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## Creating Inclusive Interface and Online Learning Environments

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This thesis, written under the direction of the candidate's thesis advisor and approved by the program chair, has been presented to and accepted by the Department of Education in partial fulfillment of the requirements for the degree of Master of Science in Education.

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**Creating Inclusive User Interface and Online Learning Environments**

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

Dominican University of California

San Rafael, CA

2023

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## Abstract

This study seeks to examine educational learning environments with a focus on new platforms of learning, course design, equity, inclusion, and user interface (ex: seeing impaired, cultural differences, gender) that includes the perspectives of students with disabilities. The evolution of learning from singular multi-age classrooms through institutional schools and into dynamic online platforms has radically reshaped the educational ecosystem (Sarkar, 2020), and there have been calls for a deeper understanding of inclusive learning practices to meet the needs of diverse students (Philips & Salem, 2021). Adams (2017) also outlines how the aesthetic interface of each learning environment impacts the quality of learning. Currently, however, there is a lack of existing integrative research that looks at user design through the lens of inclusion, students with disabilities and cultural differences.

This qualitative research project included three elementary students in grades two and three, as well as interviews with three adult educators with whom those students work. The unit-based research project took place through the school's resource center, and those students who participated, created digital posters based on a unit done around inclusion.

The research participants identified equity gaps within online educational platforms, and that the cost of entry creates significant. The participants additionally distinguished that the way in which an online educational platform is designed matters to students with disabilities and the educators who teach them, with color, language adaptations and text to speech and speech to text functionalities highlighted. Lastly, students want to feel a sense of inclusion, both in person and on digital platforms. They noted how these connections can be created through their interests, senses of feeling in relationship to their peers and seeing reflections of their identity in color and design. Through this understanding educational online platforms can be effectively designed in

ways in which this demographic of students can succeed.

Teachers can facilitate whole group discussions in open ended formats that allow students to voice their opinions and talk openly about inclusion, and provide tutorials on using the tools within an online platform. Lessons can be designed to give students the opportunity to use accessible technology to creatively demonstrate the integration of learning, using techniques of design. Schools should provide professional development meetings centered around choosing and navigating accessible and equitable online educational platforms for a particular school site or district, and taking into consideration technology that may or may not be available at home. Collaboration with colleagues should be facilitated around incorporating online educational platforms within the classroom for equitable inclusion of students with learning disabilities. Schools should also provide universal access to particular platforms.

This research study focused on finding equitable online educational learning platforms for students with learning disabilities and English language learners. The researcher taught students who have mild/moderate learning needs, and who are English Language Learners. Specifically, this study found that online platforms *can* support inclusive and equitable learning for students with mild to moderate learning disabilities when the platforms are dynamic, flexible, accessible, familiar, provide language translation services and allow students to honor their strengths with their work.

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## **Chapter 1: Introduction**

Since I was a young child I have been enraptured by the ways in which things are designed. As a young learner, I struggled with using technology, and often felt that the ways in which technological platforms were designed were not equitable. Growing up I often struggled to navigate online platforms. There were many times I felt overwhelmed and defeated when using these platforms. I additionally was always curious and interested to understand how websites were created and the ways in which they looked. It was because of this that I became fascinated with the ways in which websites and other digital platforms worked.

Then when I became a student teacher, I started working in classrooms with a full spectrum of learners ranging from gifted, special education, and students who are learning English. I have bared witness to their successes and struggles, always trying to tailor my instruction to ensure their needs are being met. Through this experience of educating young students I have come to realize that every single child has their own way of learning.

Children who have learning disabilities have historically been surrounded by stigmas about their learning, but I have learned that they just learn differently. Working with children in special education requires an educator to be creative with their teaching methods. There isn't a set recipe for success with these learners, and often teaching them requires trial and error. These students, however, have been the most hardworking children with whom I have ever worked

### **Statement of Purpose**

The purpose of this research study is to examine how educational learning environments within online course design and user interface can be more inclusive and equitable. This was accomplished by exploring inclusive learning practices, the evolution of learning environments into online interfaces, and theories of design and color as it relates to inclusive learning online.

Students with learning disabilities can face a range of difficulties within academics and in a world of growing technological platforms, it is important that these educational platforms are meeting the needs of every kind of learner.

Inclusive education is an approach that allows for an array of teaching strategies and methods (Philips & Salem, 2021). The main goal of inclusive education is to create intervention options within school curriculums that effectively teach students who have learning disabilities. The seven learning disabilities classified by the Learning Disabilities Association of America (2020) include dyscalculia, dysgraphia, dyslexia, non-verbal learning disabilities, oral and written language disorders, ADHD, and dyspraxia. Ahmed explains that (2018) students with learning disabilities should have access to an array of support systems including assistive technology, speech therapy, physical and occupational therapy, and counseling for children.

Through the evolution of virtual learning one can then find ways to understand how far it has come, and what changes still need to be made. Digital platforms came about before the Individuals with Disabilities Education Act (IDEA) came into effect in the 1970s (US GOV, 2022), which statutes the advent of online learning around a time when people with disabilities were not treated as equal. This study further highlights the critical issues of online learning and the equity gaps within them (Bollinger et al., 2021). It also dives into the effects of color and design within these platforms as it relates to students with learning disabilities (Szczytko et al., 2018).

### **Overview of the Research Design**

The purpose of the collection of the qualitative data was to illuminate how educational learning environments within online course design and user interface can be more inclusive and equitable. The researcher aimed to answer three research questions: (1) How do online

educational platforms and design create inclusive and equitable user experiences for students, particularly those with disabilities. (2) What can be learned from the design practices for students with special needs when these students are given the opportunity to be creative and have agency with the curricular design process through digital learning? (3) Do students with special needs feel included with in person and online learning?

This qualitative study, consisting of three elementary students (two third graders and one second grader) with learning disabilities and three educators (including a special education teacher, school psychologist, and speech pathologist), was conducted using a transformative worldview (Creswell & Creswell, 2018). The researcher collected qualitative data through open-ended interviews with questions that led to meaningful conversations, and a unit-based project on inclusion that resulted in a digital poster. This methodology was designed to better understand how digital learning platforms can be more inclusive and equitable for students who have learning disabilities.

This study was conducted at an elementary school located in San Rafael, California. This site was specifically selected because the researcher has been working at the school for the last two years. The researcher had pre-existing relationships with the students and educators who were in the study due to the fact that the researcher was a teacher at the school site the last two years.

### **Significance of the Study**

The findings of this study indicate that there is inequity with digital learning associated with cost, ease of access, and language. The equity gap of online educational platforms impacts everyday curriculum, in particular those within special education. Educators have had to supplement the amount of support materials to make the technology practical for use in particular

settings. There has been frustration with online platforms among both educators and students that they should have simpler designs, greater flexibility, and be free at entry. Additionally, online learning did not feel inclusive to students. Students felt distanced from their peers, often distracted from their learning, and, notably, within the special education sector, these students lost instructional minutes to the time needed to deal with technological delays and barriers. It is important to educators that students of all backgrounds receive free, equitable academic support within online educational platforms, so that students who do not have the same economic means are not disadvantaged.

### **Research Implications**

The implications of this research suggest that it would be beneficial for teachers to facilitate whole group discussions in open ended formats that allow students to voice their opinions and talk openly about inclusion. Furthermore students would benefit from teacher provided tutorials on using the tools within an online platform.

The findings also make a case for teachers being provided professional development meetings centered around choosing and navigating equitable online educational platforms but, not only should teachers have access to training on these technologies, proper research should be conducted to determine if a digital platform is equitable for all learners. Many teachers have experience with some digital platforms and can give insight on the inequities of these platforms. Therefore it would be influential to involve teachers with these decisions.

Students within special education and English language learners need platforms that are flexible, fast working, easily navigable, and have additional accommodations. Additionally, if schools provided universal access to particular platforms students would have a deeper, clearer understanding of how these technological platforms work, and they would be more successful

when using them. It would deeply benefit schools if districts provided necessary platforms that enable students from all demographics to succeed.

## **Chapter 2: Literature Review**

The goal of this literature review is to explore how educational learning environments within online course design and user interface can be more inclusive and equitable. This framework will draw connections between inclusive learning practices, the evolution of learning environments into online interfaces, and theories of design and color that lend themselves toward inclusive learning online. Students with learning disabilities can face a range of difficulties within academics, including, but not exclusive to memory processing disorders, lack of executive functioning skills, and attention disorders. With the rapid growth of technology, it is important that educational platforms are meeting the needs of every kind of learner and are equitably accessible.

