EDUCATORS' PERCEPTIONS FOR LOW PERFORMANCE ON MATHEMATICS STATE ASSESSMENTS AMONG HIGH SCHOOL ALGEBRA STUDENTS WITH LEARNING DISABILITIES IN AN ALTERNATIVE EDUCATION PROGRAM IN CALIFORNIA: AN EXPLANATORY CASE STUDY

by

D. Sung Choe

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

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Abstract

This case study addressed educators' perceptions regarding the low performance on state mathematics assessments among high school algebra students with learning disabilities in an alternative education program in a California school district. Vygotsky's theory on the zone of proximal development served as the overarching framework for mathematics content that students with learning disabilities in the alternative education environment should learn at various stages of chronological age. The central research question was: What are educators' perceptions of low performance on mathematics state assessments among high school algebra students with learning disabilities in an alternative education program in California? The methodology used was the qualitative intrinsic case study approach drawing from a sample of 60 educators at Alpha County School District in California. The data was collected from a survey, individual interviews, and archival records of student transcripts and state mathematics assessment results from 2016 to the present. A synthesis of this data analyzed generated a theme and two sub-themes for all educators in AE programs to consider when implementing math curricula and instructional strategies to support students with LD in AE settings to improve their performance on state mathematics assessments in algebra.

Keywords: alternative education, special education, mathematics assessments, educators, algebra

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Dedication

I dedicate this dissertation to God, my creator, from whom all good things flow! His mercies and blessings never cease.

To my wife, who gave me space, time, and encouragement to keep writing.

To our children, may you always remain in the center of God's will.

To my colleagues at school who provided me with their time and insights.

To the loving memory of our Cosmo. One day, we will see each other again.

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List of Abbreviations

Alpha County School District (ACSD)

Alternative Education (AE)

California Assessment of Student Performance and Progress (CAASPP)

California Commission on Teacher Credentialing (CA CTC)

California Department of Education (CA DOE)

Elementary and Secondary Education Act (ESEA)

Emotional Behavior Disorder (EBD)

Evidence-based Intervention (EBI)

Flipped Classroom (FC)

Free appropriate public education (FAPE)

Individual Educational Program (IEP)

Individuals with Disabilities Education Act (IDEA)

Learning Disabilities (LD)

Mathematics Learning Disability (MLD)

Multi-Tiered System of Supports (MTSS)

Positive Behavioral Interventions and Supports (PBIS)

School-wide Positive Behavior Interventions and Supports (SWPBIS)

Specialized Academic Instruction (SAI)

Science, technology, engineering, and mathematics (STEM)

Specific learning disability (SLD)

Student Programs and Services (SPS)

Students with disabilities (SWD)

Technological Pedagogical Content Knowledge (TPACK)

Universal Design for Learning (UDL)

Video-based Instruction (VBI)

Virtual Manipulatives (VM)

Zone of Proximal Development (ZPD)

CHAPTER ONE: INTRODUCTION

Overview

As a marginalized group of individuals, the lifetime earning capacity of students with learning disabilities (LD) in alternative education (AE) settings will continue to decline in a post-COVID-19 economy (binti Jamal & bin Mohd Rashid, 2023). High school students with LD may have difficulty obtaining employment (Taylor, 2016). These individuals may earn more than $200,000 less in income during their adult lives than their counterparts in the general education setting (binti Jamal & bin Mohd Rashid, 2023; Taylor, 2016). With about 550,000 students enrolled in AE programs in the United States (Aspiranti et al., 2021), youth face barriers to employment after involvement with the juvenile justice system (House et al., 2018). To offset these income losses, these students should obtain, at minimum, a high school diploma. One potential measure of high school reading, writing, and arithmetic proficiency may be the state standards test administered toward the end of each academic year. High school students with LD in AE learning environments have generally struggled to achieve basic proficiency levels on the state mathematics standards test since the 1960s. Minimal research exists on special education and mathematics assessments in an AE setting (Ballard & Bender, 2022; Özdemir & Kılıç, 2023; Phillippi et al., 2021). More in-depth research could provide valuable insights into ways to help educators create a more effective learning environment for students with LD in AE settings. This chapter reviews Vygotsky's theory on child development and zones of proximal development (ZPD) as an overarching framework (Vygotsky, 1986; Vygotsky et al., 1979). This chapter provides an overview of AE's background, including historical, social, and theoretical contexts, the problem statement, the significance of this study, and research questions.

Background

Further research is required on state-level math assessments for students with learning disabilities in AE settings. The imperative to establish a clear definition of AE, the dynamic nature of AE in the United States, and the need to enhance mathematics instructions for students with LD have driven the development of AE (Ballard & Bender, 2022; Kumm et al., 2020). Foundational studies on AE (Lange & Sletten, 2002) paved the way for other research (Aron, 2006; Fortems et al., 2023; Zhang et al., 2011); however, there continue to be gaps in literature over the years the intersect the study of AE, special education, and mathematics. This section will delve into the historical, societal, and theoretical contexts of special education, AE, and mathematics.

Historical Context

Since the 1960s, AE in the United States supported at-risk students from dropping out of school (Aron, 2006). There needs to be more consensus over a working definition of AE (Ballard & Bender, 2022; Grasley-Boy et al., 2021; Kumm et al., 2020; Schornack & Karlsson, 2021). A possible working definition of AE encompasses educational activities outside the scope of traditional K-12 school systems (Aron, 2006; Lehr et al., 2008; Young, 1990). AE programs remain public, provide nontraditional education, and cater to students' needs that regular public schools do not (Porowski et al., 2014; Sable et al., 2010). These AE programs remain outside the purview of regular, special, or vocational education (Sable et al., 2010). AE programs adapted to diverse student needs over time (Lange & Sletten, 2002; Sable et al., 2010). Students who are at risk of falling behind academically often attend AE programs. Traditional public-school settings fail to adequately address higher-risk students with learning disabilities or a higher likelihood of dropping out (Lange & Sletten, 2002).

AE programs serve multiple purposes despite different categorizations. AE programs address behavioral, counseling, special education, and credit-lacking students (Kumm et al., 2020; Modesto, 2018). Students with LD may also exhibit these characteristics with addiction concerns. Therefore, AE programs have evolved to the point where a single AE program can provide services that cross all three types of historical AE programs. This case study explores one American school district that offers juvenile detention centers, charter schools, credit recovery programs, special education services, and social-emotional counseling services to these different instructional settings for at-risk students.

The California Department of Education (CA DOE) establishes instructional guidelines for kindergarten through twelfth grade (CA DOE, 2021). Specifically, if seventh or eighth-grade students do not meet Algebra 1 requirements, they must pass the Algebra 1 requirement during their high school years. Schools assume that students have acquired the necessary knowledge in previous classes at an earlier age and should have maintained this knowledge when taking high school algebra classes. Students of different ages ranging from 14 to 18 compromise the same algebra class. To fulfill a graduation course requirement, the same algebra class often includes students with LD, regardless of their intellectual ability. While teachers may use various instructional strategies, such as Universal Design for Learning (UDL) methods, such instruction may only suit some students in a group setting.

Social Context

The evolution of AE programs in the United States reflects an effort to meet the needs of students in a changing social landscape. Originally designed to cater to students with varying backgrounds, skills, and interests, AE programs attempted to provide a personalized learning experience. Students who failed in a traditional academic setting received negative stigmatization because of AE program enrollment (Engelmann, 2022). The number of students identified as at-risk increased in the early 1970s (Lange & Sletten, 2002). These at-risk students had a more significant potential of dropping out of school due to academics, relationships with teachers and peers, and school size (Lange & Sletten, 2002). Students identified as special needs, specifically those with emotional disorders, chose AE programs over the traditional public school system. AE programs now provide educational services for juvenile detention, day reporting centers, teenage pregnancy centers, and rehabilitation facilities (Christian, 2022; Leone et al., 2002; Miller, 2019).

AE programs outside the public school system developed in two ways to reflect the changing educational landscape in the United States. First, to alleviate the substandard education minorities received in the United States, public schools were developed to provide better quality education. (Lange & Sletten, 2002). Second, non-public education opposed the existing educational system because the focus was on the community rather than the individual student. Finally, there was an overarching push for alternatives outside the standard public school system, which spurned a reform movement within the public school system (Lange & Sletten, 2002). Despite traditional AE programs focusing on incarcerated youth, students who dropped out of school, and students with emotional or behavioral issues, some AE programs were developed to meet the growing social needs of adolescent mothers (Aron, 2006; Cabral et al., 2023).

AE programs within the public school system pressed for change where educators designed other options to the conventional education available (Lange & Sletten, 2002; Young, 1990). Such schools maintained a child-centered approach involving parents, students, and teachers where there was autonomy in learning and pace, and evaluation focused on non-competition. In the 1970s, public AE programs grew from 100 to over 10,000 nationwide (Lange

& Sletten, 2002). In the 1980s, AE programs focused on children performing below-average achievement levels (Lange & Sletten, 2002). Some AE programs today have expanded into career and technical education for students traditionally identified as at-risk (Lea et al., 2022).

The changing learning environment reflected a social change that influenced teachers and students. The educational system from the 1960s evolved from an Industrial Age-based educational system (Reigeluth et al., 2017). This educational paradigm focused on a top-down approach where teachers were the sage on the stage, and students were given information to learn. As society developed into a more information-based economy, teachers were to step down from the academic stage to guide students to become creators of knowledge where learning is more student-centered (Reigeluth et al., 2017).

Theoretical Context

The sociocultural theory of cognitive development provides the theoretical framework to understand the causes of low standardized math test scores among high school algebra students with LD (Fetler, 2001; Vygotsky, 1986; Vygotsky et al., 1979). Students develop cognition based on social interactions (Vygotsky, 1986; Vygotsky et al., 1979). The teacher-student interaction in the classroom would be the most significant social interaction in a school setting for students. The lessons teachers provide would influence the students' cognitive development (Arafah, 2015; Enders & Kostewicz, 2023; VanUitert et al., 2020). Teachers' professional development using culturally competent lessons for students in AE programs would be a constructivist model approach affecting students with LD academic achievement and assessments (Polleck & Yarwood, 2020). Teaching critical literacy should be a priority for student achievement (Polleck & Yarwood, 2020). Furthermore, a literature review of AE programs and the implementation of positive behavioral interventions and supports (PBIS) that improved academic outcomes for students with emotional behavior disorders (EBD) and LD in AE program placement due to behavioral issues in differing high school grade levels (Grasley-Boy et al., 2021; Welsh, 2022). The use of evidence-based algebraic instruction and interventions incorporating manipulatives and peer-assisted learning influences mathematics achievement among students with LD (Bone et al., 2021).

The application of the ZPD is evidenced in high school algebra students with LD in the classroom. Students with LD exhibit varying levels of intellectual abilities within the same grade level. For example, high school students with LD may be in different ZPDs while in the same Algebra 1 class; moreover, each student may possess different mastery levels of basic mathematics skills within the same course. For example, based on the ZPD principle, students aged 14 or 15 may not have acquired the mathematical foundation as a 17- or 18-year-old. Teachers may only sometimes provide the most appropriate scaffolding needed individually. Other classroom constraints include inadequate instructional time given a class period, a lack of appropriate educational technologies, and class size.

Vygotsky's theory on learning and development and ZPD offers insight into why high school students with LD demonstrate low levels of mathematics mastery. The developmental process does not take a linear path of attaining knowledge but rather a mixture of individual and interpersonal exchanges (Gindis, 1999). Moreover, this trend of inclusion appears to be a particular goal of most Western school systems like the United States (Hausstätter & Vik, 2021). Schools have consistently moved to include students with LD with the mainstream population of students without LD. In this practice of inclusion, high school students with LD may be in different ZPD while in the same Algebra 1 class as their mainstream counterparts and possess different mastery levels of basic mathematics skills within the same class. Furthermore, despite best intentions and efforts, teachers may not necessarily provide the most appropriate scaffolding needed individually because of a lack of understanding of the individual student’s ZPD and sociocultural environment.

Problem Statement

The problem is that high school algebra students with LD in AE programs perform below or far below basic levels on the California State mathematics standards test despite receiving passing grades in the related algebra course. Over the past 20 years, research has suggested that teacher preparation and credentialing standards, technology, poverty, and economics offer potential explanations for low test scores (Fetler, 1999). AE programs address the educational needs of students outside the traditional kindergarten to twelfth-grade academic environment (Aron, 2006). Students in these programs are often categorized as at-risk (Fortems et al., 2023). For example, students with LD in grades 3 through 8 demonstrated a decline in mathematics achievement (Brown et at., 2019). Students with LD have an individual education program (IEP), qualifying for special education services under the category of specific learning disability (SLD). However, specific descriptions of the learning disability are not specified within SLD. Developmental dyscalculia could be a qualifying factor for special education services, given that this cognitive disorder affects the brain to conduct mathematical calculations (Košč, 1974). The literature review revealed several themes based upon this theory that influenced this phenomenon: the quality of teacher preparation in mathematics, educational technologies (Bouck & Satsangi, 2020), and appropriate instructional strategies based on the ZPDs (Vygotsky, 1986; Vygotsky et al., 1979).

Purpose Statement

The purpose of this case study was to understand educators' perceptions regarding factors that influence high-school algebra students with LD in an AE setting to score below and far below basic proficiency levels on the California math standards test despite receiving credit for the algebra course. At this stage in the research, below and far below basic proficiency levels on the math standards test will be defined through the CA Dashboard. Performance levels are defined by five-colored segments of red, orange, yellow, green, and blue from lowest performance (red) to highest performance (blue) (CA Department of Education, 2024). No differentiation will be made on the specific types of learning disabilities among high school students in this study because no distinction is made in the mathematics course vis-à-vis learning disability because the designation of SLD encompasses a multitude of disabilities (Küpper, 2000; Yılmaz et al., 2022). No differentiation is made between Algebra 1 and the Integrated Mathematics 1 courses because both classes satisfy the California state math graduation requirement. A review of records and archives dating back to 2018 will analyze the final grades of high school students with LD who completed Algebra 1 or Integrated Math 1, as well as their performance on the California math standards assessment. On May 29, 2020, Governor Gavin Newsom (CA) suspended all state student assessments through Executive Order N66-20 (CA Commission on Teacher Credentialing (CA CTC) (CA CTC, 2023). Assessment results will be examined for 2018, 2019, 2021, and 2022 spring semesters. Data will be collected from one California school district.

Significance of the Study

This study could influence special education in supporting high school students with LD and mathematics learning in diverse learning settings. This study can potentially influence instructional methods, mathematics curriculum, and professional development opportunities for all teachers and administrators who work with students with LD (Enu, 2021; Nindiasari & Yuhana, 2020; Riyati & Suparman, 2019). Numerous factors influence high-school algebra students with LD during mathematics instruction and their state math standards test performance. Before, during, and after the COVID-19 pandemic, levels of teacher preparation, advances in educational technologies, and instructional strategies influenced how students with LD mastered algebra content in preparation for the California math standards test (Alabdulaziz, 2021; Averett, 2021; Choate et al., 2021). While incorporating various educational technologies, instructional strategies such as UDL and the flipped classroom influenced student mathematics learning (M.K. Kim et al., 2014). Furthermore, instructional time for students in AE programs has been sacrificed for other issues addressing social-emotional counseling, suspensions, and expulsions (Minkos et al., 2023; Phillippi et al., 2021).

Theoretical

The theoretical significance of this study contributes to an understanding of Vygotsky's sociocultural theory of learning from the perspective of AE learning environments. Accordingly, students learn from social interactions. If students in AE environments spend more time addressing counseling issues, students may learn that academic learning may take a secondary position in the importance of a learning environment. AE programs focus on supporting students' social-emotional health through counseling services, especially in a post-COVID-19 environment (Minkos et al., 2023; Phillippi et al., 2021). This study could add to the theoretical literature in providing appropriate grade-level mathematics instructional support that correctly addresses the ZPD levels for students with LD in AE environments.

Empirical

The empirical significance of this study will add to the literature on AE in general and fill the gap in the literature through a study on the performance of high school students with learning disabilities in AE settings on algebra assessments (Moh'd et al., 2021; Yamchi et al., 2021). Examining student grades and results from state math assessments will provide discussion areas for educators in examining the mathematics curriculum, instructional strategies, and specific mathematics skills students with LD should focus on in AE settings. This study fills the gap from the perspective of educators working with students with LD in the AE environment regarding why these students perform below or far below basic proficiency levels in the state mathematics tests.

Practical

The practical significance of this study is to support students with learning disabilities, their families, teachers, and administrators in AE programs with knowledge to better address mathematics learning. Students with learning disabilities in AE settings are a marginalized group of students. Being categorized as an at-risk student has a stigma of being a problem child. This study has the potential to offer teachers and administrators working with students with LD in AE environments the additional skills to help these students overcome math anxiety and perform better on state math assessments (Ennis & Losinski, 2020; Mulcahy et al., 2023; Myung & Hough, 2020). Educators can reflect upon their teaching practices based on their fellow educators' perceptions without fear of reprimand or reprisal. At an organizational level, this study lays a foundation for future research into mathematics professional development. Regarding the field of special education, this study begins the discussion of the learning disability of dyscalculia in AE.

Research Questions

This qualitative explanatory case study aims to explore educators' experiences with high-school algebra students with LD in AE learning settings and performances on the CA state math California Assessment of Student Performance and Progress (CAASPP) (CA DOE, 2024). All students in California from grades three through twelve will take the Smarter Balanced Summative Assessments, California Alternate Assessments, California Science Test, and the California Spanish Assessment (CA DOE, 2024). This study will address the mathematics portion of the Smarter Balanced Summative Assessment that tests students' knowledge of Integrated Math 1 or Algebra 1 concepts. Tusing a co support student achievement on these types of assessments, educators have incorporated various educational technologies, instructional strategies like the UDL and the flipped classroom (FC) to support mathematics learning (Galindo-Dominguez, 2021; Howell, 2021; Jdaitawi, 2021). However, students with LD in AE programs often lack instructional time due to suspensions and expulsions from school (Fortems et al., 2023). This study could provide new insights into the ZPD of students with LD in AE learning environments for educators to use during math curriculum development and instructional strategies. This study attempts to answer the following central research question and sub-questions.

Central Research Question

What are educators' perspectives on possible explanations for the low performance on mathematics state assessments among high school algebra students with learning disabilities in AE settings despite receiving graduation credit for Algebra 1?

Sub-Question One

What are educators’ perceptions of mathematics training and professional development addressing high school students with LD in an AE environment?

Sub-Question Two

What are the attitudes of educators towards technology in the learning of algebraic concepts among high school students with learning disabilities in AE settings?

Sub-Question Three

What are educators’ experiences with the zone of proximal development math skills needed by students with learning disabilities to acquire algebraic knowledge in AE settings?

Definitions

The terms used in this paper are commonly known. Below is a list of terms with abbreviations that remain broad and require clarification.

1. *Alternative education (AE)* - While the federal definition of AE remains broad, AE programs are intended to educate at-risk students within the traditional education system (Ballard & Bender, 2022).
2. *Computer-aided instruction (CAI)* - Using a computer to provide educational instruction (S.J. Kim & Xin, 2022).
3. *Dyscalculia* - An inability to acquire knowledge of basic math facts, numerical quantities, and calculations (Mutlu et al., 2022).
4. *Video-based intervention (VBI)* - Video modeling of instruction (Satsangi et al., 2021a).

Summary

The problem is that high school algebra students with LD in AE programs perform below and far below basic levels on the California state mathematics standards test despite receiving passing grades in the related algebra course. The purpose of this case study will be to understand educators' perceptions regarding factors that influence high-school algebra students with LD in an AE setting to score below and far below basic proficiency levels on the California math standards test despite receiving credit for the algebra course. This case study considers educators' perceptions of low-performance levels on state mathematics assessments among high school algebra students with LD in an AE academic setting. While AE provided services for at-risk students in the United States since the 1960s, further research on the intersection of AAE, special education, mathematics assessments, and educator perspectives is essential to stop the low performance on math assessments by students with LD. Since its inception, there has been no consensus definition of AE; moreover, given the growing diversity of students where the traditional public education system may not be suitable, AE programs have grown to reflect this diversity. Considering a social constructivist perspective, Vygotsky's ZDP offers insights into the learning environment and mathematics content instruction students with LD should be taught in AE settings. An examination of student records and interviews from administrators could provide further insight into better understanding low-performance levels of state math assessments of students with LD in an AE environment.

CHAPTER TWO: LITERATURE REVIEW

Overview

A literature review was conducted to explore low standardized math test scores among high school algebra students with LD in California from the perspectives of teachers and administrators responsible for special education services in an AE learning environment. Vygotsky's theory on ZPD and child development serves as the overarching framework during this literature review (Vygotsky, 1986; Vygotsky et al., 1979). Contemporary research on mathematics assessments and high school students with LD in AE settings is lacking. An analysis of recent literature is provided on AE, special education within AE learning environments, and mathematics and special education in AE settings.

Theoretical Framework

Vygotsky's sociocultural theory of cognitive development provides the theoretical framework to understand the low performance on state standardized math tests among high school students with LD in an AE learning setting. Vygotsky's views on ZPD and the social interactions among students, teachers, staff, and family members (Probine & Perry, 2021) are fundamental to understanding how a child learns (Gindis, 1995). This theory provides the framework to explore the connection between mathematics academic content and skills possessed by high school algebra students with LD various issues (Vygotsky, 1986; Vygotsky et al., 1979). The ZPD describes the distance between actual development or achievement and where the student could achieve with adult support (Vygotsky et al., 1979). ZPD reveals a general gap between what high school students with LD enrolled in the Algebra 1 course should have learned and what prior knowledge was needed to acquire new knowledge successfully. The ZPD should guide the instructional aspects of mathematics learning in the AE environment.

As the widely accepted founder of the sociocultural theory of cognitive development, Lev Semenovich Vygotsky (1896-1934) believed that learning occurs through social interactions (Mahn, 1999). Despite growing up in a time of political and economic unrest, he believed the principles of historicism and social determination of behavior could transform the individual (Moll, 2013). Vygotsky viewed Pavlov's theory of conditioned reflexes as a foundational component of the sociocultural theory; however, Vygotsky qualified Pavlov in that social interactions influenced the development of the organism – the individual (Moll, 2013).

Vygotsky challenged the traditional belief that children with special needs should be treated through the lens of biology but through an understanding that disability influences social relationships (Vygodskaya, 1999). Special education should prevent, correct, and build up the skills which children lack (Gindis, 1995). The developmental process does not take a linear path of attaining knowledge but rather a mixture of individual and interpersonal exchanges (Gindis, 1999). Vygotsky believed that a comprehensive study of the child was crucial and that making a solid connection between the child and parents lays the foundation for providing the necessary support (Vygodskaya, 1999). The magnitude of ZDP reflects each child's learning potential (Gindis, 1995). Students with LD may achieve at different rates while in the same chronological age grouping of the ZDP. The causes of these differences vary from different types of learning disabilities and socioeconomic environments (Fetler, 1999).

High school students with LD taking Algebra 1 courses may receive the same academic content; however, these students may also be of different chronological ages. The math knowledge among these students would vary because older students would have been exposed to more math content than younger students. Students need to receive the appropriate instruction at each grade level. High school students with LD may be in different ZPDs while in the same

Algebra 1 class; moreover, each student may possess different mastery levels of basic mathematics skills within the same course. Based upon Vygotsky’s ZPD, students aged 14 or 15 may not have acquired the mathematical foundation as a 17- or 18-year-old. Teachers may not necessarily provide the most appropriate scaffolding needed on an individual basis because of a lack of understanding of the individual student’s ZPD, learning disability, and sociocultural environment.

Vygotsky’s theory on learning and development and ZPD offers insight into why high school students with LD demonstrate low levels of mathematics mastery. The development of students with LD results from social learning and includes how the child has internalized cultural and social relationships (Gindis, 1995). This trend of inclusion appears to be a particular goal of most Western school systems like the United States (Hausstätter & Vik, 2021). Schools have consistently moved to include students with LD with the mainstream population of students without LD. In this practice of inclusion, high school students with LD may be in different ZPD while in the same Algebra 1 class as their mainstream counterparts and possess different mastery levels of basic mathematics skills within the same instructional setting.

Related Literature

This section's purpose is to synthesize the existing literature on topics addressing low mathematics standardized test scores among high school algebra students with LD in AE settings in a California school district. This section addresses the existing literature on AE, special education in AE programs, and mastery on the state standards mathematics tests. With a growing focus on science, technology, engineering, and mathematics (STEM) in high school education, students with LD may be disadvantaged, given the academic focus on advanced curricular topics instead of necessary scaffolding in basic mathematics skills. Moreover, a greater emphasis on socio-emotional counseling encroaches on the finite number of instructional minutes available to students during the school day. Educational institutions and practices must focus on more significant student-focused learning in a rapidly changing economic system to meet the educational requirements of an information age-based economy (Reigeluth et al., 2017). If state assessments are benchmarks for future college and career preparation, students with LD in AE settings deserve the best possible educational services (CA Department of Education, 2024).

The California (CA) DOE sets academic standards in English, social science, mathematics, science, physical education, and electives for all public schools in California to address (CA DOE, 2021). CA high school students must pass the Algebra 1 requirement during secondary education (CA DOE, 2021). Schools assume that students have acquired the necessary knowledge in previous classes at an earlier age and should have maintained this knowledge when taking high school algebra classes. Students of different chronological ages (14 to 18) are grouped in the same algebra class regardless of the high school grade level the students are in if these students have not met the algebra graduation requirement. Furthermore, students with LD are generally grouped in the same algebra class regardless of intellectual ability to meet class scheduling purposes. While teachers may scaffold and use instructional strategies like UDL, such instruction may not necessarily be the most appropriate for individual students within a group setting.

Despite a general lack of research on mathematics assessments among high school students with LD in the AE learning environment (Ballard & Bender, 2022; Gersib & Mason, 2023), four themes emerge from this literature review: (1) there is an increasingly growing population of students with LD positively affecting the growth of AE program, (2) AE programs tend to focus on social and behavioral issues rather than academic learning (Ballard & Bender, 2022; Kumm et al., 2020; Minkos et al., 2023), (3) a general lack of teacher preparation in mathematics to support the academic content needs of students with LD (Patrick et al., 2023), and (4) appropriate implementation and incorporation of instructional techniques positively affect student achievement levels (Valdez & Maderal, 2021).

This literature review will address an overview of AE, special education in AE programs, and mathematics and special education in AE programs. The AE overview will include a discussion of the characteristics of AE students and the instructional setting and focus of AE programs. The section on special education in AE programs will address IEP implementation, AE teacher training and students with LD, the potential inappropriate disability identification of students with LD, and technology and special education. The section on mathematics and special education in AE programs will include a discussion of mathematics testing and the ZPD and mathematics in special education.

Overview of AE

AE in the United States stems from the 1960s (Aron, 2006). While there is no universal definition of AE, an AE school is a public K-12 school that addresses student needs that are typically unmet in regular school (US DOE, 2017). AE programs provide educational services to students who were not successful in the general education setting of a public school because students were failing academically or having learning difficulties because of disabilities, behavioral challenges, or poor attendance (Azid et al., 2022; Fortems et al., 2023; Kumm et al., 2020; McGee & Lin, 2020). Many AE programs focus on students' behavior in these institutions (Aspiranti et al., 2021; House et al., 2018; Minkos et al., 2023). A large portion of AE history emphasizes the emotional and behavioral aspects of students over academics. AE programs have historically focused on three characteristics of students: dropout prevention, special education, and at-risk challenges (Afacan & Wilkerson, 2024; Lange & Sletten, 2002; Moore et al., 2020). In this study, this school district provided AE services for students enrolled in juvenile detention centers, substance abuse day treatment centers, community schools, and a charter school (Christian, 2022). The following subsections will address the characteristics of students enrolled in AE programs and the instructional settings and focus of AE programs.

Characteristics of Students Enrolled in AE Programs

Students enrolled in AE programs have historically been categorized as at-risk students. Many AE programs address at-risk students expelled from traditional public schools for disciplinary reasons (Engelmann, 2022; Ohrt et al., 2021). The characteristics of at-risk students have expanded to include school dropouts, students with disabilities, incarcerated youth, pregnant teens, and students with emotional, behavioral, and substance abuse challenges. AE schools have evolved from the 1970s to reflect the changing needs of society and are becoming more commonplace to address the educational needs of students who have needed more success in the traditional school setting (Aron, 2006; Meador, 2020; Pettit, 2023). The historical trend of AE programs expanded services that initially focused on school dropouts to students with disabilities and students with high-risk health behaviors (Lange & Sletten, 2002; Moore et al., 2020).

Additional characteristics of the AE population included those students disenfranchised with the school system because of social, economic, and political issues over social injustice (Aspiranti et al., 2021; J. These juveKim & Taylor, 2008). Students with special needs comprise a large AE environment population (Fortems et al., 2023; Mathur et al., 2021; Moran, 1991). AE programs later developed to disproportionately include a large segment of students from poor, disabled, bilingual, and minority groups (Guerin & Denti, 1999; Mallett et al., 2023; Welsh, 2022). Youths in the juvenile correctional system make up a significant minority number of students with learning disabilities (Leone et al., 2002; Moran, 1991; Ochoa et al., 2021). These juveniles exhibited poor academic abilities due to dropping out of school and delinquent behaviors (B. Kim et al., 2021; Leone et al.). Pregnant and teen parents make up a unique group of the AE student population (Brouwer et al., 2018; Jain et al., 2023).

There exists an overrepresentation of racial and ethnic minorities of incarcerated youth with disabilities. There has been a significant growth in the number of students enrolled in AE programs, with an overrepresentation of Black and Latino students (Dunning-Lozano, 2014; Mallett et al., 2023; Porowski et al., 2014; Schornack & Karlsson, 2021). Black and indigenous youths tend to exhibit higher rates of recidivism relative to other racial and ethnic groups (Strassfeld & Cherng, 2022). There is a rise in class-action lawsuits alleging that educational facilities for juveniles are not meeting federal law requirements under the special education law known as the Individuals with Disabilities Education Act (IDEA). Because officers in these secure juvenile facilities do not have the skill sets or training to provide legally mandated services to these incarcerated youths with disabilities, students with LD are being adequately serviced to meet their IEP needs (Miller, 2019; Noorman & Brancale, 2023). The focus of these facilities is to ensure security over academics, thus highlighting differences in philosophical beliefs in the approach to rehabilitating these youths.

Instructional Settings and Foci of AE Programs

The instructional setting in AE is as diverse as AE programs that reflect the unique needs of its student population, with the relationships of students and teachers as a crucial element. The focus on fostering positive relationships is the foundational belief to students' success in AE programs. Some AE programs adopted an instructional model where the personal relationship between teacher and student is focused (Venezia, 2021). Positive instructional environments created by teachers rank as the most significant in preventing at-risk students from dropping out of school (Shamrova et al., 2023; Venezia, 2021). Small classroom sizes, lower student-teacher ratios, a student-centered curriculum, flexible structures, and opportunities for student decision-making contribute to a positive learning environment, especially when at-risk students in juvenile detention centers have experienced very little in the decision-making processes (Fortems et al., 2023).

Instruction in AE programs tends to focus on at-risk, violent, and anti-social behaviors of students (Afacan & Wilkerson, 2024; Beqiraj et al., 2022; Leone et al., 2002; Miller, 2019; Tobin & Sprague, 2000). Building a positive learning environment that addresses student discipline and behavioral issues in AE environments is the building block of the instructional environment. In juvenile detention centers, incorporating school-wide PBIS Tier 1 interventions are designed to support a more positive experience for at-risk students (Smith et al., 2022; Griffiths et al., 2019; H. Kim et al., 2023). This holistic approach to mentoring students in AE contributes to a positive learning environment (Brouwer et al., 2018; Jain et al., 2023).

Student behaviors and other issues affect the instructional environment of AE programs (Azid et al., 2022; Phillippi et al., 2021). The lack of teacher preparation time, student documentation, and time spent addressing students' disruptive classroom behaviors influence the instructional environment (Phillippi et al., 2021). Teachers spent more time addressing student behaviors, contributing to less time spent on instructional practices and low assessment results. Tier 1 support for students with LD in an AE setting reduced behavior escalation (Minkos et al., 2023; Phillippi et al., 2021). Less time spent addressing behaviors could be used for instruction.

A positive relationship between the student and teacher is paramount to student success. The student-teacher relationship is most important to the educational success of students (Kennedy et al., 2022; Venezia, 2021; Xu et al., 2023). Teachers should have the ability to connect with their students to understand them better. For example, Vygotsky had the unique ability to connect with children who participated in his studies, resulting in a more thorough analysis of the child (Vygodskaya, 1999). This socio-cultural relationship provides an understanding of the student with LD to include support in improving academic achievement. Specific instructional strategies for the AE learning environment include games, student individuality, teamwork, and authentic connections with the learning materials to support student-teacher relationships (Kennedy et al., 2022). This constructivist framework provides the overarching framework for a thriving instructional environment for students with LD in AE academic programs.

The heavy emphasis on students' social-emotional well-being in AE programs appears to replace instructional time (Venezia, 2021). Social and emotional learning (SEL) is a growing aspect of AE instruction (Ohrt et al., 2021). The social interactions and dynamics of student interaction with all school aspects are a foundation for learning. Most instructional time is spent on social-emotional learning and other counseling services to help these students return to the community (Ochoa et al., 2021). Wholehearted teaching is about loving another human being enough to go above and beyond the teacher's classroom duties for a student's well-being (Venezia, 2021). Working above and beyond classroom duties reflects Maslow’s belief that to meet the hierarchical needs of individuals, the lopsided emphasis on the social-emotional aspects of students competes with the limited resources of AE programs that must help these students return to the traditional school through credit recovery efforts. Moreover, AE schools may not necessarily be using evidence-based intervention (EBI) approaches to address students' emotional and behavioral needs (Aspiranti et al., 2021).

Special Education in AE Programs

The 1975 Education for all Handicapped Children Act called for all individuals under the age of 22 to receive a free and appropriate education (Christian, 2022; Moran, 1991). As part of IDEA, all students with disabilities, including incarcerated youth, must receive special education services, including transition services, as part of the IEP process (House et al., 2018; Strassfeld & Cherng, 2022). In California, school districts must form Special Education Local Plan Areas (SELPAs) to develop plans to deliver to students with special needs (Myung & Hough, 2020). Specialists do not always provide special education services. As part of the IEP process, transition services required to meet IEP requirements for youths with disabilities in the juvenile justice system rely on parole services due to limited resources (Mathur et al., 2021). Correctional officers in juvenile detention settings provide student support during instructional time and may not necessarily have been trained in special education instructional support techniques (Hester et al., 2024; Miller, 2019). The focus on physical safety and control over the students in the classroom remains central rather than the focus on academics due to at-risk behaviors (Leone et al., 2002; M. V. Young et al., 2010). AE schools are not necessarily focused on credit recovery and supporting students to return to comprehensive public school but instead became a receiving institution for students with emotional disturbance (ED) (Hoge & Rubinstein-Avila, 2014; Leone et al., 2002; M. V. Young et al., 2010).

