understood Team, 2021, p. 2 - 3). In particular, activating students' prior knowledge, means that teachers are acknowledging that students are always capable of having something to contribute to the classroom discussions. Additionally, it means that students can use the information they have previously heard or seen before and bring it into the classroom, allowing them to make connections between prior information and new information.

Having an inclusive classroom will build relationships with the students, make students feel comfortable in the classroom, and support students in feeling like they can approach the teacher without hesitation. As one example, The Understood Team (2022) suggests having inclusive books in other languages or about students' cultures (p. 2). It is important to bring inclusive books because the students will feel comfortable and welcomed.

Multicultural Education and Pedagogy

Mubaraq et al. (2019), notes “multicultural classrooms deal with a variety of students’ backgrounds in terms of mother tongue, ethnicity, and culture” (p. 25). Thus, in order to promote and enhance multicultural classrooms, teachers should understand the students’ backgrounds to ensure that their students are able to be supported and learn in their classrooms (Mubaraq et al. 2019).

Empathy. In addition to considering each student’s background, teacher empathy is an important part of multicultural classrooms. It is important because when teachers understand, students learn. Warren (2014) writes “empathy is theorized to improve the teaching effectiveness of teachers in urban and multicultural classroom settings” (p. 395). When teachers put themselves in their students’ shoes, it can change the way students view the teacher. Warren (2014) notes, “empathic concern is thought to be the signal that alerts the observer he or she must respond to the needs of another” (p. 400). This is the whole premise of UDL: for teachers to understand their students and to be able to respond to their needs by providing what they need. Furthermore, empathy can be seen as “the connective tissue that binds teachers to the realities of students’ experiences outside of school, their cultural norms, and values” (Warren, 2014, p. 401).

Technology

In alignment with CRT, technology has the capacity to bring culturally relevant information into the classroom. When a student is a first year comer, teachers have the ability to use google translator, and showing clips of the students cultures. Technology has changed education as computers have transformed classrooms (Hjetland, 1995, p. 5). Hjetland (1995) outlines several tips for teachers to successfully utilize technology in the classroom:

> [The first is to] be prepared to spend time learning new hardware and software. Second, be creative. Software and hardware can be used in many innovative ways. Third, make copies. Fourth, be prepared to ask your students how something works. Oftentimes, they are more willing to explore technology and thus master it faster than we do. Fifth, don't worry. You'll get the hang of it. (Hjetland, 1995, p. 5).

The first tip encourages teachers to learn on their own, and be creative with new applications, which allows teachers to create lessons that are engaging and fun as they utilize different learning strategies.

Cagilta (2019), drawing on the research of others, summarized, "utilizing computers to deliver the instructional content with supportive multimedia elements such as interactive images, videos, animations, simulations, and computer games made computers as a standalone supporter of students and teachers" (p. 190). There are various types of technology that students can use including: chromebooks, iPads, pen stylus, even gaming consoles if used correctly for teaching. All types of technology for students should be interactive, such as through students touching the screen, therefore possibly helping them become independent (Fernandes, 2006).

Students With Disabilities

Learning Disabilities Association of America (2020) identifies seven different learning disabilities including: dyscalculia, dysgraphia, dyslexia, non-verbal learning disabilities, oral and written language disorders, ADHD, and dyspraxia. Many services have become available to students with disabilities, like assistive technology, transportation, speech therapy, physical and occupational therapy, and counseling for children (Ahmed, 2018). All these services are part of special education. The Individuals with Disabilities Education Act (IDEA), “makes available a free appropriate public education to eligible children with disabilities throughout the nation and ensures special education and related services to those children" (US GOV, 2022). IDEA is the umbrella for other laws and acts to make sure that students have everything they need to succeed in an academic setting. IDEA ensures that students are receiving accommodations and modifications, such as extra time on an assignment or shortening an assignment (Adams, 2022, p. 1). Under IDEA, the school system is required to create an individualized education program (IEP) that details the accommodation and modifications to which a student is entitled (Nepo, 2017).

In the past, many students with disabilities have faced hardships, like the lack of appropriate instruction and receiving lower expectations than other students without learning disabilities (Davis, 2017). There are many ways, however, to help students with disabilities. For instance, students can be supported by, “ having a partner in class, staying organized, keeping instructions simple, creating opportunities for success, and making sure they don’t feel pressure” (Davis, 2017, p. 2). In order to help students with disabilities, especially given that there is a wide variety of disabilities students can be diagnosed with, educators and other school personnel

have to be well-informed of different supports in place to help the students and make sure all their needs are being met.

Universal Design and Technology

Universal Design has played a big role in classrooms, due in part to the reality that the term universal can mean many things. Morin (2021) describes Universal Design as “an approach to teaching and learning that gives all students equal opportunity to succeed” (p. 2).

UDL is a strategy and approach to teaching and learning that gives all students equitable opportunities to be able to meet their goals. UDL isn’t just one way of learning, but it is a variety of different learning approaches that aids in eliminating any learning barriers for students (Morin, 2021). UDL could look like posting and referring to lesson goals, which makes it easier for each student to know what the goal is at the end of the lesson. It can also look like offering different assignment options to let every student showcase what they know in a way with which they feel comfortable and learn best. Creative options include: podcasts, essays, and presentations such as oral presentations, slides, or posters. Such options give each student the ability to choose and take control of their own learning. Another example of a UDL approach is having digital, audio, and written texts for the same piece being used in class. Digital visuals help students follow along with the lesson even once it is time for individual work. Morin (2021) expresses, “UDL builds in flexibility that can make it easier for learners to use their strengths to work on their weaknesses” (p. 2). In summary, UDL can help teachers connect with their students and be able to help them achieve their highest potential.