### **Inclusion, Access, and Learning**

Inclusive education is an approach that includes an array of differentiated learners, including those with disabilities. (Philips & Salem, 2021) They are meant to feel welcomed and fully supported by their school to reach their full potential. Inclusive education can be incorporated within the classroom and community. The main goal of inclusive education is to create intervention options within school curriculums that effectively teach students who have learning disabilities. Many factors will decide what type of intervention a student will need to succeed and these include the type of disability, age, academic performance, family concerns, and social skills (Philips & Salem, 2021). In order to fully implement inclusive education educators, administrators, families, and students must have access to diversity training, effective strategies, and support systems. Inclusive education includes co-teaching, universal design for learning (UDL), differentiated instruction, providing support to all students, and having high expectations for one's students (The Understood Team, 2019).



### ***Students with Disabilities***

There are currently seven learning disabilities identified by the Learning Disabilities Association of America (2020). These include dyscalculia, dysgraphia, dyslexia, non-verbal learning disabilities, oral and written language disorders, ADHD, and dyspraxia. Ahmed (2018) explains that students with learning disabilities have access to an array of support systems including assistive technology, speech therapy, physical and occupational therapy, and counseling for children. These services and accommodations all fall under Special Education. When a child qualifies for special education, they then receive an Individualized Education Plan (IEP) in which they can then receive support and accommodations provided by their public school (Office of Special Education and Rehabilitative Services U.S. Department of Education, 2000). The student is therefore under the protection of the Individuals with Disabilities Education Act (IDEA) which ensures these students are receiving free services they may need within their educational setting (US GOV, 2022). Examples of a modification or accommodation a student might receive under IDEA include longer time on tests or homework, having a quiet place to take a test, the use of a fidget in class, noise canceling headphones, and differentiated seating (US GOV, 2022).

### ***Universal Design for Learning (UDL)***

Universal Design for Learning (UDL) is a direction that aims to bring multiplicity to teaching and learning in ways that respond to the diversity of learners (Baglieri, 2020). In the past ten years, UDL has become increasingly popular and is currently the recommended practice for K-12 and higher education. Baglieri (2020) emphasizes that UDL is recognized as a practice for “inclusion” for students with and without disabilities. There is a “global move” towards inclusive education which challenges the exclusion of children with disabilities from schools.

The primary goal of UDL is to alter older ways of schooling and ensure children labeled with disabilities have access to the same form of education as their neurotypical peers (Hernandez Mendoza,2022).

### *Neurodiversity*

Griffiths (2020) highlights the “neurodiversity approach” which makes an important teaching curriculum based on students' individual needs, strengths, and individual dimensions. Originally developed as a term for creating inclusive learning environments for students on the Autism Spectrum Disorder (ASD), neurodiversity now is used to include every kind of learner. Griffiths (2020) argues that, since there are different types of learning needs, it is important that educators avoid reducing students into categories of learners, and instead encourages educators to focus on the dimensions or characteristics of learning. The training for neurodiversity emphasizes that every teacher is in essence a SPED teacher and “reasonable adjustments” should be made for every student to meet diverse learning needs (Griffiths, 2020). These reasonable adjustments for students consist of fostering self esteem, understanding challenging behavior as a form of communication, teaching metacognition, using multisensory techniques, making text reader friendly, breaking down instructions and memory load, allowing time and space to foster reflective and critical thinking, supporting alternative recording strategies, and keeping language simple. Griffiths (2020) states that the results of training educators with these pedagogical principles “developed more multisensory approaches to learning, including appropriate resources to support these” (p. 3).

### *Visual and Auditory Disability*

The Alberta Education Response Center (2006) created an educational program for students who are blind and visually impaired. This program provided ten essential components

that ensure students who are blind or deaf are educationally successful. The essential components are the learning, meaningful parent and family involvement, disability- specific skills, assessment, individualized educational plan (IEP), access to programs and services, accessibility of alternate format materials, assistive technology programming options, and planning for transition (Alberta Education Response Center, 2006). Alberta (2006) explains that students who are blind or visually impaired would benefit from participating in regular class curriculum as much as they can handle. When blindness, visual impairment or deafness are the only disabilities present, students are expected to be at a level consistent with regular standards (Standards for Special Education, 2004). Additionally, programming should be centered on individual student needs and should be continuously monitored and adjusted. Staff and parent involvement and collaboration is crucial in student success in school (Alberta Education Response Center, 2006).

### *Student Voice*

Wong, Chong, and Leung (2021) found that learning opportunities that allowed students to voice their opinions and provide a space for active participation yielded results that increased student civic engagement (Wong et al., 2021). Experiential learning gives students chances for creativity and critical thinking to encourage different ways of thinking. This approach aims to invigorate students to problem solve using past experiences and prior knowledge. Allowing students to share their experiences and perspectives increases academic and emotional growth, which in turn makes schooling more enjoyable for learners (Wong et al., 2021).

**Youth Participatory Action Research.** Technology has opened the world to self expression, communication, and developing strategies for social change. Adolescents in particular, are the most enthusiastic and involved in new technologies and account for one in three internet users worldwide. Gibbs, Kornbluh, Marinkovic, Bell, and Ozer (2020) concluded

YPAR induces greater levels of engagement during the research process. In turn this would increase adult support of technology use. The researchers believe that while technology can be useful for YPAR, it also subjects youths to the dangers of the internet (Gibbs et al., 2020). Adolescent generated research could enhance the quality of research on adolescent health and well being. It is also a belief that adolescent centered research provided leadership opportunities, practitioner growth, and policy changes. Research noted a shift in opinions of adult leaders, who are acknowledging the value of adolescent decisions. Gibbs, et al. (2020) states that, “Activities, such as accessing information, networking, and producing online content, provide opportunities for adolescents to connect to each other on equal terms, allowing the identification of common interests and mobilizing collective action” (p.15). YPAR is a great way for children who are neurodiverse to express themselves and find their voice whilst participating with their neurotypical peers. Griffiths (2020) states that teaching for neurodiversity entails fostering self esteem, and YPAR is a great way for neurodiverse students to feel a sense of accomplishment. Many students who are neurodiverse often are held back, hesitant, or do not get as many empowering opportunities as their neurotypical peers, so YPAR is a great opportunity to unite peer groups together.

Suleiman, Ballard, Hoyt, and Ozer (2021) analyzed the importance and positive effects youth-led-participatory action research (YPAR) had on young students. In YPAR, the youth are trained to identify, analyze, and promote actions on issues that pertain to their lives. YPAR is equitable, community based, and is put in place to promote engagement in young students. The goal is to create opportunities for students to have a voice, feel a sense of empowerment, and engage in leadership opportunities (Suleiman et al., 2021). Through YPAR, students can conduct research on the impacts of certain programs and services, policies, environments, and advocate

for positive change. YPAR is also a chance for youth to raise awareness around issues of inequity and inequality among diverse populations as well as conduct research that pertains to issues in their own lives. More benefits of YPAR include better long term strategic thinking skills, improved health, better relationships with adults, perceived control, and self efficacy (Suleiman et al., 2021).

Jason and Glenwick (2015) outline paradigmatic considerations, key processes, social political/developmental relevance, and projects that focus on Youth-led participatory action research projects (YPAR). YPAR allows students to take on leadership roles, conduct research that helps them understand the nature of problems, and make decisions that influence where they live. Jason and Glenwick (2015) explain that while YPAR's main ethos is creating an environment where students can become the experts in research who create knowledge, solve social justice issues, and create a sense of empowerment. YPAR gives marginalized youth the opportunity to research social issues that they historically have not been allowed to be a part of (Jason & Glenwick, 2015). In the decade leading up to 2015 the amount of YPAR had increased significantly and research had been conducted on subjects such as psychology, public health, education, nursing, etc. This research was conducted across differing age groups, languages, and countries (Jason & Glenwick, 2015).

### **The Evolution toward Online Educational Learning Environments**

It is no secret that since the Covid-19 pandemic online learning environments have become a key part of each of our lives. It is important to understand the history behind how we are able to virtually learn in our present world to understand the potential challenges and the opportunities in making education accessible to diverse learners. Through the evolution of virtual learning, one can then find ways to understand how far it has come, and what changes still need

to be made. Sarkar (2020) identifies that the first step towards online learning began in the 1950s, where slide projectors and televisions were implemented into classroom settings, when instructors began to integrate multimedia platforms. The earliest instance of “online learning” was traced to 1960 at the University of Illinois, where students learned in computer terminals that were interlinked to form a network, and the first online course was created in 1984 by the University of Toronto (Sarkar, 2020). In 1986 Electronic University Network was created and used on Commodore 64 computers. In 1989 the University of Phoenix created the first online institution that awarded bachelors and masters degrees. Digital platforms came about before the Individuals with Disabilities Education Act (IDEA) came into effect in the 1970s (US GOV, 2022). Meaning that online learning sprung up around a time when people with disabilities were not treated as equal. Thus this group has been historically neglected until recently with the IDEA which has had to be revised time and time again. In 2008, Sal Khan created a digital online educational tool that moved at each child’s individual pace (Khan, 2013). This was a legendary breakthrough in the world of online education because no one had ever created a platform that focused on the individual student (Khan, 2013). Khan Academy opened the door for Youtube creators and digital creators to develop and innovate online educational tools. Then in May of 2014, google classroom was introduced as a platform that integrated the larger google landscape with flexible app integrations (Singer 2017).