Several themes emerge from the literature on AE programs and students with LD (Mathur et al., 2021; Strassfeld & Cherng, 2022). First, there needs to be more IEP implementation in AE environments. Second, AE teachers are not adequately trained to support students with LD in supporting student achievement on standardized assessments in AE environments (Darling-Hammond, 2023; Hoge & Rubinstein-Avila, 2014; Koressel et al., 2022; Leone et al., 2002). Third, there may be an inappropriate identification of disability regarding mathematics among students with LD. Fourth, There appears to be a disconnect with the appropriate technology implementation to support student achievement (Serutla et al., 2024; Valdez & Maderal, 2021).

Individual Education Program Implementation in AE Programs

The IEP is the legally binding document that guides special education services for students with LD among the student, parents (or educational rights holder), teachers, administrators, and related services personnel (Küpper, 2000). While highly individualized to meet the unique needs of students with LD, the IEP process contains universal components for all students with LD across the United States (McKenna et al., 2023). The IEP is an individualized document that contains the identification of disability, current levels of performance, annual goals, related services such as speech-language support, counseling, or adapted physical education, transition to adulthood needs, and participation in state and school district assessments (Beck & DeSutter, 2020; McKenna et al., 2023; Patti, 2015). The IEP follows the students to each school attended until age 22. The IEP contains timeframes for services to be provided to students with LD by school staff to meet instructional and non-instructional goals (Beck & DeSutter, 2020; Küpper, 2000; McKenna et al., 2023; Miller, 2019).

A lack of proper implementation of IEPs occurs (Wong & Rashid, 2022) because of a lack of training. The IEP requires transition services for students with LD to progress into post-secondary goals in career or continuing education (Christian, 2022; Miller, 2019). Personalized support, specifically for incarcerated youth, is required to implement IEP goals and support a successful social transition (Mathur et al., 2020, 2021; Zhang et al., 2011). Juvenile detention centers focus on facility security over academics (Miller, 2019). Students do not necessarily receive a differentiation of services (Miller, 2019), and such services are often provided by parole officers who are not necessarily trained in IEP transition support (Aspiranti et al., 2021; Mathur et al., 2021) because staff attention is spent on maintaining a secure environment. This lack of services represents potential non-compliance of the IEP, which can be interrupted as a violation of federal law (Beck & DeSutter, 2020; Küpper, 2000; McKenna et al., 2023).

Instruction in AE settings should consider the non-academic interventions of the IEP that incorporate academic standards and lessons relevant to students with LD to address mental health issues (Pérez-Ramírez et al., 2023). Providing cultural and inclusive lessons supports learning efforts among students with LD (Brown et al., 2019; Chang et al., 2022; Lindo, 2020). Culturally sensitive lessons also support the social-emotional and academic learning (SEL) of different types of learners (Donahue-Keegan et al., 2019; Yeh et al., 2022), especially with an overrepresentation of racial or ethnic minorities (Strassfeld & Cherng, 2022). These non-academic interventions address issues that influence academic learning. In certain instances, addressing the mental health aspects of the IEP to reduce recidivism among students with LD in incarceration facilities and foster special education services (Pérez-Ramírez et al., 2023); however, instructional time is taken away from mathematics and other academic content areas.

AE Teacher Training and Students with Learning Disabilities

The teacher plays a foundational role in the education of students. Teachers are perceived to be vital in promoting students to achieve the highest potential possible (Opper, 2019). Teacher credentialing and professional development are designed to provide a spectrum of training that prepares teachers to work with students. AE teacher credentialing requirements establish the foundational skills required by the state to provide instruction to students in AE learning environments. In California, AE teachers must possess a specialized academic instruction (SAI) to work with students enrolled in AE programs (California State Board of Education, 2023). The SAI credential incorporates two types of authorization: special education and a single subject or multiple subjects (elementary grade levels). SAI represents the most common educational service to support students with LD (Myung & Hough, 2020). An AE teacher working with high school students could possess a multiple-subject credential specializing in K-6th grade. In addition to credentialing requirements, teachers must be well-versed and trained in pedagogical strategies such as the FC model to support student achievement, engagement, learning targets, and student motivation (Howell, 2021; Jdaitawi, 2021; Strelan et al., 2020; Tang et al., 2023).

A highly qualified and trained teacher lays the instructional foundation for students with LD to acquire knowledge (Patrick et al., 2023; Phillippi et al., 2021). Teacher credentialing programs and n-the-job performance influence student achievement levels (Opper, 2019). However, AE settings must address high rates of staff turnover and inexperience working with students with LD (Minkos et al., 2023). Specifically, the characteristics of high school teaching staff influence the state math standards test (Darling-Hammond, 2023; Fetler, 1999). In particular, the quality of the teacher, namely how well the teachers are versed in mathematics concepts and instruction, influences student achievement on assessments (Fetler, 1999; Suhaini et al., 2020). One teaching skill is the use of various scaffolding techniques during instruction. Teachers' use of the reflecting thinking scaffolding technique supported student achievement in mathematics (Nindiasari & Yuhana, 2020). Another scaffolding technique is the use of blended learning strategies, which include collaboration among learners and positively influence student learning (Chen & Shin, 2022). Another instructional strategy teachers may use is the FC model, which supports student improvement, where students take greater ownership of the learning process and are more socially interactive (Galindo-Dominguez, 2021; Öztürk & Çakıroğlu, 2021). Implementing an FC model supported student learning in mathematics in certain conditions when video instruction is integrated as part of student learning (Wei et al., 2020).

Professional development (PD) is a regular and ongoing process in learning from colleagues and working with curricula in teacher preparation (Çopur-Genctürk & Li, 2023). Often, however, the PD schedule of a typical school consists of many non-academic areas such as mental health, attendance, multi-tiered support services (MTSS), PBIS, and other human resources (HR) related topics. These PDs, while very pertinent to the running of schools, often compete with precious instructional time in the classroom. Over 25,000 domestic and international schools have implemented school-wide PBIS programs (Estrapala et al., 2021; Grasley-Boy et al., 2021). PBIS could be an effective training tool for educators working in day treatment programs, alternative schools, residential programs, and juvenile facilities (Minkos et al., 2023). AE teachers leaving the education profession due to student discipline and behavior issues influence student learning (Griffiths et al., 2019; Hester et al., 2020; Minkos et al., 2023).

A lack of teacher training to address such behaviors was addressed with PBIS Tier 1 interventions, which positively influenced the school climate, reduced disruptive behaviors, and improved teacher well-being (Griffiths et al., 2019; Marshall et al., 2022). A literature review of AE and PBIS strategies noted studies that focused on academic outcomes concerning the effect of PBIS Tier 1 interventions on improvements in grades and academic achievement on state reading and math tests (Estrapala et al., 2021; Grasley-Boy et al., 2021). More robust induction programs (Beagle, 2020; Helms-Lorenz et al., 2015) and ongoing academic-based PDs should occur to help teachers refresh their memories on math concepts that are directly applicable to supporting students on state tests. Any change to teacher credentialing requirements must come from the state and may result in longer delays due to the length of the legislative process.

Professional development supporting teachers' understanding of assessment will improve teaching and learning. There are two types of assessments: formative and summative. These assessments have unique purposes but are essential in learning (Schellekens et al., 2021). Using incentives may influence on student performance (Rahimi et al., 2021). Teachers may need help understanding how to incorporate assessments into the classroom in high-stakes assessments at the state level. Teachers are aware of annual assessments by the state for high school students in all learning environments; moreover, class size, academic abilities of students, teacher training, and lesson development influence teachers' implementation of formative assessments in the classroom (Enu, 2021). This lack of teacher understanding of how to implement formative assessments in the classroom daily may contribute to a lack of exposure for students with LD and math anxiety for both students and teachers (Enu, 2021). Assessments should be considered in a sociocultural learning environment where participation in the assessment itself becomes a learning activity for students (Gweon, 2021). Further research is recommended in the use of assessments and high school students with LD in AE settings, especially in mathematics.

Potential Inappropriate Disability Identification of Students with Learning Disabilities

The United States Department of Education (US DOE) notes every IEP has a specific identification of disability for the student with LD. The Individuals with Disabilities Education Act (IDEA) identifies 13 categories of disabilities that could qualify students with LD for special education services (US DOE, 2017; Wilmshurst & Brue, 2018). *Dyscalculia* is an inability to acquire knowledge of basic math facts, numerical quantities, and calculations (Mutlu et al., 2022). *Dyscalculia* is a learning disability where an individual's ability to acquire knowledge of basic math facts, numerical quantities, and calculations is impaired (Mutlu et al., 2022). Dyscalculia is a mathematics learning disability (MLD) whereby an individual cannot acquire and apply math skills and concepts to reason and solve math problems (Megawati & Sutarto, 2021; Yılmaz et al., 2022). MLD is not identified as a separate category of learning disabilities that qualifies students with LD for special education services; however, MLD could qualify under the SLD category (Milli et al., 2022). Students with MLD historically received less attention than reading education (Rivera, 1997). Effective teaching techniques to high school students with LD and low math performance should consider students' prior achievement, students' perceptions of self-efficacy, the content of instruction, management of instruction, educators' efforts to evaluate and improve instruction, and educators' beliefs about effective instruction were contributing factors to students experiencing repeated math failure (Hamukwaya & Haser, 2021).

A lack of understanding dyscalculia challenge teachers to fully support students with LD. Students with LD identified with dyscalculia have different levels of understanding of math concepts such as addition, subtraction, multiplication, and division. In general, dyscalculic students are about one year behind their peers without this disability in mathematics. Teachers should use concrete and direct instruction methods supported by appropriate technologies to provide effective math instruction. In the area of AE, AE teachers working with students with LD may already be in a setting where direct instruction is preferred to multimedia-based instruction where access to computer technology may be limited due to the security needs of certain AE facilities like juvenile detention centers (Stevens, 2021; Tolou-Shams et al., 2022). Students with MLD historically received less attention than reading education (Rivera, 1997). Effective teaching techniques to high school students with LD and low math performance should consider students' prior achievement, students' perceptions of self-efficacy, the content of instruction, management of instruction, educators' efforts to evaluate and improve instruction, and educators' beliefs about effective instruction were contributing factors to students experiencing repeated math failure (Hamukwaya & Haser, 2021). In addition to using worksheets, instructional practices should include an introduction, instructions, concept maps, and student activities based upon PBL strategies (Umriani et al., 2020). In contrast, student worksheets based on problem learning positively influence student understanding of math concepts in certain grade levels (Riyati & Suparman, 2019; Widodo et al., 2023). The lesson design framework should be based on a constructivist framework that supports student learning and the processing of new information and skills.

Students diagnosed with emotional and behavioral disorders (EBD) in AE learning environments struggle with math topics like fractions and algebra (Ennis & Losinski, 2020; Mulcahy et al., 2023). Fractions, percentages, order of operations, expressions, the number system, and the distributive property are foundational math topics incorporated in state math standards tests (Klute et al., 2020). Direct and explicit instruction followed up with daily reviews, structured and systematic presentation of math material, sufficient support at the early stages of learning, and opportunities for repeated practice are suggested practices to improve math learning (Myers et al., 2023). Using multiple means of representation and graphic organizers also supports positive learning outcomes (Ennis & Losinski, 2020; Mulcahy et al., 2023). Such direct instruction may result in the use of math worksheets at lower grade levels that are based upon multiple intelligences rather than solely using multimedia-based or hands-on, manipulative math activities (Umriani et al., 2020).

Technology and Students with Learning Disabilities

Technology does not represent a cure-all for solving classroom curricular or instructional issues (McGeehan et al., 2018). Well-planned lessons and differentiated instruction support student success (Salinas & Mathur, 2022). Technology is essential to teacher planning, preparation, and student achievement levels (Valdez & Maderal, 2021). Mathematics assessments should be based upon continually reinforcing previously learned math concepts, which positively influences improved teaching practices and can be significantly streamlined using technology (Valdez & Maderal, 2021). While student motivation levels cannot be ignored, technology should be an intentional implication of teaching preparation and practice (Valdez & Maderal, 2021). Including technology represents the intentional practice of removing barriers to learning and connecting students' prior knowledge to current mathematics standardized test content. The use of multimedia technology can have a significant and desirable positive effect on learning (Yamchi et al., 2021). Further research should include self-efficacy levels of high school algebra students with LD from high-poverty areas and math assessment outcomes. Assistive technologies (AT) such as text-to-speech and speech-to-text support students with auditory and visual processing disorders (Bruno et al., 2020). These technologies are often outlined in the student's IEP.

Before and during the nationwide COVID-19 shutdown of American schools, teachers and students used various educational technologies as scaffolding measures to support student learning (Baykal et al., 2023). For special education, assistive technologies (AT) such as speech-to-text, text-to-speech, and tablets are standard devices for students with (LD) that contribute to improved student achievement (Yamchi et al., 2021). Furthermore, other technologies, such as Google and Microsoft products, provide additional support for students with LD. Differentiating the use of no-tech, low-tech, and high-tech AT contributes to varying levels of student achievement (Bouck et al., 2020; Bouck & Satsangi, 2020). The appropriate use of technology reflects effective teaching, which, in turn, positively influences student math achievement (Fetler, 1999; Valdez & Maderal, 2021). Moreover, the appropriate use of technology should be reflected in students' IEPs (Myung & Hough, 2020). In the case of remote instruction, teachers should build upon presentation by incorporating synchronous feedback (Enders & Kostewicz, 2023). Future research should consider how the role of a teacher's physical voice influences learning in an online environment for students with LD, especially in AE settings (Liew et al., 2020).

Using multimedia technology in mathematics instruction offers insights into the potential achievement levels of students with LD. Multimedia is a type of communication that integrates text, audio, and visual representations within a computer (Abdulrahaman et al., 2020). The use of multimedia by teachers should be based on discretion and the needs of students. Such practices include using multimedia through an iPad with explicit instruction to improve students' fluency in basic mathematics skills, such as multiplication facts (Mulcahy et al., 2023). iPad technology is becoming a universal teaching technology; however, this multimedia support may be helpful at the elementary levels, such as fourth grade, in whole number multiplication and division (Mulcahy et al., 2023). Multimedia learning should be used with students engaged in study time, especially those with visual processing disorders like dyslexia (Knoop-Van Campen et al., 2020). Further research is needed for higher levels of secondary math courses that would be more relevant insofar as assessment data. Concerning students with LD in an AE learning environment lacking foundational math skills, using iPads and multimedia to review and relearn basic core mathematics skills like multiplication and division may be helpful. However, in some AE environments, such as juvenile detention centers where technology is limited due to security protocols (Miller, 2019; Stevens, 2021), the traditional paper and pencil, in the case of AE, would be rubber pencils, and the method may be more suitable.

In the case of traditional paper and pencil, teachers may use direct instruction over computer technology for instructional purposes. Computer-aided instruction (CAI), in certain instances, had a positive effect on improving students' world problem-solving skills, and direct or guided instructional practices were less effective (S. J. Kim & Xin, 2022). CAI is defined as using a computer to provide educational instruction (S. J. Kim & Xin, 2022). Redesigned mathematics worksheets in an eWorkbook with enhanced digital interaction using an iPad may be difficult for students with visual processing disorders (Mulcahy et al., 2023). Multimedia instruction supports student memorization of materials read (Chuang & Jamiat, 2023). In the case of vocabulary building, direct instruction used in conjunction with multimedia-based technologies improved science vocabulary among students with LD (VanUitert et al., 2020). In AE learning environments, the use of CAIs may be limited due to security concerns, thus limiting the opportunity for students with LD to experience the potential positive benefits of CAI in mathematics instruction.

Video-based modeling is widely researched to teach students with severe disabilities; however, there is very little research on this strategy for students with LD and high school math (Brewer & Movahedazarhouligh, 2019; Mallidis-Malessas et al., 2021). In certain instances, video-based interventions (VBI) positively influenced high school students in learning basic algebraic concepts such as y = mx + b, slope, and the y-intercept (Satsangi et al., 2021b). VBI in AE settings where staff may have weak mathematics backgrounds in algebra may be used as a supplement. The question remains. However, the quality of the instructional design behind VBI still needs to be improved. Video instruction in Khan Academy improved students' mastery of mathematics (Vidergor & Ben-Amram, 2020). Students with LD in AE settings may not necessarily possess the foundational mathematics content knowledge to make sense of VBI and learn essential algebraic content. In certain instances, technology did make a positive influence on early childhood mathematics (Verbruggen et al., 2021).

An online learning environment of math content aligned to specific learning standards could provide remediation required for students to learn math content areas that require support (Fazal & Bryant, 2019). During the COVID-19 mandatory online instruction, teachers and students adjusted to a new learning environment. Online learning has served students for many years before the COVID-19 shutdown of schools through distance learning programs, especially at the university level. Virtual manipulatives (VM) and augmented reality (AR) represent education technologies that could be used during mathematics instruction with students with LD (Bouck et al., 2020a; Kellems et al., 2020). Specifically, students with LD in high school algebra acquired a greater understanding of equations through multistep solutions using a virtual algebraic balance scale (Bouck et al., 2020a). When teachers understand when and how to use AT and UDL principles, students with LD are supported in their learning process (Kellems et al., 2020). In addition, the appropriate incorporation of such technology also fulfills the requirements of IEPs. Further research should include an expansion of participants to high school students and several Algebra 1 classes and the use of VM (Bouck et al., 2020a; Kellems et al., 2020).

One area of research into teacher use of technology includes instruction in an online environment. Specifically, an analysis of students with LD from a social-constructive perspective in an online environment revealed teacher efficacy to include collaboration, personalization, and authenticity in virtual instruction for such learning to be effective (Porter et al., 2021). The use of calculators and online games support mathematics learning among students with LD (Long & Bouck, 2023). Modification of PowerPoint presentations supported students with LD (Naik, 2016). Moreover, students with LD from poverty-stricken environments face a greater risk of lower mathematics achievement (Porter et al., 2021). There is also a shortage of qualified special education teachers (Fetler, 1999; Porter et al., 2021). The COVID-19 pandemic has worsened the shortage of teachers (Porter et al., 2021).

More students with LD receive online instruction in high school mathematics (Enders & Kostewicz, 2023). A differentiation is made regarding online instruction: synchronous and asynchronous. Synchronous learning occurs in real-time, where both the teacher and student are online simultaneously. Asynchronous learning occurs when the student engages in video-based lessons that are often pre-recorded, and little interaction occurs between teacher and student. Online math instruction faces challenges obtaining student work and implementing IEP goals (Enders & Kostewicz, 2023). Using math worksheets is an effective strategy in synchronous and asynchronous environments (Enders & Kostewicz, 2023). For AE learning environments, the Emergency Conditions Provisions Plan within the IEP will be a crucial element in monitoring students with LD and their progress in the event online instruction becomes mandatory. Further research should include specific case studies on access and inclusion of students with LD in a high school setting and mathematics achievement levels in a post-pandemic environment.

Mathematics and Special Education in AE Environments

A disconnect exists between mathematics curricula and the pedagogy used by special education teachers (Sheppard & Wieman, 2020). Special education and mathematics education often have different knowledge bases that should be intertwined to support students with LD (Sheppard & Wieman, 2020). The advances in internet technology call for a reinvention of collaboration among mathematics teachers to empower student learning. Special education teachers should use repetition of mathematics instruction to create confidence in students with LD in their mathematical abilities (Kadarisma & Juandi, 2021). Whereas math instruction used a constructivist approach, special education teachers relied on teacher-driven direct instruction (Şanal & Elmali, 2023). Special education teachers may have been relying on poorly designed math instruction, which could negatively influence the achievement of math understanding among students with LD (Sheppard & Wieman, 2020).

Students need mathematics knowledge for greater opportunities to earn higher incomes (binti Jamal & bin Mohd Rashid, 2023; House et al., 2018). Furthermore, without a better understanding of grade-aligned academic standards, mathematics instruction for students with developmental abilities would continue to suffer and limit these students' prospective futures in careers requiring a solid math background (Spooner et al., 2019). The successful completion of Algebra 1 leads to higher levels of math and post-secondary courses that may influence the future success of students with LD (Fazal & Bryant, 2019). This section will address the issues of mathematics testing, the ZPD of mathematics instruction, and the need for AE teachers to become better-trained instructors for students with LD in AE learning environments.

The challenge to providing effective mathematics instruction to students with LD in AE learning settings stems from the types of AE programs. The effectiveness of mathematics instruction stems from math teachers with sufficient knowledge and skills to teach math content through lesson plans and appropriate instructional strategies (Moh'd et al., 2021). Students enrolled in AE programs attend for varying lengths of time (Maccini & Gagnon, 2006). Generally, lengths of stay range from interim, short, and long term: one month up to 20 months. Safety, transitions, and mental health counseling compete with the students' instructional time.

Unfortunately, 65% of youth diagnosed with ED and 38% of students with LD drop out of school (U.S. Department of Education, 2002). Multimedia-based, hands-on math instruction that reflects the direct relevance of math concepts to the students' lives suggests effective math instruction (Yamchi et al., 2021). Community day AE programs could incorporate multimedia-based, technology-driven instructional activities with a greater focus on rational number interventions to support students with LD as a foundational skill for algebra mastery (Rojo et al., 2023).

AE teachers should consider incorporating successful online teaching practices to support their students in the areas of math curricula, special education pedagogy, assessments, and online teacher practices (Enders & Kostewicz, 2023; Kellems et al., 2020; Kumar et al., 2019; Martin et al., 2019; Olakanmi et al., 2020). Educators should receive mathematics preservice training to better support students in math instruction (Theobald et al., 2021). The lack of teachers with special education and math backgrounds further compounds challenges to developing instruction and intervention strategies to support students with LD in mathematics assessment performance (Theobald et al., 2021). Teachers should increase their awareness of algebra's course design elements in the areas of digital resources, activities, academic and non-academic supports, and evaluation (Kumar et al., 2019). For students with LD, the incorporation of appropriate educational AT supports student learning (Olakanmi et al., 2020). Other online instructional practices should include teachers relying on more seasoned and award-winning faculty to design and deliver effective online instruction (Martin et al., 2019). To support direct instruction, teachers should also increase their instructional delivery skills in VBI and augmented reality (AR), which incorporates a mixture of physical and digital experiences of the learner and instructor (Kellems et al., 2020). Further research into the budgeting of AE programs should be considered when adopting online professional development so teachers can become more trained.

Students diagnosed with emotional and behavioral disorders (EBD) in AE learning environments struggle with math topics like fractions and algebra (Ennis & Losinski, 2020; Mulcahy et al., 2023). Fractions and algebra are foundational math topics incorporated in state math standards tests. Direct and explicit instruction followed up with reviews requested by students, structured and systematic presentation of math material, sufficient support at the early stages of learning, and opportunities for repeated practice are suggested practices to improve math learning and address mathematics anxiety among students (Araya & Gormaz, 2021; Kusmaryono et al., 2022; Süren & Kandemir, 2020). Using multiple means of representation and graphic organizers also supports positive learning outcomes. Such direct instruction may result in the use of math worksheets rather than multimedia-based or hands-on manipulative math activities.

Mathematics Testing

Students with LD tend to score lower on reading and math tests than their general education peers (Myung & Hough, 2020). Students with LD needed help acquiring and retaining algebraic reasoning skills to pass math assessments aligned with state academic content standards (Myung & Hough, 2020; Sheppard & Wieman, 2020). More research on math instruction is needed to identify instructional practices and assessment accommodations to support improved math achievement (Barr & Mavropoulou, 2021; Sheppard & Wieman, 2020). Specific accommodations such as using calculators and assignment modifications – reduced classwork problems – could not be validated as supportive of math achievement and embedded accommodations (Lee et al., 2021). However, there are instances where digital calculators supported mathematics achievement among eighth graders (Long & Bouck, 2023). Special education teachers were less familiar with math knowledge than their counterpart general math teachers, affecting students with LD learning math content for math assessments (Sheppard & Wieman, 2020).

A mismatch exists between students' learning characteristics and teachers' instructional materials and strategies (Lee et al., 2021; Long & Bouck, 2023). Teachers should focus on big ideas, design appropriate direct instruction, use conscious strategies, utilize time efficiently, communicate explicitly, and offer students explicit instructional practice and review times, to support students with LD in mathematics achievement (Hughes et al., 2022; Twyman, 2021). Effective instruction should include explicit instruction, feedback, motivating incentives, cooperative learning experiences, and building student confidence by aligning tasks with students' abilities (Araya & Gormaz, 2021; Kusmaryono et al., 2022).

An examination of formative assessment and self-efficacy regarding mathematics helps better understand how to support students with LD for better performance on mathematics assessments and better achievement levels (Rakoczy et al., 2019). Given that mathematics is learned over an extended period, in large-scale assessments, many students need to develop strong math skills and concepts (Mahlambi et al., 2022). The formative assessment incorporates theory into action that affects learning outcomes (Rakoczy et al., 2019). Teachers should help students with their self-efficacy to master mathematics to enhance learning outcomes; however, little research is available demonstrating a positive effect of self-efficacy and learning outcomes (Rakoczy et al., 2019).

Project-based learning (PBL) may influence high school students' math achievement on standardized tests. The lack of research into PBL is unavailable; however, PBL instructional strategies continue to spread despite the conventional use of teacher-directed, lecture-style approaches to math instruction (Craig & Marshall, 2019). There is no difference in math achievement levels of ninth to 11th-grade students using PBL versus conventional methods on their math assessment results (Craig & Marshall, 2019). Contrasting research suggests that PBL supports student understanding by connecting concepts to real-life experiences and supports student learning of mathematics concepts (Fisher et al., 2020; Lazić et al., 2021; Serin, 2019). Further research is required to understand how PBL mathematics instruction affects students with LD in mathematics assessment in AE learning environments, given the different uses of instructional strategies that may already be in place.

Zone of Proximal Development and Mathematics in Special Education

Students with LD must learn basic mathematics concepts and skills (Özdemir & Kılıç, 2023). An understanding of fractions, decimals, and rational numbers supports student achievement in higher levels of mathematics like algebra (Flores et al., 2023;Rojo et al., 2023). To support students with LD in learning foundational algebra skills, video modeling and teacher-led modeling are two instructional strategies that offer positive results. Virtual manipulatives have been explored substantially with students with severe disabilities and are now being introduced to students with less severe disabilities (Long et al., 2023; Shin et al., 2021). Students with LD, especially with varying degrees of dyscalculia, in which they may not be diagnosed, benefit from highly structured instruction that includes multimedia and teacher-led direct instruction. Teacher-led modeling has resulted in higher levels of maintained attainment than VBI (Long et al., 2023). Teacher-led modeling may be more suitable in the AE environment, especially in secured detention facilities. Furthermore, teacher-led modeling offers a greater degree of social interaction with students, which could provide social-emotional support for students with LD, given that learning algebra can lead to higher rates of anxiety (Rozgonjuk et al., 2020).

Understanding the concept of fractions remains a foundational concept for algebra and higher levels of mathematics (Bouck et al., 2020b; Fuchs et al., 2021; Fuchs et al., 2005). The concept of fractions is generally taught in grades 1 to 3. Concrete, visual, and explicit instructional strategies are standard practices to support students with LD in mathematics classes. Furthermore, incorporating digital visual manipulatives provides further support (Bouck et al., 2020b). For students with LD in AE environments, using concrete, visual, and explicit instructional strategies may be beneficial; however, further research is required. Students with LD need to develop an understanding of fractions to advance to more advanced mathematics concepts (Brafford et al., 2023; Hord et al., 2020).

One possible area of research addresses the issue of anxiety and high students with LD working with fractions and algebraic multi-step equations. Students with LD have a general tendency to struggle with mathematics. Teachers are crucial in making mathematics instruction more inclusive for all students (Tan et al., 2022; Vodičková et al., 2023). Evidence supports using manipulatives and visual diagrams to help elementary-aged students (VanUitert et al., 2020). The mathematics curriculum and these instructional tools appear well-matched with elementary school students. Manipulatives and algebraic multi-step problems are less helpful for high school students with LD than elementary school students with LD (Hord et al., 2020). Physical gestures by teachers appear to help high school students with LD during the algebraic learning process. Students with LD require more time on algebraic problems due to increased anxiety (Hord et al., 2020). Offloading information will help lower anxiety levels. Using notes like Cornell notes may reduce anxiety levels while high school students with LD solve fractions in algebraic multi-step equations. Further research is required in notetaking and students with LD mastering mathematics concepts.

Students with LD had difficulty in mathematics because they lacked content and requisite math skills (Sönmez & Alptekin, 2020). The National Council of Teachers of Mathematics (NCTM) created a new set of standards focusing on applying mathematics over skills development (Sayeski & Paulsen, 2010; Tarr et al., 2013). Students had difficulties solving math-based word problems because of a lack of reading and comprehension skills (S. J. Kim & Xin, 2022). In other instances, students with LD used calculators to solve fractions that were part of mathematical equations (Hord et al., 2020). For special education teachers, the traditional emphasis on problem-solving based on practice and fluency in basic number combinations moved to the reform curricula based upon mastery of math content and carefully constructed activities for students to engage in to make meaning of math concepts for daily life skills (Sönmez & Alptekin, 2020). For the students with LD, while daily timed math drills helped, these students generally lacked self-regulation and required more explicit instruction; in contrast, the math reform curricula focused math assessments on a broader, conceptual understanding (Sönmez & Alptekin, 2020).

Certain instructional practices support high school students with LD in learning algebra: concrete-representational-abstract integration, virtual manipulatives, and gestures and diagrams (Strickland, 2022). Students with LD tend to perform lower on algebra assessments than their non-disabled peers. Students with LD in a traditional learning environment may have greater access to virtual manipulatives, whereas students with LD in AE environments such as juvenile detention centers may have limited access to technology due to security concerns (Miller, 2019). While the research on the use of computer technology remains sparse, educational trends suggest that the incorporation of virtual manipulatives may become more readily available in non-AE learning environments (Bouck et al., 2020b).

Other instructional practices, such as a response to intervention (RtI) approach and Tier 2 interventions, supported increased student performance on mathematics assessments (E. C. Bouck & Cosby, 2019; Ovadiya, 2023). RtI interventions include three tiered levels of support: Tier 1 focuses on classroom instruction, Tier 2 focuses on small group instruction, and Tier 3 provides intensive individual support. Tier 2 mathematics interventions specifically address students with mathematics difficulties (MD) (E. C. Bouck & Cosby, 2019; Jitendra et al., 2022;). Research results suggest that Tier 2 support is adequate for lower-grade students (Jitendra et al., 2022). Given that there is very little information regarding special education instruction and academic interventions for mathematics (Boyd & Bargerhuff, 2009; Freeman-Green et al., 2018; Gunasegar et al., 2021), for example, in juvenile correctional facilities (Maccini et al., 2006), high school students with and without disabilities require effective instructional techniques and approaches to pass rigorous state assessments. Interventions to improve fraction sense supports student learning of higher levels of math (Dyson et al., 2020). AE teachers in juvenile detention facilities rely on drill-based practice worksheets for essential math skills. State math assessments often require higher-level problem-solving skills and an understanding of algebraic and geometric concepts that need to be addressed in essential arithmetic topics. The use of direct instruction and technology and real-world problems is a practical and empirically based instructional approach. However, the use of paper and rubber pencils can only be used due to security protocols established by the prisons for safety reasons for the students and staff, thereby minimizing the potential positive benefits of incorporating higher levels of technology. Further research is needed on how tiered levels of support influence students with LD in the mathematics content area at the secondary level in AE settings.

AE teachers need to develop mathematical skills and better understand interventions to support students with LD in AE settings to improve mathematics knowledge. Teacher effectiveness in designing instruction is based on a combination of skills in pedagogy, assessing learners, planning, and checking for understanding (Arafah, 2015; Mahlambi et al., 2022). Teachers may lack a clear understanding of dyscalculia concerning students' learning difficulties with mathematics. Students with LD identified with dyscalculia have different levels of understanding of math concepts such as addition, subtraction, multiplication, and division. In general, dyscalculic students are about one year behind their peers without this disability in mathematics. To provide effective math instruction, teachers should use concrete and direct instruction methods supported by appropriate technologies (Satsangi et al., 2021b; Stevens, 2021; Tolou-Shams et al., 2022). In addition to math instruction, teachers may not necessarily be familiar with the type of formative assessments that should be used to measure student learning in mathematics (Ambrosio et al., 2021). In certain types of AE settings, teachers working with students with LD may already be in a setting where direct instruction is preferred to multimedia-based instruction

Summary

Additional research into social cognitive learning, teacher preparation, appropriate AT, and mathematics instruction in a post-COVID pandemic learning environment to support high school algebra students with LD in AE settings is warranted (Bouck et al., 2020b; Bouck & Satsangi, 2020). The need for teacher training and preparation and the negative influence of poverty on student learning are well-documented (Fetler, 1999; Porter et al., 2021). Small case studies provide tangential support and are insufficient to sound an even giant alarm bell concerning high school students with LD (Bouck et al., 2020c; Kellems et al., 2020). The COVID-19 pandemic revealed opportunities for the educational system to enhance teacher and student training to adopt advances in AT in diverse learning environments to improve mathematics instruction, especially at the high school level. However, until a genuinely unified and updated pre-kindergarten to twelfth-grade mathematics curriculum is developed, teacher training must include better and more specific identification of learning disabilities, adoption of AT, and instructional practices in supporting high school algebra students with LD in AE settings to demonstrate essential mastery on state standardized tests (Bouck & Satsangi, 2020; Bouck et al., 2020c; Yeh et al., 2022).

A gap exists in the literature about appropriate and effective mathematical instructional practices related to high school algebra students with LD performance in the AE learning environment on standardized math tests. The literature supports incorporating instructional strategies with educational technologies in diverse learning environments for high school algebra students with LD to perform at higher levels of mastery on the state standards test. To fill this gap, teachers should use various instructional strategies, such as UDL (Kellems et al., 2020). Furthermore, teachers should incorporate educational technologies such as virtual manipulatives (VM) and other ATs (Bouck et al., 2020c; Bouck & Satsangi, 2020; Bruno et al., 2020). However, teachers should possess instructional skills to appropriately use technology to be effective teachers, which will positively influence student achievement on math assessment tests (Valdez & Maderal, 2021). Small case studies of students with LD in elementary and middle school describe low math achievement levels (Bouck et al., 2020b). Other research examines the influence of the shortage of qualified special education teachers (Fetler, 1999; Porter et al., 2021).

The purpose of this research is to gain insight into the perspectives of educators on high school algebra students with LD who consistently perform below basic proficiency levels on California's standardized math tests. Teachers, administrators, and district-level managers work together to provide instructional support services to meet both state algebra graduation and IEP requirements in a variety of learning environments. These educators also utilize different educational technologies to offer additional assistance to these students. The COVID-19 pandemic and subsequent school closures have highlighted areas where instruction requires further development. This literature review, grounded in sociocultural theory of cognitive development, delves into special education topics relevant to state math assessments, instructional techniques, educational technologies, and diverse learning environments.