Universal Design Principles

Mace (1997) noted that UDL is a "commonsense approach to making everything we design and produce usable by everyone to the greatest extent possible" (p. 2). Brown et al. (1998) emphasizes that there are seven Universal Design Principles:

1. Equitable use; it provides the same means of use for all users;
2. Flexibility in use; the design accommodates a wide range of individual preferences and abilities;
3. Simple and intuitive use; use of design is easy to understand regardless of the user's experience, knowledge, language skills, or current concentration level;
4. Perceptible information: the design communicates necessary information effectively to the user regardless of ambient conditions or the user's sensory abilities;
5. Tolerance for error the design minimizes hazards and the adverse consequences of accidental or unintended actions;
6. Low physical efforts: the design can be used efficiently and comfortably and with a minimum of fatigue;
7. Size and Space in approach and use; the appropriate size and space are provided for approach, reach, manipulation, and use, regardless of the user's body size, posture, or mobility. (p. 1-2)

Garderen & Whittaker (2006) identify that "Universal Design is a movement in architecture that calls for the needs of individuals with disabilities to be considered from the outset" (p. 13). This speaks to UDL being an approach to teaching and learning as opposed to a prescribed set of rules or directions. UDL is relevant given that teachers have the responsibility

to assist all their students to pass their classes. IDEA "calls for individualized education for students with disabilities in the least restrictive environment" (Garderen & Whittaker, 2006, p. 12). This report documented how UDL holds the ability to improve achievement by meeting goals and standards. Since diversity is such a big topic in schools, Garderen and Whittaker (2006) reported that schools have started to create multicultural policy statements and create culturally responsive teaching.

History of Universal Design Learning and Technology in the Classroom

Brown et al. (1998) identified how, starting in the 1950s, UDL was being considered in Europe, Japan, and the United States. In the 1970s, the Architectural Barriers Act of 1968, the Rehabilitation Act of 1973, and the Education of the Handicapped Act of 1975 began to come into place to remove physical barriers to people with disabilities to integrate the students within the environment.

Universal Design has many definitions, but according to OCALI (2013) "Universal Design means to promote the design of products and environments that would appeal to all people yet meet the requirements of the Americans with Disabilities Act (ADA) to provide access for individuals with disabilities" (p. 1).

The History of Technology and Learning.

Hjetland (1995) explains that by 1995 technology had made things faster and easier; it made grading and other aspects of the classroom faster, but more time was spent learning how to use it (p. 3). Teachers were able to record and make sure parents did not miss announcements, and meeting reminders, as technology allowed communication to improve between parents and teachers. Additionally, students loved using technology to complete homework assignments (Hjetland, 1995).

Anderson & Putman (2020) describe different perspectives on having technology in the classroom. They note how some teachers were not confident about using technology, because they were not sure if they were going to lose all their hard work, whereas other teachers really loved bringing the technology into the classroom. Some teachers believed that without technology, teaching would not be engaging. Anderson and Putman (2020) also identified the following perceived benefits of technology integration: differentiation, varied representation, motivation and engagement, formative assessment, and life skills.

King-Sears (2009) notes how UDL is more than just technology: "UDL is also about the pedagogy or instructional practices used for students with and without disabilities" (p. 199). UDL technology gives the students the ability to work individually. It also creates flexibility as it provides students with a choice to choose how they exhibit their knowledge.

Assistive Technology

The goal of assistive technology (AT) is to help students function more independently in their own way in their daily life. It "serves as a bridge between the learning material and how students access it" (Gibson & Obiakor, 2018, p. 4). "AT can be defined as any item, piece of equipment, or product system… that is used to increase, maintain, or improve functional capabilities of individuals with disabilities" (LDRFA 2022, p. 1). The legislation also played a role regarding all the technology that special education educators can access. The Assistive Technology Act (1998) affirms that technology is a valuable tool that can be used to improve the lives of Americans with disabilities (OCALI, 2013, p. 25). Utilizing AT in the classroom can be as simple as allowing students to use a text to speech feature during assignments. Allowing a student to communicate through speech to text with other students could also be beneficial. Speech to text also can be implemented to aid a student in writing for assignments.

Ahmed (2018) states, “the benefits of assistive technology in the classroom are that the students that are non-verbal are able to communicate” (p. 3). Some of the barriers to assistive technology include training teachers how to use AT and funding for obtaining AT devices in the classroom. According to Neese (2022), some examples of assistive technology are “text-to-speech, low-tech handouts, draft: builder, assistive listening systems, FM systems, sip-and-puff systems (helps students who have mobility challenges), proofreading software, ginger, ghotit, and mathtalk.” Applications can also be helpful for support for students with disabilities. One specific example is Ginger, an app that helps students with dyslexia. Ginger helps with learning disorders that inhibit writing abilities. Neese also notes, “It is also designed for speakers of languages other than English” (Neese, 2022, p. 5). It has features like grammar checkers and rephrasing tools so students can hear what they have written.