### ***Online Course Design as a STEM Grounded Iteration***

STEM (Science, technology, engineering and mathematics) is a type of learning that encourages students to ask questions, look at problems through multiple lenses, work collaboratively, plan carefully, become flexible, embrace change, improve upon their ideas, persevere through challenges, and open themselves up to discussing new ideas and differing

points of view (Carter 2020). The technological side of STEM took off in the 1980's with the creation of the first cell phone and first personal computer (Marick Group, 2016). Creation of internet and technological tools that everyone would come to own set off a spark that would one day lead to the advancement of online course design (Marick Group, 2016). The Maverick group (2016) explains that once the first cell phone and computer were created, more and more people ached for technology to evolutionize. From there this led to an increase in competition between large companies to make the best version of these products (Marick Group, 2016). Once these products grew in popularity STEM and online course design began to rise.

**A Successful Case Study: Khan Academy.** Khan Academy is another, more recent step in the progression of educational learning platforms. Khan Academy is an educational learning environment that offers practice exercises, instructional videos, and a personalized learning dashboard that aims to empower learners to study at their own pace. Khan (2013) **has** outlined the reinterpretation of the academy as being in need of a transition from passive to active learning. This means that students will be the most successful when they are educated in a way where students can learn and move forward with the curriculum at their own pace. Khan (2013) explains, "Every day-every class period-the gap grows wider between the way kids are being taught and what they actually need to learn"(p.56).

Khan created his ethos after years of studying different methods of learning. He examined the Prussian Model, which is a practice of learning based on not believing in independent thinking, creativity, or growth (Khan 2013). The main goal of the Prussian Model was used to create a group of learners that would be submissive to those who hold authority or power. Khan (2013) on the other hand, looked at this model and began promoting a way of thinking that aimed to encourage learning, and have students find interest within course

materials. When students have interest in curriculum they can take responsibility for their own learning (Khan 2013).

### ***Critical Issues with Online Learning***

Higher education campus enrollment has decreased. However, the number of online courses and online enrollment has continued to increase. Yet, online student dropout and lack of engagement in distance education are still issues of concern (Bollinger, Florence, & Flowers, 2021). It is clear that high-quality course design is critical to the success of online courses. Bollinger et al. (2021) found that design features influenced student performance, interaction affected student grades, clarity of design, interaction with instructors, and active discussion influenced students' perceived learning and satisfaction (Bollinger et al., 2021).

Since the Covid-19 pandemic started in 2020, there has been a significant increase in online learning platforms (Yuanyuan & Xin, 2022). Online learning has proved to not be favored among students for its lack of human interaction and connection. Yuanyuan and Xin (2022) discuss how many forms of online curriculum are unsuccessful because of the way in which courses are designed. They examined four types of design consisting of content, activity, object, and evaluation through survey data collection. Research participants were given four different design layouts and asked to choose which they were most satisfied with. The researchers notably found that content design and activity design within online learning did improve the satisfaction of learners. However, when it came to object design and evaluation design learning, satisfaction was not improved. With the growth of online educational learning it is crucial that the ways in which these platforms are designed directly reflect what specific learner populations need. In particular, students who have learning disabilities need different accommodations and supports,



and thus need a better designed digital platform in order to ensure learner success (Learning Disabilities Association of America 2020).

**F.A.C.E.** Yeh, Rega, and Chen (2019) researched new models for improving creativity through what the authors call FACE (Feedback, Aesthetic experience, Creative design, and Evaluation of designed products). FACE is a computer-based training program that investigates desired aesthetic experience and design through emotional creativity (Yeh et al., 2019). FACE training was created to elevate cognitive aesthetic enhancement and improve creative performance within design. Yeh et al. (2019) found that training that provided direct constructive feedback proved to enhance learning effects better than that of informational feedback. Researchers demonstrated how important FACE is in improving creativity within computer-based training (Yeh et al., 2019). Additionally, creativity within computer-based training is crucial for modern educational systems.

**Learning Management Systems (LMS).** Learning Management Systems (LMS) have reshaped the landscape of online learning by establishing a dynamic interface that integrates the principles outlined by FACE (Habeeb, 2019). They are “software application or Web-based technology used to plan, implement, and assess a specific learning process” (Habeeb, 2019, p.65). LMS’s are also known as E-learning Platforms, Pedagogical Platforms, or Course Management Systems (Habeeb, 2019). The goal of a LMS is not to create content, but to provide space for educators or tutors to upload content. The LMS design pattern is divided in three categories; the learners, the instructors, and the administrators. The typical design of a LMS consists of registration and enrollment options to teachers and students, adding/deleting courses, setting the different user roles and user account, setting the course calendar, uploading and retrieving assignment and resources, and forum module (Habeeb, 2019). Habeeb (2019) found

that LMS is gaining popularity within teaching and distance learning because of its leveled, differentiated instruction for a diverse range of learners. Habeeb (2019) also expressed that he feels these LMS are the future of learning and that they can even improve the quality of learning, widen access to education, and reduce cost of delivery.

Fonseca and Peralta (2018) outline the importance of incorporating technology in the classroom, and how many teachers hesitate to learn about new technological platforms such as google classroom. They emphasize that in order to keep up with present day schooling, teachers must incorporate technology into the classroom and explain that virtual learning communities have the opportunity to improve the students academic performance, stimulate collaborative learning through peer interaction, and give teachers the responsibility of enhancing student learning.

**Americans with Disabilities.** Pendergast (2015) argues that sections 504 and 508 of the Rehabilitation Act of 1973 are put into place to protect those with disabilities, provide federal financial assistance and ensure that they aren't discriminated against. There is a deficit in the quality of accommodations around web design. Pendergast (2015) points to Canvas as an LMS that has made progress toward being an equitable and adaptive technology for students with disabilities. For instance Canvas includes San Serif fonts that promote readability (ex. Arial, Calibri, Tahoma), uses colors with care (8% of men have some degree of color blindness with red/green being the most common), ensures good contrast between text and background, provides detailed “ALT” tags when inserting images, uses informative hyperlink phrases, avoids the use of tables to achieve page layout, uses the “LABEL” tag when creating forms, and supports keyboard only input (Pendergast, 2015). Additionally, Canvas offers speech to text software (closed captions), audio recordings, tape recorded lectures, readers for tests, and

tutoring. By providing these digital accommodations to a diverse range of learners, a door opens up for students with learning disabilities to gain confidence in their learning, and be provided with equitable opportunity in the development of their education.

### **Design and Color Theory: Toward Inclusive Learning**

Adams (2017) points toward the vital information needed to creatively and effectively apply color to one's own design work, by explaining how the human eye and brain experience color physically, mentally, and emotionally. As a result, these colors have meanings. Color symbolism is a cultural agreement and opinions about associations are varied and sometimes conflicting. Adams (2017) states that isolated colors tend to have negative connotations, while colors that are thoughtfully paired or put together have a sense of harmony (Adams 2017).

Adams (2017) further explains that this colorful harmony is a key aspect of design. It is important to keep the user engaged and create a balanced visual experience. If color harmony is not achieved then the user will have a more chaotic user experience. Students with learning disabilities such as Attention Deficit Hyperactivity Disorder (ADHD), Attention Deficit Disorder (ADD), and Autism have an energetic and unfocused mind, therefore a chaotic color design could distract this particular type of user (Learning Disabilities Association of America 2020).

### ***Design***

Perkins (2016) investigated how brand equity was perceived on Purdue University's Facebook page. This thesis aimed to evaluate user data and determine whether the brand demonstrated equity within their Facebook page. Meaning the focus of this study was how successful Facebook was creating equitable branding.

Facebook has a monthly user base of 1.71 billion making the web-based platform very influential. Because of this influence, it is important that this user interface provides equitable

content for its users. Perkins (2016) explains that the problem with Facebook's user interface is that it is incredibly hard for brands to evaluate customer experience. According to Perkins, “This study aims to gather data to help evaluate actual user experience from the consumer’s perspective online by combining the method of Website Experience Analysis (WEA) with Keller’s customer-based brand equity theory” (p. 6). Perkins (2016) concluded that equity was incredibly influential over user’s perceptions of a brand, and that if users found a brand not equitable they were less likely to use it.

### *The Space of Learning*

Szczytko, Carrier, and Stevenson (2018) found that while students with emotional, cognitive, and behavioral disabilities (ECBD) such as Attention Deficit Hyperactivity Disorder (ADHD), autism and dyslexia, consistently lag behind their non-ECBD peers academically. One way to reduce ECBD students’ challenges to learning includes time in outdoor green areas. Green spaces have been found to be highly beneficial for students identified with ADHD (Szczytko et al., 2018). For instance, it has been found that playing in green spaces significantly reduced symptoms of ADHD for youth of all income levels, locations, and community types ((Szczytko et al., 2018), and routine play, particularly in green outdoor spaces, improved attention spans and reduced hyperactivity in those with ADHD and ADD (Szczytko et al., 2018). The color green could also aid user experience designers in creating digital platforms that incorporate this color.