CHAPTER THREE: METHODS

Overview

The purpose of this case study was to understand educators' perceptions regarding factors that influence high-school algebra students with LD in an AE setting to score below and far below basic proficiency levels on the California math standards test despite receiving credit for the algebra course. Data was collected from a California school district in this single holistic case study (Yin, 2018). The pseudonym Alpha County School District (ACSD) was used to refer to the school district in this research. At this stage in the research, no differentiation was made on the specific types of learning disabilities among high school students in this case study. The records review and archival research since 2018 examined final grades for students with LD completing high school Algebra 1 and their respective mathematics scores on the state math standards assessment. Furthermore, no differentiation was made between Algebra 1 and the Integrated Math 1 courses because both classes satisfy California's state Algebra 1 graduation requirement. In 2020, the California governor suspended all state assessments for all K-12 students (CA CTC, 2020). therefore, assessment results will be examining the spring semesters of 2018, 2019, 2021, and 2022 (RELP, 2023).

Research Design

A qualitative research design for this study was appropriate to examine educators' perceptions in an AE learning environment. The qualitative approach was suited to encompass attitudes and offers participants opportunities for deeper explanations during the interview stage of data collection, especially when, for example, archival data may necessitate such explanations (Yin, 2018). Various professions and academic disciplines utilized a qualitative research approach (Yin, 2018). The following section provides an overview and rationale of the research design used in this study.

This qualitative research approach examined a bounded system of specific parameters of the case study examining teacher perceptions of low math assessment scores of students with LD in AE programs (Stake, 1995). The case study approach explores, describes, and explains phenomena (Yin, 2018). In this intrinsic approach, data collection and analysis stemmed from interviews, documents, and analysis of archival information to develop themes for further study (Yin, 2009, 2018). Furthermore, explanatory case studies offer possible explanations of causal relationships (Mills et al., 2017). For example, an outline offers a logical flow that prioritizes patterns to investigate while maintaining an iterative process to minimize research bias. (Mills et al., 2017). “How” and “why” based questions in explanatory case research models offer more excellent explanations that describe processes and just frequencies or incidences (Yin, 2018).

For the past five years, students with LD in ACSD have generally scored below and far below basic levels on the California mathematics standards tests (CA DOE, 2024, April). There are five major components of research design: questions, propositions, the case itself, the linkage of the data to the propositions, and the criteria for analyzing findings (Yin, 2018). In the case of ACSD, high school algebra students with LD have historically performed below and far below basic proficiency levels on the state mathematics assessments (CA DOE, 2024, April). A study investigating the reasons for low performance in algebra among high school students with learning disabilities from the perspective of educators has yet to be conducted. The explanatory case study design offers an iterative process to consider multiple sources of data while limiting potential bias as an employee of ACSD.

Research Questions

The primary goal of this case study addressed educators' perceptions of high-school algebra students with LD in an AE setting and their performance on the CA state mathematics test. Research questions can be quantitative and qualitative and should focus on explaining, exploring, describing, and understanding the concepts addressed in the case study (Hatch, 2002). This qualitative study used one central research question followed by three sub-questions. Additional survey and interview questions provided information to address the central research question.

Central Research Question

What are educators' perspectives on possible explanations for the low performance on mathematics state assessments among high school algebra students with learning disabilities in AE settings despite receiving graduation credit for Algebra 1?

Sub-Question One

What are educators' perceptions of mathematics training and professional development addressing high school students with LD in an AE environment?

Sub-Question Two

What are the attitudes of educators towards technology in the learning of algebraic concepts among high school students with learning disabilities in AE settings?

Sub-Question Three

What are educators' experiences with the zone of proximal development math skills needed by students with learning disabilities to acquire algebraic knowledge in AE settings?

Setting and Participants

The setting and participants of this study were from an AE program of a California public school district. This section provides an overview of the school district and the teachers and administrators who work with students enrolled in the AE program. The AE program of this school district consisted of juvenile detention centers, community schools, day reporting centers, teen pregnancy programs, an adult education program, and a charter school.

Setting

ACSD was chosen for its long-standing history, extensive program for students with LD, and easy data access. Initially founded in 1893 as the Office of the ACSD, ACSD is in California (RELP, 2023). The county covers 7,000 square miles and supports over 430,000 students in grades K-12 (RELP, 2023). Roughly the size of New Jersey, ACSD employed over 19,000 teachers (RELP, 2023). As of December 2020, ACSD supports 23 other independent school districts and over 500 schools (RELP, 2023). ACSD services 96 continuation, alternative, adult, charter, online, and special education schools. Organizationally, there are nine departments under the ACSD Superintendent: deputy superintendent of schools, administration and business services, early education services, educational services, governmental relations, information technology services, leadership, wellness and student services, personnel services, and student programs and services (SPS) (RELP, 2023).

The Student Programs and Services (SPS) department supports over 34,000 students annually through several division programs: AE, career technical education, pupil and administrative services, special education, and translation services (Regional Educational Laboratory Program, 2023). The AE program includes one charter school, nine community schools, three court schools, and a program for teen parents. While the AE program can service students as early as 1st grade, this study will focus on AE students with LD entering the 9th grade based on high school graduation credits in the community, court, and charter schools. The teacher cadre remains stable, with an average of over ten years with the district, while senior administrative leadership experiences change every two to three years. Middle-level administrative management remains stable.

Participants

This case study drew from 10 to 15 administrators and about 50 teachers from the court, community, and charter schools of the AE division of ACSD that have provided algebra instruction to students with LD in the past five years. While there is no minimum number of participants in a case study, five to twenty-five participants are manageable (Yin, 2018). Within the AE program of ACSD, there is one executive director with four administrators and nine principals. All administrators possess administrative credentials and experience working with students with LD. In this case study, no differentiation will be made insofar as the ranking of administrators, despite principals holding the lowest rank of administration with supervisorial authority. There are no assistant principals in ACSD. All administrators have supervisorial positions over teachers, with principals with the most immediate contact with teaching staff and students.

The ACSD AE program has about 50 teachers possessing an SAI credential to teach students with LD. The CA CTC outlines specific licensing requirements for the education specialist, including multiple-subject and single-subject credentials (CA CTC, 2023). SAI instruction requires a teacher to possess a valid California multiple-subject or single-subject teaching credential and a valid California mild/moderate special education credential (CA CTC, 2023). Each credential begins with a preliminary or level one status, and within five years of receiving preliminary or level one status, the teacher must clear the credential – earning professional or level two status (CA CTC, 2023).

Recruitment Plan

The following recruitment plan ooutlined the steps to garner educator participation for this study. Liberty University's Institutional Review Board (IRB) (Appendix A) and ACSD Research Request (Appendix B) approvals were received before contact was made with the participants. Ten to 15 administrators and 50 to 60 ACSD AE Program teachers served as the participant pool. Each participant received the recruitment email (Appendix D) with a screening survey (Appendix E) and an attached consent form (Appendix F). Participants who respond to the screening email were asked to complete the survey via Google Forms (Appendix G). Participation in the survey assumed that participants read and agreed to the consent form. Participants returned the signed consent form before the individual interview (Appendix H). Participants received a transcription of the interviews (Appendix I). Upon completion of the data analysis, a final report was given to the ACSD Executive Director (Appendix P).

Researcher's Positionality

As an educator with nearly twenty-five years' experience working with students with LD, I observed that these students passing high school Algebra 1 and scoring below or far below proficiency levels on the California standardized math test administered in the spring semester of the school year. I wanted to better understand this phenomenon. Conversations with veteran and novice teachers suggested many different reasons stemming from the students' socioeconomic background, personalities, and a lack of fundamental math skills. Research relies on participants' views of a phenomenon in search of understanding in the social context (Moustakas, 1994). The world of special education and high school algebra is no exception, especially from the perspective of educators and from an AE setting. I currently possess CA credentials in social science, special education, autism spectrum disorder, English Language Learners, and administrative authorization.

Interpretive Framework

The interpretative framework for this study stemmed from a social constructivist perspective where individuals gain knowledge and develop understanding through experiences (Rana, 2022). Constructivist researchers must address interaction processes and the specific context of peoples' lives and develop a greater understanding of the historical and cultural settings of the participants (Lincoln & Guba, 1985). As an educator, I believe that the teacher serves the most important role of helping students gain knowledge through the social interaction of teaching and learning. A teacher be able to balance the sage-on-the-stage role with being a guide-by-the-side of students (Reigeluth et al., 2017). This instructional balance should be built upon the teacher's thorough understanding of the student's academic, social, emotional, and cultural experiences. For students with LD in an AE setting, the role of the teacher could be arguably even more substantial given the constraints of the classroom (Stevens, 2021; Tolou-Shams et al., 2022).

Philosophical Assumptions

Philosophical assumptions articulate the values and belief systems of the researcher. My core belief is that the Christian biblical God is the source and center of all knowledge, and through God's grace, I can better understand the world around me. I take comfort and encouragement from the words in the Book of Jeremiah, 'Call to me and I will answer you and tell you great and unsearchable things you do not know' (Bible Gateway, 2023). For nearly twenty-five years of teaching and working in special education, I have continued to wonder why students with LD struggle so much with mathematics. After all these years of working with students with LD, I have yet to see dyscalculia or MLD identified as the reason students qualify for special education services in IEPs. Students often qualify for special education services under the category of specific learning disability under mild disabilities (Myung & Hough, 2020). In California, students receiving special education services fall into two categories: speech impairments and specific learning disorders (Myung & Hough, 2020). Specific learning disorders include dyslexia and visual and audio processing disorders. The offer of free appropriate public education (FAPE) aims to align present levels of performance, which should be based upon a clinical analysis of students' academic strengths and needs, academic goals based upon the areas of academic need, and academic services to provide scaffolded support. I wonder if the qualifying reasons for special education services are aligned with the necessary and appropriate support services with a broad category of specific learning disability (SLD) instead of being more specific in naming the actual disability. For example, if students with LD are struggling with mathematics, I wonder why they would not qualify for special education services under dyscalculia or MLD and not the SLD category.

If scriptures clearly label and identify characteristics of the world around us, we should use more specific descriptions of LD to support our students. The art of asking questions and interacting with others leads to a better understanding of the world around me, especially when all my goals are aligned and focused on shared goals. I accept that the American public education system often considers politics and economics over the interests of student-centered learning. I will make dedicated efforts to keep my personal biases in asking questions and analyzing the results of the data. A clear articulation of assumptions regarding ontology, epistemology, and axiology provides readers with a better understanding of the lens in which this research has been conducted.

Ontological Assumption

Ontology addresses the issue of the nature of reality (Lawson, 2019). In this respect, ontological research embraces a single or multiple set of realities based on individual perspectives. I believe there is only one reality: God's truth written in the bible. However, in our imperfect world, multiple forms of thematic evidence are used to explain reality. Social ontological research attempts to understand better the underlying structures of individuals and groups (Löfgren et al., 2015). As a special education teacher of over twenty years, I have observed a diverse set of beliefs and attitudes toward students with learning disabilities and the instruction of mathematics at the high school level. There exist numerous factors that interact and intersect that should be studied so that students with (LD) gain a stronger academic foundation in mathematics to make a positive difference in an ever-increasingly complex information-based economy: learning environments, different learning disabilities, levels of teacher preparation, strength of instruction, appropriate scaffolding of mathematics curriculum, and elimination of barriers to mathematics content and appropriate technologies.

Epistemological Assumption

The epistemological assumption means researchers attempt to get as close as possible to those being studied (Chamberlain, 2015). Thus, in a case study approach, knowledge potentially becomes very subjective based on the participants' experiences and researcher interpretations and biases. During this study, my 20-plus years of experience as a special education teacher afforded me a unique insight into the intricacies of curriculum and instruction insofar as the mathematics content, teaching pedagogies, and students with learning disabilities. For example, the instructional accommodations and modifications outlined in an IEP influence the day-to-day learning of students with learning disabilities, and such accommodations and modifications are played out on a potentially daily basis throughout the academic year, especially in an in-person, traditional brick-and-mortar environment. Moreover, my background will help facilitate deeper questioning during the individual interview process. Furthermore, my observations and interpretations based on my experiences as a special education teacher should offer unique insights during the data analysis. I will maintain an iterative process of analysis to keep researcher bias to a minimum as much as possible.

Axiological Assumption

An axiological assumption makes the researcher's values clear, admits to the value-laden nature, and actively reports their values and biases during the research process (Klenke, 2016). As a Christian working in a public-school setting, I often discover that my dearly held values and opinions have been marginalized and, at times, discriminated against. Jesus said in the Gospel of Matthew, "I am sending you out like sheep among wolves. Therefore, be as shrewd as snakes and as innocent as doves" (Bible Gateway, 2023). We have yet to discover the appropriate technology and instructional strategies to fully support the unique needs of students with learning disabilities when mastering mathematics content in an AE learning environment. I believe when we have a humble and yearning heart, the words in the Book of Jeremiah ring loud, "Call to me and I will answer you and tell you great and unsearchable things you do not know." (Bible Gateway, 2023).

Researcher's Role

I am a human instrument in this study. My objective will be to remain as neutral as possible in collecting, analyzing, and presenting the data. To maintain as much objectivity as possible, I will use Otter.ai to transcribe the video-recorded interviews, followed by participant verification of the transcript. I work primarily with the teachers in the charter school and participate in faculty meetings that include all teachers of the AE program. I maintain no supervisory position over any of the participants. I have minimal teaching contact with teachers in the community and court schools of the AE program. I am familiar with the administrators when students transfer between and among the court, community, and charter schools. I have been employed with ACSD for the past nine years, hold tenure, participate in the teachers' union, and intend to retire from this school district. I have been elected as the president of the teachers' union.

Procedures

The following procedure plan outlines the steps to obtain the target sample pool of 10 to 15 participants for this case study. Liberty University's IRB must approve the commission of this study (Appendix A). First, ACSD approval must be received (Appendix B). ACSD has a two-step process that the Office of the Chief Academic Officer requires of all research requests. An initial screener must be submitted. If the initial screener is accepted, the researcher is invited to submit a full research proposal (Appendix C). Third, after these approvals are received, a screening/recruitment email will be sent to all ACSD educators (Appendix D) using my ACSD email with a link to the screening questions through Google Form with a copy of the informed consent form (Appendix E). Fourth, those participants responding to the screening/recruitment email will be invited to participate in a survey (Appendix F). Fifth, participants responding to the survey will be contacted to participate in an individual interview (Appendix G). A final report will be provided to the ACSD Executive Director on the results of this case study (Appendix H).

Data Collection Plan

This section provides an overview of the data collection approaches for this explanatory case study qualitative design regarding administrators' perceptions of low-performance levels of high school algebra students with LD in the AE program of ACSD. The first set of data will come from a survey. The second data set will be generated from semi-structured individual interviews (Jamshed, 2014; Yin, 2018). No additional questions will be asked during the interview portion of this case study to maintain consistency throughout the interview process for all participants. The third data set will come from archival records of students with LD of the final transcripts and state math assessment scores. Coding methods can be used during the analysis of data collection (Saldaña, 2021). The data synthesis of the survey, interviews, and archival records will generate various themes and sub-themes. The triangulation of data from these sources results in increased reliability of this case study (Yin, 2018). A synthesis of these data themes should yield a single set of themes that provides an overview of administrator and teacher perceptions of the low performance of students with LD in an AE environment on the state math assessments. Appropriate codes will be developed and should be triangulated to strengthen the validity of the research findings (Saldaña, 2021).

Survey

Surveys provide potential themes to participants' views on the research topic. One survey will be sent to all participants using Likert-scale questions (Appendix D) to gather descriptive statistics on participant perspectives. Survey questions will reveal participant perspectives and attitudes (Eftenaru, 2023; Yin, 2018). Likert-scale statements and questions are closed-ended and could reveal feedback from educators' views on educating students (Abed & Abu-Ali, 2022; Summers et al., 2019). The five Likert measurements used in this survey include strongly agree,

agree, neutral, disagree, and strongly disagree (Rumary et al., 2023). A Google Form will be given to participants as a survey (Appendix G). Codes represent symbolic interpretations of information using labels. The survey will be used to generate themes during the first and second coding cycles (Saldaña, 2021). Structural coding should be used to provide an overview of survey results (Saldaña, 2021). After the first cycle of descriptive coding, the second cycle of pattern coding will be used (Saldaña, 2021) to generate broader themes.

Table 1 (Appendix G)

Survey: Likert-scale Questions

Participants will select one response to each statement with (a) Strongly agree, (b) Agree, (c) Neutral, (d) Disagree, or (e) Strongly disagree. Please complete all parts of this survey.

1. Which division do you work in (court, community, or charter)? Basic information
2. Students with learning disabilities in AE do well on the math portion of the CAASPP assessment test. CRQ
3. Students with learning disabilities in AE score proficient or above in the math portion of the CAASPP assessment. CRQ
4. Students with learning disabilities in AE score below proficient on the math portion of the CAASPP assessment. CRQ
5. Students with learning disabilities in AE score far below proficient on the math portion of the CAASPP assessment. CRQ
6. Students with learning disabilities entering AE have foundational skills to acquire CAASPP math content. CRQ
7. Students with learning disabilities in AE have adequate instructional time to prepare for the CAASPP math assessment. CRQ

8. Students with learning disabilities should receive at least one hour of dedicated instructional time daily to learn foundational skills for the CAASPP math assessment. CRQ
9. Students with learning disabilities should receive at least two hours of dedicated instructional time daily to learn foundational skills for the CAASPP math assessment. CRQ
10. Students with learning disabilities in AE come prepared with Algebra 1 concepts addressed in the CAASPP assessment. CRQ
11. Students with learning disabilities in AE understand how to access mathematics instructional material independently. CRQ
12. Teachers need a mathematics credential to provide mathematics instruction to support students with learning disabilities in AE. SQ1
13. Teachers need a background in mathematics to provide mathematics instruction to support students with learning disabilities in AE. SQ1
14. Teachers receive high-quality professional development in administering the CAASPP test. SQ1
15. Teachers receive adequate algebra content training to support students with learning disabilities in AE. SQ1
16. Teachers receive adequate professional development time to collaborate with others on mathematics topics. SQ1
17. Teachers receive regular training on mathematics curricula throughout the academic year. SQ1
18. Teachers should receive mathematics training during the summer break. SQ1

19. Students with learning disabilities in AE have access to technology to support mathematics learning. SQ2
20. Students with learning disabilities in AE understand how to use technology in learning mathematics. SQ2
21. Students with learning disabilities in AE prefer paper and pencil over the computer when working on mathematics problems. SQ2
22. Students with learning disabilities in AE prefer direct instruction when learning mathematics. SQ2
23. Technology hinders the mathematics learning of students with learning disabilities in AE. SQ2
24. Instructional math videos provide additional support for students with learning disabilities in AE. SQ2
25. Students with learning disabilities enter the AE setting with foundational math skills to learn algebra concepts. SQ3
26. Students with learning disabilities in AE possess a proficient understanding of addition. SQ3
27. Students with learning disabilities in AE possess a proficient understanding of subtraction. SQ3
28. Students with learning disabilities in AE possess a proficient understanding of multiplication. SQ3
29. Students with learning disabilities in AE possess a proficient understanding of division. SQ3

30. Students with learning disabilities in AE possess a proficient understanding of orders of operations. SQ3
31. Students with learning disabilities in AE possess a proficient understanding of ratios and proportions (fractions). SQ3
32. Students with learning disabilities in AE possess a proficient understanding of percentages. SQ3
33. Students with learning disabilities in AE possess a proficient understanding of decimals. SQ3
34. Students with learning disabilities in AE possess a proficient understanding of the number system. SQ3
35. Students with learning disabilities in AE possess a proficient understanding of geometry (perimeter and area of a square, rectangle, and triangle). SQ3
36. Students with learning disabilities in AE possess a proficient understanding of solving basic expressions ($2x + 1=7$). SQ3
37. Students with learning disabilities in AE possess a proficient understanding of the distributive property ($a[b+c] = ab + ac$). SQ3
38. Students with learning disabilities in AE should have two consecutive years of mathematics preparation before taking the CAASPP math assessment. CRQ
39. Students with learning disabilities in AE do not remain enrolled long enough to access mathematics instruction to reach proficiency levels. CRQ
40. Students with learning disabilities in AE should be able to demonstrate algebra proficiency through an alternative measure to the CAASPP. CRQ

41. The IEP's specific learning disability (SLD) designation is adequate to provide math instructional guidance for students with learning disabilities in AE settings. CRQ
42. Thank you for your participation in this survey. I will contact you to schedule an individual interview for this study.

Individual Interviews

The interview provides a crucial source of information in a case study (Yin, 2018). The interview data provides insight into participants' perspectives and experiences (Smith et al., 2022). Building upon a central research question (CRQ), sub-question questions (SQ) will provide further clarification and depth to participants' responses during the interview. The interview should be more of a guided conversation, not a rigid question-answer interview (Yin, 2018). Furthermore, open-ended questions leading with why and how will facilitate and generate better responses. I will use Zoom videoconferencing to record interviews (Appendix H) and Otter.ai and manual transcription of the recording within one week of the recorded interview (De Voto & Thomas, 2020). Interviews are expected to last about 30 minutes. Participants will be given a written transcription of their individual interview to confirm the accuracy of the transcription. The data from interviews is designed to generate subsequent codes and themes that support the overarching themes generated by the survey (Giesen & Roeser, 2020). Video recordings will be secured on my ACSD-assigned desktop computer in the classroom at a secure learning facility. I will be the only person listening to the participants' responses as I conduct the interviews from my home office using headphones. Zoom has been set up on my home computer through my ACSD login.

Each interview question sought educators' perceptions in detail based on the central research and sub-questions. Questions one and two were asked to gather basic information on the participants to help organize participants' responses during the analysis. Questions three, four, five, and 18 focused on the central research question of students with LD and their performance on the state math assessment. Questions six, seven, and eight addressed sub-question one on educators' perceptions of mathematics training and professional development. These series of questions were designed to understand the relationship of the type of teacher training received on mathematics topics over the recent years. Questions nine, 10, and 11 addressed sub-question two. These questions were designed to understand the role technology played in mathematics instruction. Questions 12, 13, 14, 15, 16, and 17 addressed sub-question three. These questions were designed to understand educators' experiences with the pedagogical practices of implementing the IEP math goals. Furthermore, these questions were designed to lay future research opportunities into the concepts of dyscalculia and MLD in the AE learning environments.

Educators participated in an individual videoconference meeting (Zoom) with the researcher. Questions or statements will be open-ended so participants can provide their responses. Participants will not be interrupted once they begin a response to a question. There is no time limit restriction on their response. The researcher will read the following statement before the interview begins: "Thank you for your voluntary participation in this study. Please respond to the best of your ability based on your personal experiences."

Table 2 (Appendix H)

Individual Interview Questions

1. Which division do you work in (community, court, or charter)? Basic information
2. Describe your background in mathematics. Basic information

3. Describe how your students with learning disabilities perform on the CAASSP math assessment. CRQ
4. Describe the foundational math skills your students with learning disabilities have when they enter your program? CRQ
5. Describe the instructional day for your students with learning disabilities. CRQ
6. Describe the mathematics curricula and instructional materials you have access to. SQ1
7. What type of training or professional development on mathematics have you received to support the performance on the CAASPP math test by your students with learning disabilities? SQ1
8. What type of training or professional development do you think teachers should receive to support mathematics instruction for their students with learning disabilities? SQ1
9. What type of math instruction do your students with learning disabilities receive daily? SQ2
10. How does technology support your math instruction? SQ2
11. What type of technology do your students with learning disabilities use in their mathematics learning? SQ2
12. Describe the level of mathematics competency your students with learning disabilities have when they come to your academic program. SQ3
13. What foundational math skills do your students with learning disabilities need for the CAASPP math test? SQ3
14. Describe how the IEP disability designation supports math learning for your students with learning disabilities? SQ3

15. Describe how classroom math instruction competes with other needs of your students with learning disabilities. SQ3
16. What has been your experience with mathematics learning disability? SQ3
17. What has been your experience with dyscalculia? SQ3
18. Why do you feel students with learning disabilities in AE perform below proficiency levels on the math portion of the CAASPP? CRQ

Archival Records

Archival records can enhance and validate information gathered through surveys and interviews. (Yin, 2018). Analysis of these documents provides specific information such as student names, records, birth dates, and other identifying factors (Yin, 2018); however, schools may limit access given restrictions governed by the Family Educational Rights and Privacy (FERPA) Act (US DOE, 2017). Moreover, obtaining copies of transcripts, teacher grade books, and related lesson plans may take longer. A public record search of the California Dashboard will be used to collect state assessment results on mathematics proficiency at the school level (CA DOE, 2021). For ACSD, document analysis for state math proficiency results would focus on the 2018 to 2023 school years. In this research, student transcripts from 2018 to 2023 and student mathematic assessment results from the CAASPP website will be used.

Data Analysis

This section describes the process of analyzing data obtained from surveys, individual interviews, and archival records. Descriptive statistics will be used to analyze the data. Descriptive statistics in qualitative research are collected through questionnaires using Likert-scale responses like strongly agree, agree, neutral, disagree, and strongly disagree to understand participant perceptions and experiences (Rahmania & Mandasari, 2021). The tabulation and summary of the research data gathered from the questionnaire would include tables and percentages of Likert-scale responses to each question in the questionnaire (Rahamania & Mandasari, 2021). By coding the participants' responses, themes will be identified to verify survey results. Themes and sub-themes will be determined through data analysis and questionnaires. This compilation of themes will provide a more comprehensive level of generalization for future research. The combination of surveys, interviews, and archival records will be strengthened by synthesizing the compiled themes. This case study's evidence is derived from student transcripts, state math assessment results, surveys, and interviews (Yin, 2018).

Pattern matching, explanation building, time series, and logic models are several different analytical models used to synthesize data from research (Yin, 2018). Codes in qualitative research are interpreted meanings of data (Saldaña, 2021). The synthesis of codes from the surveys, interviews, and document analyses should reveal patterns regarding educators' perceptions of low mastery performance on math standards assessments of high school algebra students with LD. The steps in analyzing the data collected progress from compiling, disassembling, reassembling, interpreting, and developing conclusions (Yin, 2018). Codes are used to analyze qualitative data (Saldaña, 2021; Yin, 2018). After initial coding, themes will be generated for the survey, interviews, and archival records. While not as precise as other quantitative data, using precise pattern-matching measures strengthens a case study's internal validity (Yin, 2018). The synthesis of the data may result in a trinity of concepts (Saldaña, 2021) that would reveal further areas of research in supporting students with LD in AE learning settings.

Individual interviews will be video recorded using Zoom videoconferencing software. Videorecorded interviews will be analyzed through Otter.ai and then manually confirmed by the researcher for accuracy. I will use brackets, capitalization, italicization, bolding, and thematic codes to provide initial analysis during the interview process (Saldaña, 2021). These codes provide insight into educators' perceptions and low mastery levels of students with LD. Initial themes will then be grouped into three or four more generalized themes for analysis. A manual transcription review will take place to verify the automated transcription. A written draft and audio recording will be sent to the corresponding participant through email for verification and accuracy of their statements. An Excel spreadsheet will be used to code the participants' video-recorded interviews. Coding the participants' responses will generate themes to validate survey results. Two cycles of coding methods for individual interview data analysis will be value coding followed by pattern coding (Saldaña, 2021). The first cycle of coding methods will examine grammatical, elemental, affective, literary, language, exploratory, procedural, and methods of theming (Saldaña, 2021). The second cycle of coding will examine the results of cycle one (Saldaña, 2021). Initial themes will then be grouped into three or four more generalized themes for analysis. Specifically, descriptive coding is often the default method (Saldaña, 2021). Descriptive coding provides insight into educators' perceptions and low mastery levels of students with LD.

Archival records used in this analysis phase will be final semester grades in Algebra 1 and Integrated Math 1 classes for high school students with LD in ACSD AE programs and mathematics scores from the California Assessment of Student Performance and Progress (CAASPP) since 2018 (CA DOE, 2024). Theming of the data may be more suitable for document analysis. An Excel spreadsheet will analyze documents (Saldaña, 2021). NVivo or Atlas.ti are helpful automation tools; however, this type of coding is not a substitute for manual coding (Saldaña, 2021). Interpreting the data will include examining teachers' final records and state math assessment information. Where applicable, analytic memo writing will provide opportunities to critically analyze and challenge my assumptions during the document analysis phase (Saldaña, 2021). All identifying information, such as names, birth dates, gender, home addresses, and parental information, will be requested to be removed before ACSD provides these documents to the research. In the event I receive identifying information on archival records, I will create pseudonyms for each record.

Trustworthiness

My study will consider the following trustworthiness issues: credibility, transferability, dependability, and confirmability (Lincoln & Guba, 1985). Ethical considerations remain of utmost importance to protect the confidentiality of participants. Protecting student privacy will be a priority in keeping FERPA regulations. Moreover, ethical considerations will be considered. To promote the trustworthiness of this study, steps have been taken to be transparent so that this study can be replicated among different AE programs throughout the state of California. Questionnaires, interview questions, and disclosure letters will be included.

Credibility

Credibility is defined as the level of confidence in the data collected in a research study and is crucial to the trustworthiness of a study (Shenton, 2004). Fourteen aspects of a research study promote credibility (Lincoln & Guba, 1985; Shenton, 2004). Specifically, familiarity with participant culture, random sampling, triangulation, promotion of honesty among participants, reflective commentary, member checks, investigator background, a thick description of the issue, and examination of past research findings contribute to this study (Shenton, 2004). As a researcher, I have been and remain employed by ACSD in the AE program for the past nine years and have been involved in teaching special education for over twenty years in California. Member checks are the most critical aspect of bolstering this study's credibility (Lincoln & Guba, 1985). Thus, participants will be given a video-recorded interview transcript and asked to sign verification forms. Moreover, bolstering a thick description of methods, data triangulation will rest with interviews supported by documents from ACSD, CA state assessment records, and participant-transcribed video recordings. Finally, the literature review of this study will suggest further examination of related research into AE programs and special education insofar as state assessments are concerned.

Transferability

The transferability of research is the level at which a study's findings can be transferred to other contexts or settings (Maxwell, 2021). As a case study examining educators' perceptions of low mastery achievement on state assessments of students with LD, this study aims to serve as a model for other AE programs throughout the United States. A detailed description of this study's research context and procedures leads to greater transferability (Shenton, 2004). For example, participants in this study all hold an SAI credential (CA CTC; 2020). A SAI credential means that the teacher must be dual credentialed—special education and single subject or multiple subject credentials. Two distinct special education credentials exist in California to work with students with mild/moderate or moderate/severe disabilities in K-12 settings (CA CTC, 2023). Single-subject credentials focus on middle and high school students in specific academic subjects like English, mathematics, science, social sciences, physical education, and the arts (CA CTC, 2023). The multiple-subject credential permits teachers to work with students in elementary grade levels (CA CTC, 2023).

Dependability

The dependability of qualitative research aims to establish the study’s findings as consistent and repeatable by other potential researchers. While dependability is difficult to satisfy, a detailed description of procedures provides future investigations to repeat the study in different situations (Shenton, 2004). This study aims to fill the literature gap regarding educators' perceptions and low mastery assessment scores among students with LD in an AE setting. A researcher enhances the dependability of a study by taking steps to describe the research design and implementation, explain the details of data gathering, and reflect on the overall process of this study (Shenton, 2004). For this study, I will maintain a log of data collection and reflections on the process throughout the study.

Confirmability

The confirmability of research reflects the researcher taking steps to allow the findings to emerge from that data (Shenton, 2004). Data triangulation in this research will foster greater confirmability and neutrality of the findings through audit trials and maintaining accurate records of notes from interviews (O’ Kane et al., 2021). Furthermore, my research positionality will contribute to substantiating confirmability given my experiences as a special education teacher and employee of the ACSD. To further promote confirmability, an audit trail will be available. The purpose of the audit trail will be data-oriented to demonstrate that the findings of the study are based upon the data and the process in which the data was collected (O'Kane et al., 2021; Shenton, 2004). Reflexivity is used to determine confirmability of researchers admitting their roles in research (Lemon & Hayes, 2020). I acknowledge that my personal beliefs as an educator and experiences in special education and AE play a role in this research study.

Ethical Considerations

Permission from participants to work with educators will be obtained from ACSD (Appendix E). Students will not be interviewed. ACSD provides an application document that must be approved before research data can be collected (Appendix B). The senior leadership and several administrators know my dissertation topic and proposal to work with educators and their perceptions of low math test scores among students with LD. I have taken the initial steps in filling out the initial screener for the research form. All identifying information will be removed from the final publication.

Permissions

Permission from the IRB (Appendix A) and ACSD (Appendix C) must be received before data can be gathered for this cases study. The steps to receive ACSD approval for research begin with an initial screening questionnaire and once approved, the completion of the research request. The links to these forms can be obtained from the Office of the Chief Academic Officer (Appendix B). The request to research ACSD includes a description of this research study and procedures. After receiving ACSD approval, IRB approval is required (Appendix A). As part of ACSD approval for research (Appendix B), I will provide the ACSD leadership with my findings through an executive summary after completion of my doctorate program at Liberty University (Appendix H).

Other Participant Protections

Additional steps will be taken to protect the privacy of all involved. All participants will be given a consent letter explaining the voluntary nature of this study, which will include a consent section for their signatures (Appendix E). During this study's data collection and analysis steps, all identifying biographical and demographic information on gradebooks, math assessment results, work samples, and lessons will be blacked out. All the names of teachers and students will be blacked out. During the questionnaire/survey part of this study, the names of educators will be deleted. Data collected will be stored on encrypted and secured school computer files and locked cabinets. The executive summary will be delivered within four weeks after I defend this study with Liberty University's School of Education. After delivering the executive summary to ACSD, I will destroy all data through electronic deleting and the physical shredding of physical documents after three years.

Summary

This case study examines educators' perceptions of low performance on mathematics state assessments among high school algebra students with LD in an AE program in California. Research positionality centered on a social constructivist perspective. Data collection methods will employ a survey, individual interviews, and document collection of student transcripts and assessment results. Data analyses included triangulation and various coding cycles to enhance the data's credibility, transferability, dependability, and confirmability. The researcher will receive approvals to conduct this research from the IRB and the ACSD. Measures will be taken to protect participants' confidentiality.

CHAPTER FOUR: FINDINGS

Overview

This chapter describes the findings of this qualitative case study to understand educators' perceptions regarding factors that influence high-school algebra students with LD in an AE setting to score below and far below basic proficiency levels on the California math standards test despite receiving credit for the algebra course. The problem is that high school algebra students with LD in AE programs perform below or far below basic levels on the California State mathematics standards test despite receiving passing grades in the related algebra course. Using a qualitative method provides insight into the experiences of teachers and administrators working with students with LD in AE settings (Yin, 2018). Surveys and individual interviews from educators and archival student records provided data for this study. This chapter includes participants' demographics, themes, and subthemes to better understand the central research question on possible explanations for the low performance on mathematics state assessments among high school algebra students with learning disabilities in AE settings despite receiving graduation credit for Algebra 1. During this data collection phase, I intended to gather the views of administrators and teachers from surveys and individual interviews and to gather student archival records. This research study was intended to lay the foundation for future research in the areas of mathematics learning disabilities, teacher professional development, and instructional strategies for high school algebra and students with LD.