Technology With English Language Learner Students

Nomass (2013) states, “students trying to learn English as a second language need further language support” (p. 111). Some ways students may learn are through hearing language, reading language, speaking language, and writing languages. Strategies to assist English Language Learners (ELL) include using audio recordings for students to listen to, utilizing reading apps that read out loud to students, and multimedia software (texts, graphics, sound, video, and animation, browsing the internet, using electronic dictionaries, speaking, using computers (Nomass, 2013).

Smart (2008) believes that there are many benefits to using technology with ELL and English for Speakers of Other Languages (ESOL) as it can “accelerate the acquisition of phonics, increase vocabulary, improve reading-comprehension skills and encourage language developments” (p. 1).

SHARE Team (2020) identified five positive outcomes of using technology as a strategy to support ELL students: “providing hands-on opportunities; keep[ing] instruction simple, with step-by-step increments; us[ing] multiple large graphics; deliver[ing] information in small segments, and lastly us[ing] real-world examples and relevant exercises” (p. 2).

Technology with Students with Disabilities

Ahmed (2018) also describes the benefits of assistive technology in the classroom, which include a “range of services and devices… it can also aid students with disabilities in overcoming or bypassing their learning challenges” (p. 129-130). It is important for educators to “acknowledge not just the disability, but also the ability that the students with special needs have to benefit from assistive technology” (Ahmed, 2018, p. 132). Educators can focus on creating a relationship with the students to understand all their assistive technology. AT helps students do work, communicate and be able to see, and be able to have graphic organizers. It is difficult for students that are non-verbal to communicate with their friends. There are many challenges students face, but AT gives them the opportunity to become independent and find the best way to communicate with others.

Nepo (2017) states how IDEA ensures free appropriate public education for individuals with disabilities in the least restrictive environment. This researcher also notes, however, that “the statute only ensures the use of these technology devices for students with special needs as assistive technology” (p. 207). Nepo (2017) notes how Congress launched the Technology-Related Assistance for Individuals with Disabilities Act in 1998 with the purpose of securing the funds to support technology-related services for individuals with disabilities.

Technology for students with disabilities is very important especially if they are in a General Education (GE) classroom, but overall, it is important because it will help students with

their needs (Ahmed, 2018). IDEA and ADA have been talked about and placed into the world to make sure every single student is given what they need to succeed in all aspects of their life (Adams, 2022, p. 2).

Conclusion

There are many benefits to implementing UDL in the classroom. Technology brings inclusion and excitement into the classroom. Gordon (2021) explains how technology is a distraction to those in class because they go on different websites when they are supposed to be doing work, but there are so many ways to avoid that, like blocking pages that might be a distraction and creating an expectation for students to utilize technology to promote their learning.

There is a gap in the research regarding the connection between technology in the classroom and the inclusion of students with special needs as co-designers of their learning experiences. Even though assistive technology is used now, the question remains about how it enables inclusion. Teachers not being able to use the technology correctly remains an issue. Teachers are not always prepared the way they would like to be, and they are not always given the opportunity to attend workshops to learn how to properly use technology. The most important consideration about technology is how it will help incorporate each student's input. The purpose of this research is to show that technology is not just a distraction in class, but that it is a tool that fosters inclusion, engagement, and agency with learning.

Chapter 3: Methods

This study sought to understand how Universal Design for Learning helps and includes everyone, with a specific focus on technology and how it helps English Language Learners and students with learning disabilities. This topic is important not only for teachers to meet the students' needs but for ensuring that all students feel included in the classroom.

Research Questions

This study focused on students who are both English Language Learners and students with special needs, and UDL strategies as related to the benefits of technology. The primary research questions include:

a. How are students able to understand their own ways to learn best?
b. What strategies or tools do students use, or would they like to use?
c. How do students with disabilities experience their own agency and empowerment with learning and technology?

Description and Rationale for Research Approach

In exploring the impact of technology in special education and students that are English Language Learners, the researcher conducted a qualitative research study using a constructivist worldview. Qualitative research allowed the researcher the opportunity to ask open-ended questions allowing students to express their own stories (Creswell & Creswell, 2018). This allowed the students to share their own learning methods and preferences with their disabilities.

In the constructivist worldview, “the goal of the research is to rely as much as possible on the participants’ views of the situation being studied” (Creswell & Creswell, 2018, p. 27). The constructivist worldview helped the study because the participants were able to show their views. The participants’ views are important to the researcher since she was focusing on what are the

students' needs. Their views guided the researcher to be able to learn the students' patterns of learning (Creswell & Creswell, 2018).

Research Design

Research Site and Entry into the Field

The research was conducted at La Escuelita Elementary School in Northern California (pseudonyms have been used for the school and research participants to protect their identities). La Escuelita Elementary School is in a large suburb and includes a diverse population with students who speak at least eleven different native languages within the school. 65% of students are considered English Language Learners. Moreover, 38% of students are classified as low-income (Great Schools, 2022).

A lot of the parents of students at La Escuelita sign their children up or move to the area because of the programs that La Escuelita offers. There are special day classrooms, Gifted and Talented Education (GATE) programs (for students that are advanced compared to their grade level peers), and general education programs. The school's population is 44.9% Caucasian, 40.1% Hispanic/Latino, 7.1% two or more races, 3.7% Asian or Asian/Pacific Islander, 2.3% Black or African American, 1.7% American Indian or Alaska Native, and 0.3% Native Hawaiian or other Pacific Islander (Great School, 2022).