### **Conclusion**

The literature has produced a broad understanding on the value and diversity of inclusive education, which serves an approach that allows for an array of teaching strategies and methods (Philips & Salem, 2021). Inclusive education includes universal design for learning (UDL),

differentiated instruction, providing support to all students, and having high expectations for one's students (The Understood Team, 2019). Students who are in special education are, additionally, eligible to receive an array of services, supports, and accommodations from the state (Learning Disabilities Association of America 2020). Baglieri (2020) and Griffiths (2020) describe how YPAR and teaching through UDL are a way of educating students that gives them a sense of confidence and voice within their learning. Design in both color (Adams, 2017) and online courses (Bollinger et al. 2021) proved to be crucial in the development of emotion and process of engagement.

However, there is a lack of existing integrative research that looks at user design through the lens of inclusion, people with disabilities and cultural differences. The purpose of this study is to examine educational learning environments with a focus on new platforms of learning, course design, equity, inclusion, and user interface (ex: seeing impaired, memory processing). An additional purpose of this study is to gain perspective of those students who have learning disabilities and their experiences within these digital platforms.

### **Chapter 3: Methods**

There is research on the history of education as it pertains separately to inclusion (Gibbs, Kornbluh, Marinkovic, Bell, and Ozer 2020), UDL (Baglieri 2020), online course design (Bollinger, Florence, and Flowers 2021), and SPED (Hernandez 2022). However, there is a lack of existing integrative research that looks at user design through the lens of inclusion elementary school students with learning disabilities. This study sought to examine educational learning environments with a focus on new platforms of learning, course design, equity, inclusion, and user interface (ex: seeing impaired, cultural differences, gender) that includes the perspectives of students with disabilities.

#### **Research Questions**

This research study consisted of a series of individual interviews with students and teachers at a local elementary school in northern California. It also focused on student experiences with inclusion and design within a classroom setting. Therefore the research was guided by the following questions:

- How do online educational platforms and design create inclusive and equitable user experiences for students, particularly those with disabilities?
- What can be learned from the design practices for students with special needs when these students are given the opportunity to be creative and have agency with the curricular design process through digital learning?
- Do students with special needs feel included in person and online learning?

#### **Description and Rationale for Research Approach**

This qualitative research study was developed through a transformative worldview and aimed to understand how educational learning environments within online course design and

user interface can be more inclusive and equitable. This gave students the opportunity to share their experiences regarding inclusion at school and within their personal lived experiences. Using a qualitative approach allowed for the researcher to focus on exploring and understanding concepts, experiences, and opinions of students (Creswell & Creswell, 2018). The researcher collected qualitative data through open-ended questions that led to meaningful conversations, individual interviews, and a digital poster project (Creswell & Creswell, 2018). A transformative worldview is research in which “specific issues need to be addressed that speak to important social issues of the day, issues such as empowerment, inequality, oppression, domination, suppression, and alienation” (Creswell & Creswell, 2018, p. 9). In a modern world with changing technologies, it is important to take on transformative worldviews when researching ways in which to serve marginalized participants. This research seeks to understand how digital learning platforms can be more inclusive and equitable for students who have learning disabilities.

### **Research Design**

The researcher led a series of discussions around two books read as a class that centered around inclusion. These books aimed to have students think deeply about what inclusivity means, how they see this at their school, and how it can further be incorporated into everyday life. Additionally, it has the students reflect on how educators can teach in a more inclusive manner. Students furthermore engaged in an opportunity to create their own digital poster about an important social topic (ex. inclusion) and display these digital posters (optional) for the educators they were closest to. Teachers and students who agreed to participate in the study were individually interviewed in single sessions. These interviews consisted of questions that revolve around inclusive learning platforms and practices, and how to effectively incorporate those into modern day classrooms.

### ***Research Site and Entry into the Field***

This study was conducted at an elementary school located in San Rafael, California. To maintain confidentiality, pseudonyms are used for the school and participants. The elementary school is a neighborhood school that has around 500 students, and serves grades pre-kindergarten through fifth. The school contains a somewhat diverse population of cultures, economic and religious backgrounds, race, ethnicity, and educational levels, with 27% classified as English Language learners and 21% eligible for free lunch. The school contains a population 1% Native American, 4% Asian, 27% Hispanic, 1% Black, and 60% White (Public School Review).

This site was specifically selected because the researcher has been working at the school for the last two years. The researcher had pre-existing relationships with the students and educational professionals who were in the study due to the fact that the researcher was a teacher at the school site the previous year.

### ***Participants and Sampling Procedure***

Of the eight students in the class and who were asked, only three provided parent consent to participate in the study. Their ages range from six to eleven years old. Students who frequently receive additional support in the resource center have learning needs that consist of specific learning difficulties, autism spectrum disorder (ASD), attention deficit hyperactivity disorder (ADHD), sensory processing disorders, and memory impairments. All of these students are in general education classrooms and are only pulled for additional support. The researcher sent home a consent letter to the parents via email and a hard copy through the student to be signed. The consent letter outlined the purpose of the study and provided details on how the data will be collected, used, and protected. A consent letter translated into Spanish was also sent home, as many of the students are English language learners. Students who returned the consent



forms were able to participate in the study that consisted of mini lessons about inclusion and technology, focus group conversations, and individual interviews.

The three to five educational professionals were asked to participate in the study in person. These educational professionals were all female, between the ages of 30 and 65. Their teaching experience ranged from seven and thirty years. When the educational professionals agreed to participate, they were asked to sign a consent letter that outlined the purpose of the study and provided details on how the data was to be collected, used, and protected. Educational professionals who returned the consent forms then were able to participate in individual interviews. This included the SPED teacher, school psychologist, and the speech pathologist.

### ***Methods***

The research began with an introductory conversation to identify how students thought about inclusion, learning and design. The researcher also explained to the students that this project would consist of reading books, discussions about inclusion, and a digital poster of their creation. During the second session, the researcher read the first book, *This is a school*, followed by a conversation on inclusion based on the narrative inspiration of the text as a starting point for generating connections, explorations and new ideas (I.e., What are some things that help people feel more included? How can our school work better to create a more inclusive environment?). During the third session, a second book, *My name is Yoon*, was read aloud, and then discussed with a series of follow-up questions (I.e., What new ideas do you have about including people? What are some things that are different from the book that we read last time?). The researcher also outlined the project to design. This design project allowed students to choose a topic generated by the context and conversations from previous visits. The students created a digital poster about their topic using online learning tools. The students had a few days of organized

time to work on their projects. The researcher and students brainstormed during this time about how to design their digital posters, discussed principles of design, inclusion and how to connect with an audience of their choosing. During the last session, the researcher organized an optional gallery walk, where students had the opportunity to showcase their posters and share what they wanted people to understand from their work. After the gallery walk, the researcher engaged the class in a conversation to debrief what they experienced (I.e., How did it feel to complete your digital posters? What do you think is important for people to learn from your project?).

Following the unit, the researcher conducted individual interviews with students, held during class time in a separate interior room that is visible through a shared window, while the class instructor worked in stations with the rest of the class. These rotations are standard practice for this class. Each interview took no longer than 10 minutes. Sample questions included, what ways do you think learning feels most inclusive? In what ways do you think learning with technology is or can be more inclusive? Describe your experience of online learning during the pandemic? All interviews were recorded with a smartphone using the voice memos app. Additional notes were taken during interviews.

Educational professional interviews occurred on campus at the elementary school, in the resource center. Three educational professionals were included in teacher interviews. Examples of interview questions include: What principles, practices or tools do you find most supportive of inclusion? What work still needs to be done to create greater equity and inclusion? How do you incorporate online learning platforms into the classroom? Do you feel as though these platforms are inclusive of all learners?

### *Data Analysis*

The researcher collected data qualitatively through open-ended questions, classroom discussions, individual interviews, analytic memos on observations during the sessions, and through the creation of digital posters. All of the interviews were recorded on the researchers iphone through an app called voice memos, and then later transcribed. After analysis of transcribed individual interviews, the researcher wrote analytic memos to examine research bias and to add to any ideas pertaining to this study (Maxwell, 2013). These analytic memos ensured the researcher was able to categorize data findings and recognize differences in answers between participants. The researcher was also better able to understand participants emotions, body language, and overall feelings by comparing these analytic memos to individual and whole group discussions.