Participants

The participant pool in this study consisted of 60 educators from the ACSD AE division from the court, community, and charter programs. Multiple recruitment emails were sent to a pool of 60 participants, followed by recruitment phone calls. Fourteen participants, consisting of six administrators and eight teachers, responded to the screening survey (Appendix E). Among the fourteen participants, there were twelve female and two male educators. Of the fourteen participants from the screening survey, eleven continued their participation in the survey and ten in the individual interviews. Participants that completed the surveys and interviews were included in the data collection. No students or their families were contacted during the data collection phase of this study. Figures 1 through 4 provide general demographic information on the participants based on the screening questionnaire.

Figure 1 describes the AE learning environment of the participants. Each AE learning environment is unique for ACSD. Court schools tend to have the most restrictive environments for students and teachers, given the safety protocols in place. Specifically, the Department of Probation outlines the classroom's physical security measures for students, including all restrictions on the use of technology. In this case study, ACSD must receive approval from the Department of Probation to use laptops, Internet access, and other classroom technologies. Court school operates a typical 8:30 a.m. to 3:30 p.m. daily schedule with schedule breaks for nutrition and lunch in a completely self-contained classroom. A probation officer is inside the classroom to ensure the physical safety of the students and staff. Like the court school, community school programs have fewer restrictions than court schools. ACSD community schools have full access to computers, digital media, the Internet, ACSD-permitted software such as Canvas, and the suite of Google and Microsoft products. ACSD community schools operate a typical 8:30 a.m. to 3:00 p.m. daily schedule whereby students stay in the same classroom with the same teacher for all academic subjects. The charter program is an independent studies program of ACSD whereby students are placed on individual learning contracts and meet with their respective once a week for about an hour. Students can access the regular classroom and work on the classes at home or school. In all three learning environments, students with LD are provided with accommodations and modifications as outlined by the student's IEP.

Figure 1

Participants' Working Divisions

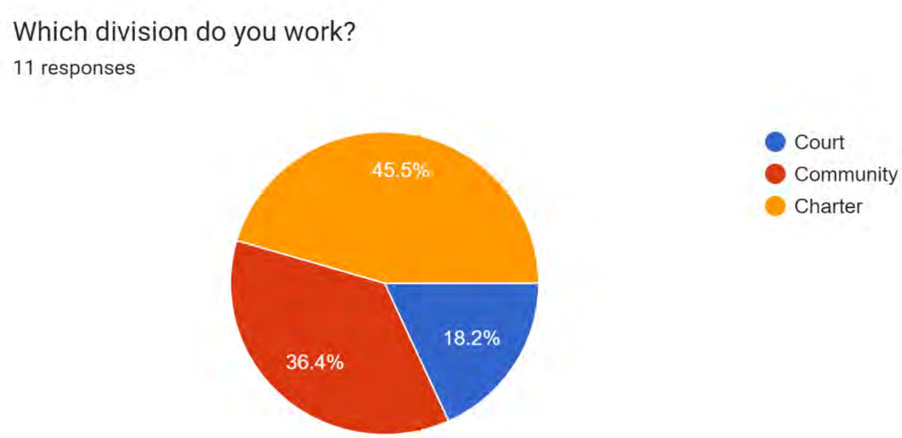


Figure 2 describes the participants' possession of a mathematics credential or mathematics authorization added to current credentials. A specific mathematics credential or authorization is not required to teach in the AE programs. AE teachers must possess an education specialist credential (special education mild/moderate credential) and single or multiple subject credentials. A single subject credential can be from any academic content subject such as English, social science, science, art, or physical science. The multiple subject credential is designed for teachers working with the K-5 grade level. Figure 2 notes that over 70% of participants did not possess a mathematics credential or mathematics authorization added to their existing credentials. This figure does not indicate whether participants acquired mathematics knowledge from on-the-job training, professional development, or self-acquired mathematics knowledge. This information will be elaborated upon in the analysis of the individual interviews.

Figure 2

Participants' Possession of Mathematics Credentials or Authorizations

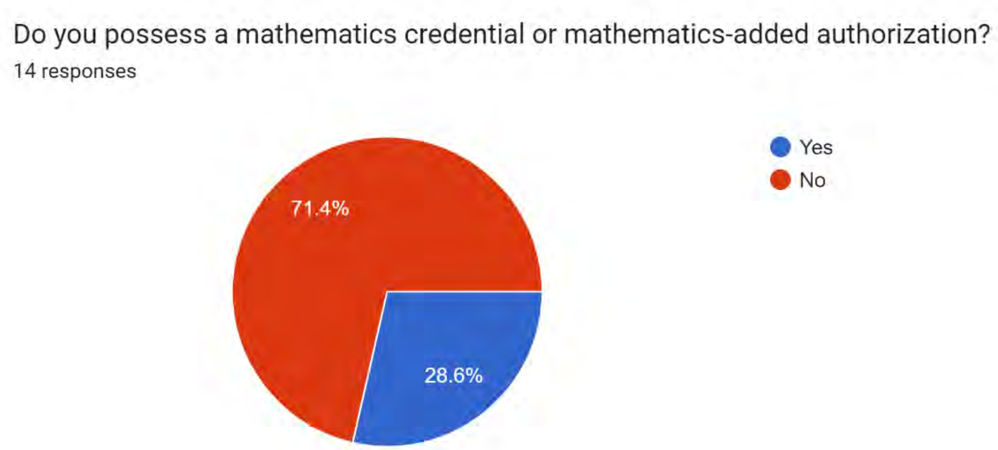


Figure 3 provides an overview of the participants' years of teaching experience. All participants had over six years of teaching experience. Over 57% of participants had more than 20 years of teaching experience. Over 35% of participants noted 16 to 20 years of teaching experience. Teachers with over 15 years of teaching experience may be eligible for retirement. Therefore, ACSD faces a potential shortage of AE teachers soon, with over 90% of teachers eligible for retirement in the next few years.

Figure 3

Participants' Years of Teaching Experience

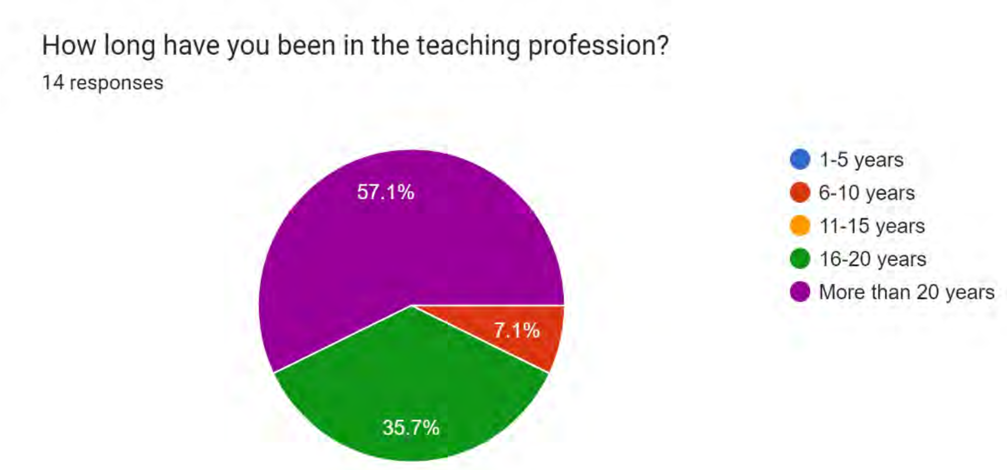
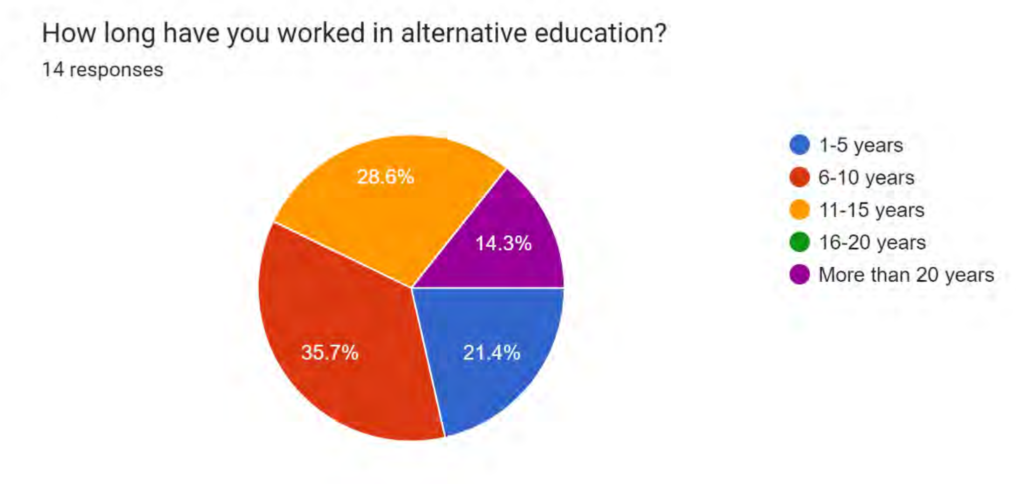


Figure 4 provides the number of years of specific AE experience of the participants. In the case of ACSD, the AE programs have generally experienced a stable teaching cadre. Over 14% of ACSD AE teachers have over 20 years of experience specific to AE programs. The second largest group of ACSD AE teachers has six to 10 years of experience. Over 20% of the ACSD teachers have less than five years of AE teaching experience. Over 50% of participants have less than ten years of experience working in AE programs. In this case, ACSD will face a potential wave of retirement of nearly half of its teaching cadre, assuming an educator is eligible to retire after 15 years of service.

Figure 4

Participants Years of Experience in AE



The following descriptions of participants come from the individual interviews. Participants were offered directions before the interview began (Appendix I). The interview included open-ended questions and statements for participants to respond to. Each interview lasted 15 to 30 minutes. In addition to gathering codes, intonations, inflections, pitch, and the speaking rate were observed of each participant. Areas of participants' interests and behaviors during the interview were noted. Each participant was assigned a pseudonym to maintain anonymity and confidentiality.

Table 3

The Participants

Participant	Teacher or Administrator	Single subject credential	Mathematics credential or mathematics-added authorization	Multiple subject credential	Years in the teaching profession	Years in AE
Anna	Administrator	Yes	Yes	No	20+	1-5
Esther	Teacher	Yes	No	No	20+	11-15
Matthew	Administrator	No	No	Yes	20+	1-5
Thomas	Teacher	Yes	No	No	6-10	6-10
Candace	Teacher	No	No	Yes	16-20	6-10
Deborah	Teacher	No	No	Yes	16-20	11-15
Hope	Teacher	Yes	No	Yes	16-20	6-10
Mary	Teacher	Yes	Yes	No	20+	11-15
Sophia	Teacher	No	No	Yes	20+	20+
Luke	Administrator	Yes	No	Yes	20+	6-10

Anna

Anna indicated over 20 years of teaching experience in mathematics but had the fewest years of experience in AE. Anna holds advanced degrees and credentials in education and mathematics. Anna described her extensive background in mathematics and working with students in grades seven to 12. Anna described her experiences teaching in various educational settings, including public, private, and charter schools. Anna was hired as an administrator from a neighboring school district with years of experience working with at-risk students. Although Anna had the fewest years of experience working with the AE population, Anna expressed a passion for helping children from the socio-economic margins and having their voices heard in the education process. Anna emphasized that learning mathematics allowed these students to escape their depressed socio-economic situation. Anna highlighted insufficient foundational math skills among students with LD, a need for more professional development for teachers in mathematics content, and how technology can support instruction. Anna noted that the IEP should be more tailored to support student mathematics learning. Anna is currently an administrator.

Esther

Esther indicated over twenty years of teaching experience and 11 to 15 years of AE experience and did not possess a mathematics credential. Esther recently completed her doctorate in special education, specifically studying the transition plans of students with LD in an AE learning environment. Esther described her limited mathematics background and courses taken to earn her university degrees. Esther’s soft and pleasant demeanor masked her deep frustrations over being unable to offer adequate support for her students, especially those with LD. Esther emphasized the challenges of students with LD acquiring foundational math skills needed for the

CAASPP math assessment. The participant identified teachers' need for professional development because of the heavy reliance on instructional videos rather than direct instruction. Esther expressed a hurtful concern over her students with LD because she felt she did not have enough instructional time and expertise to provide the scaffolded and differentiated instruction needed to help her students truly. Esther expressed her frustrations and need for more training. Esther wants to observe master teachers of mathematics in action so she can learn how to be a better math teacher for her students. Esther was frustrated because her administration would not provide what she requested and would place more administrative duties on top of her overwhelming caseload. Esther felt that her caseload did not provide the time to provide the support needed to meet the instructional goals of the IEP for her students.

Matthew

Matthew indicated an elementary school background with over 20 years of teaching experience and one to five years of experience in AE. Matthew expressed quiet composure throughout the interview but appeared to be on the verge of explosive indignation that the entire process of mathematics curriculum and instruction was rife with the blind leading the blind. Matthew noted that a teacher’s mathematics background, structured instructional approach, and students' foundational math skills contribute to student success. Matthew emphasized that a lack of foundational math skills at the elementary grade level and explicit understanding of math vocabulary influence student math achievement. Matthew felt that teachers were not prepared to provide effective instruction because the teachers were not adequately trained. Matthew expressed frustration that there was a lack of overall mathematics PD provided. Matthew also described the role technology played as an integral role in facilitating learning. Matthew emphasized that the students were not being taught how to do algorithms and explained mathematics vocabulary as a significant obstacle to student achievement in math. Matthew is currently an administrator.

Thomas

Thomas was the youngest of all participants. He maintained the fewest years of teaching experience; however, all his teaching experience was in an AE environment. Thomas did not have a mathematics credential. Thomas described feelings of a lack of confidence because of a minimal mathematics teaching experience. Thomas also noted students' weak foundational math skills. Moreover, this participant described a need for more focused mathematics professional development for teachers. Thomas highlighted that students' high absenteeism rate prevented them from receiving mathematics instruction in-person or through instructional videos offered through digital platforms such as Canvas or YouTube. Thomas expressed hope for his students and believed he needed more training, especially in special education services, to meet the needs of his students. Thomas expressed his lack of understanding of special education issues, such as dyscalculia, that hinder his ability to offer differentiated instruction to his students.

Candace

Candace indicated 16 of 20 years of elementary teaching experience with 11 to 15 years of AE experience. While Candace did not have a mathematics credential, Candace emphasized that she met the basic teaching qualifications by passing the state-required tests for teachers, which included mathematics. Candace emphasized that the shift in teaching responsibilities over the years to more significant administrative duties hindered her ability to meet her students' needs. Candace felt the paperwork was overwhelming and took away precious instructional time. Candace highlighted an inadequacy of foundational math skills at the elementary level for both the teacher and students, an over-reliance on technology to offer students instruction, and an unmet need for professional development on math topics for teachers. Candace also noted that the IEP does not provide adequate guidance for teachers to support students with LD and their math goals. When Candace spoke about her students and math, she paused many times to gather her thoughts and responded very softly.

Deborah

Deborah indicated the same demographics as Candace. Deborah noted her limitations in math education, especially in foundational math skills. Deborah is the only participant who noted their struggle with dyscalculia. Deborah also emphasized the importance and need for professional development in math content and instruction. Deborah highlighted the need for more detailed IEPs with math support and a more thoughtful math curriculum planning process that addresses the foundational math gaps of students. Deborah shared her personal experiences with dyscalculia and math learning disabilities when growing up as a younger student. Deborah connected with her students' frustrations because she had experienced the same feelings of frustration, anxiety, and defeat when learning math. Deborah hoped to share her success strategies with her students when overcoming math. She called for more math training for teachers by the school district. Deborah exuded an attitude that if she could conquer math, so could her students.

Hope

Hope exuded confidence and was a no-nonsense teacher. Hope indicated the possession of secondary and elementary school credentials but no mathematics credentials. Hope talked about her 16 to 20 years of teaching experience with six to 10 years of experience in AE. Hope noted that despite having a non-mathematics background, she had been teaching mathematics for five years. Hope noted her students' inadequacy of foundational math skills, a lack of targeted professional development, and a heavy reliance on technology to provide math instruction. Hope also highlighted the low motivation levels of students, especially regarding mathematics. Hope manifested a stern demeanor but a willingness to support her students. Hope believed the IEP, despite all its inadequacies, remained a solid blueprint to meet the needs of her students with LD.

Mary

Mary possessed a secondary mathematics credential with over twenty years of teaching experience and eleven to fifteen years of AE experience. Mary noted her strength in understanding mathematics. Mary highlighted gaps in students' elementary math content knowledge, a need for more focused professional development for teachers, and discrepancies in standardized test preparedness by students and teachers. Mary described students receiving limited direct instruction in mathematics and using technology as a substitute for students to pursue self-study of math topics. Mary noted that professional development should address the use of technology in mathematics instruction. During the interview, Mary discussed her thoughts in responding to questions and statements. Mary believed she was more of a student guide than a teacher. Mary served on multiple ACSD committees to develop the math curriculum for the Canvas platform.

Sophia

Sophia had the most years of teaching experience and experience in AE among all the participants in this study. Sophia was known as a strict, no-nonsense teacher who expected the best from her students. Sophia only possessed an elementary-level credential and no mathematics credential. Sophia provided the most extended interview, whose responses often overlapped or repeated the same information from other interview questions. Sophia highlighted recurring and systemic issues faced by teachers and students. Sophia noted a need for her students to have foundational math skills to be successful on the math assessment test. Professional development could have improved the teacher's effectiveness in mathematics instruction. Moreover, Sophia believed an over-reliance on standardized math curricula offered mixed results because of the highly individualized needs of students with LD. Sophia believed that teachers should expect much from their students and provide abundant support; however, students should ask for support. Sophia believed that teachers and students must communicate well with each other. Sophia emphasized that she could not read students' minds and that students needed to speak up for themselves. Sophia also served on multiple PD committees addressing literacy and math curricula for the school district.

Luke

Luke indicated over twenty years of teaching experience with six to ten years of AE experience. Luke possessed a secondary and an elementary credential and no mathematics credential. Luke maintained a dry sense of humor filled with sarcasm. Luke noted students' low proficiency in fundamental math skills, a lack of specialized teacher training, and the need for differentiated math instruction. Luke highlighted some advantages of incorporating technology into math instruction; however, the allocated instructional time competes with mathematics instruction. Luke demonstrated frustration with the administration because he felt the administration did not offer the needed support to address the mathematics issue in the AE programs. Instead, Luke felt that teachers and students were set up to fail because of a lack of dedicated support in mathematics. Luke is currently an administrator.

Results

The purpose of this qualitative study was to understand educators' perceptions regarding factors that influence high-school algebra students with LD in an AE setting to score below and far below basic proficiency levels on the California math standards test despite receiving credit for the algebra course. A survey, individual interviews, and archival records were used to triangulate the data results. This section provides the results gathered from the survey, interviews, and student archival records. The results from this study include three themes and several sub-themes. The triangulation of data resulted in three themes and six subthemes. Three outlier findings resulted from the analysis.

The survey was developed using Google Forms and incorporated 41 Likert-scale statements. Likert-scale statements or closed-ended questions could reveal feedback from educators’ views on educating students (Abed & Abu-Ali, 2022; Summers et al., 2019). The five Likert measurements used in this survey include strongly agree, agree, neutral, disagree, and strongly disagree (Rumary et al., 2023). The survey results are listed in Table 4 (Appendix H). The participants were asked to identify the division of AE they worked in to highlight the uniqueness of each AE program (court, community, and charter). Participants’ responses to the survey questions generally leaned towards agree/strongly agree and disagree/strongly disagree. Very few responses were in the neutral category. These bipolar responses offer clear guidance on future curricular and pedagogical strategies for educators to help students with LD potentially improve mathematics assessment performance. Appendix H summarizes each participant’s responses to all survey questions or statements.

Individual interviews (Appendix I) provide invaluable information for case studies (Yin, 2018). This research studied the insights provided by participants and their experiences while working with students with LD in an AE setting (Smith et al., 2022). The individual interviews were conducted via Zoom videoconferencing and were based on 18 open-ended statements or questions. During the interview, when the participant requested, the prompt was repeated. Once the participant began responding to each prompt, I did not interrupt the participant. I waited for a distinct end to each statement to each prompt before proceeding to the next question or comment. Many responses were repeated or rephrased while addressing different interview prompts due to the overlapping nature of the topics. For example, participants described technology while discussing curriculum, student foundational math skills, and teacher PDs. Direct quotes from participants will be provided in each discussion of interview question responses to highlight the educators' perceptions of their students with LD performance on the state math assessment.

The ACSD data team provided archival math semester grades and state math assessment records of students with LD. This archival information consisted of student transcripts and test scores on the math portion of the CAASPP assessment (Appendix N). Student numbers were randomized by ACSD when these records were provided. From the 2016-17 to the 2022-23 school years (excluding the 2020-21 school year due to COVID-19), 1288 student enrollments in ACSD took an Algebra 1 or equivalent course. Among the 1288 student enrollments in ACSD, 641 students received direct math instruction over this same period by an ACSD teacher. All students in this archival research were identified as students with LD. Appendix N consists of several tables separated by the academic school year.

An analysis of student archival records provided further information on student performance on math state testing. Appendix N consists of six tables that describe student archival records of course information, credits attempted, credits earned, semester final grades, and the students' corresponding scores on the CA math state assessment (proficiency levels). Student names and their corresponding student identification numbers were masked and randomized by the ACSD information technology office. In certain instances, the masked ID numbers repeated, which meant the same student enrolled in different algebra courses or repeated the same course. The course titles of Int Math 1, Int Math 1 CP, Int Math 1 CP P, Int Math 1S1, Int Math 1S2 Algebra 1, Algebra 1 S1, and Algebra 1 S2 refer to the same algebra content required to meet the CA high school algebra equivalency for graduation. Students earning five credits in each math course earned a minimum D- grade, which met the minimum passing grade to satisfy the CA high school algebra graduation requirement. Students enrolled in ACSD could have taken the algebra course while attending ACSD or at another school. However, this archival analysis consisted of students who received mathematics instruction from an ACSD teacher. Student data was limited to those students who took the algebra course while enrolled in ACSD. No data was provided for the 2020-21 school year due to a pause in testing because of the COVID-19 school closure. The performance levels are divided into four categories: 1 means “not met,” 2 means “nearly met,” 3 means “met,” and 4 means “exceeded.”

The ACSD data team provided archival math semester grades and state math assessment records of students with LD. This archival information consisted of student transcripts and test scores on the math portion of the CAASPP assessment (Appendix N). Student numbers were randomized by ACSD when these records were provided. From the 2016-17 to the 2022-23 school years (excluding the 2020-21 school year due to COVID-19), there were 1288 student enrollments in ACSD that took at an Algebra 1 or equivalent course. Among the 1288 student enrollments in ACSD, 641 students received direct math instruction over this same period by an ACSD teacher. All students in this archival research were identified as students with LD. Appendix N consists of several tables separated by the academic school year.

Themes and Sub-themes

Several themes and subthemes were identified based on the analysis of the survey results, interviews, and student archival records. These data collection methods were used to ensure triangulation. Google Forms was used for the survey. Zoom videoconferencing was used for the individual interviews. Microsoft Excel was used to organize and analyze student archival records provided by the ACSD information technology branch, with all identifying student information masked with randomized numbers for each student. Three themes emerged from the data collection (Table 11): (a) Curriculum, (b) Instruction and technology, and (c) the IEP. Two subthemes were identified under curriculum: (a) Teachers' mathematics content knowledge and (b) Pedagogical knowledge. Two subthemes were identified for instruction and technology: (a) Differentiating instruction and (b) Personalizing instruction. Two subthemes were identified for the theme of the IEP: (a) Dyscalculia and (b) Modifications and accommodations.

Codes were clustered to form subthemes. The codes of foundational math skills, YouTube, and videos were clustered to form the subtheme of the teacher's math content knowledge. The codes of PDs, fluency, Common Core, and experiences were clustered to form the subtheme of teachers' pedagogical knowledge. The codes of building blocks, structure, PEMDAS, addition, subtraction, multiplication, division, technology, computer, and Canvas were clustered to form the subtheme differentiating instruction. The codes of standards, algebraic concepts, Edmentum, instruction, website, and textbooks were clustered to form the subtheme of personalizing instruction. The codes MLD, don't know, no idea, and what's that were clustered to form the subtheme dyscalculia. The codes of goals, proficiency, grade level, and calculators were clustered to form the subtheme of IEP modifications and accommodations. In total, these codes appeared 1021 times in participant interviews.

Table 11 (Appendix O)

Themes & Subthemes

Theme	Subtheme	Subtheme
Curriculum	Teachers' math content knowledge	Teachers' pedagogical knowledge
Instruction and Technology	Differentiating instruction	Personalizing instruction
The IEP	Dyscalculia	IEP Modifications and Accommodations

Curriculum

The curriculum theme addresses the academic content of mathematics. This study focused on the Algebra 1 mathematics curriculum. ACSD had adopted the Integrated Math 1 curriculum, an evolution of Algebra 1 based on the Common Core standards (Strickland, 2022). The math curriculum is available for teachers and students in textbooks and digital formats using Canvas and Edmentum. The ACSD math curriculum is designed to meet the CA state high school Algebra 1 graduation requirement and the CA state math assessment on the CAASPP. The ACSD administration has encouraged all teachers to use this math curriculum to provide math instruction for all students enrolled in ACSD. Based on this survey, nine out of 11 participants disagreed or strongly disagreed that their students with LD understood how to access this math curriculum (Appendix H). Furthermore, six out of 11 educators agreed or strongly agreed with this survey prompt, and the remaining participants' responses ranged from neutral to strongly disagree (Appendix H).

Math textbooks and instructional videos are available as math curricula. ACSD has adopted Integrated Math textbooks from McGraw-Hill publishers. Teachers and students use instructional videos embedded in Canvas, Edmentum, and textbooks. Candace explained, “The materials are the programs, the Canvas program for math…but sometimes we pull out textbooks…I mean, not text…we are given the program and paper and pencil they [students] use.” Candace described using mathematics instructional videos from online sources to supplement and replace direct math instruction, “I guess, official and unofficial things [instructional materials] we use to help with instruction are websites like Khan Academy or sometimes YouTube.”

Teachers’ Math Content Knowledge

The essence of this sub-theme addresses the need to expand ACSD teachers’ foundational knowledge of mathematics. Educators agreed that teachers need focused professional development on mathematics curriculum and to build up the teachers’ foundational knowledge of mathematics content given the diverse experiences educators had insofar as mathematics is concerned. Furthermore, 10 out of 14 participants in the screening survey noted they did not possess a mathematics credential or a mathematics-added authorization. Moreover, eight of 14 participants in the screening survey indicated they possessed a multiple-subject credential, which would address foundational math content knowledge. The remaining six respondents may not have mathematics-based or mathematics-required content for their single-subject credentials.

Further survey data revealed that teachers used instructional math videos as additional support. Nine out of 11 participants agreed or strongly agreed that instructional math videos provided additional support for students with LD. Interview results supported survey data on teacher math content knowledge. Based on the interviews, eight out of 11 ACSD AE teachers did not have a background in mathematics, while only 3 did. Anna said, “I was a math teacher…[with] close to 20 years teaching…in the private, public, and charter school sectors.” Anna further noted, “And I remember was interesting when I received my degree in mathematics, I thought this was so interesting that I didn’t really even learn how to teach elementary algebra until I was in my upper-level classes in mathematics.” Anna further said, “And so most of those teachers that are teaching the basic building blocks of mathematics to our elementary school students never receive those courses.” Thomas succinctly described the typical math background and needs of ACSD AE teachers, “Since the majority of us don’t have math credentials, we need some foundational training and then just kind of scaffold and build this up just so that we can ensure that we’re teaching math in the appropriate manner.” Hope said, “I was thrown into teaching mathematics in alt ed nine years ago.” Candance said, “Just through being able to watch a professional like a math teacher, a math math teacher explain it.”

The participants also noted that the Canvas learning platform could be improved to provide better curricular support for teachers, especially when explaining how to use Canvas to their students. Survey responses (Appendix H) and interview results indicated that the teachers and students accessed the mathematics curriculum through Canvas. Thomas described the math curriculum as follows: “So we have a course built on Canvas; it’s an Integrated 1 math and Integrated 2 math.” This math curriculum in Canvas and Edmentum assumes teachers would possess a foundational background in mathematics. However, based on survey and interview results, many ACSD teachers do not possess this type of expertise.

Teachers’ Pedagogical Knowledge

Pedagogy is the instructional practice teachers use to deliver curriculum. A well-trained teacher and student using targeted technology based on scaffolded curricula and instructional design can help improve performance on the CAASPP math assessment for high school students with LD. Elements of pedagogical issues related to the amount of instructional time appeared across all three data sources in this survey. In the survey (Appendix H), when asked about adequate instructional time to prepare for the math assessment, seven out of 11 participants disagreed or strongly disagreed with this statement. Furthermore, ten of the 11 educators agreed or strongly agreed that students with LD should receive at least one hour of math instructional time daily (Appendix H). However, the same educators were divided when asked if students with LD should receive at least two hours of daily math instruction (Appendix H). Hope said, “The instruction is very rigorous so many students fall behind.” Esther described the math instruction offered to her students, “I only see them once a week, but when I do see them, they [students] receive instruction based on where they are in the curriculum.” Candace further described the instruction provided to students, “Teaching themselves independently.”

ACSD educators have received PD training on UDL and other pedagogical strategies over the past several years. Anna stated, “They [students] receive the adoptive curriculum instruction at their level and a lot of scaffolding…then we have intervention methods that are used.” However, Anna did not specify the intervention methods available. Matthew further described the instructional day for students, First of all, it’s highly structured…writing prompts daily…warmups…or review of what was done, and then they do into a…lecture, a step-by-step process by the teacher.” Anna and Luke are administrators in ACSD. In the interviews, ACSD teachers did not mention instructional practices or examples of specific instructional strategies such as UDL or the flipped classroom. However, when asked if teachers receive regular training on mathematics curricula throughout the academic year, eight out of 11 participants disagreed or strongly disagreed that teachers received math training. ACSD has dedicated extra PD time outside the regular school-year PD schedule for teachers to collaborate and develop the math curricula in the past three years. These extra PDs occurred before the survey of this research project. As a participant in these past PDs, I have collaborated with three additional AE teachers on math curricula development in two different collaboration periods that have occurred once a week during the academic year in the spring semester and for six weeks daily over the summer break.

Instruction and Technology

In this study, the theme of instruction and technology addresses how teachers have incorporated technology into the current instructional practices at ACSD AE programs. Educators overwhelmingly noted that the mathematics curriculum is widely available in digital and textbook formats. Educators described using Canvas, Edmentum, and textbook-based mathematics curricula for the Algebra 1 graduation requirement, which also addresses the math state assessment topics. Canvas is the digital platform teachers and students access by a computer, laptop, smartphone, or tablet using their ACSD email login. Based on survey results (Appendix H) and interview responses, ACSD educators highlighted the use of technology as part of mathematics instruction. Survey and interview results show that students do not necessarily receive differentiated or personalized instruction, given the one-size-fits-all delivery vehicles for mathematics instruction through Canvas, Edmentum, and text-based math curricula. However, the incorporation of technology was limited to using a computer to access the mathematics curriculum on Canvas or Edmentum. Canvas was noted as the primary source of access to the math curriculum. The use of instructional math videos embedded in Canvas or accessed on YouTube was another instructional strategy used by teachers. Thomas described the instructional delivery of the mathematics lessons, “It’s predominantly there’s videos so the gentleman describes the equations." The following section discusses the two subthemes of differentiating instruction and personalizing instruction for students. Deborah noted, "I have been focusing primarily on the curriculum that the district developed on Canvas, and it's very much based on embedded videos that the students watch on a given topic."

Technological, pedagogical, and content knowledge (TPACK) research suggests that teachers may not fully understand or possess the skills to incorporate digital technologies in a variety of instructional settings (Saralar-Aras & Türker-Biber, 2024; Oliveira & de Souza, 2022). While ACSD students and teachers may have access to technology in the classroom, this access does not necessarily suggest a strong TPACK understanding (Arias et al., 2021). While ACSD students and teachers may have access to technology in the classroom, this access does not necessarily suggest a strong TPACK understanding (Arias et al., 2021). The results of this survey statement provide inconclusive evidence as to whether educators use direct instruction intentionally or rely on instructional videos, given their general lack of mathematics content mastery. Over 90% of participants noted that students with LD in the ACSD AE program have access to technology to support mathematics learning; educators were equally divided regarding students with LD understanding of how to use the technology to learn math. One participant summed up the instruction and technology behind the mathematics curriculum. Mary offered insights into both Canvas and Edmentum math programs. Mary said, "We also have an online Canvas program for math, which is the better independent program for our math students [and] is the best independent program we have for math." Mary further explained, "I don't think it's [Canvas] the best, but it's the best one we have, and then we also have an online Edmentum math program, which is very difficult for students of any ability."

Differentiating Instruction

When a teacher differentiates instruction, using various levels of technology, such as AT, contributes to varying levels of student achievement (Bouck et al., 2020c; Bouck & Satsangi, 2020). This appropriate incorporation of technology reflects effective teaching that can positively influence student math (Fetler, 1999; Valdez & Maderal, 2021). Interestingly, no participant referred to AT during the interviews. Most participants described using computers and instructional videos without describing the specific differentiation of instruction. When asked how technology supports math instruction, Mary, who claimed to have a math background, responded, “I’ll tell you when I’m typically working with a student on math, I’m using paper and pencil.” Mary further explained, “If I’m helping a student with their math, I’m actually looking at their work, and I’m teaching them on paper how to do something.” Mary then offered an example of differentiating instruction, “Now, we might go online and show them the online calculators…go to YouTube…there are video tutorials within their math program.” Despite the teachers’ claims that their students with LD did not possess foundational math skills that include fractions, order of operations, and essential addition, subtraction, multiplication, and division (Appendix H), there were no responses of differentiation of instruction to address these areas of need in the interviews. This data supports the current literature, which states that students in AE programs do not necessarily receive a differentiation of services (Miller, 2019).

Educators noted that reliance on video instruction through digital and online formats such as Canvas and YouTube appears to substitute teacher-led direct instruction. Survey and interview results indicate that students with LD in AE programs generally needed elementary-level math skills development, specifically in the content areas of order of operations, number sense, percents, ratios, and fractions. Mary said, “Their competency level is really elementary, second to fifth-grade level." Students with LD in AE programs generally needed elementary-level math skills development, specifically in the content areas of order of operations, number sense, percents, ratios, and fractions (Appendix H). When asked to describe the mathematics instruction, Esther said, "I don't think it really improved their overall math skills." Educators did not go into detail nor give examples of differentiated math instruction in the interviews.