Participants and Sampling Procedure

In the classroom, where the researcher conducted her study, there were nine students. Seven students were Latinx and the other two were Caucasian. The researcher had been working with the students for a semester before the start of the study, allowing her to develop a relationship with them prior to the study. By the time of the research, the students were very

close to the researcher. All of the students in the researcher's class had an Individualized Education Program (IEP).

Before the research began, the researcher distributed consent forms to the principal, and parents of students who participated. The interviewees included both Special Education teachers and General Education teachers.

Methods

The study began by having the student-participants fill out a pre-survey (See Appendix A). After the pre-survey, there was a debrief. The debrief included a summary of the survey they had completed in which the researcher and students had a conversation about the similarities and differences between what they had learned. Once the debrief was finished, the researcher introduced the project and the end goal. The project consisted of co-creating a lesson with the students including a strategy or a tool they prefer to utilize when they learn.

The student-participants had four weeks to co-create a lesson with the researcher. There were also interviews, which were conducted during the co-creation of the lesson. These interviews were conducted with students and teacher colleagues.

Halfway through the project, the researcher checked in with the students, asked questions, and cleared up any confusion the students had. During the unit, the researcher also interviewed teacher colleagues. At the end of the unit, the students were asked to present their lesson to each other and the researcher. Once all the students shared, they were asked to debrief what they noticed from different learning styles in the classroom.

Data Analysis

Interviews were recorded and transcribed. The transcribing was followed by coding. The coding process helped the researcher discover that there were certain patterns in how the students

learn best. Maxwell (2013) explains, “open coding involves reading the data and developing your coding categories based on what data seems important” (p. 107). The open coding included reading all of the students’ responses to the surveys and putting their answers together to figure out who would work together throughout the rest of the research process.

Analytic memos were written during and immediately after each student presentation. The analytic memos were written and kept secure on the researcher’s iPad so they would not get lost. Each analytic memo was unique to each presentation since the students all presented their work differently. Most importantly, the researcher took into consideration the students' native language. The researcher used “in vivo…” (Creswell & Creswell, 2018, p. 217) words that were provided by the participants, to create more themes.

This was a qualitative study in which the researcher conducted open-ended interviews that were audio recorded on the researcher’s phone. No one had access to them besides the researcher. Students engaged in debriefs while co-creating their lessons.

During the process of collecting the data, the researcher conducted concept mapping to figure out the “value in developing a conceptual framework for the student” (Maxwell, 2013, p. 44). The researcher thought a lot about how to collect data while ensuring that each participant had a chance to express their point of view.

Validity

It is important to consider the viewpoint from which the researcher approached this research. From her own experiences in school, the researcher always had to follow the directions and do assignments the way the teachers were teaching. She never experienced a teacher who allowed her to show her work in a way that made the most sense to her. The researcher clearly remembers being told that she could not do or show her math work the way her brothers had

taught her. She often did not understand the way the teacher was teaching. The researcher also remembers her teacher's words: "You can't do it like that, that's not the way we are teaching it," which made division difficult for her throughout the third grade. This positionality was critical in the researcher's decision to pursue research focused on UDL. In addition, the researcher chose to research this topic because as a student that identified as a Latina who went to a school that was predominantly Caucasian. She did not have access to all the resources that could have been provided to help her. Furthermore, Spanish was her first language, which led to her desire to research the intersection between UDL, technology and ELL students.

The researcher took several steps to ensure the validity of her data after considering her own positionality. One step she took was to establish intensive long-term involvement because this allowed her to collect rich data (Maxwell, 2013). Rich data is "data that are detailed and varied enough that they provide a full and revealing picture of what is going on" (Maxwell, 2013, p. 126). The researcher was with the students from the beginning of the school year in August as a student teacher, and continued to be their student teacher for a total of nine months. She gained their trust, and they were comfortable with her asking questions and participating. Additionally, there were only nine students in the class, thus allowing the researcher to get to know the students and build a deeper connection with them.

Along with long-term involvement, the researcher also triangulated her data. Triangulation "involves using different methods…[to] reduce the risk that [the researcher's] conclusions will reflect only the biases of a specific method" (Maxwell, 2013 p. 102). In this study there were interviews with three different adults. Each interviewee had a different background. One interviewee was district administrator, one was a special day classroom

teacher, and one was a first-year teacher. The interviews were also triangulated with data collected from the student participants.

The researcher also looked for discrepant evidence, which can be summarized as leaving out judgment and looking for all types of data, rather than data that proves a certain point (Maxwell, 2013). In this study, discrepant data could look like a student who prefers learning without technology. According to Maxwell (2013), "the basic principle here is that you need to rigorously examine both the supporting and the discrepant data" (p. 127). In this research project, there were a couple of students that did not want to use technology and believed that the use of technology in the classroom is more time-consuming than beneficial.