Open-coding was used within this research study to break down data and then organized into relevant categories (Maxwell, 2013). Organizing this data into different categories aids in understanding different or reoccurring themes and relationships within the research. The researcher examined these recurring themes after conducting interviews and open-ended discussions with the students and educators. After completing the open-coding, the researcher was able to create concept maps, which provided more opportunity for analysis (Maxwell, 2013). The concept map was created to define emergent themes and enabled the researcher to divide the emergent themes of educational learning environments into sections revolving around online and in person inclusion, equity, online learning platforms, course design, and user interface. After completing the concept maps the researcher was then able to identify common themes and examine the differing opinions of the participants. This allowed the researcher to understand different subcategories and key phrases for data analysis. The research participants recognized

that there are equity gaps within online educational platforms, and that the cost of entry creates significant differences in the dynamics that different communities can access, and the amount of additional support materials instructors have to produce to make the technology practical for use in particular settings. The participants additionally distinguished that the way in which an online educational platform is designed matters to students with disabilities and the educators who teach them, with color, language adaptations and text to speech and speech to text functionalities highlighted. Lastly, students want to feel a sense of inclusion both in person and on digital platforms, which occurs through their interests, senses of feeling in relationship to their peers and seeing reflections of their identity in color and design. Through this understanding educational online platforms can be effectively designed in ways in which this demographic of students can succeed.

### *Validity*

The researcher is a student teacher in the resource center for the elementary students, as well as a colleague to adult participants in this study. This relationship could have affected data collection due to the professional relationship between the elementary school teachers, the bond between student teacher and the students. The researcher has a personal investment in the implementation of inclusive educational platforms, course design, and equity and wants this to positively affect students of all grades and every walk of life. This creates a sense of personal bias within this research. During the pandemic, students all across America learned online and educational learning environments have been transformed as a result. Having observed in an educational setting for almost five years, the researcher has noticed equitable and inequitable online learning platforms. It is important to the researcher that online learning platforms include

students with learning differences and that teachers educate themselves on the most inclusive learning platforms.

In order to account for bias, the researcher used several validity checks. Since the researcher has been working at the elementary school for two years, this has created a level of trust between students and educators, which provided intensive long-term involvement and rich data to validate the findings (Maxwell, 2013).

The qualitative data within this research study was collected through audio recorded interviews of students and teachers, classroom discussions, as well as through a series of digital posters, and included 3 students and 3 teachers. Collectively, this created several layers of triangulation (Maxwell, 2013). Throughout this study the researcher also used negative or discrepant information to counter themes (Maxwell, 2013). It was important to the researcher to understand and explore the different perspectives of participants, and acknowledge that those opinions were different. When helpful, respondent validation was also integrated to ensure context and interpretation of findings were accurate to the participants' intentions (Maxwell, 2013).

## **Chapter 4: Findings**

This study aimed to find the inclusive impact of online educational platforms on special education students and teachers. It additionally sought to understand the importance of online educational design and gain perspective from both teachers and students about equity gaps within these platforms.

After examining the data, a few overarching themes emerged. First, it became evident that there are many equity gaps within online educational course designs. Second, the participants additionally distinguished that the way in which an online educational platform is designed matters to students with disabilities and the educators who teach them; with color, language adaptations and text to speech and speech to text functionalities highlighted. The third theme that developed was that students want to feel a sense of inclusion both in person and on digital platforms, which occurs through their interests, senses of feeling in relationship to their peers and seeing reflections of their identity in color and design.

Data within this research was collected through a series of readings and whole class discussions centered around inclusion. Data was additionally collected through student created digital posters that highlight what they learned throughout the unit. A series of 1:1 interviews were then conducted with three educators and three students. These interviews focused on questions around inclusion at school and within online educational platforms. Questions also focused on design within these platforms.

### **Equity Gaps within Online Educational Platforms**

The research participants recognized that there are equity gaps within online educational platforms. Interviewees stated that the cost of entry creates significant differences in the

dynamics that different communities can access, and the amount of additional support materials instructors have to produce to make the technology practical for use in particular settings.

### ***Cost of Entry***

Early in the research, it became apparent that the majority of online educational platforms required some form of payment. Depending on the district and school, it is clear that there is a major equity gap in the kinds of access students have at home and at school. Both the school's special education teacher and speech pathologist were in agreement that in order to achieve true equity, technological platforms should be free at the point of entry.

Ms. D, who is one of the most highly respected members on our school's campus, began her career in the early 80's as a speech therapist in hospitals, and later began working in schools. She has been working at this site for about five years, and another nearby site for over ten. Her day consists of aiding students in their speech and social emotional goals. Ms. D does so by incorporating songs, games, and play into her teaching. Her room looks like a child's wonderland and her students always appear thrilled to see her. Ms. D (SP), shared a story about a student with whom she had worked. And from whom she had learned even more fully to understand how many of the children she taught struggled economically. It did not take long for her to realize that this student didn't even have access to the internet. She explained that while some of these educational platforms may market themselves as being affordable, the costs can quickly add up to sums that many families cannot afford. This results in families and students with special needs not having access to the range of online content that children of higher economic status are receiving. Ms. D highlighted the importance of truly getting to know the backgrounds, culture, home lives, and previous experiences of the students one works with. Additionally, she exposed the equity gap of many online educational tools and explained the

importance of giving all learners a chance to access these platforms.

Mrs. S. also spoke to the notion of the cost of many online educational platforms. Mrs. S (SPED), the school's special education teacher, began her teaching career working in preschools, but fell in love with teaching during her time in early intervention. She often speaks of how she realized her passion for teaching special education with these students, and carries that passion every day within the school's resource center. She teaches academics to students who have learning disabilities, and has become known as skilled in the art of differentiated instruction and teaches with a respectful, loving, and firm hand. Her room is filled with inspirational quotes such as, "Nothing worth doing will be easy," and often references this in her teaching. She believes, supports, and encourages her students to challenge themselves in their learning. Her room is a warm and welcoming place where every student feels right at home.

Ms. S (SPED) uses a wide variety of technological tools within her classroom, and described the technological equity gaps in her district. She explained that all of the programs she currently uses in her school's learning center require some form of payment. She explained that she felt very fortunate to work at the school because it is in a wealthier area and that the PTO funds a lot of their online learning programs. However, the school receives the most basic package and any additional simplified readings or tools these platforms offer can be hundreds of dollars more:

Our school gets more funding than let's say, another school where the parents can't chip in as much money. So to me, it's not equitable across the district. And the reason I say that is that for children who are language learners, for example, they often come from less wealthy environments, so there are many equity gaps there.

Mrs. S explained that the location of a school and the community it serves significantly impacts



the kinds and amounts of financial support it can find, including digital educational platforms.

### *Economic Inequity and Students' Home Lives*

Mrs. L (Psych), the school's psychologist is in charge of testing and accommodating students' emotional and cognitive needs. She is passionate about student mental health and is constantly helping students to understand how to problem solve when they are experiencing certain emotions. She is empathetic, compassionate, and works endlessly to ensure she is testing and diagnosing her students to the best of her ability. Her room has become a small oasis for students to escape to when they are feeling dysregulated. She has a calm, inviting energy that always appears to make students feel comfortable and safe.

Mrs. L (Psych) who has worked at this site for many years, explained that many of the assessments she gives students are conducted on ipads. It was through this testing that she realized many students did not know how to navigate an ipad. She discovered that this is because many students do not have access to ipads at home, and many don't have computers. She has learned that many students only have access to technology within the school walls or occasionally through parent or older sibling smartphones. This produces an inequity that impacts performance at the outset. Additionally, she outlined the importance of building a school community that is inclusive of people from all financial backgrounds. She explains that this is not the case at her current school site:

Often, it's the wealthier families and the more affluent families that have the time and the resources to provide, be a part of, and more ingrained in the community. But I have seen other schools that do a better job in creating that, for those who don't have the means.

Usually when there are more families that don't have the means.

Mrs. L (Psych) expressed that there are many factors outside of the school that will affect a

students ability to properly access technology. With that said, she stated it is the job of the school to ensure students are receiving the necessary technological tools to be successful.

Ms. D (SP), spoke to the notion that every teacher needs to gain experience within a wide range of diverse communities. She expressed that until educators and school staff experience a less fortunate community first hand, equity will never be achieved. It was evident that she had worked in many different districts with a wide range of cultures and people. She relayed an experience she had with a student and how she struggled to witness the conditions of his home life. In an effort to support his speech development, she made a home visit:

He lived in a trailer with about five other family members, and they all talked the same way. I knew my job was very different. I think educators need to travel and be in different spots, experience different cultures, and less wealthy learning environments.

Teachers need to have the knowledge and emotional awareness and carry that into their teaching.

Ms. D added that this child's family could not afford a computer nor the additional cost that online educational platforms would require. She emphasized that teachers are usually only seeing part of the picture when it comes to students, and that it is important to never assume that a child has access to technology. She said that, "Working in education is more than just teaching, it is understanding that every student needs different tools and support in order to succeed." The point for Ms. D is that every teacher must and should experience teaching in a wide range of communities. This is to develop the tools, cultural understanding, and insight into economic inequalities, so as to be able to support students more fully.