Personalizing Instruction

Personalized instruction is modifying curriculum based on student needs. This type of instruction is built upon a teacher's thorough understanding of the student's academic, social, emotional, and cultural experiences (Reigeluth et al., 2017; Stevens, 2021; Tolou-Shams et al., 2022). Survey and interview data results are conflicting about the personalization of instruction. ACSD has attempted to incorporate social and emotional learning (SEL) through instruction over the years to personalize instruction. Social and emotional learning does support instruction in AE programs (Ohrt et al., (2021). However, no participants mentioned the SEL during the interviews. Survey responses (Appendix H) indicate that over 90% of respondents agreed or strongly agreed that their students with LD prefer direct instruction when learning mathematics (Appendix H); however, interview results indicate that teachers incorporate digital and instructional videos to teach math-based on the ACSD mathematics curriculum on Canvas, Edmentum, and available textbooks in digital format. Educators noted that reliance on video instruction through digital and online formats such as Canvas and YouTube replace teacher-led instruction. In the case of Candace, she noted, "We depend on videos…we depend on programs that will show us step-by-step instructions." She added additional instructional support, "If they need help, they will call me over, and either I'll help them [with math], or if they need a lot of help, we'll refer them to tutoring." One reason for additional tutoring support may be ACSD teachers' limited time with students. In the case of community and court schools, mathematics lessons are at most one hour per day. In the case of the charter school with ACSD, students come in once a week for an hour-long appointment with the teacher.

Instructional practices should personalize instruction. However, in this study, generalizations were given to describe the personalized aspect of instruction without using the phrase “personalizing instruction.” Survey statement results support interview responses related to students’ foundational math skills. Specifically, the results of survey questions 25 to 36 (Appendix H) support educators’ observations that students lack proficiency in foundational math skills such as basic geometry (perimeter and area of basic geometric shapes), the number system, fractions, percentages, decimals, and the order of operations remain low support the interview statements of a general lack of foundational math skills. Over 70% of respondents disagreed or strongly disagreed with the survey statement that students with LD entering AE have foundational math skills. Educators disagreed or strongly disagreed with the survey statements that their students with LD had a proficient understanding of addition, subtraction, multiplication, division, order of operations, and fractions (Appendix H). Interview responses referred to foundational math skills students lacked, but no details were provided in the personalization of instruction. Educators highlighted that their students held basic elementary math skills of addition, subtraction, multiplication, and division. In that practice, teachers often use paper and pencil and review questions step-by-step in an I-do, you-do instructional strategy. Matthew gave details of this lack of foundational math skills, “Their foundational math skills are not that great. They have a hard time with…addition…subtraction…multiplication…and division.” Matthew further detailed, “It’s (math lesson) highly structured…[with] warm-ups…a lecture, a step-by-step process by the teacher.” Hope detailed this lack of foundational math skills, “Their [Students’] competency is very low…they need multiplication, division, addition, subtraction…multi-step equations, fractions, and geometry.”

The Individualized Education Program

The IEP guides educators' curricular and pedagogical practices when working with students with LD in all learning environments. Students with LD qualify for special education services based on their IEP designation. For many students with LD, the category of specific learning disability (SLD). However, specific descriptions of the learning disability are not specified within SLD. SLD encompasses a multitude of disabilities (Küpper, 2000; Yılmaz et al., 2022). MLD could qualify under the SLD category (Milli et al., 2022). This designation guides educators in designing an individualized learning plan for students with an IEP. These plans include specific academic content goals and necessary curricular and instructional accommodations and modifications.

When asked if the IEP SLD designation is adequate for math instructional guidance, seven of the 11 respondents disagreed or strongly disagreed with this statement; three of the 11 participants agreed or strongly agreed, and one offered a neutral response. One possible explanation for those educators who disagreed or strongly disagreed that the SLD designation was adequate to provide math instructional guidance was a lack of understanding of the concept of dyscalculia or MLD. The individual interviews revealed that many ACSD educators were unfamiliar with dyscalculia, which may explain why these educators understand the importance of IEPs. However, when applying SLD to mathematics learning, the SLD designation may need to be revised for students with LD and mastering mathematics concepts to perform at proficiency levels on the CAASPP. Further discussion of dyscalculia and the IEP modifications and accommodations will be provided in the following sections. The survey and interview results support the possibility that students with LD in AE programs whose SLD designation may not necessarily be adequate to support math learning and achievement. This lack of appropriate services represents potential non-compliance with the IEP, which can be interpreted as a violation of federal law (Beck & DeSutter, 2020; Küpper, 2000; McKenna et al., 2023).

Dyscalculia

Dyscalculia is an inability to acquire knowledge of basic math facts, numerical quantities, and calculations (Mutlu et al., 2022). As an MLD, dyscalculia is a condition whereby an individual cannot acquire and apply math skills and concepts to reason and solve math problems (Megawati & Sutarto, 2021; Milli et al., 2022). MLD is not identified as a separate category of learning disabilities that qualifies students with LD for special education services; however, MLD could qualify under the SLD category (Milli et al., 2022). While all ACSD AE teachers have an SAI credential, many ACSD educators in this study demonstrated a lack of understanding and familiarity with dyscalculia. Teachers were unaware of nor did not understand the concept of dyscalculia and its applications for the IEP. Educators also noted that teachers needed to better understand the IEP, MLD, and dyscalculia. When asked about her experience with dyscalculia, Hope said, “I don’t even know what that is.” When asked about his experience with dyscalculia, Thomas quickly responded, “What’s that?” Matthew stated, “I’[ve] not [heard] that term.” When asked about dyscalculia, Luke said, “With what, now? I’m not familiar with what that is.” With over 20 years of mathematics teaching experience, Anna stated her experience with dyscalculia as “Zero.” Hope expressed confusion, “Don’t even know what that is.” Only one teacher understood dyscalculia. Deborah shared her personal experiences with dyscalculia, “Oh I love this word. So if we’re talking about my personal experiences with dyscalculia, I’m I’m a prime example of what we need to improve our mathematics instruction for students. I've always had a challenge working with numbers."

IEP Modifications and Accommodations

Modifications and accommodations for the students should be based on the IEP's present levels of performance, goals, and services agreed upon by the IEP team. Personalized instruction is modifying curriculum based on student needs. This type of instruction is built upon a teacher's command over curriculum, pedagogy, and understanding of the student's ZPD. Specifically, the appropriate use of technology should be reflected in students' IEPs (Myung & Hough, 2020). This designation guides educators in designing an individualized learning plan for students with an IEP. These plans include specific academic content goals and necessary curricular and instructional accommodations and modifications. Survey responses to question 40 (Appendix H) support interview responses regarding the SLD designation as adequate to provide math instructional guidance: Seven out of 11 responses disagreed or strongly agreed that the SLD designation was adequate to provide math instructional guidance. Sophia reported, "I see great discrepancies in that. So here I have a kid that's 14, 15, or 16 years old so that's ninth, 10th, and 11th grades, but their academic abilities are at second, third, or fourth grades."

Teachers require more PD and training to identify appropriate modifications to Canvas-based mathematics curricula and implement them with the necessary accommodations in pedagogy. Candace said, "Probably on an average, they [students] are able to add and subtract and multiply and divide, usually with a calculator." Deborah said, "They tend not to have any understanding of ratios, proportions, fractions, or practical applications as far as like real world problems." In the area of instruction, over 72% disagreed or strongly disagreed with the statement that teachers receive adequate algebra content training. Matthew said, "Their foundational math skills are not that great." In the same survey, over 72% disagreed or strongly disagreed with the statement that teachers received regular training on mathematics curricula throughout the academic year. Regarding teacher training in mathematics, Thomas said, “That I can think of as of right now, none that I can think of.”

Outlier Data and Findings

Two unexpected outlier data and findings were the social-emotional aspect of students with LD in AE programs and one student's performance level on the CAASPP. Educators’ perceptions and attitudes towards mathematics revealed a lack of confidence. Educators noted the students’ lack of confidence and motivation to learn mathematics. Students with LD experience increased anxiety when working on algebra (Hord et al., 2020). Only two teachers referred to the emotional aspects of mathematics learning in this study.

Outlier Finding #1

Student archival records (Appendix N) list all students enrolled in ACSD who receive full credit for Algebra with minimal passing grades and their corresponding test scores on the state math assessment since 2016. One student scored a two, which equates to “nearly met” the standard on the performance level of all the data points among all students from the 2016-17 school to the present. This one outlier score stems from 641 ACSD students from 2016 who enrolled in an Algebra 1 course, received five credits with passing grades, and took the CAASPP math assessment test. All other students in this data set scored a one, which equates to not meeting standards.

Outlier Finding #2

While survey and interview responses address this study's curricular, pedagogical, and IEP aspects, two teachers referenced the emotional aspects of learning mathematics. Luke said, “And as it comes up to the level where we get them at middle or high school, they’ve all but either decided that math is too hard or they're not good at it, and they've already given up." Thomas noted how student confidence was connected to mastering mathematics topics. Thomas said, "The kids are the least confident when they're doing the math in terms of how they feel about themselves." This finding leads to another avenue of future research to address students' experiences with LD and the emotional aspects of learning mathematics.

Research Question Responses

This qualitative case study used a survey, interviews, and student archival records to gather data on the low performance of students with LD on the CA state mathematics assessments in AE learning environments. The central research question was used to gather information on educator's perceptions of this low performance. Sub-question one was used to gather participants' perceptions of the professional development they received in mathematics. Sub-question two was used better to understand the role of technology during math instruction. The analysis of survey responses, participants' responses from the interviews, and analysis of student records revealed that the themes of curriculum, instruction, and technology should be addressed to help students with LD in AE learning environments improve mathematics performance on the state math assessment.

Central Research Question

What are educators' perspectives on possible explanations for the low performance on mathematics state assessments among high school algebra students with learning disabilities in AE settings despite receiving graduation credit for Algebra 1? The themes of curriculum, instruction and technology, and the IEP address this central research question. Unanimously, all participants described the lack of foundational math skills equivalent to the elementary school level students with LD did not possess when entering their academic program. Esther succinctly stated why students with LD were performing so low on the state math assessment, “Because they fail[ed] to receive those foundational math skills in their primary years.” When asked to describe the foundational skills students with LD have when entering their academic program, many participants provided specific math content skills they believed their students needed to perform well on the math state assessment test. Aaron said, “We have a lot of students who do not know their algorithms.” Thomas said, “They don’t know numbers of operations, PEMDAS.” Candace said, “But when it comes to [the] order of operations or integers or anything like that, they’re unable to do it.” Finally, Deborah provided the greatest level of detail in foundational math skills missing in students with LD, “They tend not to have any understanding of ratios, proportions, fractions, or practical applications as far as real-world problems.”

When asked about the curricula and instruction offered to students, participants overwhelmingly described using online math platforms such as Canvas and other digital formats teachers and students used. The participants described how they used YouTube and other digital formats to provide math instruction to students. When asked to describe the mathematics curricula and instructional materials teachers have access to, several participants described Canvas and other online materials. Thomas said, “We have a course built on canvas. It’s predominantly videos.” Candace said, “We have access to a textbook and teacher edition and there are other online, I guess official and unofficial. Websites like Khan Academy or sometimes YouTube just so I can present my students.” Educators in this study did not evaluate the effectiveness of these math curricula or the instructional strategies used. Student archival data would lead to the conclusion that the current math curricula, instructional strategies, and the IEP are not effective when supporting students with LD in an AE learning environment, given that all students since the 2016-17 school year enrolled in ACSD did not meet the standard on the state math assessment.

Sub-Question One

What are educators' perceptions of mathematics training and professional development addressing high school students with LD in an AE environment? Collectively, the subthemes of teachers' math content knowledge, teachers' pedagogical knowledge, dyscalculia, and IEP modifications and accommodations address this sub-question. Most participants noted the dearth of professional development and training in mathematics content. The sub-theme of teachers' content and pedagogical knowledge was revealed in several participants' responses. Participants noted the importance of training and professional development to increase a teacher's ability to provide better curriculum and instruction. Deborah said, "I don't have enough foundational skills to know how to even understand these concepts, let alone teach them to you. And this isn't fair." Thomas said, "That I can think of as of right now, none that I can think of." Luke said, "We get a lot of PD in the programs that teachers are expected to utilize but not necessarily on instructional delivery."

Insofar as PD and teacher collaboration are concerned, teachers lacked the training and time to address the concept of dyscalculia and the pedagogical strategies related to the modifications and accommodations of the math curricula required in the IEP to meet students' goals. Survey results (Appendix H) noted that ten participants (90%) disagreed or strongly disagreed that educators had time to collaborate on math topics. Furthermore, seven out of 11 responses disagreed or strongly disagreed over whether the IEP designation was adequate to provide mathematics support. Sophia noted, "So here I have a kid that's 14, 15, or 16 years old, so that’s ninth, 10th, and 11th grades, but their academic abilities are at second, third, or fourth grades.” Mary said, “We haven’t. We don’t get math at PD trainings.”

Sub-Question Two

What are the attitudes of educators towards technology in the learning of algebraic concepts among high school students with learning disabilities in AE settings? The theme of instruction and technology addresses this sub-question. Survey results (Appendix H) indicate that educators believe teachers and students have the technology to access the math curriculum. However, the survey results were mixed when asked if their students with LD understood how to use that technology in learning mathematics. While all participants described using Canvas, some noted that students required scaffolding and other means of instruction. Matthew said, “We, we tend to use the paper and pencil so that when they see it, then they can repeat those steps on another problem.” Thomas said, “It’s all Canvas-based. They have Khan Academy.”

Educators in this study lack understanding in TPACK and other instructional design methods when designing and implementing technology into their instructional practices. The default instructional practice is for teachers to use instructional videos when they cannot explain algebraic concepts to their students. Sophia said, “I use YouTube, I use jMap, I use a variety of resources like the book.” Hope said, “So they do have to use their Dell computers. They have to go online. They do the practices online, the test online. Everything is online.” Esther said, “We depend on videos. We depend on online calculators. We depend on programs that will show us step-by-step instructions.”

Sub-Question Three

What are educators’ experiences with the zone of proximal development math skills needed by students with learning disabilities to acquire algebraic knowledge in AE settings? The subthemes of teachers' math content knowledge, differentiating instruction, dyscalculia, and IEP modifications and accommodations address this sub-question. Survey responses clearly describe students with LD having difficulty with elementary grade-level math concepts such as fractions, ratios, geometric shapes, and order of operations (Appendix H). Teachers agreed or strongly agreed that their students lacked foundational math skills when entering their AE program. Students at the elementary level should have math skills related to number sense and integers. Educators appeared to replace teacher-led math instruction with videos embedded in Canvas or YouTube. To compound matters, implementing appropriate IEP accommodations and modifications is reduced, given that teachers are generally unaware of dyscalculia. When asked about dyscalculia, many participants noted their lack of understanding or experience with this disability. Hope said, "I don't even know what that is?" Luke said, "With what now? I'm not familiar with what that is." Mary provided a general understanding of this topic, "It's like dyslexia in reading, like where you're mixing up numbers and not able to keep them straight." When asked about how the IEP designation supports math learning, Anna said, "I see that a lot of the support mechanisms that are put in place through the IEP are very generalized, and they're not specific enough to help our students where they need support and assistance in math." Deborah said, "So we use a lot of videos to support math instruction. So it's all technology and very little instruction is generally given by me."

Summary

This chapter analyzed the results of data collected from a survey, individual interviews, and student records. Curriculum, instruction and technology, and the IEP were the overall themes of this study's findings. Subthemes included teachers' math content knowledge, pedagogical knowledge, differentiating instruction, personalizing instruction, dyscalculia, and IEP modifications and accommodations. Four specific findings from this study have been discussed in the results and themes sections of this chapter. First, students with LD in AE learning environments lacked foundational math skills. Second, teachers and students relied heavily on technology for mathematics curriculum and instruction. Third, teachers lacked professional development and training on foundational math topics and special education instructional strategies to implement the IEP. Fourth, students did not receive differentiated and personalized math instruction as required by their IEPs. Fifth, the IEP designation of SLD may not be enough to provide the appropriate modifications and accommodations to support the IEP math goals of students with LD. The results of this study indicate many future avenues of study to address mathematics performance among high school students with LD in AE learning environments.

CHAPTER FIVE: CONCLUSION

Overview

The purpose of this case study was to understand educators' perceptions regarding factors that influence high-school algebra students with LD in an AE setting to score below and far below basic proficiency levels on the California math standards test despite receiving credit for the algebra course. This chapter describes findings based on the triangulation of data collected during June of the ACSD academic calendar. This chapter consists of five discussion subsections: (a) interpretation of findings, (b) implications for policy and practice, (c) theoretical and methodological implications, (d) limitations and delimitations, and (e) recommendations for future research. A summary of the entire study will be provided at the end.

Discussion

A survey, individual interviews, and student records were collected and analyzed to understand educators' perceptions regarding factors influencing high-school algebra students with LD in an AE setting to score below and far below basic proficiency levels on the California math standards test despite receiving credit for the algebra course. For this study, 14 participants responded to a screening questionnaire, 11 responded to a survey, 10 educators were interviewed, and 1,289 student enrollment records from 2016-17 to the present (except for the 2020-21 school year) provided the data analyzed. An *enrollment record* is defined as a student enrolled in an Algebra 1 or similar course. This section will discuss the case study's findings in light of the theme of curriculum and instruction. This discussion section has five major subsections to include: (a) Interpretation of Findings; (b) Implications for Policy or Practice; (c) Theoretical and Empirical Implications; (d) Limitations and Delimitations; and (e) Recommendations for future research.

Summary of Thematic Findings

This case study explored educators' perceptions regarding factors that influence high-school algebra students with LD in an AE learning environment to score below and far below proficiency levels on the California math standards test despite receiving credit for the algebra course. According to CAASPP, proficiency levels are identified by four levels: Level 4 (Standard Exceeded), Level 3 (Standard Met), Level 2 (Standard Nearly Met), and Level 1 (Standard Not Met) (CA Department of Education, 2024). After collecting and analyzing the data, three major themes emerged: Curriculum, Instruction and Technology, and the IEP. The curriculum theme contained two sub-themes: (a) Teachers' math content knowledge and (b) Teacher's pedagogical knowledge. The instruction and technology theme had two sub-themes: (a) differentiating instruction and (b) personalizing instruction. The IEP theme had two subthemes: (a) Dyscalculia and (b) IEP modifications and accommodations.

Interpretation of Findings

This section provides an interpretation of the themes and subthemes discovered during this qualitative case study. The theme of curriculum and content addresses academic content (curriculum) and strategies for teaching (instruction) that curriculum. Sub-theme one describes a well-trained teacher using targeted technology-based, scaffolded curricula and instructional design that can help improve student learning and achievement in all areas of content and assessments. Sub-theme two describes how all students, specifically students with LD, benefit from differentiated instruction to meet IEP goals and improve math assessment scores. The following sections support, refute or require further study of the interpretations of this case study's findings.

Special Education in Alternative Education Learning Environments

The concept of special education in AE learning environments encompasses three main ideas: (a) training for AE teachers, (b) the need for improved implementation of Individualized Education Programs (IEPs), and (c) the use of technology for students with learning disabilities (LD). Students with LD often face learning challenges due to disabilities, behavioral issues, or poor attendance in AE learning environments (Azid et al., 2022; Fortems et al., 2023; Kumm et al., 2020; McGee & Lin, 2020). Proper implementation of IEPs is lacking (Wong & Rashid, 2022) because of a lack of training and understanding of the student’s disability designations. Technology is essential in delivering instruction to students with LD (Valdez & Maderal, 2021). Properly implementing multimedia technology and using AT can have positive learning effects on students (Bruno et al., 2020; Yamchi et al., 2021).

Alternative Education Teacher Training

A well-trained teacher in curriculum and instruction is the cornerstone to helping students with LD to learn academic content, such as mathematics. Teachers need additional professional development and training in two specific areas: (a) foundational math concepts and (b) increased knowledge of dyscalculia and its relevance to the IEP accommodations for students with LD. Educators noted that they struggled in and needed more confidence in foundational math skills to help their students with LD in AE learning settings. Participants noted the ongoing need for professional development to collaborate with colleagues and develop curricula supporting the literature on continual training (Çopur-Genctürk & Li, 2023).

Teachers need additional training on the topics of MLD and dyscalculia. *Dyscalculia* is an inability to acquire knowledge of basic math facts, numerical quantities, and calculations whereby an individual cannot acquire and apply math skills and concepts to reason and solve math problems (Mutlu et al., 2022; Megawati & Sutarto, 2021; Yılmaz et al., 2022). MLD is not listed as a specific learning disability that qualifies students for special needs services. Instead, MLD could qualify under the general specific learning disability qualification (Yilmaz et al., 2022). Ten out of 11 participants acknowledged that they did not know or were unfamiliar with the MLD of dyscalculia. Educators also believed that while the IEP provided a general strategy to support students with LD overall learning needs, the IEP did not address specific instructional strategies to support math-learning needs.

Students with MLD historically received less attention than reading education (Rivera, 1997). Effective teaching techniques to high school students with LD and low math performance should consider students' prior achievement, students' perceptions of self-efficacy, the content of instruction, management of instruction, educators' efforts to evaluate and improve instruction, and educators' beliefs about effective instruction were contributing factors to students experiencing repeated math failure (Hamukwaya & Haser, 2021). Nonetheless, a well-trianed teacher with sufficient knowledge and skills to teach math content supports student achievement (Moh’d et al., 2021). However, the findings of this study suggest that teachers are not adequately trained in foundational math content.

Need for Improved IEP Implementation

All students with LD must receive instructional services as outlined by the IEP if those students qualify for special education services (House et al., 2018; Strassfeld & Cheng, 2022). Personalized supports are needed to implement the IEP effectively and appropriately (Mathur et al., 2020, 2021; Zhang et al., 2011). Professional development is crucial in properly implementing IEPs (Aspiranti et al., 2021; Mathur et al., 2021; Wong & Rashid, 2022). The findings in this case study support the literature in that an overwhelming majority of participants acknowledged their need for additional training in MLD, dyscalculia, and differentiated instruction to support the IEP process. The participants acknowledged that the IEP offers general guidance; however, when it comes to specific instructional accommodations for math, the participants noted the need for additional training. One area that was referenced in the interviews addressed credentialing. While all participants noted their credentials, only one participant indicated that while they possessed all the proper credentialing requirements to teach in the AE program offering SAI services, that participant felt they were not prepared to teach foundational math skills to their students (Darling-Hammond, 2023; Fetler, 1999; Suhaini et al., 2020).

Technology and Students with Learning Disabilities

The findings in this study are inconclusive regarding the positive influence on student mastery of mathematics concepts to meet standards on the state math test. Technology is essential in teacher planning, preparation, and student achievement (Valdez & Maderal, 2021). Multimedia and AT suggest an intentional use of technology to remove student learning barriers (Bruno et al., 2020; Yamchi et al., 2021). Technology, specifically AT, such as text-to-speech or speech-to-text technologies, computers, tablets, and instructional videos, are standard technologies students with LD use in the classroom (Baykal et al., 2023; Bouck et al., 2020c; Bouck & Satsangi, 2020; Bruno et al., 2020; Yamchi et al., 2021). The participants' responses did not mention the use of tablets or iPads in their instructional practices; therefore, no conclusion can be drawn on the helpfulness of this technology regarding its use of elementary-grade math topics of multiplication and division (Mulcahy et al., 2023).

The findings of this case study support the need to incorporate successful online teaching practices to support student learning in math, special education, and assessments (Enders & Kostewicz, 2023; Kellems et al., 2020; Kumar et al., 2019; Martin et al., 2019; Olakanmi et al., 2020). Participants noted the need to receive adequate training in mathematics content and instructional practices. One participant noted the need to see other master math teachers in action to learn practices and instructional techniques to be used in their classrooms.

Mathematics and Special Education

This interpretation contains two main ideas: (a) ZPD and students with LD learning mathematics and (b) math testing. The findings support the literature regarding a highly qualified and trained teacher laying the instructional foundation for students with LD to acquire knowledge (Patrick et al., 2023; Phillippi et al., 2021). The participants, in this case, do not support the literature on a high turnover rate among teachers in AE (Minkos et al., 2023). Most participants (78%) had over six years of experience teaching in AE programs. Of those 78%, 42% had over 11 years of experience in AE settings. The findings of this case study support the existing literature documenting the disconnect between mathematics curricula and pedagogy used by special education teachers (Sheppard & Wieman, 2020).

Zone of Proximal Development and Students with Learning Disabilities

Vygotsky's thoughts on ZPD are central to the learning process for students (Vygotsky, 1979). There are curricular aspects to ZPD in foundational math skills that students with LD in high school AE programs should possess before taking high school algebra courses. Foundational math topics for algebra and higher levels of mathematics require an understanding of fractions and are usually taught from grades 1 to 3 (Bouck et al., 2020b; Fuchs et al., 2021; Fuchs et al., 2005). Additional math topics in this ZPD include algebraic multi-step equations, ratios, and percentages (Brafford et al., 2023; Hord et al., 2020). The findings of this case study are inconclusive regarding how the instructional practices support students with LD in an AE setting regarding math instruction using manipulatives because participants generally noted the use of instructional videos (VanUitert et al., 2020).

The instructional practices in this case study do not support the literature on instructional practices such as the FC model, MTSS, PBIS, and blended learning strategies (Estrapala et al., 2021; Grasley-Boy et al., 2021; Minkos et al., 2023; Nindiasari & Yuhana, 2020; Chen & Shin, 2022). Participants noted the heavy reliance on instructional videos and using computers to teach mathematics. Only one participant noted the importance of direct, hands-on instruction, specifically, the “I-do you-do” approach whereby students replicate the teacher’s explanations and then apply learned principles in different examples. Some participants noted the independent learning environment of their AE program, whereby students take ownership of their learning. The findings regarding this independent model of learning are conclusive regarding the literature where students take on greater ownership of their learning (Galindo-Dominguez, 2021; Öztürk & Çakıroğlu, 2021). One participant supported the literature regarding using worksheets to reinforce mathematics learning (Riyati & Suparman, 2019; Widodo et al., 2023). The findings are inconclusive regarding the effectiveness of PBL strategies, concept maps, and student activities when incorporated into math lessons (Umriani et al., 2020).

Math Testing

The findings in this case study do not directly support the literature regarding the need for explicit teaching of math concepts for improved math assessment results (Hughes et al., 2022; Twyman, 2021). The findings are inconclusive insofar as incorporating incentives to influence student performance (Rahimi et al., 2021). Several participants noted that students and teachers review questions on the math assessment test, which may contribute to the assessment as a learning activity in itself (Gweon, 2021); however, student archival records indicated that all students in this case study received the below proficiency marks on the math standards test.

One finding supports the literature regarding math test anxiety for students and teachers (Enu, 2021). Math assessments are high-stakes tests where school performances are published annually. Participants acknowledged receiving training on administering these tests; however, they also noted that they did not receive foundational math training for these tests. Several participants noted that students with LD entering the AE program have experienced so much failure in math; these students demonstrated an “I give up” mentality at the beginning and throughout math classes. Participants noted they had to focus on the social-emotional aspects of teaching more than the mathematics content. This focus on the social-emotional aspects of teaching does support the literature (Kennedy et al., 2022; Venezia, 2021; Xue et al., 2023).

The findings of this case support the literature regarding the misalignment of math curricula and instructional strategies (Leet et al., 2021; Long & Bouch, 2023). Participants documented the plethora of Canvas-based math content; however, they noted the need for training to use this curriculum in their AE learning setting. Specifically, participants noted that the regimented and limited instructional class time does not offer time to provide feedback to students (Araya & Gormaz, 2021; Kusamaryono et al., 2022). Participants could describe the curricula that should be used; however, they also noted their need for foundational math concepts. Therefore, participants heavily relied on instructional videos.

Implications for Policy

The purpose of this case study was to understand educators’ perspectives on the low performance of high school students with LD in AE learning environments on the CA state math assessment. The leadership of schools determines policy. The practice is the implementation of those policies. ACSD is uniquely positioned to end the low performance of students with LD on the state math assessment. The findings of this study offer suggestions for policy rooted in a review of the current literature contrasted by the triangulation of data collected from a survey, interviews, and archival student records.

The findings of this case study offer ACSD data-driven guidelines for policy regarding curriculum and instruction. ACSD leadership should consider PD and training opportunities for educators targeted on foundational math skills, appropriate implementation of technology use during instruction, and continued training into the concepts of dyscalculia and the IEP process. These suggestions are outside the realm of teacher credentialing issues. However, the policy implications are built upon a core educational principle developed by Vygotsky and the sociocultural theory of learning. A well-trained teacher can tremendously influence the teacher-student relationship, supporting students in reaching their highest academic potential. These professional developments should be offered continually. The true challenge comes with the allocation of finite school resources.

Empirical and Theoretical Implications

The purpose of this qualitative case study was to understand better educators' perceptions regarding factors that influence high-school algebra students with LD in an AE setting to score below and far below proficiency levels on the CA math standards test. This section discusses the empirical and theoretical implications by comparing the findings from this study and Vygotsky's sociocultural theory of learning, as discussed in Chapter Two (Vygotsky, 1986; Vygotsky et al., 1978). The findings in this section will be connected to the importance of a well-trained teacher in curricular and instructional practices to support students with LD in achieving better on the state math assessments.

Empirical Implications

The findings in this case study have empirical implications and show areas of alignment within certain areas of the literature review detailed in Chapter 2. The overarching theme of curriculum and instruction is supported by the sub-themes of teachers' content and pedagogical knowledge and differentiating and personalizing instruction for students. This section will discuss two areas of empirical implications: (a) special education in AE programs and (b) special education and mathematics.

The findings reinforce four aspects of the literature review regarding special education in AE programs: (a) IEP implementation, (b) AE teacher training, and (c) Technology and students with LD. The survey results, participant interviews, and student records support the finding that teachers lack curricular and pedagogical training to fully scaffold and differentiate instruction to meet the academic needs of students with LD in an AE learning environment.

The proper implementation of the IEP should be the central focus of all teachers working with students with LD. Participants described a need for instructional training to properly implement the IEP goals (Wong & Rashid, 2022). Most participants indicated no knowledge of MLD or dyscalculia (Košč, 1974). Not understanding what dyscalculia is hinders teachers' abilities to provide scaffolding and differentiated instruction in foundational math skills for students with LD in AE programs. This lack of understanding of dyscalculia has implications for AE teacher training, disability identification, and the use of technology with students with LD.

Most participants indicated that they lacked and did not receive professional development or training in foundational math topics to support their students' math needs. Teacher training is paramount regarding curriculum and instruction (Darling-Hammond, 2023; Hoge & Rubinstein-Avila, 2014; Koressel et al., 2022). This lack of training directly impacts student learning, especially in the foundational math topics needed for success on the state math assessments at the high school level. Math assessments are helpful for instruction in the classroom (Mahlambi et al., 2022). In the case of ACSD, since the 2016-17 school year, all students receiving math instruction did not meet academic standards on the CAASPP math test. Further research is required to explore, if any, the direct correlation between teacher pedagogical knowledge of foundational math topics and students with LD in AE environments learning math to meet academic standards.

The findings of this case study document the role of technology and students with LD in AE learning environments regarding mathematics instruction. Technology is essential in curriculum and instruction (Serutla et al., 2024; Valdez & Maderal, 2021; Yamchi et al., 2021). Participants overwhelmingly noted the use of technology in the classroom (Olakanmi et al., 2020). Participants described how the math curriculum relies heavily on the Canvas learning management system. Participants noted the use of YouTube and other Canvas-based instructional videos for mathematics. Participants noted that they would use videos to replace direct instruction because they felt they needed to be more adequately trained or knowledgeable in foundational math topics to offer direct instruction to students. The use of technology often substitutes proper instructional strategies (Brown et al., 2019; Chang et al., 2022; Lee et al., 2021).

The second empirical implication supports the current literature regarding mathematics and special education instruction (Özdemir & Kılıç, 2020). The findings of this case study do not fully support the literature review regarding video-based instruction and mathematics (Satsangi et al., 2021b). In this case, archival records from the 2016-17 school year show that no student demonstrated or met academic standards on the state math assessment, which focused on

Algebra 1 topics. The use of multimedia, such as YouTube videos and Canvas-based instructional videos, does not fully support the literature on technology use among students with LD (Mulcahy et al., 2023). However, participants did note the importance of instructional videos for the educator as a review and support when teaching students with LD the foundational math concepts needed to demonstrate mastery of the state math assessments.

Theoretical Implications

The findings in this case study reinforce Vygotsky's understanding of the sociocultural theory of learning and the importance of the teacher-student relationship (Vygotsky, 1986; Vygotsky et al., 1979). The sociocultural theory of learning emphasizes a well-trained teacher (Vygotsky, 1986). The findings in this case study noted that teachers in AE environments need specific training in foundational math skills, which were not addressed in the credentialing program, and a greater understanding of special education topics related to instructional practices to support dyscalculia and MLD. Participants shared a general lack of understanding of dyscalculia and MLD with the IEP process. Participants also noted that the IEP provided a general structure of support that was not specific enough nor scaffolded appropriately to meet the needs of students with LD in AE learning environments.

This study reinforced Vygotsky's core ideas around the ZDP and students. Participants' survey responses and interviews overwhelmingly noted the lack of foundational math skills by students with LD. These foundational math skills are centered on the basic building blocks of mathematics. Vygotsky's views on ZPD and the teacher-student relationship are fundamental to understanding how a child learns (Gindis, 1995). This case study revealed that students entering AE programs had a ZPD in their mathematics learning in the second/third to about the sixth-grade level. Specifically, participants noted a general lack of understanding of the concepts of number sense, fractions, ratios, percents, and one-step variable equations. The archival record of students with LD enrolled in ACSD indicated that all students, except for one situation, did not meet academic math standards on the CAASPP math test, which is a high school-level examination.

Limitations and Delimitations

This case study considered limitations and delimitations to ensure the validation and reliability of data collection and analysis. *Limitations* are weaknesses that cannot be controlled. *Delimitations* are intentionally made to provide boundaries to this study. The following sections describe the limitations and delimitations of this study.

Limitations

The limitations of this case study were few. The major limitation was the time allocated to collecting data. IRB approval was received relatively quickly. However, ACSD site approval took longer and was ultimately received for all teachers on the last day before the summer break. The summer break substantially limited the availability of participants. A smaller portion of teachers and administrators were available for data collection because of the reduced staffing needs of summer school. If data collection did not occur during the one month of summer school, data collection would have to wait nearly two additional months when teachers and administrators would return from summer break. However, the minimum participant requirements for this study were satisfied during the summer school period.