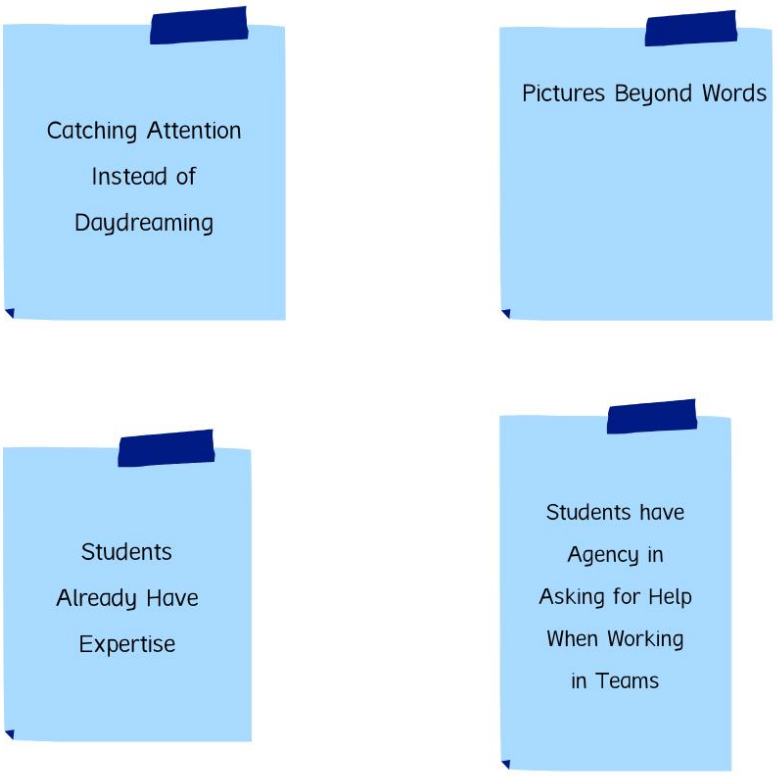
One more strategy the researcher used to ensure validity was peer debriefing. Creswell and Creswell (2018) stated that peer debriefing involves "an interpretation beyond the researcher and invested in another person [and] adds validity to an account" (p. 223). The debriefing happened throughout the research. The researcher and the classroom teacher talked about what the participants answered in complete confidentiality. The researcher also asked for respondent validation by having participants confirm that her interpretation of their answers was accurate, as it "is the single most important way of ruling out the possibility of misinterpreting the meaning of what the participants say and do…" (Maxwell, 2013, p. 126).

Chapter 4: Findings

This project facilitated how students that have been diagnosed with learning disabilities, including those who are also ELL, identify how they learned best by inviting them to design and share a curriculum to meet their own learning objectives underlying these research principles of UDL. The data that was collected revealed the following findings:

1) Catching Attention Instead of Just Daydreaming
2) Pictures Beyond Words
3) Students Already Have Expertise
4) Students Have Agency in Asking for Help When Working in Teams

Figure 1Findings: These are the four main findings of the research



Catching Attention Instead of Just Daydreaming

While the students in the research pool had often “zoned out” during previous classes, when the curricular design project was introduced, there was a palpable interest in what they were going to do. “Zoned out” is when students are thinking of outside activities rather than schoolwork. When Javier realized that he could showcase his work, find videos, and use slides to guide what he was saying he chose Roblox as the medium for sharing, because he knew so much information about it and felt confident in himself as a result. The researcher asked him why he chose to create a PowerPoint for his lesson. He replied, “I wanted others to have something to look at and imagine they were playing.”

Another student, Bobby shut down when the project was explained because of the group to which he had been assigned. Bobby did not want to work with someone else on Mobymax, so he decided to put his head down and refused to participate. The researcher later had a conversation with Bobby and let *him* decide what he wanted to do and what group he wanted help with, and he decided to do Roblox. As the groups worked together, Bobby came out of his shell and wanted to participate and took charge of drawing the pictures for his group while everyone was discussing what they were going to share with the class and what they were going to draw and add to the presentation.

Javier shared, “We used Roblox because every block they want to use to build they can do an additional problem. If they want to run or improve their stamina, they can do a multiplication problem.” The other students' eyes lit up when Bobby’s group presented about Roblox because they, too, play Roblox at home. To the researcher, Roblox had never seemed like a game that could be used for Math, but the group put together a presentation and talked

about how they would bring Roblox into the classroom using Math and it not only was accurate, but it was in a medium that her students understood.

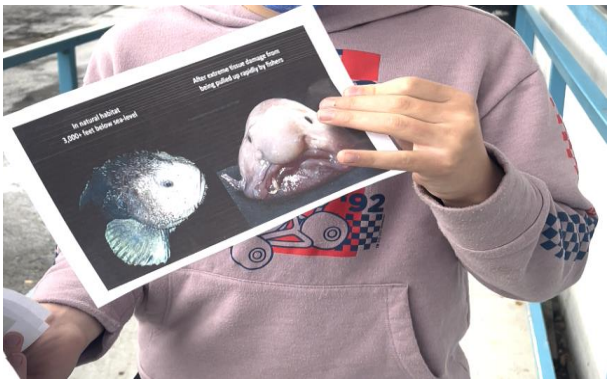
Catching Attention to the material is hard especially when the material isn't interactive. In an interview, Mr. Smith, the classroom teacher stated that "technology isn't always his go-to thing to use in the classroom unless the students need it, but since times have changed since I first started teaching. Now I play music for the kids to focus on independent work and the ability for the students to finish work quicker is unbelievable." At the end of the research, Mr. Smith also acknowledged the increased engagement of students. Mr. Smith elaborated that, "learning life skills is a tool that comes from using technology in the classroom." Technology was a tool that he started to use more in his classroom, noticing that the students were having a better understanding and reaction to math and language arts. He did notice that the kids' engagement went from daydreaming to only taking mini breaks outside when they felt overwhelmed.