### ***Bilingual Teachers and Learners***

Mrs. S (SPED), who has experience with a diverse range of learners, conveyed many important factors relating to bilingual teachers and learners. She explained that while they are incredibly needed, bilingual teachers are not funded by the district. It is because of this that there is a lack of incentive for them to take on these jobs. She sees equity gaps and lack of support to teach ELLs within her school and that she believes more intervention is needed. She states:

We don't fund our bilingual teachers through the district. So any teacher that is bilingual is doing it out of their own care for the child. I don't think we have an extensive program to teach English to these students in our school. I think the teachers try. So because of that, I don't feel like that is equitable.

According to Mrs. S, the majority of the school's wealth comes from families that aren't English Learning, and that the majority of their funding goes into enrichment within the school (ex. garden, music, dance, etc.). It is because of this lack of funding from the district and parents that bilingual teachers and students are not receiving professional development or an equitable education. Mrs. S stated that because the majority of school funding is coming from families that aren't English learning, there isn't as much of a push for funding bilingual teachers or ELL programs. In particular, ELL online educational platforms are incredibly limited with the exception of only a few in existence.

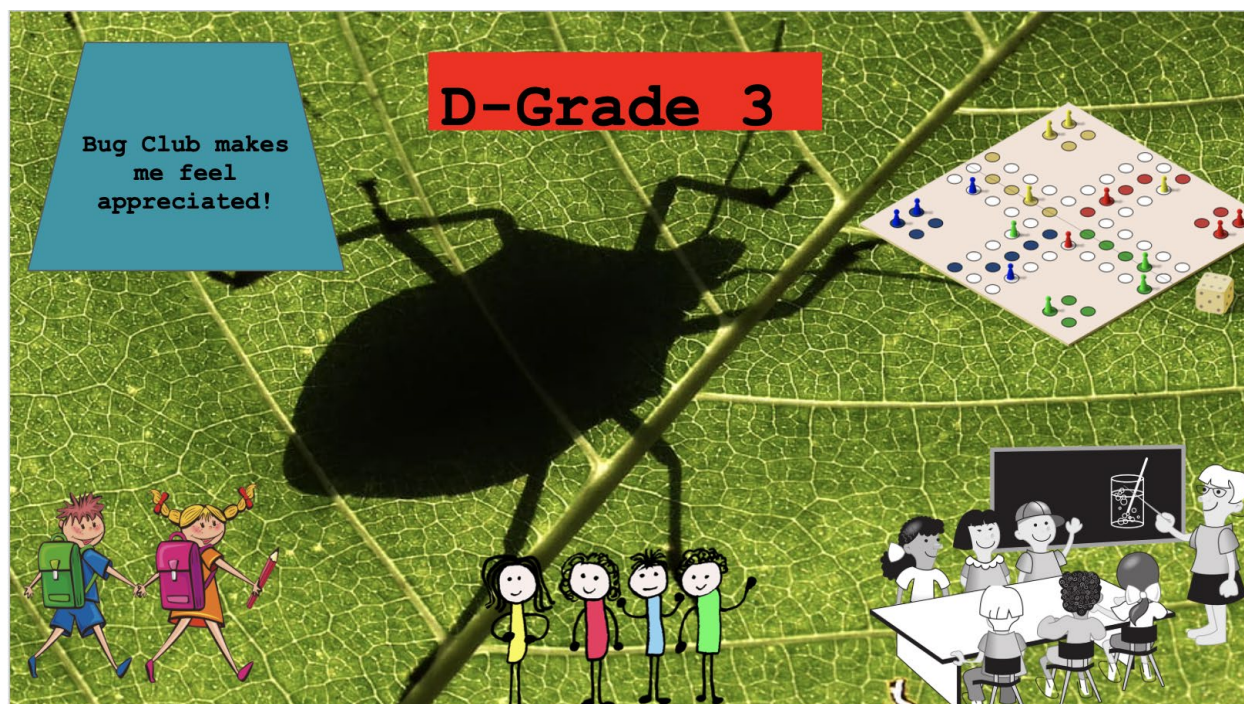
### **The Importance of Design within Online Educational Platforms**

The participants within this study distinguished that the way in which an online educational platform is designed matters to students with disabilities and the educators who teach them. Additionally, participants stated that, in particular, design—regarding color, language adaptations, and text to speech and speech to text functionalities—proved to show an increase in

the equity gaps within online educational platforms. Students that the researcher worked with found the reading and discussion parts of the unit easy, but struggled with navigating the technology, in this case, google slides. More specifically, they enjoyed the group discussions and stories centered around inclusion, but felt challenged when it came to creating their digital posters. A few students relayed that google classroom felt a little “touchy and at times hard to find things.” However, by the end of the unit, student participants felt proud of their accomplishment. They additionally felt that they understood Google slides better than they did when they began.

For instance, Student D thoroughly enjoyed the readings of *My Name is Yoon* and *This is a School*. Class discussions relayed that Student B feels encouraged and included by his third grade teacher. He expressed that she does so by incorporating many games into instruction. He additionally felt most included with his peers during times of play or in clubs within the school. Student D enjoyed creating his digital poster through google slides, although was very hesitant at first. This was not necessarily because he didn't want to complete the project, but rather because of his struggles focusing. He explained that his favorite part of this project was that he got to choose any type of picture he wanted. Student D struggled the most with beginning this project, given he struggles with his executive functioning skills. He furthermore struggled with making images smaller within the slide. He thoroughly enjoyed making the background and other images whatever he wanted. When he had the chance to share his digital poster, he was nervous at first but gradually became excited to show his work. By the end, he had the biggest smile on this face.

*Figure 1*  
*Student D Digital Poster*



Student D, a spunky third grade boy who loves being in nature, felt most included within the clubs at his elementary school and said: “Other kids asked me if I wanted to join the bug club. It made me feel good and appreciated.” Student D also has Autism and often struggles with student interactions. However, he has really found himself and opened up to a group of students who started a bug club. This group experience within his school has made him feel a part of something and very included. Student D also spoke of how he included the color green in the design of his digital poster because it makes him feel calm.

### ***Design and Color***

Through extensive interviews of students within the Special Education program, it became apparent that design and the color determined whether a child wanted to interact with an online educational platform. Student D is a 9 year boy in the third grade. He loves bugs, construction sites, aliens, and anything to do with building. He is on the Autism Spectrum, and

often finds it hard to concentrate for extended periods of time. He has goals centered around executive functioning (e.g., task initiation), addition & subtraction facts, and writing. Student D expressed that he was more drawn to an online educational game if it contained a character, animal, or specific thing he liked. He explained that he really likes learning games, and expressed that games that include things he is interested in are more likely to make him want to play.

Student B, was a 8 year old second grade student. She finds joy in skiing with her brother, playing games with Ms. D (SP), the color purple, and learning how to be a better friend to others. Student B is both on the Autism Spectrum and has Attention Deficit HyperActivity Disorder (ADHD). She is incredibly bright but lacks executive functioning skills (e.g., task initiation), which is why she receives SPED accommodations. Student B is easily distracted and can often be found in the classroom organizing her pencil box instead of doing work. Student B expressed that color played a major role in how engaged she felt in certain games. This student, in particular, expressed that the color purple makes her feel calm and that colors tended to determine whether she wanted to play an online educational game. If games had too many buttons or too many different bright colors, she felt more distracted, and wouldn't feel as productive as she would like. When student B feels calm, she feels productive. She also expressed that the reading she has to do on her computer is very distracting because the paragraphs feel very long and the writing is so little. She explained how she reads very slowly and finds it easier to read with a larger font. This can be true of many students who have Attention Hyperactivity Disorder, and many teachers often print out books or math pages with a larger font.

### *Flexibility*

There was broad consensus, among the educators, that many of the online educational applications were slow and often did not work right. For instance, Ms. D (SP), whose learning games never bore students, explained that many of her learners lost interest with the applications she was supposed to use. Many of her students have learning disabilities (e.g., ADHD, Autism) in addition to their speech disorders:

The apps are often slow to load and many times don't work properly. I feel that it is important that apps work simply, especially for someone like SO [a student]. I would love to use an app that's just simple to the point. For those who are impaired with processing and expressing language, these apps are not well presented. All in all, I found these apps very limited.

Ms. D conveyed that students who have memory processing disabilities, or those who are impaired struggle with complex apps and online platforms. It has become evident through this interview that apps and online educational platforms should be clear, simple, and easy to navigate.