Delimitations

The delimitations of this case study were intentionally set to obtain specific participants and students. All participants had to be teachers or administrators in the ACSD AE division. All teachers had to possess a special education credential and either a single or multiple subject credentials. These credentials combined permitted the teacher to offer SAI services to students with LD in AE settings. All administrators had to possess an administrative credential. No delimitation was set on the years of experience teaching in general or working in an AE environment. ACSD masked all student archival information. The delimitation set on student data was for students with LD, and there was no delimitation on the type of learning disability the student was diagnosed with. This delimitation aimed to gain a large enough sample from the 2016-17 school year to the present. A further delimitation of the student data did not limit the class nomenclature. For example, Integrated Math 1, Algebra 1, and any derivative of such class titles were accepted because all these classes met the CA high school algebra graduation requirement. The last delimitation made on student records was to consider students who earned at least five credits for the five credits attempted with a minimum semester passing grade of D-. This delimitation would provide data on students who received all the necessary instruction that would have been addressed on the math standards test towards the end of the spring semester.

Recommendations for Future Research

The purpose of this qualitative case study was to understand educators' perceptions regarding factors that influence high-school algebra students with LD in an AE setting to score below and far below basic proficiency levels on the California math standards test despite receiving credit for the algebra course. Students can earn a D- or higher grade to meet the California math high school graduation requirement. Eleven educators participated in a survey, ten educators participated in an individual interview, and archival records of students with LD were collected from the 2016-17 school year. Each participant met the requirements for either offering SAI instructional services or the appropriate administrative credentials. No student was contacted, and the ACSD information technology officer masked all identifying student information when the data was transmitted via an Excel spreadsheet. The following recommendations for future research are described below based on the data triangulation.

Additional data should be collected from all educators in all three divisions of the AE program at ACSD. The more participants involved could provide greater details about each unique division of the AE divisions. Court, community, and charter programs may have the same type of students with LD in their respective programs; however, the learning environments in each program are unique. Furthermore, data collection during the beginning of the school year may reveal different perceptions of educators when data is collected at the end of the school year. The findings of this case study serve as a foundational benchmark for future data collection.

Future research should include teacher pedagogical training in dyscalculia and MLD concerning the implementation of IEPs. The literature powerfully describes the benefits of a well-trained teacher. The findings in this case study noted that teachers are not well-trained in special education, MLD, and dyscalculia. Further research in this area may provide more effective pedagogical strategies to meet the differentiated needs of students with LD. This future research should consider how MLD and dyscalculia could be considered an entirely different category of learning disabilities that may qualify students for special education services.

Future research should include professional development for teachers on foundational math concepts and scaffolded instructional strategies for delivering this curriculum to students with LD. The findings of this case study indicate that teachers may not necessarily be adequately prepared with the math content knowledge students with LD need to meet high school algebra standards. These instructional professional developments should include the appropriate use of technology in the classroom. The findings of this case study indicate that educators need training in specific instructional strategies in differentiation and scaffolding to incorporate technology into everyday math lessons for their students with LD.

Conclusion

The purpose of this qualitative case study was to understand educators' perceptions regarding factors that influence high-school algebra students with LD in an AE setting to score below and far below basic proficiency levels on the California math standards test despite receiving credit for the algebra course. Through the lens of Vygotsky's sociocultural theory of learning, the findings of this case study provide arguments that curriculum and instruction are significant when working with students with LD in an AE learning environment. Curriculum, instruction and technology, and the IEP are the main themes of this case study's findings. Additional subthemes include expanding a teacher's knowledge of foundational math skills and incorporating appropriate technology with differentiated and personalized instruction to support math learning.

Curriculum and instruction are the foundation of student learning. A well-trained teacher in curriculum versed with various instruction strategies will help any student achieve. Teachers must become familiar with diverse academic content, such as math and literacy, for students with LD in an AE learning environment. Because these teachers also service students with LD, they must know about a diverse range of learning disabilities and the differentiated instruction needed to meet their students' IEP goals. The findings in this case study suggest that teachers in AE must be extraordinarily equipped not only in mathematics curricula but also in the appropriate use of pedagogical strategies, including a discerning use of technology and the concept of dyscalculia. Students with LD require differentiated and personalized instruction that a well-trained teacher can offer.

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Appendix A

IRB Letter

LIBERTY UNIVERSITY
INSTITUTIONAL REVIEW BOARD

April 30, 2024

D. Sung Choe
Traci Eshelman

Re: IRB Exemption - IRB-FY23-24-1726 EDUCATORS' PERCEPTIONS FOR LOW PERFORMANCE ON MATHEMATICS STATE ASSESSMENTS AMONG HIGH SCHOOL ALGEBRA STUDENTS WITH LEARNING DISABILITIES IN AN ALTERNATIVE EDUCATION PROGRAM IN CALIFORNIA: AN EXPLANATORY CASE STUDY

Dear D. Sung Choe, Traci Eshelman,

The Liberty University Institutional Review Board (IRB) has reviewed your application per the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study to be exempt from further IRB review. This means you may begin your research with the data-safeguarding methods described in your IRB application, and no further IRB oversight is required.

Your study falls under the following exemption category, which identifies specific situations in which human participants research is exempt from the policy set forth in 45 CFR 46:104(d):

Category 2.(iii). Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if at least one of the following criteria is met:
The information obtained is recorded by the investigator in such a manner that the identity of the human subjects can readily be ascertained, directly or through identifiers linked to the subjects, and an IRB conducts a limited IRB review to make the determination required by §46.111(a)(7).

For a PDF of your exemption letter, click on your study number in the My Studies card on your Cayuse dashboard. Next, click the Submissions bar beside the Study Details bar on the Study Details page. Finally, click Initial under Submission Type and choose the Letters tab toward the bottom of the Submission Details page. Your information sheet and final versions of your study documents, **which you must use to conduct your study,** can also be found on the same page under the Attachments tab.

This exemption only applies to your current research application, and any modifications to your protocol must be reported to the Liberty University IRB for verification of continued exemption status. You may report these changes by completing a modification submission through your Cayuse IRB account.

If you have any questions about this exemption or need assistance in determining whether possible modifications to your protocol would change your exemption status, please email us at irb@liberty.edu.

Sincerely,
G. Michele Baker, PhD, CIP
Administrative Chair
Research Ethics Office

Appendix B

ACSD Research Request Form

[redacted]

Research Request Submission/Approval Process Summary

Pre-Research Policy Review

- Researcher reviews [redacted] Board Policies/Procedures regarding research, as well as complete research request guidelines.
- If a research request meets [redacted] criteria, the researcher submits the Research Request Initial Screener.

[redacted] Initial Screening

- A member of the [redacted] staff (Chief Academic Officer) will review the Research Request Initial Screener within one week to determine if:
  - [redacted] has access to the requested research setting, or has ownership over the relevant existing data.
  - There is a clear, direct, and immediate benefit to [redacted] students or staff.

Full Application to Conduct Research

- If the [redacted] staff member determines that the criteria in the Initial Screener has been met, then the researcher will be invited to complete the Full Application for research with [redacted]

[redacted] Consideration and MOU

- Once submitted, the [redacted] Review Committee will consider the Research Request Application.
- If approved, as needed, a MOU may be drafted to outline terms and conditions of data collection and sharing.

Participant Recruitment

- County approval to conduct research is the first step in recruiting participants. The researcher must now approach site principals/directors for permission to conduct research.
- Principals/Directors inform [redacted] that they are opting into the research.

Conduct Research

- Researcher conducts research, adhering to all ethical guidelines and any additional conditions of research from [redacted]

Disseminate Results Back to [redacted]

- Any results from research conducted with [redacted] should be shared back.

Research Guidelines

Thank you for your interest in conducting research at the [redacted] Office of Education! [redacted] requires that our *Research Review Committee* review all research (including surveys) involving students, parents, or district personnel. The role of this committee is to ensure that all proposed research comply with the ethical codes of research in addition to state and federal laws.

[redacted] conducts and supports research that contributes to a greater understanding of highly effective teachers, instructional strategies, and resources and conditions that promote academic achievement for all students. Please understand that our ability to support external research projects, including the staff time allocated to review and comment on proposals, is limited. Only proposals that have a clear, direct, and immediate benefit to the county in terms of informing practice will be considered for approval. We are also limited in our ability to provide access to student data.

An approval from the *Research Review Committee* serves only as an authorization to contact the program lead(s), the district(s), or principal(s) of the school(s) of interest. Researchers will need to secure an approval from individual program(s) before any research work is permitted.

The guidelines included in the application are to support research by internal and external researchers while respecting the time and privacy of students and staff.

Step by Step Process

Please follow the application directions below very carefully. If you do not adhere to the submission requirements, the review of your application will be delayed and/or your application may be denied without further review.

Step 1: Review (a) [redacted] Board Policy and (b) Research Request Guidelines.

Step 2: Complete and submit the [redacted] Initial Screener to [redacted]

Step 3: A member of [redacted] staff will respond to your Initial Screener request to determine whether the research request should continue further.

Step 4: Complete the full Research Request Application and submit to [redacted] The application must include a signature, and should be sent electronically to [redacted] Please also submit the following documentation:

- One Page Summary of the Research Project, Methodology, and Implications
- Research Application
- Research Approval Notification
- Criminal History Clearance (see General Policies for more info)
- Signed [redacted] Research Applicant Acknowledgement Page
- Data Privacy Assurances (if applicable)
- Parent Permission Form (if applicable)
- Child Consent Form (if applicable)
- Recruitment Letter (if applicable)
- Survey Instruments/Interview Protocols (if applicable)

Note: If the research request includes a student, school, or district level data request, please complete the data request portion of the [redacted] Research Request Application (see page 3).

Step 5: Once a decision has been made regarding the research request, the applicant will receive an email indicating whether the request was approved or denied. If needed, the approval email may require a Memorandum of Understanding (MOU), outlining terms of data use and dissemination.

Step 6: If approval has been granted at the district level, the applicant must then obtain site level approval by the site principal. Approval of a research request application at the district level does NOT guarantee approval by site administrators.

Step 7: Principals must inform the central office whether or not they approved or denied the research request by emailing [redacted].

Timeline

The average start-to-finish processing time for research requests ranges up to 45 business days. The processing time depends on several factors such as: (a) staff availability, (b) whether or not extant data is also being requested, and (c) whether or not additional departments need to be contacted for approval. Be sure to allow sufficient time for your application to be reviewed before the proposed start date of your research study.

Please note, applications will not be reviewed during the following time periods:

- First 30 Days of the School Year
- December 1st - December 31st
- Last 30 Days of School Year

Applicants should direct all questions regarding research requests to [redacted] at [redacted]@[redacted].[redacted].

General Policies

- All participation will be voluntary, and it is understood that approval of the proposal, if granted, will not obligate any person, school, or department/unit in [redacted] to participate. In addition, any person, school, or department/unit in [redacted] can decide to withdraw at any time.
- If the research request involves face-to-face interaction with students, all researchers and research team members **must** submit a document clearing them of criminal history. Listed below are the options to provide this required documentation:
    - **Researchers from Other School Districts:**
      Submit a copy of the LiveScan results completed during the hiring process at your district.
    - **Researchers from Universities:**
        - Submit a signed affidavit from an appropriate department at the university that is requiring the research. This affidavit must appear on university letterhead. If the university is unable to provide such an

affidavit, the applicant will likely be referred to LiveScan services.
    - Submit a completed background check report that is provided by LiveScan once fingerprinting has been completed. Please note, LiveScan services generally involve a fee. Interested applicants can do an internet search for "LiveScan locations".

- All research carried out at school sites **must** be conducted under the <u>direct supervision</u> of a certificated administrator or certificated staff member.
- All applicants **must** review and adhere to the Family Educational Rights and Privacy Act (FERPA) and Protection of Pupil Rights Amendment (PPRA).
    - https://ed.gov/policy/gen/guid/fpco/ferpa/index.html
    - http://familypolicy.ed.gov/ppra
- If the applicant is requesting extant data from [redacted] the request for release of student information **must** be included in the parent permission form.
- To ensure valid informed consent, student materials **must** be developed at least one grade level below their current grade to better accommodate the wide range of student reading levels.
- Communications intended for parents/guardians **must** be developed using a 4th to 6th grade readability level. It is department protocol that all parent/guardian communications concerning research requests be translated into Spanish for intended distribution at district schools.
- Annual review of multi-year studies is required. There is no automatic assurance of renewal each year.
- Questions regarding (a) research hypothesis development, (b) appropriate data selection, and (c) research methodology should be directed to your institution's IRB department.

Evaluation Criteria

The primary criteria that will be used to evaluate external research requests are as follows:

1. **Significance**
   Preference will be given to studies:
    a. Improving academic achievement.
    b. In areas that are of high concern and potential usefulness to districts within [redacted]
    c. Testing novel ideas.
    d. Showing promise of contributing to a scientific knowledge base for education.
    e. University required for a Master's thesis or Doctoral dissertation.

2. **Design**
    a. Adequacy of conceptual framework, research questions, instrumentation, data collection, and design.
    b. Appropriateness of arrangements to report and explain results of the research to [redacted] personnel.

c. Consideration of the rights and feelings of the subjects involved in the research.
d. Confidentiality of information pertaining to individual students or staff.
e. Clarity of plans for participation of [redacted] students and staff.

3. Protection of Human Subjects

a. Adherence to the Family Educational Rights and Privacy Act (FERPA) and Protection of Pupil Rights Amendment (PPRA) regarding family and pupil rights, their privacy, and protection.
b. Appropriate parental consent forms and student assent forms when necessary.

4. Logistics

a. Minimal disruption of district, school, and classroom operations.
b. Minimal time required of students and staff.

Research Applicant Acknowledgement

By signing the below, I acknowledge that I have read, understand, and agree to abide by the provisions set forth in the [redacted] Research Request Guidelines.

Print Name: Daniel SungHan Choe

Signature:

Date: 2|28|2024

Application

Name:	Daniel S. Choe
Job Title:	SAI Teacher
Agency Name:	[redacted]
Work Phone:	[redacted] (Cell: 949-783-8988)
Work Address:	[redacted]
City, State, Zip:	[redacted] CA [redacted]
Work Email:	[redacted]
Which degree(s) do you current possess?	BA,MA
Is this research part of an educational requirement?	Yes
If so, which degree are you seeking?	Ph.D.
Are you a [redacted] employee?	Yes
If you are a graduate student, what is your advisor's name?	Dr. [redacted]
Advisor Phone Number:	[redacted]
Project Title: (Provide a title of your request.)	Educators' perceptions for low performance on mathematics state assessments among high school algebra students with learning disabilities in an alternative education program in California: An Explanatory case study
Project Purpose: (Provide a brief summary of the project purposes. Be specific as possible.)	The purpose of this study is to understand educators' perceptions that influence high school algebra students with learning disabilities in an alternative education setting to score below and far below proficiency levels on the state mathematics assessment despite receiving credit for algebra courses.
Project Area: (Counseling, assessment, reading, special education, and etc.)	Alternative education, students with learning disabilities, mathematics
Project Aims: (Projected outcomes of the research project.)	The projected outcome of this research will fill the literature gap regarding alternative education, special education, and mathematics assessements at the high school level.
Methodology: (Include information about design, procedures, population, sites, and analysis.)	An intrinsic case study qualitative approach will be used. Participants will be teachers and administrators in the AE program. No contact will occur with students or sites. Participants will be contacted via email, phone, and Zoom videoconferencing for surveys and individual (one-on-one) interviews. Data requested will be transcripts of students with learning disabilities from 2018 to the present. All identifying information is asked to be redacted before I receive them.
Hypotheses to be tested:	Not applicable. This is a qualitative study.

Instruments to be used:	I am the instrument conducting this research.
Does the study deal with sensitive topics? If so, please specify. (abuse, alcohol/drug use, disability concerns, psychological well-being, sexual behavior, sexual orientation, health concerns, and etc.)	Not applicable. This study does not interact with students and/or families directly. This study looks at transcripts and state test scores.
Study Needs: (List all schools, pupils, and staff members directly involved in your study.)	• Number of Schools: [illegible] •Specify Grade Levels: 9-12 • Number of Persons to be Involved, Administrators: 10-15 Teachers: 55-60 Students: 0 Parents: 0
Have specific schools been contacted? (If yes, please provide the names of schools and the contact person at each.)	No schools have been contacted.
Total in-school individual <u>student</u> time involved, if any:	Length of each session: NA Number of sessions: Spacing of sessions:
Total in-school <u>teacher</u> and <u>administrator</u> time involved, if any:	Length of each session: NA Number of sessions: Spacing of sessions:
Will non-school time be involved? (If so, how much and when?)	Yes. Surveys and individual interviews will be given to participants during non-school hours.
Special Characteristics of Participants:	Participants will come from alternative education program only (administrators and teachers).
Are there any stipends or other incentives for participation? (If yes, please describe.)	No.
Will Spanish translations of parental consent forms be provided?	No.
Describe any potential <u>benefits</u> to [redacted] schools or students? (Applicant's Opinion)	Educators and students will be able to incorporate curricular and instructional strategies suggested by this case study's findings to help improve student performance on mathematics assessments. Benefits will be based upon the timeline [illegible] Are these benefits **immediate** or **deferred?** Depends on leadership

Describe any potential <u>risks</u> to [redacted] schools or students? (Applicant's opinion)	There are no direct contact with students. I am requesting that all identifying information be redacted on student transcripts and test scores. Pseudonyms will be used (Student 1, Student 2, etc).
Research Evaluation: (Provide a statement of how this research project will be evaluated.)	This research will be evaluated by Liberty University's School of Education IRB and dissertation committee
Reported Results: (Provide a statement of how results will be reported to local staff and district administrators.)	An executive summary of findings will be provided to the Alternative Education Executive Director upon completion of this study.
Projected Timeline:	Date of Research Request: Estimated Date of Site Consultation (if applicable): NA Start Date of Data Collection: August 2024 Estimated End Date of Data Collection: October 2024 Estimated Start Date of Data Analysis: October 2024 Estimated Date of Publication: June 2025 Estimated Date Report will be Provided to [redacted] June 2025
If requesting additional data from please proceed to the next section. If not, skip this section.	
Purpose of Request: (Provide the reason why you are requesting educational data and what you plan to use the data for.)	I am requesting semester transcripts for students with learning disabilities in 9th-12th grade and CAASPP math results for 2018 to the present. Data will be used to triangulate this study's surveys and participant interviews.
Description of Data Requested:	Transcripts for students with learning disabilities in 9th-12th grades and their CAASPP math scores for 2018 to the present.
Data Type: (Provide information on the data type. For example, are you requesting bi-annual versus annual, point of time versus longitudinal, and snapshot versus cumulative.)	Student transcripts from 2018-19 school year to the present. Student CAASPP math test scores since 2018-19 school year to the present.
Intent to Publish: (Will the data be used in a published document?)	This data will be used for my dissertation only.
Date Needed:	September 1, 2024

ASSURANCES: The proposed research activities to be conducted within [redacted] of [redacted] are in compliance with existing legal and ethical codes. The research will not differ significantly from the activities described within the proposal. All participation will be voluntary, and it is understood that approval of the proposal, if granted, will not obligate any person, school, or department/unit in [redacted] to participate. Researchers must obtain a signed parent consent form for each student before having contact with students. All student or staff data provided by the district will not be shared with other researchers or organizations. All research must be carried out at school sites and must be conducted under the direct supervision of a certification administrator or certificated staff member. Any amendments to the original proposal must be submitted and approved by the *Research Review Committee*. All researchers agree to provide [redacted] and each participating school with a copy of the research findings.

I also acknowledge that I have reviewed the applicable board policies for Research at [redacted] (BP 6162.8), available at [redacted]

I understand and agree with the above statement, and will follow the guidelines it sets forth. I have read and accept the provisions of the state and federal law regarding the protection of pupils in research attache[redacted]ation.

Applicant's Signature: [redacted]

Date Submitted: 2/29/24

[redacted] SUPERINTENDENT OF SCHOOLS
[redacted]
[redacted] California [redacted] l

DATA SECURITY BREACH REPORTING AND PRIVACY OF RECORDS PROTOCOLS AND AGREEMENTS

1. **DATA SECURITY BREACH REPORTING:** California Civil Code 1798.82(a) and California Civil Code 1798.29(a) require business' and state agencies to notify any California resident whose unencrypted personal information, as defined, was acquired, or reasonably believed to have been acquired, by an unauthorized person. Additionally, when any single breach occurs that effects 500 or more California residents, the business or agency is required to electronically submit a sample copy of the security breach notification, excluding any personally identifiable information (PII), to the Attorney General.

2. **PROTECTION OF PUPIL DATA:** California local educational agencies, such as the Riverside County Superintendent of Schools, hereinafter referred to as "SUPERINTENDENT", and third party researchers, such as ___David Choe___, hereinafter referred to as "RESEARCHER", are required by federal and state laws to protect certain pupil data, including but not limited to; financial, health, and educational records. RESEARCHER must implement procedures and protective measures to ensure compliance with current federal and state privacy requirements, including but not limited to; California Education Code 49073.1, the Student Online Personal Information Protection Act (SOPIPA), the federal Family Educational Rights and Privacy Act (FERPA), the federal Children's Online Privacy Protection Act (COPPA), and the Children's Internet Protection Act (CIPA).

3. **COMPLIANCE:** In addition to other penalties, an agreement that fails to comply with the requirements of this Agreement shall be rendered void if, upon notice and reasonable opportunity to cure, the noncompliant party fails to come into compliance and cure any defect. Written notice of noncompliance may be provided by any Party to this Agreement. All Parties subject to this Agreement, voided under this section, shall return all records in their possession to SUPERINTENDENT as detailed in section 7 of this Agreement.

4. **DEFINITIONS:**

Local Education Agency	Includes school districts, county offices of education, and charter schools
Pupil Records	i. Any information directly related to a pupil that is maintained by the local educational agency. ii. Any information acquired directly from the pupil through the use of instructional software or applications assigned to the pupil by a teacher or other local education agency employee.
Pupil-Generated Content	Materials created by a pupil, including but not limited to, essays, research reports, portfolios, creative writing, music or other audio files, photographs, and account information that enables ongoing ownership of pupil content.

Personally Identifiable Information (PII)	Shall include, but is not limited to, student data, metadata, and user or pupil-generated content.
Eligible Pupil	A pupil who has reached 18 years of age.
Individual	For purposes of this Agreement, any reference to individual(s) in this Agreement are referring to pupils, both of minor age and adult, parents, legal guardians, and LEA employees.

RESEARCHER will be hosting, collecting, or processing [redacted] data which may include PII, as indicated on the [redacted] RESEARCH REQUEST. RESEARCHER must provide written responses to items 1-5, as applicable, in the space provided and sign this Agreement indicating acceptance of the protocol. For any items that are not applicable to this Agreement, please write **"not applicable".** If more space is needed, additional pages may be added.

1. RESEARCHER shall provide a description of the actions RESEARCHER will take, including the designation and training of responsible persons, to ensure the security and confidentiality of an individual's records. Compliance with this requirement shall not, in itself, absolve the RESEARCHER of liability in the event of an unauthorized disclosure of an individual's records.

   RESEARCHER to insert information here. All information received from [redacted] will [illegible] [redacted] [illegible] I will be the only person having access to this [illegible]. All information will be redacted to remove all identifying information [illegible]

2. RESEARCHER shall provide a description of the procedures RESEARCHER will take, for notifying the affected individual or, if applicable, their parent or legal guardian, in the event of an unauthorized disclosure of an individual's records.

   RESEARCHER to insert information here. Not applicable.

3. RESEARCHER shall provide a description of the means by which a pupil or, if applicable, their parent or legal guardian, may retain possession and control of their own generated content.

   Not applicable.

   RESEARCHER to insert information here.

4. RESEARCHER shall provide a description of the procedures by which an eligible pupil or, if applicable, their parent or legal guardian, may review PII in their records and correct erroneous information.

   Not applicable.

   RESEARCHER to insert information here.

5. RESEARCHER shall provide a description of how SUPERINTENDENT and RESEARCHER will jointly ensure compliance with the federal Family Educational Rights and Privacy Act (20 U.S.C. Sec. 1232g) to protect Pupil Records.

   RESEARCHER to insert information here. Information requested from [redacted] should be redacted of student names [illegible] In the event information [illegible] I will redact the information. All information will [illegible] [redacted] computer. Pseudonyms will be used (Student 1, Student 2, etc

6. RESEARCHER shall notify SUPERINTENDENT within 24 hours of an unauthorized breach.

Notifications shall be sent as follows:

SUPERINTENDENT:
[redacted]
Contracts and Purchasing Services
[redacted]
CA [redacted]

7. RESEARCHER, upon completion of the terms of this Research Request, will provide a Certificate of Destruction that certifies that an individual's records have not been retained or available to RESEARCHER upon completion of the terms of this Agreement and a description of how that certification has been enforced.

   A. RESEARCHER will ensure all SUPERINTENDENT data will be stored on the RESEARCHER'S server/virtual server separate from all other LEAs.
   B. At the conclusion of the research timeline as indicated in the Research Request, or immediately after receipt of termination notice from SUPERINTENDENT, RESEARCHER shall submit a Certificate of Destruction Request to SUPERINTENDENT. If the research timeline from the Research Request requires extension, a written request must be made to SUPERINTENDENT to retain data provided under the Research Request.
   C. The Certificate of Destruction Request must be sent pursuant to Section 6 of this Agreement.
   D. SUPERINTENDENT will indicate what method of destruction will be used, if any, and return the Certificate of Destruction Request to RESEARCHER.
      1. RESEARCHER will not destroy data unless authorized by SUPERINTENDENT.
      2. If authorized to destroy data by SUPERINTENDENT, RESEARCHER will provide a completed Certificate of Destruction to SUPERINTENDENT.
8. All records obtained by RESEARCHER from SUPERINTENDENT continue to be the property of and under the control of SUPERINTENDENT.
9. This Agreement prohibits RESEARCHER from using any information in SUPERINTENDENT'S records for any purpose other than those required or specifically permitted by this Agreement.
10. This Agreement prohibits against RESEARCHER using any PII contained in SUPERINTENDENT'S records to engage in targeted advertising.

IN WITNESS WHEREOF, the Parties hereto have executed this Agreement on the day and year first above written.

[redacted] **Schools**

Signed____________

Authorized Signature

____

Printed Name and Title

Date________________

RESEARCHER Name:

[redacted]

Authorized Signature

Daniel Sanghan Choe, SAI Teacher (Doctoral Candidate, Liberty University)

____

Printed Name and Title

Date__ [illegible]

Appendix C

ACSD Research Approval Letter

[redacted]

[redacted]
Board of Education

[redacted]

May 20, 2024

Daniel Sung Choe
[redacted]

Dear Daniel Choe:

The purpose of this letter is to inform you that the [redacted] is granting you permission to conduct research on "Educators' perceptions for low performance on mathematics state assessments among high school algebra students with learning disabilities in an alternative education program in California," per your request.

Please abide by all assurances, timelines, and agreements stipulated in the research request and related permission forms. Best of luck as you continue your research!

[Sincerely,

[redacted]

[redacted]CH

[redacted]

[redacted]

May 20, 2024

Daniel Sung Choe
[redacted]

[redacted]

Dear Daniel Choe:

The purpose of this letter is to inform you that the [redacted] is granting you permission to conduct research on "Educators' perceptions for low performance on mathematics state assessments among high school algebra students with learning disabilities in an alternative education program in California," per your request.

You may use data gathered for the purposes of research and completion of requirements for your education program. Additionally, the data and associated research may be used for broader publication or presentation, provided that the anonymity of [redacted] sites and staff is maintained.

Please abide by all assurances, timelines, and agreements stipulated in the research request and related permission forms. Best of luck as you continue your research!

Sincerely,

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Appendix D

Recruitment Email/Screenings

Dear Educator,

As a doctoral candidate in the School of Education, D. Sung Choe, at Liberty University, I am conducting research for my dissertation as part of the requirements for a Ph.D. degree. The purpose of my research is to understand educators' perceptions regarding factors that influence high-school algebra students with learning disabilities in an alternative education setting to score below and far below basic proficiency levels on the California math standards test despite receiving credit for the algebra course. I am writing to invite you to join my study.

Participants must be teachers or administrators working with students with learning disabilities in an alternative education program. Participants will be asked to take an online survey and participate in a one-on-one videorecorded interview via Zoom. The online survey will be sent via email and take approximately 15 minutes to complete. Once the online survey is completed, participants will be invited for a one-on-one video-recorded interview via Zoom, which should take approximately 30 minutes to complete. Participants will be given a written transcription of their individual interview to review for accuracy. Participants' names will be requested, but identities will not be disclosed.

To participate, please complete the following screening questions and attached consent form. After you have read the consent form, please click the link to proceed to the survey. Participating in the survey will indicate that you have read the consent information and would like to participate in the study. The consent document contains additional information about my research.

If you choose to participate, you will need to sign the consent document and return it to me at the time of the interview. Please contact me if you have any questions.

Sincerely,

D. Sung Choe
Doctoral Candidate
[redacted]

Attachment: Consent Form

Appendix E

Screening Survey

Participants will answer the following questions.

1. What is your name (first and last)?
2. What is your work email address?
3. What is the best phone number to contact you?
4. What position do you currently hold? (Administrator or Teacher)
5. Do you possess a single subject credential? (Yes or No)
6. Do you possess a mathematics credential or mathematics-added authorization? (Yes or No)
7. Do you possess a multiple-subject credentials? (Yes or No)
8. How long have you been in the teaching profession? (one to five years; six to 10 years; 11-15 years; 16-20 years; More than 20 years)
9. How long have you worked in alternative education? (one to five years; six to 10 years; 11-15 years; 16-20 years; More than 20 years)

Appendix F

Consent Form

Title of the Project: Educators' perceptions for low performance on mathematics state assessment among high school algebra students with learning disabilities in an alternative education program in California: An Explanatory case study

Principal Investigator: D. Sung Choe, Doctoral Candidate, School of Education, Liberty University

Invitation to be a part of a research study

You are invited to participate in a research study. To participate, you must be a teacher or administrator working with students with learning disabilities in an alternative education program. Taking part in this research project is voluntary.

Please take time to read this entire form and ask questions before deciding whether to take part in this research.

What is the study about and why is it being done?

The purpose of the study is to understand the perceptions of educators regarding factors that influence high-school algebra students with LD in an alternative education setting to score below and far below basic proficiency levels on the California math standards test despite receiving credit for the algebra course.

What will happen if you take part in this study?

If you agree to be in this study, I will ask you to do the following:

1. Participate in an online survey. This should take about 15 minutes.
2. Participate in an individual video-recorded Zoom interview. This should take about 30 minutes.
3. Receive a written transcription of the interview to review for accuracy.

How could you or others benefit from this study?

You should not expect to receive a direct benefit from participating in this study.

Benefits to the teaching profession include insights into pedagogy and instructional practices in mathematics and supporting high school students with learning disabilities to perform better on state math assessments. Other benefits include school districts aligning math-based professional development for teachers.

What risks might you experience from being in this study?

The expected risks from participating in this study are minimal, which means they are equal to the risks you would encounter in everyday life.

I am a mandatory reporter. During this study, if I receive information about child abuse, child neglect, elder abuse, or intent to harm self or others, I will be required to report it to the appropriate authorities.

How will personal information be protected?

The records of this study will be kept private. The research records will be kept safe and secure, and only the researcher will have access to them. All recordings will be password and fingerprint-protected on the researcher's computer, and physical documents will be stored in a locked filing cabinet that can only be accessed by the researcher.

- Participant responses will be kept confidential by replacing names with pseudonyms. Pseudonyms used will be Participant 1, Participant 2, et cetera.
- Interviews will be conducted in a location where others will not easily overhear the conversation via Zoom videoconferencing.
- Data will be stored on a password-locked computer, in a locked file cabinet, and secured on school servers. After three years, all electronic records will be deleted, and all hardcopy records will be shredded.
- Recordings will be stored on a password-locked computer until participants have reviewed and confirmed the accuracy of the transcripts and then deleted after three years. The researcher and members of his doctoral committee will have access to these recordings.

Is study participation voluntary?

Participation in this study is voluntary. Your decision whether to participate will not affect your current or future relations with Liberty University. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships.

What should you do if you decide to withdraw from the study?

If you choose to withdraw from the study, please exit the survey and close your internet browser. Your responses will not be recorded or included in the study.

If you have completed the survey and choose to withdraw from the individual interview portion of the study, please contact the researcher at the email address/phone number included in the next paragraph. If you choose to withdraw, data collected from you, apart from the survey data, will be destroyed immediately and not included in this study.

Whom do you contact if you have questions or concerns about the study?

The researcher conducting this study is D. Sung Choe. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact him at [redacted] and [redacted]. You may also contact the researcher's faculty sponsor, Dr. Traci Eshelman [redacted].

Whom do you contact if you have questions about your rights as a research participant?

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the IRB. Our physical address is Institutional Review Board, 1971 University Blvd., Green Hall Ste. 2845, Lynchburg, VA, 24515; our phone number is 434-592-5530, and our email address is irb@liberty.edu.

Disclaimer: The Institutional Review Board (IRB) is tasked with ensuring that human subjects research will be conducted in an ethical manner as defined and required by federal regulations.

The topics covered and viewpoints expressed or alluded to by student and faculty researchers are those of the researchers and do not necessarily reflect the official policies or positions of Liberty University.

Your Consent

Before agreeing to be part of the research, please be sure that you understand what the study is about. You will be given a copy of this document for your records/you can print a copy of the document for your records. If you have any questions about the study later, you can contact the researcher using the information provided above.

I have read and understood the above information. I have asked questions and have received answers. I consent to participate in the study.

☐ The researcher has my permission to audio-record/video-record me as part of my participation in this study.

____

Printed Subject Name

____

Signature & Date

Appendix G

Survey Questions (Table 1)

Survey Likert-scale Questions:

Participants will select one response to each statement with (a) Strongly agree, (b) Agree, (c) Neutral, (d) Disagree, or (e) Strongly disagree. Please complete all parts of this survey.