Pictures Beyond Words

Jimmy is a student who has Becker muscular dystrophy. When something is new for Jimmy, he often does not want to try or wants someone to aid him in a way that allows him to complete as little as possible. The researcher observed that he was starting to look around the class to see what everyone else was doing. Jimmy noticed that a lot of people were drawing pictures and the researcher had a class printer. He had asked, "Can I print pictures of the animals I want to talk about?" However, he already had pictures of animals for the lesson. He decided to talk about the pictures he had chosen, and he wanted to share all of the interesting facts he knew about the animals. Additionally, he spoke about how YouTube helps him learn and how it can be used in the classroom. The researcher found that Jimmy showed that he struggled to learn when the lesson involved writing. When instead he was allowed to present orally with visual graphics,

he was more open to sharing in a way that was possible to assess his learning. In fact, it was Jimmy who asked the researcher to record a video of him, because he was excited to showcase what he had learned. He was able to finish the project before anyone else did. He was proud of his accomplishment. He even started to tell everyone in the class about his project. When it came time to present, he said, “I did a video because I love being on YouTube and you can learn a lot of things and I felt like I was teaching on my own YouTube channel.” He was particularly excited to talk about the Blobfish. Once it started playing, it was evident that the rest of the class was learning and they seemed excited to talk about a new animal they had never learned before. The whole class had questions for Jimmy after the video, such as, “How did you learn that?” and “How did you find that fish?” Jimmy was excited to talk about the Blobfish and newly proud of his role in this learning community. Jimmy’s classmates were similarly proud of him because many of them knew he had a hard time writing and putting together information on paper because of his learning disability.

Figure 2 A screenshot of the video Jimmy put together and was able to tell us about the blobfish.



Another teacher, Pam, expressed that she wished that students had more ability to showcase their own work. This year they had a project that they had to do with creating a state project. As the researcher observed this classroom, she saw that the students were putting together small floats that described their state. The students later presented to an audience, which

consisted of other students at the school and parents came in to see the students' work. The researcher had the opportunity to walk around and noticed that the small floats had no words. It was just pictures and objects representing their assigned states, which, like Jimmy, proved to be a great way to describe a state without physically writing words. Some students had folders filled with facts, because they were nervous about presenting, so they had something to refer to, in case the student forgot what they were going to say. Pam and the researcher discussed how she wished that students could show their work in the best way to make the student feel comfortable and less pressured. Allowing students to take control of their work might let the expertise they have about a state also be interesting and empowering for them to share.

Students Already Have Expertise

Many of the students chose topics they were already familiar with to further develop their lesson. Moreover, many of the projects included math. The researcher walked around and asked the students why they were collectively choosing math. The majority of them suggested that they chose to complete a math project because they are good at math. Dolores, in particular, had an outstanding excitement to provide a lesson about MobyMax, which is a program they use during math time. During this time, she never questioned her ability to explain how to use Mobymax as a tool in class. According to Dolores, "Mobymax is fun, and after learning something new you can practice it at home." She also explained how, if students needed extra help, she would use Mobymax, because Mobymax makes it a game which makes it easier for her to pay attention.

Electra is a student who has a lot of knowledge about bunnies. When asked how she would use bunnies to teach the lesson, she similarly wanted to use her own expertise. Electra noted that she felt eager to be able to learn in this way and to build on knowledge she already had as someone who has a rabbit at home.

Jimmy was the first to complete the project presentation, after which he went around to help other students. He would ask questions like, “what do you know?” or “what comes to mind when?” whereas at the beginning of the year he would complain about trying something new, especially when asked to help other students. Usually, if work was challenging, he would break down and refuse to try and would often cry and put his head down for the remainder of the lesson. However, this project allowed Jimmy to see his potential and break this habit. He wanted to showcase his knowledge and help other students achieve their inner knowledge and put together their own posters and presentations. Jimmy had never been the type of student to try to help others, because he felt that he did not know how to spell, but he felt confident speaking in class and proud of how much he learned on YouTube about a lot of animals. The researcher was proud that she was able to have a conversation with Jimmy without him shutting down and becoming resistant. He was excited to present his video and was proud of his work and would walk around the classroom to tell others about what he had accomplished.

Agency in Asking for Help When Working in Teams

Co-creating lessons or creating a lesson is a challenging task. All the students asked for help because it was a lot of information for them. Students in this class rarely ask for help from anyone, but during this study they were not afraid to ask questions of their classmates. For instance, Bonnie hadn’t previously liked asking for help on anything, because she is the student who often understands what to do, but who when lost stays quiet. Sally and Bonnie sat near each other working on how to create their lesson. At times Bonnie wasn’t sure what to add, and then there were times that Sally wasn't sure what to add or how to spell. Together they were able to be mutually supportive. Bonnie just sat there, and Sally noticed that she was perplexed. Sally leaned

over and asked Bonnie what she was doing. Bonnie was quiet. That was her sign of needing help. But since Sally didn't know that, Bonnie replied, "I need help, I don't know what to add.

Sam is autistic, which makes it hard for him to be social and to present to others. Javier, who was also working with Sam, knew about this, and he decided to invite Sam to be the typist. Sam is a skilled typist and knows the keys to do the special characters. He helped his team by typing up everything that Javier had written in the notes. When it came time to present, he spoke for a bit, but not too much because he was nervous. The researcher recognized in how they coordinated and organized themselves that several different accessible moments and styles allow for diversified learning. For instance, Jimmy did a video that was easier for him with his needs. Sam was part of the group and still contributed even if he has a hard time thinking about what to do.