Mrs. S (SPED), who uses technology everyday in her teaching, described online platforms that worked really well and many that still have user equity gaps. For instance, one online program she uses every day called Sondag has proven to be effective. However she has had to adapt some of her teaching strategies because of how inflexible the platform operates. She finds that, "Sondag is a little stiff, still, I think it would be nice if it was more flexible. When I'm using it to teach, and if I'm changing what card I'm trying to show them, there's five steps to do so." She emphasizes the importance of simplicity, especially for the time constraints that she has with the children within her classroom. If she needs to continuously remember how to use a

platform, then special education students are losing valuable learner minutes. It was also conveyed that Sonday has a lag in time when switching between learner activities. This additionally affected teaching time and whether students were getting enough minutes. Mrs. S also uses CO writer, which serves as a speech to text tool. It also matched students' reading level to books that had read-along functionality through its text to speech function. While somewhat useful, Mrs. S felt challenged by the delay through which students still had to manually search for books that they wanted to read instead of searching with voice. This design flaw made it harder for students who have specific learning disabilities in reading and writing to find a book they would like to listen to.

### ***Teacher Navigation***

It was widely reported that many of these online educational platforms were difficult for educators to navigate. Mrs. S (SPED), who had continued to educate herself within the educational digital world, expressed that during the pandemic many educators, including herself, struggled to learn and implement educational platforms such as zoom, google classroom, google docs, google meet, google slides, etc. Mrs. S felt particularly challenged learning to use Zoom and the applications within this platform. She recalled how she wished she could use functions such as the whiteboard, but struggled using multiple windows at the same time. She felt that this application did not have the ease of use that she felt she needed. She also conveyed how there was not enough time to properly learn how to use these types of applications and that many educators had to jump right in and learn as they taught. Many of the professional educators who have been teaching for over ten years felt both challenged and frustrated with online educational platforms. In fact, many educators would have liked it if their schools provided classes in which they could learn how to use these platforms, instead of being expected to learn to navigate them



on their own.

### **Inclusive Practices: Digitally and in Person**

Both student and educational professionals identified inclusion as being crucial for learning both in person and through digital platforms. Additionally the research highlighted when students felt the most included within online and in person learning, and how many felt that digital learning wasn't inclusive. Educator professionals also described the role and lack there of inclusion during a time of online learning.

#### ***Students Define Inclusion***

Students participated in a series of class readings and discussions centered around inclusion. After these lessons, readings, and discussions took place students had the opportunity to create a series of digital posters (via google slides). These posters were meant to demonstrate what inclusion means to them. Students expressed a feeling of empowerment and excitement when completing their posters.

Student B, a second grader, who loves the color purple and making new friends, also said that she felt most included during times of playing games with friends. She explained that this happened both within the classroom and out at recess. She has autism, which often makes it challenging for students with this condition to understand other children's facial expressions and many social cues. However, Student B longs for friendship connections. Ms. D (SP) had been helping Student B with social interactions with a group of girls in her class and will role play scenarios with her (e.g., playing a game at recess) that she can put into practice at recess time.

Figure 2  
Student B Digital Poster



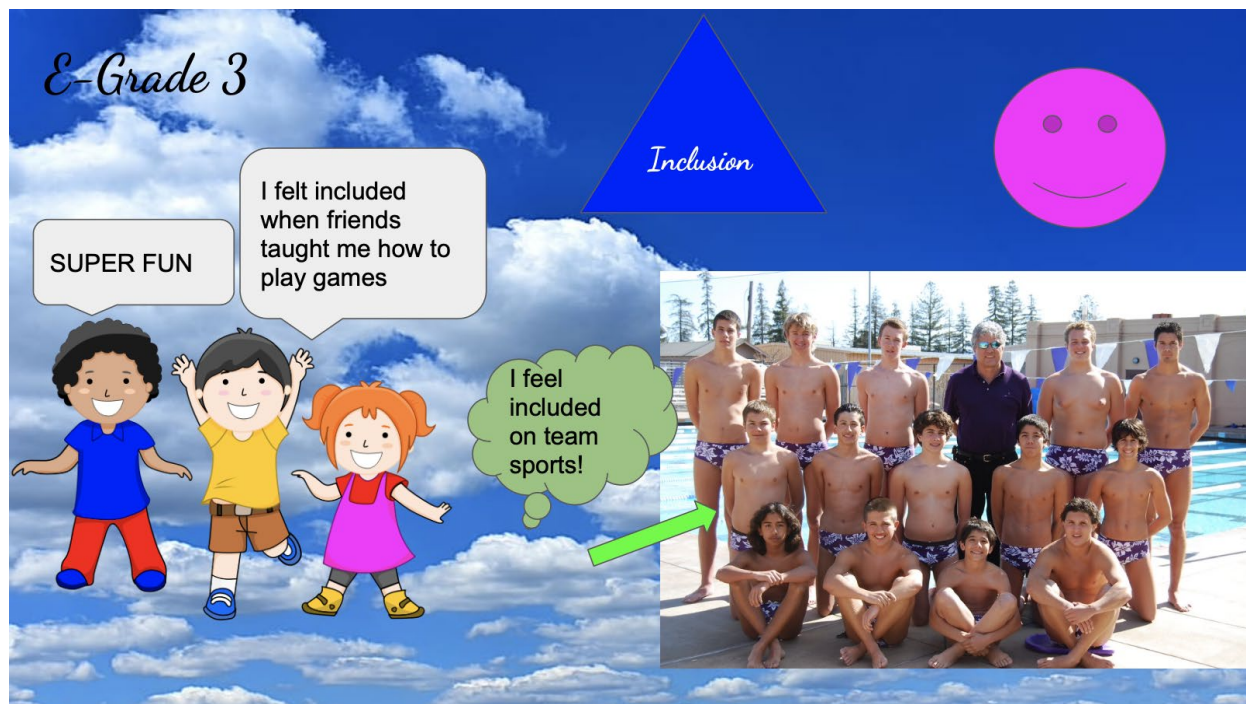
After reading the books *My Name is Yoon* and *This is a School*, student B participated within a series of classroom discussions where she got to think deeply about what inclusion means to her and where she feels the most included. She stated that she makes others feel included within the classroom by helping a fellow classmate when they can't find something or do not know how to solve a problem in their workbook. She explained that her brother, her friends, and her swim team are where she feels the most included. After the completion of her digital poster she expressed that she liked getting to learn how to create a poster in google classroom and her favorite part was that she got to make the background purple. Student B struggled at first with getting to know this online educational platform but over the course of a few sessions got the hang of it. Student B also noted that the color purple made her feel a sense of calmness, which is why she included it in her digital poster. Student B defined inclusion as

making everyone feel welcome and loved within the community. Her specific community, school, makes her feel safe and equal among her peers.

Student E was a nine year old third grader diagnosed with Attention Deficit Hyperactivity Disorder, who enjoyed being outside. His goals were primarily in executive functioning, reading, and writing. He was social, full of energy, and regularly had kind things to say about his peers. Although student E struggles with executive functioning, he exhibited eagerness to learn. After the unit on inclusion, he described how he felt most included during recess:

Sometimes at recess someone will come up to me. And they can ask, “can I play?” And we said, “Sure”. And then we could pair up, like good players. If it's not equal teams, we could just pair up good players, and really good players. This way everyone gets to play.

*Figure 3*  
*Student E Digital Poster*



Student E was thrilled when he heard that the unit was going to end with him getting to use google slides. He is a very creative child at heart and can focus well when his hands are moving,

so he is very comfortable with the computer. The readings of *My Name is Yoon* and *This is a School* brought forth challenges for him and he lost focus very easily. His favorite parts in his poster included speech bubbles and the shapes he put in. He explained that he felt most included with his friends at school, on his swim team, and during recess playing games. Student E expressed how the color blue made him feel a sense of calmness, which is why he chose to include it within his digital poster.

The students who were interviewed had many interpretations and key examples from their own lives defining what inclusion meant to them. Special education students who were interviewed highlighted that everyone has different ways in which they successfully learn. They explained that, for many learners, there is extra help needed, while others don't need as much. To these particular three learners, inclusion means ensuring that everyone feels safe and welcome at school. Whether this be in person or online, these students expressed that inclusion means students and teachers are kind to one another, always willing to show a helping hand, instruction is differentiated, and that digital forms of education meet the needs of all learners. The students all identified green, purple, and blue as calming colors. All three of these students naturally included all three of these colors within their posters.

### ***Inclusive Teaching: Learning Behind a Screen***

Another common theme amongst all of the student participants was that students did not feel that learning during the online learning was equitable. Students described sitting all day in front of screens as a major challenge for them and those within this resource center found it hard to concentrate and sit still. Student B expressed, "You're just looking at a screen the whole entire day. Yeah, so it felt bad. And it's not like it's a tv or something. It was boring. So extremely boring. And often, it is hard to sit still." Students who have learning disabilities such as Attention

Hyperactivity Disorder and Autism often have difficulties remaining still and concentrating, so online learning only heightened challenges that come along with learning. Student D, a third grader on the Autism Spectrum conveyed, “To be alone at home with a screen in your face all day made me feel far away from my friends.”