1. Which division do you work in (court, community, or charter)? Basic information
2. Students with learning disabilities in AE do well on the math portion of the CAASPP assessment test. CRQ
3. Students with learning disabilities in AE score proficient or above in the math portion of the CAASPP assessment. CRQ
4. Students with learning disabilities in AE score below proficient on the math portion of the CAASPP assessment. CRQ
5. Students with learning disabilities in AE score far below proficient on the math portion of the CAASPP assessment. CRQ
6. Students with learning disabilities entering AE have foundational skills to acquire CAASPP math content. CRQ
7. Students with learning disabilities in AE have adequate instructional time to prepare for the CAASPP math assessment. CRQ
8. Students with learning disabilities should receive at least one hour of dedicated instructional time daily to learn foundational skills for the CAASPP math assessment. CRQ
9. Students with learning disabilities should receive at least two hours of dedicated instructional time daily to learn foundational skills for the CAASPP math assessment. CRQ
10. Students with learning disabilities in AE come prepared with Algebra 1 concepts addressed in the CAASPP assessment. CRQ

11. Students with learning disabilities in AE understand how to access mathematics instructional material independently. CRQ
12. Teachers need a mathematics credential to provide mathematics instruction to support students with learning disabilities in AE. SQ1
13. Teachers need a background in mathematics to provide mathematics instruction to support students with learning disabilities in AE. SQ1
14. Teachers receive high-quality professional development in administering the CAASPP test. SQ1
15. Teachers receive adequate algebra content training to support students with learning disabilities in AE. SQ1
16. Teachers receive regular training on mathematics curricula throughout the academic year. SQ1
17. Teachers should receive mathematics training during the summer break. SQ1
18. Students with learning disabilities in AE have access to technology to support mathematics learning. SQ2
19. Students with learning disabilities in AE understand how to use technology in learning mathematics. SQ2
20. Students with learning disabilities in AE prefer paper and pencil over the computer when working on mathematics problems. SQ2
21. Students with learning disabilities in AE prefer direct instruction when learning mathematics. SQ2
22. Technology hinders the mathematics learning of students with learning disabilities in AE. SQ2

23. Instructional math videos provide additional support for students with learning disabilities in AE. SQ2
24. Students with learning disabilities enter the AE setting with foundational math skills to learn algebra concepts. SQ3
25. Students with learning disabilities in AE possess a proficient understanding of addition. SQ3
26. Students with learning disabilities in AE possess a proficient understanding of subtraction. SQ3
27. Students with learning disabilities in AE possess a proficient understanding of multiplication. SQ3
28. Students with learning disabilities in AE possess a proficient understanding of division. SQ3
29. Students with learning disabilities in AE possess a proficient understanding of orders of operations. SQ3
30. Students with learning disabilities in AE possess a proficient understanding of ratios and proportions (fractions). SQ3
31. Students with learning disabilities in AE possess a proficient understanding of percentages. SQ3
32. Students with learning disabilities in AE possess a proficient understanding of decimals. SQ3
33. Students with learning disabilities in AE possess a proficient understanding of the number system. SQ3
34. Students with learning disabilities in AE possess a proficient understanding of geometry (perimeter and area of a square, rectangle, and triangle). SQ3
35. Students with learning disabilities in AE possess a proficient understanding of solving basic expressions ($2x + 1=7$). SQ3

36. Students with learning disabilities in AE possess a proficient understanding of the distributive property (a[b+c] = ab + ac). SQ3
37. Students with learning disabilities in AE should have two consecutive years of mathematics preparation before taking the CAASPP math assessment. CRQ
38. Students with learning disabilities in AE do not remain enrolled long enough to access mathematics instruction to reach proficiency levels. CRQ
39. Students with learning disabilities in AE should be able to demonstrate algebra proficiency through an alternative measure to the CAASPP. CRQ
40. The IEP’s specific learning disability (SLD) designation is adequate to provide math instructional guidance for students with learning disabilities in AE settings. CRQ

Thank you for your participation in this survey. I will contact you to schedule an individual interview for this study.

Appendix H

Survey Results (Table 4)

Table 4

Survey Results

Participants	Division	Students with learning disabilities in alternative education do well on the math portion of the CAASPP assessment test.	Students with learning disabilities in alternative education score proficient or above on the math portion of the CAASPP assessment.	Students with learning disabilities in alternative education score below proficient on the math portion of the CAASPP assessment.	Students with learning disabilities in alternative education score far below proficient on the math portion of the CAASPP assessment.
Esther	Charter	Strongly disagree	Strongly disagree	Strongly agree	Strongly agree
Anna	Community	Strongly disagree	Strongly disagree	Strongly agree	Strongly agree
Aaron	Community	Disagree	Disagree	Agree	Agree
Candance	Charter	Strongly disagree	Strongly disagree	Strongly agree	Strongly agree
Matthew	Court	Strongly disagree	Strongly disagree	Strongly agree	Agree
Deborah	Charter	Strongly disagree	Strongly disagree	Agree	Agree
Hope	Community	Disagree	Strongly disagree	Strongly agree	Strongly agree
Mary	Charter	Strongly disagree	Strongly disagree	Strongly agree	Strongly agree
Rebecca	Charter	Strongly disagree	Strongly disagree	Strongly agree	Agree
Sophia	Community	Disagree	Strongly disagree	Agree	Strongly agree
Luke	Court	Strongly disagree	Strongly disagree	Strongly agree	Strongly agree

Table 4 (continued)

Survey Results

Participants	Division	Students with learning disabilities in alternative education have adequate instructional time to prepare for the CAASPP math assessment.	Students with learning disabilities should receive at least one hour of dedicated instructional time daily to learn foundational skills for the CAASPP math assessment.	Students with learning disabilities should receive at least two hours of dedicated instructional time daily to learn foundational skills for the CAASPP math assessment.	Students with learning disabilities in alternative education come prepared with Algebra 1 concepts addressed in the CAASPP assessment.
Esther	Charter	Strongly disagree	Strongly agree	Strongly agree	Strongly disagree
Anna	Community	Disagree	Strongly agree	Strongly agree	Strongly disagree
Aaron	Community	Agree	Agree	Disagree	Disagree
Candance	Charter	Disagree	Neutral	Neutral	Agree
Matthew	Court	Neutral	Agree	Disagree	Disagree
Deborah	Charter	Neutral	Strongly agree	Agree	Strongly disagree
Hope	Community	Disagree	Strongly agree	Strongly agree	Strongly disagree
Mary	Charter	Strongly disagree	Strongly agree	Agree	Strongly disagree
Rebecca	Charter	Neutral	Agree	Neutral	Agree
Sophia	Community	Disagree	Strongly agree	Disagree	Disagree
Luke	Court	Disagree	Agree	Neutral	Disagree

Table 4 (continued)

Survey Results

Participants	Division	Students with learning disabilities in alternative education understand how to access mathematics instructional material independently.	Teachers need a mathematics credential to provide mathematics instruction to support students with learning disabilities in alternative education.	Teachers need a background in mathematics to provide mathematics instruction to support students with learning disabilities in alternative education.	Teachers receive high-quality professional development in administering the CAASPP test.
Esther	Charter	Strongly disagree	Agree	Strongly agree	Strongly disagree
Anna	Community	Strongly disagree	Strongly agree	Strongly agree	Strongly disagree
Aaron	Community	Disagree	Disagree	Agree	Agree
Candance	Charter	Disagree	Strongly disagree	Neutral	Strongly agree
Matthew	Court	Disagree	Disagree	Disagree	Agree
Deborah	Charter	Disagree	Neutral	Strongly agree	Agree
Hope	Community	Strongly disagree	Disagree	Disagree	Strongly agree
Mary	Charter	Strongly disagree	Disagree	Strongly agree	Disagree
Rebecca	Charter	Agree	Disagree	Agree	Strongly agree
Sophia	Community	Agree	Strongly disagree	Disagree	Disagree
Luke	Court	Disagree	Neutral	Neutral	Neutral

Table 4 (continued)

Survey Results

Participants	Division	Teachers receive adequate algebra content training to support students with learning disabilities in alternative education.	Teachers receive adequate professional development time to collaborate with others on mathematics topics.	Teachers receive regular training on mathematics curricula throughout the academic year.	Teachers should receive mathematics training during the summer break.
Esther	Charter	Strongly disagree	Strongly disagree	Strongly disagree	Strongly agree
Anna	Community	Strongly disagree	Strongly disagree	Strongly disagree	Strongly agree
Aaron	Community	Disagree	Disagree	Disagree	Agree
Candance	Charter	Disagree	Strongly disagree	Strongly disagree	Neutral
Matthew	Court	Agree	Neutral	Neutral	Agree
Deborah	Charter	Disagree	Disagree	Disagree	Disagree
Hope	Community	Disagree	Disagree	Strongly disagree	Neutral
Mary	Charter	Disagree	Strongly disagree	Strongly disagree	Neutral
Rebecca	Charter	Neutral	Disagree	Neutral	Strongly disagree
Sophia	Community	Neutral	Disagree	Agree	Neutral
Luke	Court	Disagree	Disagree	Disagree	Agree

Table 4 (continued)

Survey Results

Participants	Division	Students with learning disabilities in alternative education have access to technology to support mathematics learning.	Students with learning disabilities in alternative education understand how to use technology in learning mathematics.	Students with learning disabilities in alternative education prefer paper and pencil over the computer when working on mathematics problems.	Students with learning disabilities in alternative education prefer direct instruction when learning mathematics.
Esther	Charter	Neutral	Strongly disagree	Agree	Strongly agree
Anna	Community	Strongly disagree	Strongly disagree	Strongly agree	Strongly agree
Aaron	Community	Agree	Agree	Disagree	Agree
Candance	Charter	Agree	Agree	Strongly agree	Strongly agree
Matthew	Court	Strongly agree	Disagree	Neutral	Strongly agree
Deborah	Charter	Agree	Disagree	Neutral	Strongly agree
Hope	Community	Strongly agree	Disagree	Neutral	Strongly agree
Mary	Charter	Agree	Agree	Neutral	Strongly agree
Rebecca	Charter	Strongly agree	Strongly agree	Strongly disagree	Neutral
Sophia	Community	Agree	Agree	Strongly agree	Strongly agree
Luke	Court	Agree	Agree	Neutral	Neutral

Table 4 (continued)

Survey Results

Participants	Division	Technology hinders the mathematics learning of students with learning disabilities in alternative education.	Instructional math videos provide additional support for students with learning disabilities in alternative education.	Students with learning disabilities enter the alternative education setting with foundational math skills to learn algebra concepts.	Students with learning disabilities in alternative education possess a proficient understanding of addition.
Esther	Charter	Neutral	Strongly agree	Strongly disagree	Agree
Anna	Community	Agree	Neutral	Strongly disagree	Strongly disagree
Aaron	Community	Agree	Agree	Strongly disagree	Agree
Candance	Charter	Disagree	Neutral	Strongly disagree	Strongly agree
Matthew	Court	Strongly disagree	Agree	Disagree	Disagree
Deborah	Charter	Agree	Agree	Neutral	Disagree
Hope	Community	Disagree	Strongly agree	Strongly disagree	Disagree
Mary	Charter	Agree	Agree	Agree	Disagree
Rebecca	Charter	Disagree	Strongly agree	Neutral	Strongly agree
Sophia	Community	Disagree	Agree	Disagree	Strongly disagree
Luke	Court	Disagree	Agree	Disagree	Agree

Table 4 (continued)

Survey Results

Participants	Division	Students with learning disabilities in alternative education possess a proficient understanding of subtraction.	Students with learning disabilities in alternative education possess a proficient understanding of multiplication.	Students with learning disabilities in alternative education possess a proficient understanding of division.	Students with learning disabilities in alternative education possess a proficient understanding of orders of operations.
Esther	Charter	Agree	Disagree	Disagree	Disagree
Anna	Community	Strongly disagree	Strongly disagree	Strongly disagree	Strongly disagree
Aaron	Community	Agree	Disagree	Strongly disagree	Strongly disagree
Candance	Charter	Agree	Agree	Neutral	Disagree
Matthew	Court	Disagree	Disagree	Disagree	Disagree
Deborah	Charter	Disagree	Strongly disagree	Strongly disagree	Strongly disagree
Hope	Community	Disagree	Disagree	Disagree	Strongly disagree
Mary	Charter	Disagree	Disagree	Strongly disagree	Strongly disagree
Rebecca	Charter	Strongly agree	Strongly agree	Agree	Neutral
Sophia	Community	Agree	Strongly disagree	Strongly disagree	Strongly disagree
Luke	Court	Agree	Disagree	Disagree	Disagree

Table 4 (continued)

Survey Results

Participants	Division	Students with learning disabilities in alternative education possess a proficient understanding of ratios and proportions (fractions).	Students with learning disabilities in alternative education possess a proficient understanding of percentages.	Students with learning disabilities in alternative education possess a proficient understanding of decimals.	Students with learning disabilities in alternative education possess a proficient understanding of the number system.
Esther	Charter	Strongly disagree	Strongly disagree	Strongly disagree	Strongly disagree
Anna	Community	Strongly disagree	Strongly disagree	Strongly disagree	Strongly disagree
Aaron	Community	Strongly disagree	Strongly disagree	Strongly disagree	Disagree
Candance	Charter	Disagree	Disagree	Disagree	Disagree
Matthew	Court	Disagree	Disagree	Disagree	Disagree
Deborah	Charter	Strongly disagree	Strongly disagree	Strongly disagree	Disagree
Hope	Community	Strongly disagree	Strongly disagree	Strongly disagree	Strongly disagree
Mary	Charter	Strongly disagree	Strongly disagree	Strongly disagree	Strongly disagree
Rebecca	Charter	Disagree	Strongly disagree	Disagree	Agree
Sophia	Community	Strongly disagree	Strongly disagree	Strongly disagree	Disagree
Luke	Court	Disagree	Disagree	Disagree	Agree

Table 4 (continued)

Survey Results

Participants	Division	Students with learning disabilities in alternative education possess a proficient understanding of geometry (perimeter and area of a square, rectangle, and triangle).	Students with learning disabilities in alternative education possess a proficient understanding of solving basic expressions (2x + 1=7).	Students with learning disabilities in alternative education possess a proficient understanding of the distributive property (a[b+c] = ab + ac).	Students with learning disabilities in alternative education should have two consecutive years of mathematics preparation before taking the CAASPP math assessment.
Esther	Charter	Strongly disagree	Strongly disagree	Strongly disagree	Strongly agree
Anna	Community	Strongly disagree	Strongly disagree	Strongly disagree	Strongly agree
Aaron	Community	Strongly disagree	Strongly disagree	Strongly disagree	Agree
Candance	Charter	Disagree	Strongly disagree	Strongly disagree	Disagree
Matthew	Court	Strongly disagree	Disagree	Strongly disagree	Agree
Deborah	Charter	Strongly disagree	Strongly disagree	Strongly disagree	Strongly agree
Hope	Community	Strongly disagree	Strongly disagree	Strongly disagree	Agree
Mary	Charter	Strongly disagree	Strongly disagree	Strongly disagree	Strongly disagree
Rebecca	Charter	Disagree	Disagree	Strongly disagree	Strongly agree
Sophia	Community	Strongly disagree	Disagree	Strongly disagree	Agree
Luke	Court	Disagree	Neutral	Disagree	Agree

Table 4 (continued)

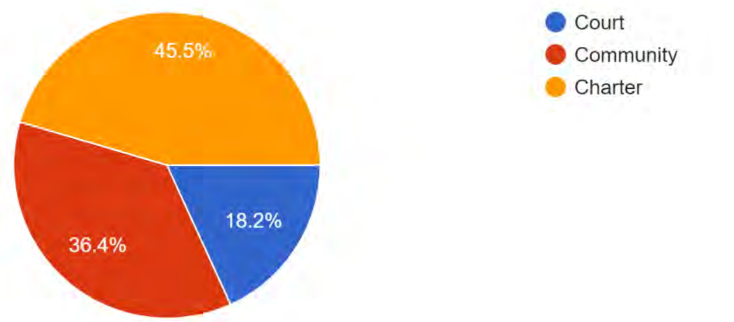
Survey Results

Participants	Division	Students with learning disabilities in alternative education do not remain enrolled long enough to access mathematics instruction to reach proficiency levels.	Students with learning disabilities in alternative education should be able to demonstrate algebra proficiency through an alternative measure to the CAASPP.	The IEP's specific learning disability (SLD) designation is adequate to provide math instructional guidance for students with learning disabilities in AE settings.
Esther	Charter	Strongly agree	Strongly agree	Strongly agree
Anna	Community	Strongly agree	Strongly disagree	Strongly disagree
Aaron	Community	Agree	Agree	Agree
Candance	Charter	Agree	Agree	Disagree
Matthew	Court	Agree	Agree	Disagree
Deborah	Charter	Disagree	Neutral	Strongly disagree
Hope	Community	Agree	Neutral	Disagree
Mary	Charter	Strongly agree	Neutral	Disagree
Rebecca	Charter	Agree	Neutral	Neutral
Sophia	Community	Neutral	Neutral	Disagree
Luke	Court	Strongly agree	Agree	Agree

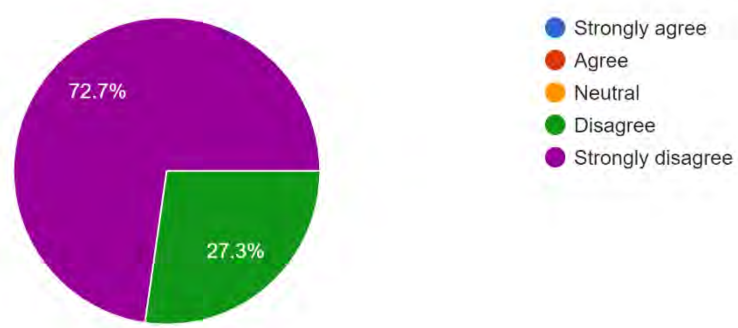
Table 4 (continued)

Survey Results

Which division do you work?
11 responses

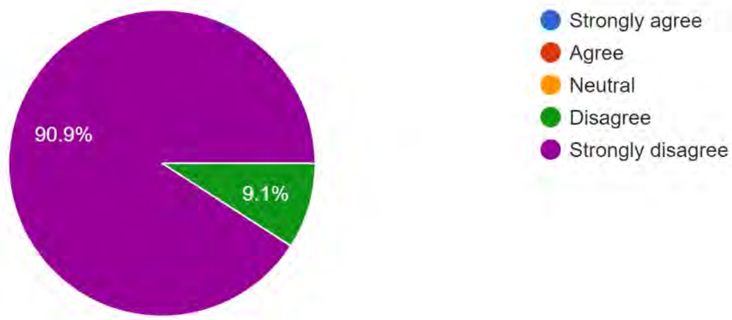


Students with learning disabilities in alternative education do well on the math portion of the CAASPP assessment test.
11 responses



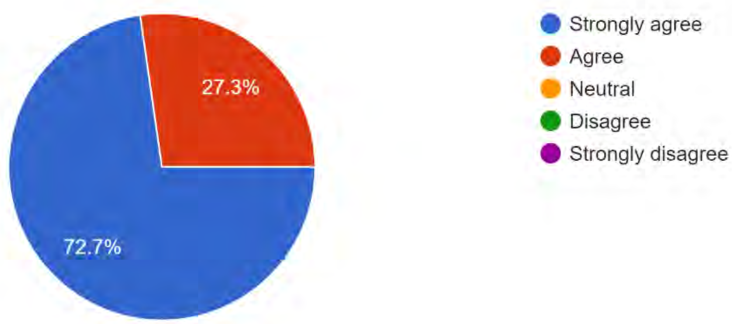
Students with learning disabilities in alternative education score proficient or above on the math portion of the CAASPP assessment.

11 responses

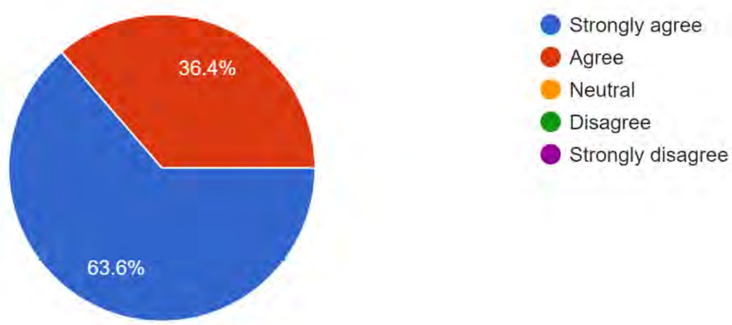


Students with learning disabilities in alternative education score below proficient on the math portion of the CAASPP assessment.

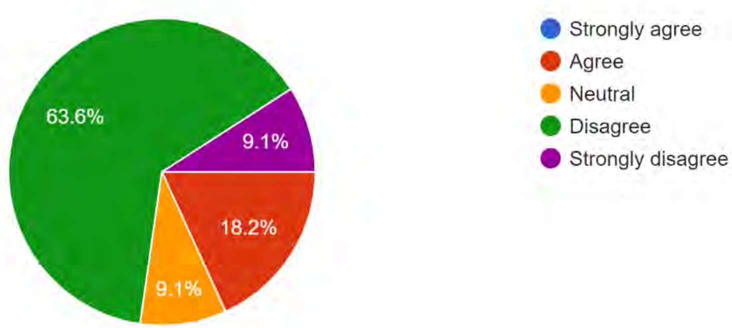
11 responses



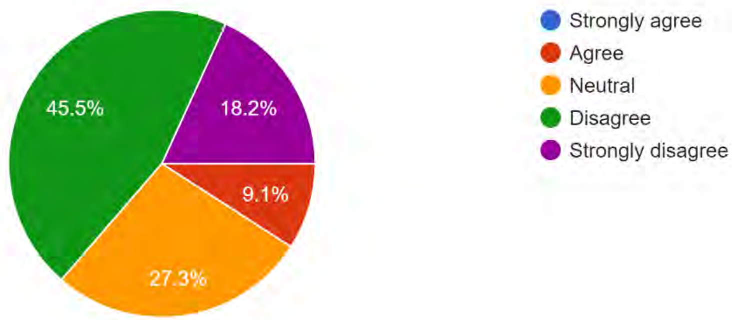
Students with learning disabilities in alternative education score far below proficient on the math portion of the CAASPP assessment.
11 responses



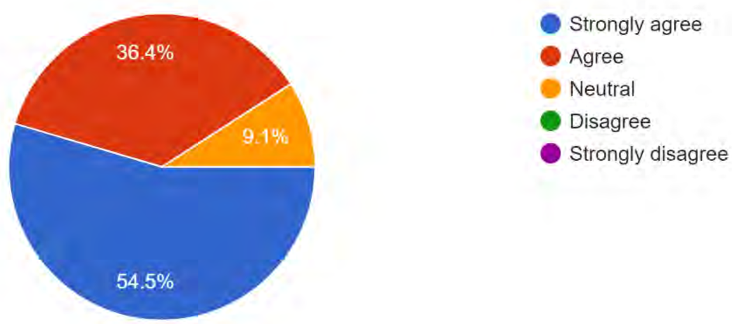
Students with learning disabilities entering alternative education have foundational skills to acquire CAASPP math content.
11 responses



Students with learning disabilities in alternative education have adequate instructional time to prepare for the CAASPP math assessment.
11 responses

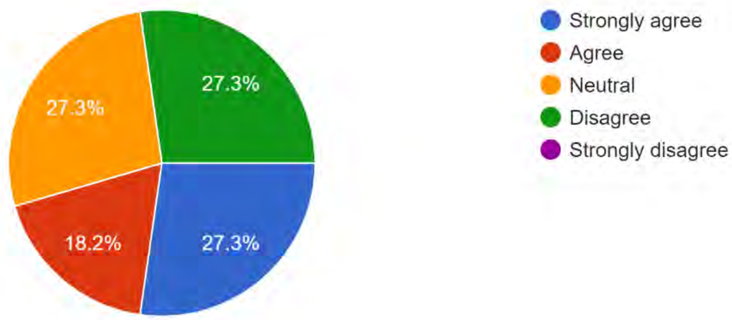


Students with learning disabilities should receive at least one hour of dedicated instructional time daily to learn foundational skills for the CAASPP math assessment.
11 responses



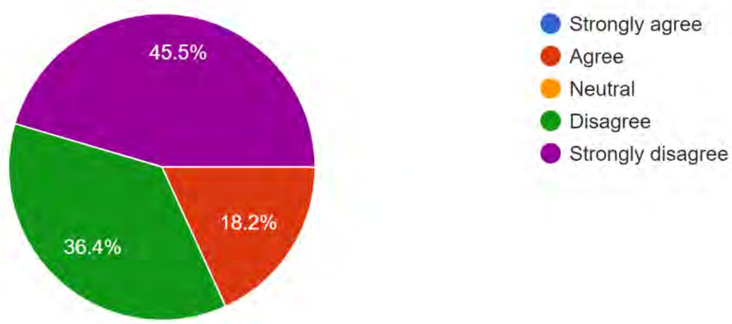
Students with learning disabilities should receive at least two hours of dedicated instructional time daily to learn foundational skills for the CAASPP math assessment.

11 responses

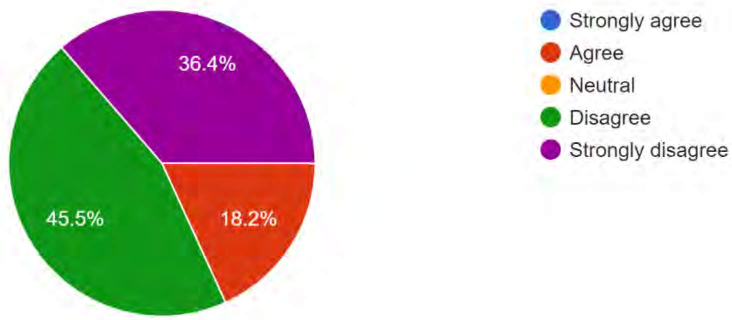


Students with learning disabilities in alternative education come prepared with Algebra 1 concepts addressed in the CAASPP assessment.

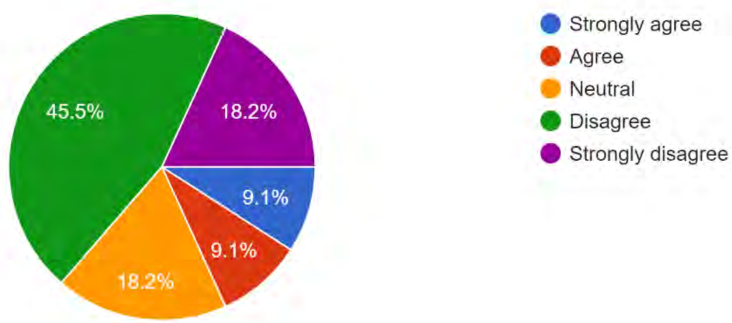
11 responses



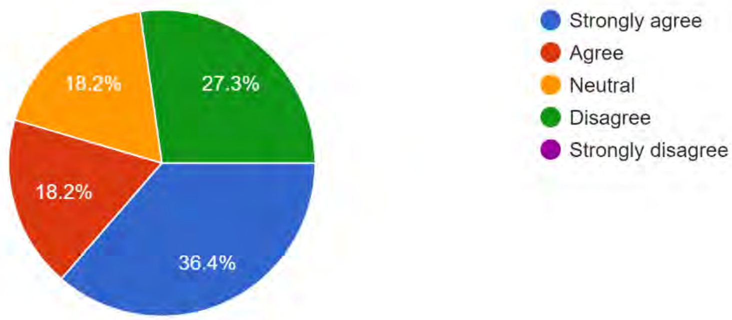
Students with learning disabilities in alternative education understand how to access mathematics instructional material independently.
11 responses



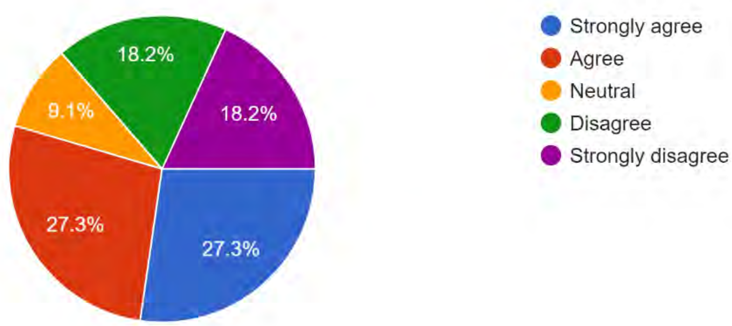
Teachers need a mathematics credential to provide mathematics instruction to support students with learning disabilities in alternative education.
11 responses



Teachers need a background in mathematics to provide mathematics instruction to support students with learning disabilities in alternative education.
11 responses

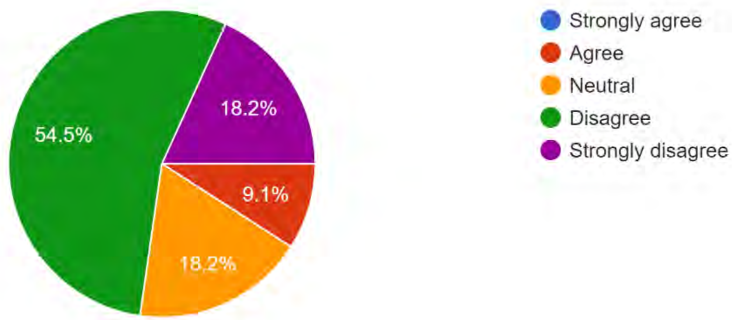


Teachers receive high-quality professional development in administering the CAASPP test.
11 responses



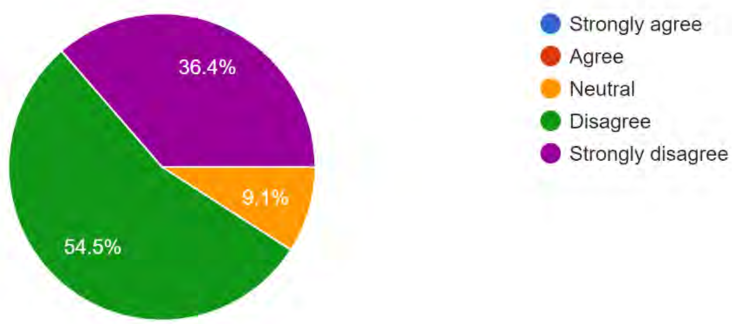
Teachers receive adequate algebra content training to support students with learning disabilities in alternative education.

11 responses



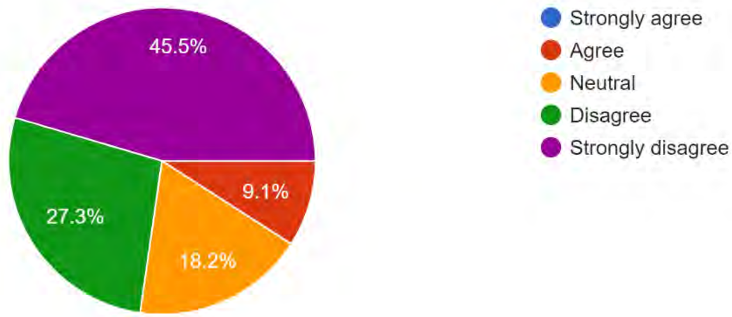
Teachers receive adequate professional development time to collaborate with others on mathematics topics.

11 responses



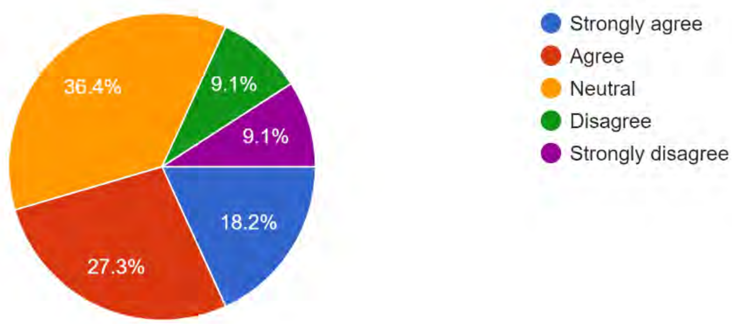
Teachers receive regular training on mathematics curricula throughout the academic year.

11 responses



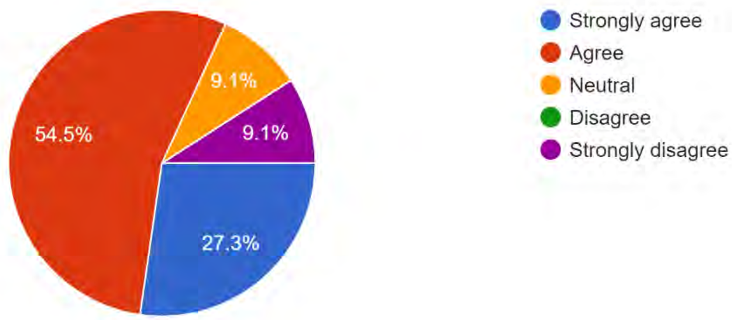
Teachers should receive mathematics training during the summer break.

11 responses



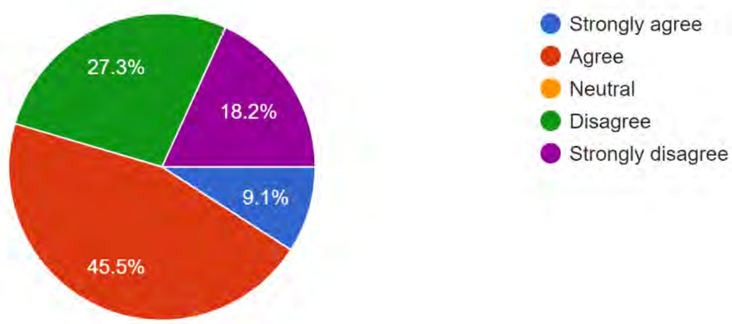
Students with learning disabilities in alternative education have access to technology to support mathematics learning.

11 responses



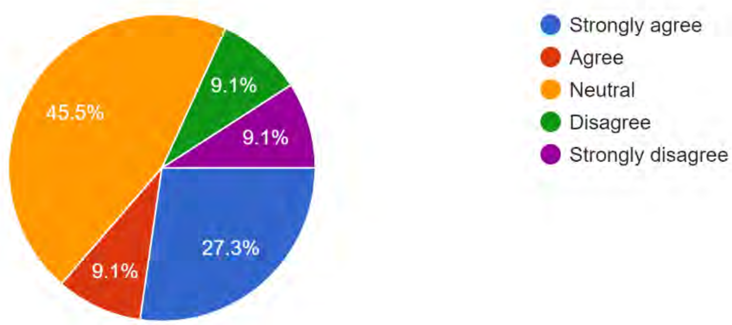
Students with learning disabilities in alternative education understand how to use technology in learning mathematics.

11 responses



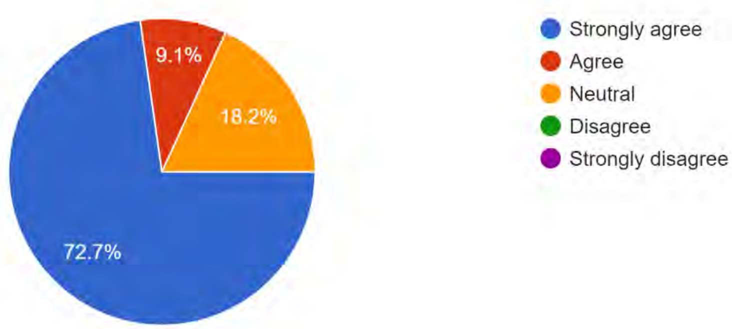
Students with learning disabilities in alternative education prefer paper and pencil over the computer when working on mathematics problems.