Conclusion

At the end of the project, each student put together a project based on their *own* abilities. Each student felt satisfied with their work because they were able to work collaboratively and use technology if they chose to. The guiding questions for this research were: Are students able to understand their own ways to learn best? What do students believe engages them best when learning? What strategies or tools do students use or would like to use? How do students with disabilities experience their own agency and empowerment with learning and technology?

"Catching Attention Instead of Just Daydreaming" explored how having different teaching strategies had students engaged where they had previously been disinterested in their classroom experiences. By inviting them to be co-creators of the learning they found their own way to be excited about what they were doing.

"Pictures beyond Words" describes the ways by which students with learning disabilities and who are English Language Learners feel empowered with school by providing them access to accessible ways of communicating what and how they are learning. It could be described as a tool for asset-based learning. This is also connected to how "Students Already Have Expertise." Not only do they have areas of pre-existing content knowledge, but they also have pre-existing capacities for content acquisition. During this research, students with learning disabilities showcased that they knew what they liked, were able to explain the subject of their interest, and share how they would use it to teach others with various tools. "Students Already Have Expertise" also highlighted how students know an incredible amount of information, they just weren't previously sure how to bring it out and use it in the classroom.

"Students have Agency in Asking for Help When Working in Teams" highlighted how while these students rarely ask for help, through this work, centered on their interests, building on the assets of their knowledge, and working with others, they felt empowered in asking for support from the teachers and, even more powerfully, from each other.

Chapter 5: Discussion

The overall results of this research demonstrated that this cohort of students in a special day classroom knows how they learn best. At times they had been unsure what to do because they have had things done for them for much of their academic lives. This project taught them to advocate for their needs and ask for help. Before this research, they often didn't want to try new things, because they were scared they weren't doing it correctly. Through the project we see Universal Design being used across the classroom, with posters, videos, and PowerPoints. What had been disenchanted daydreaming became an eagerness to want to learn. The findings found were: Catching Attention Instead of Just Daydreaming, Pictures Beyond Words, Students Already Have Expertise, and Agency in Asking for Help When Working in Teams.

Both the literature review and the findings of this research identified that Universal Design Learning helps each student find their own techniques to learn. Through the findings and literature, the researcher saw how inclusive everything became once students felt like they were being heard. Inclusive learning "allows students of all backgrounds to learn and grow side by side, to the benefit of all," (UNICEF, 2019). The researcher was able to blend her Spanish speaking skills with her students that needed the instructions restated in Spanish, which made it easier for them to understand the assignment of co-creating a lesson. Similarly, Garderen and Whittaker (2006) stated "Students who are English Language learners are empowered when teachers or teacher assistants can talk to them in their native language." (p. 15). Not only does speaking a student's native language promote inclusivity but it empowers the student to continue learning.

Another important similarity is that technology helps students with disabilities (Adams, 2022). The researcher did notice that often, when students had access and opportunity to use

technology, they were more engaged than when they would only use it throughout the day. One powerful example the researcher got to observe was the assistive technology with a student who is non-verbal. The only way for this student to communicate was through the iPad. He would create full sentences on the iPad. However, it is also worth noting that at least two students expressed a preference for learning without technology.

Implications for the Literature

This study helped the researcher understand that it's not just about learning how students learn best, but the expertise of students coming to light. The ability for students to stop daydreaming and turn towards engaged learning, even, for example by using pictures to explain what they are trying to teach the class. The literature outlined seven UDL Principles including: "flexibility in use; the design accommodates a wide range of individual preferences and abilities" (Brown et al., 1998, p. 1).

The findings also made the researcher realize that students just need a small token to bring out their expertise. UDL does identify opportunities for students to give their best work, but it doesn't demonstrate how students can showcase what they already know. Through this research, students in a special day classroom were able to teach others about subjects for which they were passionate and often in ways that exceed average grade-level understanding. Although the teacher was initially worried that the research participants would not take to the project, it was when the students were invited to use non-traditional tools, including apps like Roblox, and focus on subjects for which the students had their own interests that the researcher saw a spark. In fact, it was through the initial panic the researcher felt and arriving at the knowledge that she didn't need to know everything, that it first became possible to connect with the students through their own authentic languages for learning.

Implications for Practice and Policy

The findings will help future teachers know what their students like and how to keep them engaged**.** Providing an opportunity to let the students express their work in their own way can be very beneficial.

Classrooms

Teachers and students need to be well informed about what each person's needs are. The results in the findings provide teachers with insights on how to keep the students engaged with a project. It also invites teachers and other students to be involved in each other's learning. It does raise the questions as to how well teachers know their students, their learning preferences, and their learning interests.

After the researcher observed that using Google Slides to showcase the students' work and how well it was received, the researcher continued to use slides throughout the school year. The researcher also allowed them to showcase their work in ways by which the students best thought they would be able to present.

Schools

At the school level, teachers should be supported and have professional development days where they are taught how to use tools like google classroom, Roblox in the classroom, YouTube for teaching purposes, and various other apps and sites to engage students. Like with the students, having extra support for the teachers through learning something new will be helpful if they have a question or aren't sure what is going on. The support should be there from both administration and IT. If teachers lack the general information, or even all the resources, they could be used in the classroom and the students are missing out on life learning skills. It would also be helpful if districts navigate school funds for these learning tools to help teachers

keep students engaged. Additionally, the school can put together a master key that teachers refer to for videos or free applications.