Online learning made these young elementary students feel lonely and disconnected from their peers. Overall, they did not feel that this form of learning was inclusive, nor did they feel connected to each other. When looking at inclusive and equitable practices, it is critical that the community of learning feels accessible both in terms of relationships and capacities. Educator participants similarly voiced that online learning during the pandemic made students within the special education sector fall behind academically. Students receiving academic support in Special education could not receive their full amount of minutes, which caused them to get behind during the period of online learning. Mrs. S (SPED) explained:

We couldn't serve them the full time. We couldn't give them their full service. It was just that particular year, I was back to back in class with the kids in person. And so to end with one and get on with the next one was really difficult. The other thing was, at the time of the pandemic, we didn't have any online materials. So I had to create everything. The lack of online materials, and ability of teacher navigation were major struggles of educators during the period of online learning.

## **Conclusion**

The findings of this study demonstrate that there is inequity with digital learning associated with cost, ease of access, and language. This research study aimed to uncover how educational platforms and design created inclusive practices and engaging environments for students, particularly those with disabilities. It furthermore sought to examine what could be

learned from the design practices for students with special needs when these students are given the opportunity to be creative and have agency with the curricular design process through digital learning. This study additionally researched what students with special needs thought was important through user design interfaces to support everyone in feeling included.

The equity gap of online educational platforms impacts everyday curriculum. Educators have had to supplement the amount of support materials to make the technology practical for use in particular settings. There has been frustration with online platforms among both educators and students that they should have simpler designs, greater flexibility, and be free at entry. It was found that online learning isn't inclusive in that students, especially those with disabilities, felt distanced from their peers, often distracted from their learning, and within the special education sector, did not receive their full amount of minutes. It is important to educators that students of all backgrounds receive free, equitable academic support within online educational platforms.

This study showed the value of understanding that almost every aspect of education is going to have a cost. In particular, online educational platforms are very expensive, and depending on what district an educator will work in affects the funding for these platforms. Additionally, the findings indicated the importance of how these digital platforms are designed. Lastly, students who come from less wealthy populations (often English language learners) find themselves at a disadvantage with access to certain technologies and online educational tools. The research questions that were answered within this chapter were: (1)How do online educational platforms and design create inclusive and equitable user experiences for students, particularly those with disabilities? (2)What can be learned from the design practices for students with special needs when these students are given the opportunity to be creative and have agency

with the curricular design process through digital learning? (3) Do students with special needs feel included in person and online learning?

## Chapter 5: Discussion

The research within this study proved to have many findings and highlighted the importance of cultivating equity within online educational platforms as well as a student and teacher perspective of inclusion. First, there are many equity gaps within online educational course designs. Second, the participants additionally distinguished that the way in which an online educational platform is designed matters to students with disabilities and the educators who teach them; with color, language adaptations and text to speech and speech to text functionalities highlighted. Lastly, students want to feel a sense of inclusion both in person and on digital platforms, which occurs through their interests, senses of feeling in relationship to their peers and seeing reflections of their identity in color and design.

The following will examine the importance of using equitable online educational platforms for students in special education, and English language learners. This discussion will highlight similarities and deficits of the research findings and the literature review. It will additionally outline the implications for the literature, practice, and policy.

There were many similarities within the findings of this study that mirrored the literature review. The research further reinforced the importance of assistive technologies as it pertains to students who are in special education (Ahmed 2018). This connects to the current research as it was found that assistive technologies such as Co-writer have helped students with specific learning disabilities convert speech to text.

The literature review further analyzed that there is a deficit in the quality of accommodations around web design (Pendergast 2015). It additionally explained the significance of learning management systems moving toward equitable and adaptive technology for students with disabilities (Pendergast 2015). This mirrors the research findings in the way that there was a



broad consensus among educators that many online applications were slow to work, inflexible, and not entirely equitable for students with learning disabilities. It will dive into possible future research and limitations of this research study.

In the review of the literature, the value of the ways in which these online educational platforms were designed in reference to color and features was greatly highlighted (Adams 2017). A key theme within the research was that participants distinguished that the way in which an online educational platform is designed matters to students with disabilities and the educators who teach them. Also participants stated that in particular, design regarding color and language adaptations proved to show an increase in the equity gaps within online educational platforms.

### **Implications for the Literature**

There were a few aspects of the literature review that differed from the research findings. For instance, the way in which inclusion was defined in the literature was purely from a school and district point of view (Philips & Salem, 2021). The literature defined inclusion education as curriculums that effectively teach students who have learning disabilities (Philips & Salem, 2021). However, the research findings found definitions around inclusion that were from the point of view of the student and teachers. Furthermore, the findings found that the majority of online digital platforms required some form of cost and that many students had limited access to technology at home. Unlike the literature, findings also found that the ways in which these platforms were designed around language were limited and not equitable. Another factor was the struggles teachers and students had within these digital platforms, which resulted in a loss of teaching minutes for students with learning disabilities. The literature review did not highlight this but focused rather on the perspective of users with learning disabilities (Learning Disabilities Association of America 2020).

## **Implications for Practice and Policy**

The findings within this study provide many implications centered around inclusive and equitable online educational platforms. In reviewing these implications one must understand the equity gaps within online educational platforms, the importance of design within online educational platforms, and how students define inclusion. These implications further illustrate how the findings can be put into practice within classrooms, schools, and policies.

Implications for classrooms include lessons that can be designed to give students the opportunity to use accessible technology to creatively demonstrate the integration of learning, using techniques of design. Whole group discussions allowed students to voice their opinions and talk openly about inclusion, technology, and design. Students and educators identified google software as an equitable online educational tool because it is free, familiar, and flexible. Teachers should aim to empower students to create designs as a way of integrating learning. This can be done through creative lesson planning, supporting student work, and encouragement.

At the school level, teachers should be provided professional development meetings centered around choosing and navigating accessible and equitable online educational platforms for a particular school site or district, and taking into consideration technology that may or may not be available at home. Teachers should be given digital educational platforms that they can use effectively within their classrooms. These platforms need to be flexible, easily navigable, and language accessible. Collaboration should be facilitated with colleagues around incorporating online educational platforms within the classroom for equitable inclusion of students with learning disabilities. Additionally, schools should provide universal access to particular platforms, meaning online educational platforms should be free at the cost of entry.

School districts would benefit tremendously if the teachers had access to online educational platforms that addressed equity gaps. Students within special education and English language learners need platforms that are flexible, fast working, easily navigable, and have additional accommodations. Moreover, districts should provide their schools with the necessary platform that enables students from all demographics to succeed. An example of a platform that has proven to be equitable and free of cost is google. Many schools are implementing this into their curriculum and it has many noteworthy features such as drive, translations, slides, docs, etc.

### **Limitations of the Study and Future Research**

Through more in depth expansion of this research, additional implications could be discovered. The following limitations of this study lie below as well as possible future research opportunities.

#### ***Limitations of the Study***

Following the discovery of findings within the research, many limitations were unveiled. For instance, the number of participants was a limitation. In addition, the limitation of the study being done in a wealthy area, did not give a broader perspective of students who are struggling financially. Additionally, only the special education team was interviewed in this study. While they have a lot of experience with special education students, it could have been beneficial to interview general education teachers. Only students in the second and third grade were interviewed within this study and it may have been helpful to have perspectives of students from a wider variety of grade levels. Every participant, with the exception of one, was white, and for future research it would be best to have a more diverse population. Of the educational professionals interviewed, the majority were only women. Lastly no English language learners participated in this study, which was an additional limitation.

### ***Future Research***

This research could be extended in researching up and coming online educational platforms that aren't quite as popular as the ones that are currently being used, such as Google. One could also extend this current research to other schools in less wealthy areas and where students don't have access to the same materials. Additionally, the researcher could extend the time to research and this could give a better, more particular set of findings. Lastly, the research could and should be done with a larger age demographic of students and educators.

### **Conclusion**

Technology is a lifeforce nowadays within school ecosystems. It's used for reading, writing, math, research methods, projects, etc. It has ingrained itself into every subject, and every classroom. The number of students with learning disabilities and English language learners continues to grow within our schools, and it is crucial that technology catches up. Technology is not going anywhere and it is important that online educational platforms are created with equity in mind for this demographic of students. These online educational platforms should be dynamic, flexible, accessible, familiar, provide language translation services and allow students to honor their strengths with their work.

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**Appendix A IRB Approval Letter**





Jan 23, 2023

Grace Mosher 50 Acacia Ave.  
San Rafael, CA 94901

Dear Grace,

On behalf of the Dominican University of California Institutional Review Board for the Protection of Human Participants, I am pleased to approve your proposal entitled *How educational learning environments within online course design and user interface can be more inclusive and equitable* (IRBPHP Initial IRB Application #[11080]).

In your final report or paper please indicate that your project was approved by the IRBPHP and indicate the identification number.

I wish you well in your very interesting research effort.

Sincerely,

Michaela George, Ph.D.  
Chair, IRBPHP  
Cc: Matthew E Davis

## Appendix B