Additionally, we know that technology can be a distraction to students if there are policies around guiding students on how to use them appropriately and guide them in both how these tools can be educational and fun simultaneously.

Policy

Policies for students with special needs already exist, but there could be greater clarity in policy directives on how to support all students to find their best learning style, because "technology is best when it brings people together" (Mullenweg, 2021, p. 2).

Through my findings, policies help regulate what should be happening. For example, most students with IEPs have technology in their requirements so it's used in the classroom. But technology is a life skill that needs to be taught in classrooms as well.

Limitations of the Study and Future Research

There have been many limitations to this study. Some of the limitations that the researcher encountered were in regards to time, participants and procedures, and the positionality of the researcher. Time was affected due to the fact that the researcher felt rushed. The students also were limited to putting together their presentations.

Limitations of the Study

A limitation of this researcher is the sample size. The researcher also had a hard time with cultural diversity. The sample was very small and as a result, the demographic diversity was limited to the cultural community of the site and what nine total students might represent.

This research was conducted in a shorter period of time. It was challenging to dive into each student's perspective on technology or to let them explain why they liked learning the information they wanted in the way they decided to present the information.

Future Research

If there was an opportunity to continue the research there would be a bigger sample size, and most importantly different perspectives from different age groups in the classroom. A larger sample size could have helped from nine students who were four fifth graders and five fourth graders, we could go into a bigger classroom with more students within that same age range. It would also be beneficial to include multiple grade level teachers since technology is used differently in each grade level.

The researcher would love to see more data collected from different levels of disabilities and expand on different types of assistive technology for those with disabilities. In the future, if she could do this all over again, the researcher would do more interviews with different teachers in special education, general education, and possibly higher education. The researcher does believe that the process was a bit confusing for the students because they had never worked on a group project or set up a presentation on their own. In addition, the researcher would like to see quantitative research conducted to explore the central questions of this study. In a longitudinal study, it would be interesting to see how students used their technology at home to put together their work or even learn other school material during the course of a school year and across school years.

Conclusion

At the onset of this project, the researcher had assumed that all teachers had taught the students how to use technology as simple as google slides but discovered this was not the case.

Some students did advocate that typing or trying to put together a presentation was easier than trying to write, since on the computers they could spell everything correctly. Applying differentiated instruction in the classroom is based on the learning, but a lot of teachers who have been teaching for a long time are stuck to teaching the same way and just move along with the class.

Through the data, the researcher did learn that a lot of the time not all teachers are taught how to use technology. Also, allowing students to let the teacher know what works best for them is helpful for the teacher so they can adjust their lessons to make sure all students' needs are being met. If students feel like the teacher is trying to help them or wants the best for them, the student would be more engaged in the lesson.

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Appendix A: Pre-Survey

1. What is something you understand or do really well?
2. How did you learn to be really good at that?
3. Did you learn it with other people? Or did you learn alone? Or was it a mix?
4. Have you explained or taught it to anyone else?
5. Did you learn it when it was quiet or when it was loud? Was there background noise? Was it quiet, like you were alone, teaching yourself?
6. Did a grown up teach you? Or did a friend? Or did you learn by yourself?
7. Where did you learn it? From a book or magazine, your own imagination, technology (YouTube, games, etc.), or somewhere else? If somewhere else, then where?
8. What other things help you learn best?
9. If you were going to be a teacher, how would you teach people in these ways?

Appendix B: Sample Debrief Pre-Survey Questions for Class

1. Why do you think people learn similar things?
2. Why do you think people learn different things?
3. Is there only one way to learn things?
4. What do you think is an easier way to learn, alone or together?
5. What things do you think are important for learning?

Appendix C: Sample Brainstorming Lesson Design Questions

1. What ways do you learn best?
2. How do you think you learn best?
    a. Maybe alone or together
3. How does your strategy help you learn?
4. How will your strategy help others?
5. Is your strategy easy? Hard to explain? Or hard to understand?
6. How do you think you learn best?

Appendix D: Sample Mid-Design Questions

1. What are we learning?
2. What questions do we have?
3. What will help us finish this project?
4. Why did you choose that strategy or tool?
5. How would you describe it?
6. How would you use this tool or strategy?

Appendix E: Focus Group Design

1. What tools or strategies did you decide to use?
2. Why did you choose that tool?
3. How did you choose that tool?
4. How much work have you each done in the project?
5. How much time do you still need?
6. What have you learned about the tool?
7. What are the beneficial outcomes of the tool?

Appendix F: Post Survey

1. Which tool do you want to use during learning a new lesson?
2. Would you participate more in math if the teacher used these technologies?
3. Which tool or strategy catches your eye more and why?
4. Did you learn a different strategy or tool you want to use while learning?
5. How did you like learning about different ways to learn?
6. Would you recommend different learning strategies to other students?

Appendix G: Personnel Interview Questions

1. How do you learn best?
2. How do you think your students learn best?
3. Have you ever given a student the ability to show their own work?
4. Do you prefer technology?
5. Have you ever worked with assistive technology?
6. How do you use technology in your classroom?
7. How has assistive technology helped the classroom/district?
8. What do you think classroom lessons would go if technology never came to classrooms?