11 responses

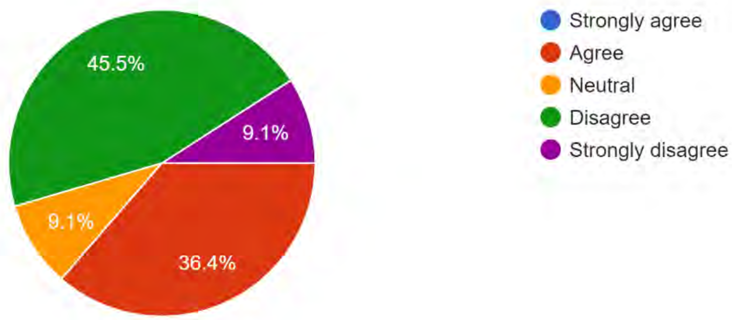


Students with learning disabilities in alternative education prefer direct instruction when learning mathematics.

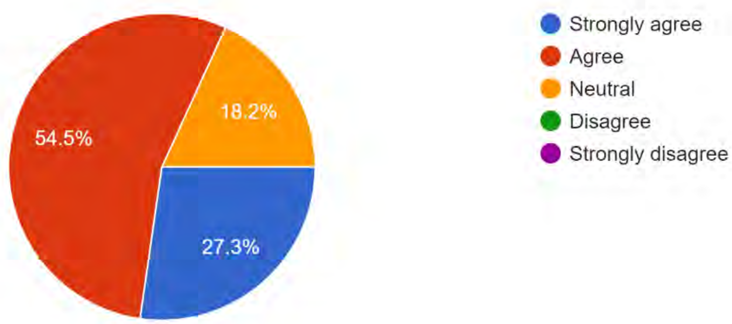
11 responses



Technology hinders the mathematics learning of students with learning disabilities in alternative education.
11 responses

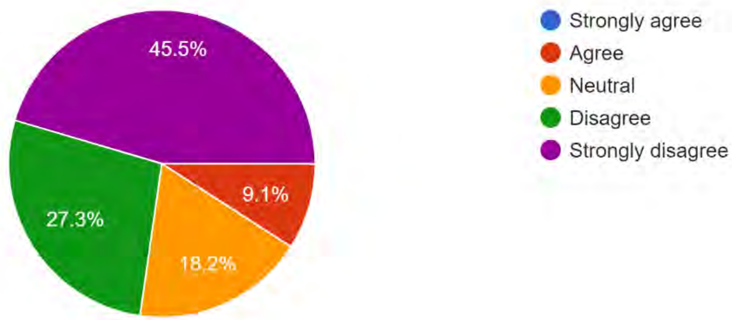


Instructional math videos provide additional support for students with learning disabilities in alternative education.
11 responses



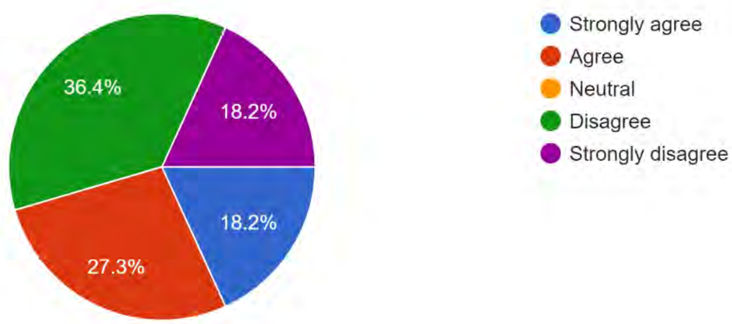
Students with learning disabilities enter the alternative education setting with foundational math skills to learn algebra concepts.

11 responses



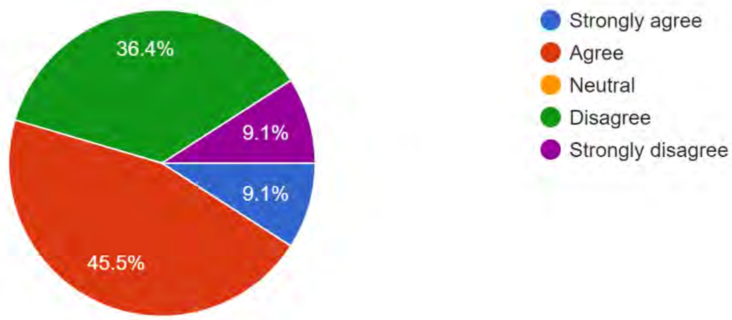
Students with learning disabilities in alternative education possess a proficient understanding of addition.

11 responses



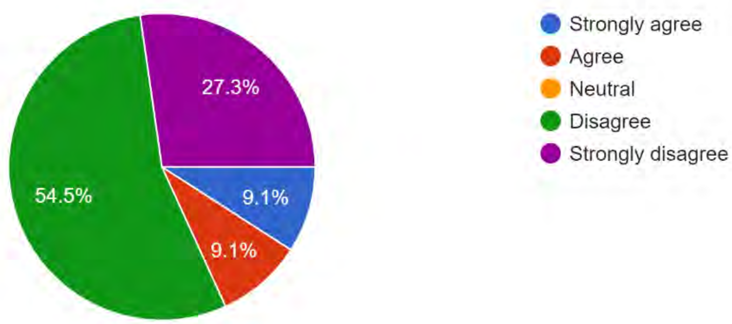
Students with learning disabilities in alternative education possess a proficient understanding of subtraction.

11 responses



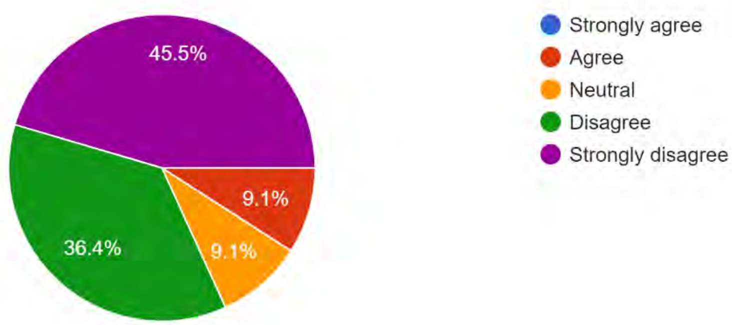
Students with learning disabilities in alternative education possess a proficient understanding of multiplication.

11 responses



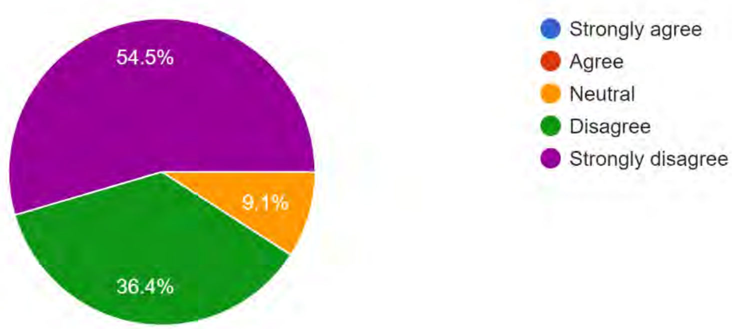
Students with learning disabilities in alternative education possess a proficient understanding of division.

11 responses

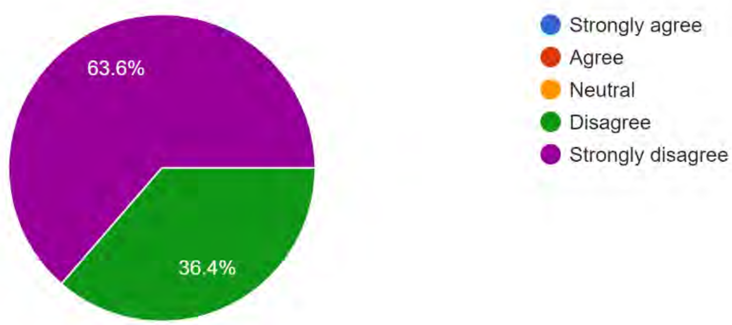


Students with learning disabilities in alternative education possess a proficient understanding of orders of operations.

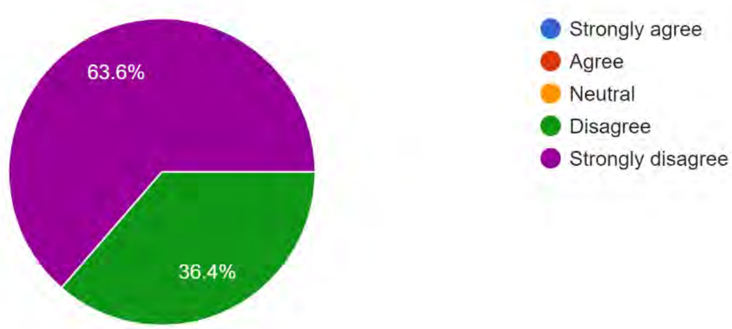
11 responses



Students with learning disabilities in alternative education possess a proficient understanding of ratios and proportions (fractions).
11 responses

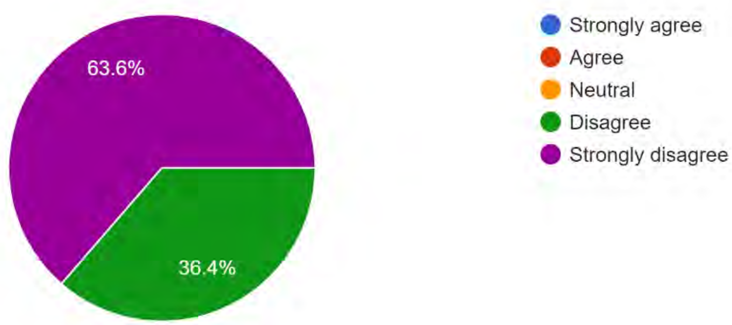


Students with learning disabilities in alternative education possess a proficient understanding of percentages.
11 responses



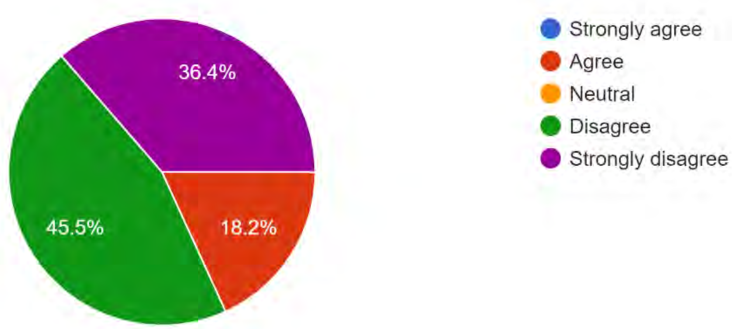
Students with learning disabilities in alternative education possess a proficient understanding of decimals.

11 responses



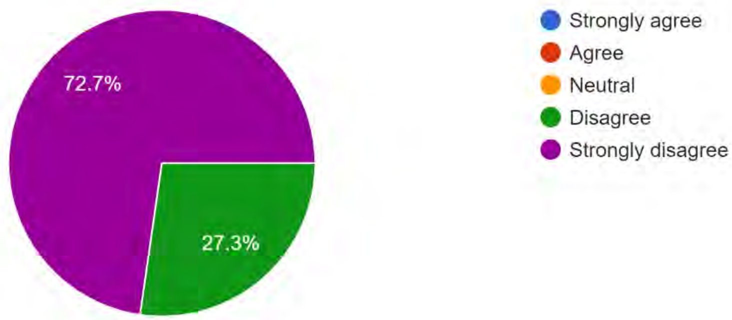
Students with learning disabilities in alternative education possess a proficient understanding of the number system.

11 responses



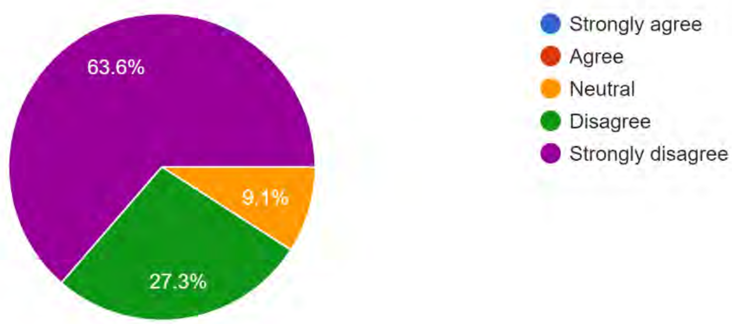
Students with learning disabilities in alternative education possess a proficient understanding of geometry (perimeter and area of a square, rectangle, and triangle).

11 responses

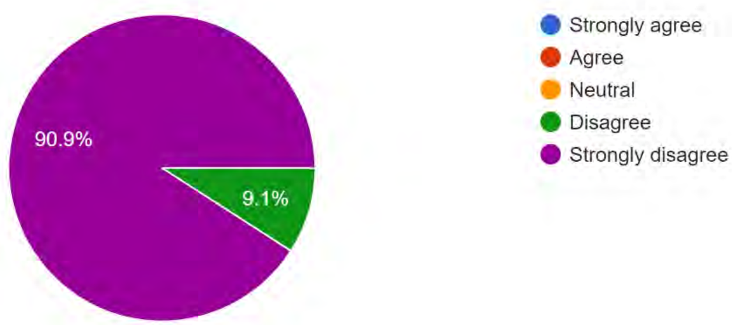


Students with learning disabilities in alternative education possess a proficient understanding of solving basic expressions (2x + 1=7).

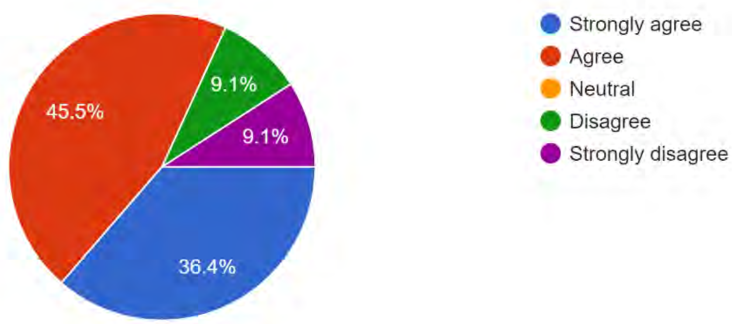
11 responses



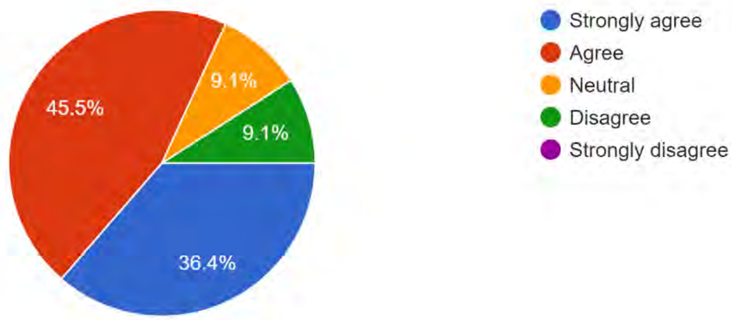
Students with learning disabilities in alternative education possess a proficient understanding of the distributive property (a[b+c] = ab + ac).
11 responses



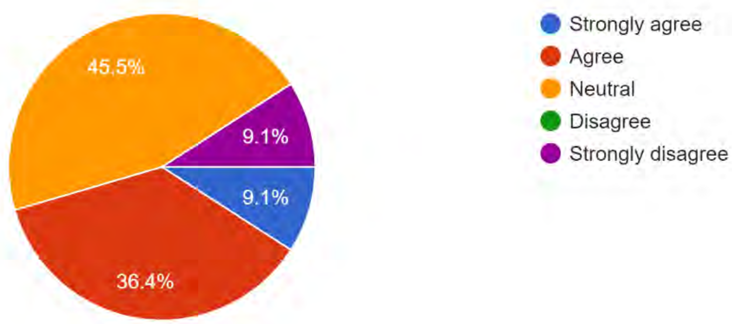
Students with learning disabilities in alternative education should have two consecutive years of mathematics preparation before taking the CAASPP math assessment.
11 responses



Students with learning disabilities in alternative education do not remain enrolled long enough to access mathematics instruction to reach proficiency levels.
11 responses

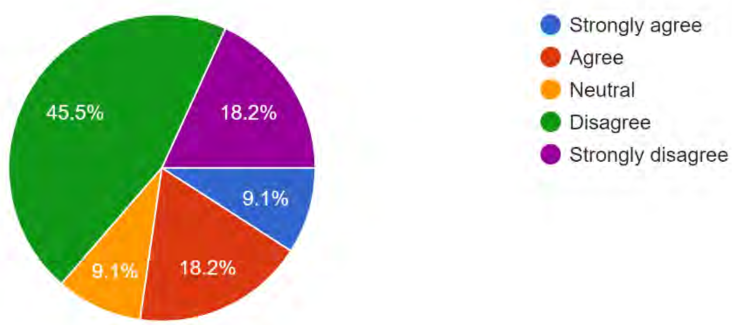


Students with learning disabilities in alternative education should be able to demonstrate algebra proficiency through an alternative measure to the CAASPP.
11 responses



The IEP's specific learning disability (SLD) designation is adequate to provide math instructional guidance for students with learning disabilities in AE settings.

11 responses



Appendix I

Individual Interview Questions (Table 2)

Individual Interview Questions:

Participants will participate in an individual videoconference meeting (Zoom) with the researcher. Questions or statements will be open-ended so participants can provide their responses. Participants will not be interrupted once they begin a response to a question. There is no time limit restriction on their response.

Researcher will read the following statement before the interview begins: "Thank you for your voluntary participation in this study. Please respond to the best of your ability based on your personal experiences."

1. Which division do you work in (court, community, or charter)? Basic information
2. Describe your background in mathematics. Basic information
3. Describe how your students with learning disabilities perform on the CAASSP math assessment. CRQ
4. Describe the foundational math skills your students with learning disabilities have when they enter your program? CRQ
5. Describe the instructional day for your students with learning disabilities. CRQ
6. Describe the mathematics curricula and instructional materials you have access to. SQ1
7. What type of training or professional development on mathematics have you received to support the performance on the CAASPP math test by your students with learning disabilities? SQ1
8. What type of training or professional development do you think teachers should receive to support mathematics instruction for their students with learning disabilities? SQ1

9. What type of math instruction do your students with learning disabilities receive daily? SQ2
10. How does technology support your math instruction? SQ2
11. What type of technology do your students with learning disabilities use in their mathematics learning? SQ2
12. Describe the level of mathematics competency your students with learning disabilities have when they come to your academic program. SQ3
13. What foundational math skills do your students with learning disabilities need for the CAASPP math test? SQ3
14. Describe how the IEP disability designation supports math learning for your students with learning disabilities? SQ3
15. Describe how classroom math instruction competes with other needs of your students with learning disabilities. SQ3
16. What has been your experience with mathematics learning disability? SQ3
17. What has been your experience with dyscalculia? SQ3
18. Why do you feel students with learning disabilities in AE perform below proficiency levels on the math portion of the CAASPP? CR

Appendix J

Student Archival Records (Tables 5-10)

Table 5

Student Records (2016 - 17)

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
406508	Int Math I S1	B	5.00	5.00	1.00
451968	Int Math I S1	C	5.00	5.00	1.00
531650	Int Math I S1	D	5.00	5.00	1.00
531884	Int Math I CP	B	5.00	5.00	1.00
531884	Int Math I CP	C	0.50	5.00	1.00
532200	Int Math I S1	NM	5.00	5.00	1.00
532973	Int Math I S1	C	5.00	5.00	1.00
533503	Int Math I CP	D	5.00	5.00	1.00
533503	Int Math I CP	B	5.00	5.00	1.00
533608	Algebra 1 S1	C	5.00	5.00	1.00
533608	Algebra 1 S2	C	5.00	5.00	1.00
533741	Int Math I S1	B-	5.00	5.00	1.00
533866	Int Math I S1	C	5.00	5.00	1.00
534634	Int Math I CP	D-	1.00	5.00	1.00
531493	Int Math I S1	A	5.00	3.00	1.00
532552	Int Math I S1	C-	3.00	2.50	1.00
532973	Int Math I S1	C	3.00	2.50	1.00
533741	Int Math I S1	A-	4.00	2.50	1.00
406508	Int Math I S1 P	F	0.00	2.00	1.00
407139	Int Math I S1	C	2.00	2.00	1.00
407139	Int Math I S1	C	1.00	2.00	1.00
530336	Int Math I S1	C	2.50	2.00	1.00
531649	Int Math I S1	D	2.00	2.00	1.00

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
531649	Int Math I S1	F	0.50	2.00	1.00
531649	Int Math I S1	F	0.00	2.00	1.00
532552	Int Math I S1	C-	2.00	2.00	1.00
532763	Int Math I S1	D	1.00	2.00	1.00
531493	Int Math I S2	D	5.00	1.00	1.00
534458	Int Math I S2	D	5.00	0.50	1.00
534714	Int Math I S2	D	5.00	0.50	1.00
406508	Integrated Math	C	1.00	0.00	1.00
406508	Integrated Math	C	1.00	0.00	1.00
407139	Int Math I S2	C	2.00	0.00	1.00
407139	Int Math I S2		1.00	0.00	1.00
407139	Integrated Math	NG	0.00	0.00	1.00
407139	Integrated Math	F	0.00	0.00	1.00
420732	Int Math I S2	A	5.00	0.00	1.00
420732	Integrated Math	D	2.00	0.00	1.00
420732	Int Math I S2	C	1.00	0.00	1.00
451968	Int Math I S2	C	5.00	0.00	1.00
531878	Int Math I S2	F	0.00	0.00	1.00
532200	Int Math I S2	C+	1.00	0.00	1.00
532200	Int Math I S2	C	1.00	0.00	1.00
532552	Int Math I S2	C-	3.00	0.00	1.00
532552	Int Math I S2	D	2.00	0.00	1.00
532763	Int Math I S2	C	5.00	0.00	1.00
532973	Int Math I S2	C	5.00	0.00	1.00
533503	Int Math I S2	NM	0.00	0.00	1.00
533648	Integrated Math	C	2.50	0.00	1.00
533648	Integrated Math	C	2.50	0.00	1.00
533903	Int Math I S2	C+	5.00	0.00	1.00
534333	Int Math I S2	F	0.00	0.00	1.00

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
534714	Int Math I S2	D	2.00	0.00	1.00
534738	Int Math I S2	F	0.00	0.00	1.00

Note. Of the 122 student enrollments in the 2016-17 ACSD school year, 58 student enrollments took Algebra 1 related courses through ACSD.

Table 6

Student Records (2017 - 18)

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
457340	Int Math I CP	D	5.00	5.00	1.00
532167	Int Math I S2	C	5.00	5.00	1.00
534926	Int Math 1 CP P	D	5.00	5.00	1.00
534926	Int Math I S1	D	5.00	5.00	1.00
535092	Int Math I CP	D	5.00	5.00	1.00
535197	Int Math I CP	D	5.00	5.00	1.00
540132	Int Math 1 CP P	D	5.00	5.00	1.00
540152	Int Math I CP	C	5.00	5.00	1.00
540369	Int Math I CP	C	5.00	5.00	1.00
540369	Int Math I CP	C	5.00	5.00	1.00
531420	Int Math I CP	D	5.00	3.00	1.00
532655	Int Math I CP	D	2.50	2.50	1.00
532655	Int Math I S1	C-	2.50	2.50	1.00
541126	Int Math 1 CP P	B	5.00	2.50	1.00
541126	Int Math 1 CP P	B	2.50	2.50	1.00
531420	Int Math I CP	D	2.00	2.00	1.00
532655	Int Math I CP	C+	2.00	2.00	1.00
532655	Int Math I S2	C	2.00	2.00	1.00
540152	Int Math I CP	D-	2.00	2.00	1.00

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
417457	Int Math I CP	B	4.00	1.50	1.00
531981	Int Math I CP	B	5.00	1.50	1.00
532259	Int Math I CP	A	5.00	1.50	1.00
532773	Int Math I S1	C-	1.50	1.50	1.00
531981	Int Math I S2	B	5.00	1.00	1.00
532167	Int Math I S1	C-	1.00	1.00	1.00
532773	Int Math I CP	C	1.00	1.00	1.00
532919	Int Math I CP	B	1.00	1.00	1.00
534839	Int Math I S1	D	1.00	1.00	1.00
535176	Int Math I S1	B	1.00	1.00	1.00
541020	Int Math I CP	C	1.00	1.00	1.00
532655	Int Math I CP	C	0.50	0.50	1.00
455760	Int Math I S2	F	0.00	0.00	1.00
457340	Int Math I CP	F	0.00	0.00	1.00
531420	Int Math I S2	F	0.00	0.00	1.00
532919	Int Math I CP	F	5.00	0.00	1.00
533746	Int Math I CP	F	0.00	0.00	1.00
533746	Int Math I S1	NM	0.00	0.00	1.00
533746	Int Math I S1	F	0.00	0.00	1.00
534839	Int Math I CP	F	5.00	0.00	1.00
534839	Int Math I CP	F	5.00	0.00	1.00
535006	Int Math I S1	F	0.00	0.00	1.00

Note. Of the 95 student enrollments in the 2017-18 ACSD school year, 41 student enrollments took Algebra 1 related courses through ACSD.

Table 7

Student Records (2018 - 19)

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
448259	Int Math I S1	D	5.00	5.00	1.00
451413	Int Math I CP	C	5.00	5.00	1.00
455760	Int Math I CP	D	5.00	5.00	1.00
531493	Int Math I CP	C-	5.00	5.00	1.00
531493	Int Math I S2	D	5.00	5.00	1.00
533689	Int Math I CP	B	5.00	5.00	2.00
533903	Int Math I S2	C+	5.00	5.00	1.00
534640	Int Math I CP	A	5.00	5.00	1.00
534640	Int Math I CP	A	5.00	5.00	1.00
534756	Int Math I CP	D-	5.00	5.00	1.00
535073	Int Math I CP	C	5.00	5.00	1.00
535092	Int Math I CP	D	5.00	5.00	1.00
535092	Int Math I CP	D-	5.00	5.00	1.00
535330	Int Math I CP	B	5.00	5.00	1.00
535351	Int Math I CP	D	5.00	5.00	1.00
541501	Int Math I CP	D	5.00	5.00	1.00
541501	Int Math I CP	C	5.00	5.00	1.00
541650	Int Math I CP	D	5.00	5.00	1.00
541650	Int Math I CP	C	5.00	5.00	1.00
542459	Int Math I CP	D-	5.00	5.00	1.00
542652	Int Math I CP	B	5.00	5.00	1.00
542834	Int Math I CP	B-	5.00	5.00	1.00
448259	Int Math 1 CP P	C	4.50	4.50	1.00
533095	Int Math I CP	C-	4.00	4.00	1.00
533689	Int Math I CP	B	5.00	4.00	2.00
541382	Int Math I CP	C	4.00	4.00	1.00

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
541742	Int Math I CP	D-	4.00	4.00	1.00
541020	Integrated Math	D	3.50	3.50	1.00
451941	Int Math I S1 P	C	3.00	3.00	1.00
534511	Int Math 1 CP P	B-	4.00	3.00	1.00
535330	Int Math I CP	C	5.00	3.00	1.00
541149	Int Math I CP	B-	3.00	3.00	1.00
532041	Int Math I CP	D	2.50	2.50	1.00
535073	Int Math I CP	D-	2.50	2.50	1.00
535073	Int Math I CP	B-	2.50	2.50	1.00
541382	Int Math I CP	D	2.50	2.50	1.00
451941	Int Math I S1	D	2.00	2.00	1.00
531975	Int Math I CP	C	2.00	2.00	1.00
532041	Int Math I CP	C	2.00	2.00	1.00
535007	Int Math 1 CP P	A	5.00	2.00	1.00
535229	Int Math I S2	D	2.00	2.00	1.00
541149	Int Math 1 CP P	B	2.00	2.00	1.00
541329	Int Math I CP	A	5.00	2.00	1.00
541382	Int Math I CP	C-	2.00	2.00	1.00
531975	Int Math I CP	C	1.50	1.50	1.00
532041	Int Math I CP	D	2.50	1.50	1.00
532259	Int Math I CP	A	5.00	1.50	1.00
532259	Int Math I CP	A	3.50	1.50	1.00
534399	Int Math I CP	B+	5.00	1.50	1.00
535073	Int Math I CP	C	1.50	1.50	1.00
540011	Int Math I CP	C-	1.50	1.50	1.00
541031	Int Math I CP	D	1.50	1.50	1.00
541329	Int Math I CP	A	1.50	1.50	1.00
532041	Int Math I CP	C	1.00	1.00	1.00
532041	Int Math I S2	B	1.00	1.00	1.00

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
533095	Int Math I CP	A-	1.00	1.00	1.00
534368	Int Math I CP	B	1.00	1.00	1.00
534511	Int Math 1 CP P	B	5.00	1.00	1.00
534634	Int Math I CP	D-	1.00	1.00	1.00
535007	Int Math I CP	A	5.00	1.00	1.00
535073	Int Math I S1	D	1.00	1.00	1.00
535204	Int Math I CP	C-	1.00	1.00	1.00
535204	Int Math I CP	D	1.00	1.00	1.00
535204	Int Math I CP	C	5.00	1.00	1.00
541020	Int Math I CP	C	1.00	1.00	1.00
541031	Int Math I CP	C	1.00	1.00	1.00
541031	Int Math I CP	C-	1.00	1.00	1.00
541501	Int Math I CP	D-	1.00	1.00	1.00
541650	Int Math	D-	1.00	1.00	1.00
542572	Int Math I CP	C	1.00	1.00	1.00
542588	Int Math I CP	D-	1.00	1.00	1.00
448259	Int Math I CP	C	0.50	0.50	1.00
451413	Int Math I CP	B	0.50	0.50	1.00
531975	Int Math I CP	B	5.00	0.50	1.00
531975	Int Math I CP	C	3.50	0.50	1.00
533764	Int Math I CP	B	5.00	0.50	1.00
533764	Int Math I CP	B	1.00	0.50	1.00
541020	Int Math I CP	A-	0.50	0.50	1.00
541380	Int Math I CP	B	0.50	0.50	1.00
541380	Int Math I CP	B-	2.50	0.50	1.00
455760	Int Math I S2	F	0.00	0.00	1.00
530134	Int Math I CP	NM	0.00	0.00	1.00
532041	Int Math I CP	F	0.00	0.00	1.00
532041	Int Math I CP	F	0.00	0.00	1.00

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
532041	Int Math I CP	F	0.00	0.00	1.00
532907	Int Math I CP		10.00	0.00	1.00
533095	Int Math I CP	F	0.00	0.00	1.00
534368	Int Math I CP	F	0.00	0.00	1.00
534368	Int Math I CP	F	5.00	0.00	1.00
534368	Int Math I CP	F	5.00	0.00	1.00
534376	Int Math I CP	F	0.00	0.00	1.00
534376	Int Math I CP	F	0.00	0.00	1.00
534376	Int Math I CP	F	0.00	0.00	1.00
534376	Int Math I CP	F	0.00	0.00	1.00
534376	Int Math I CP	F	0.00	0.00	1.00
534634	Int Math I CP	F	5.00	0.00	1.00
535204	Int Math I CP	F	0.00	0.00	1.00
535351	Int Math I CP	F	5.00	0.00	1.00
541742	Int Math I CP	F	0.00	0.00	1.00
542380	Int Math I CP	F	5.00	0.00	1.00
542588	Int Math I CP	F	0.00	0.00	1.00
542898	Int Math I CP	F	0.00	0.00	1.00
543216	Int Math I CP	F	0.00	0.00	1.00

Note. Of the 277 student enrollments in the ACSD school year, 114 student enrollments took Algebra 1 related courses through ACSD. Student 533689 received a two, which equates to the “nearly met” performance level. This student earned nine out of 10 credits with a semester average grade of a “B.”

Table 8

Student Records (2021 - 22)

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
130153	Int Math I CP	C	5.00	5.00	1.00
534373	Int Math I CP	C+	5.00	5.00	1.00
540621	Int Math I CP	C	5.00	5.00	1.00
541082	Int Math I CP	D	5.00	5.00	1.00
541672	Int Math I CP	D-	5.00	5.00	1.00
541672	Int Math I CP	D	5.00	5.00	1.00
542114	Int Math 1 CP P	C-	5.00	5.00	1.00
542434	Int Math 1 CP P	B	5.00	5.00	1.00
542634	Int Math I CP	D+	5.00	5.00	1.00
542678	Int Math 1 CP P	B	5.00	5.00	1.00
542958	Int Math I CP	D-	5.00	5.00	1.00
543179	Int Math I CP	B-	5.00	5.00	1.00
543199	Int Math I CP	C	5.00	5.00	1.00
543201	Int Math 1 CP P	B	5.00	5.00	1.00
543251	Int Math I CP	D+	5.00	5.00	1.00
543286	Int Math I CP	B-	5.00	5.00	1.00
543603	Int Math I CP	D	5.00	5.00	1.00
543603	Int Math I CP	B-	5.00	5.00	1.00
543815	Int Math I CP	C-	5.00	5.00	1.00
543815	Int Math I CP	C	5.00	5.00	1.00
544942	Int Math 1 CP P	B	5.00	5.00	1.00
545397	Int Math 1 CP P	C	5.00	5.00	1.00
545426	Int Math I CP	C	5.00	5.00	1.00
545496	Int Math I CP	C	5.00	5.00	1.00
546019	Int Math I CP	C-	5.00	5.00	1.00
546122	Int Math I CP	C+	5.00	5.00	1.00

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
546122	Int Math I CP	C+	5.00	5.00	1.00
546165	Int Math I CP	D	5.00	5.00	1.00
546165	Int Math I CP	C-	5.00	5.00	1.00
546436	Int Math I CP	C+	5.00	5.00	1.00
546446	Int Math I CP	A+	5.00	5.00	1.00
546528	Int Math I CP	C	5.00	5.00	1.00
546675	Int Math I CP	A	5.00	5.00	1.00
546785	Int Math I CP	A	5.00	5.00	1.00
546943	Int Math I CP	B	5.00	5.00	1.00
540621	Int Math I CP	B-	4.00	4.00	1.00
544380	Int Math I CP	C-	4.00	4.00	1.00
546055	Int Math I CP	C	3.75	3.75	1.00
130156	Int Math I CP	C	3.50	3.50	1.00
541858	Int Math I CP	C-	3.50	3.50	1.00
543179	Int Math I CP	A	5.00	3.50	1.00
543627	Int Math I CP	D	3.50	3.50	1.00
546171	Int Math I CP	C+	3.50	3.50	1.00
541082	Int Math I CP	C	3.00	3.00	1.00
541672	Int Math I CP	C-	3.00	3.00	1.00
542958	Int Math I CP	A	3.00	3.00	1.00
543286	Int Math I CP	A-	3.00	3.00	1.00
545911	Int Math I CP	C	3.00	3.00	1.00
130155	Int Math I CP	B+	2.75	2.75	1.00
534373	Int Math I CP	A	2.50	2.50	1.00
541858	Int Math I CP	C	3.50	2.50	1.00
543201	Int Math 1 CP P	A	2.50	2.50	1.00
543201	Int Math I CP	A	5.00	2.50	1.00
543286	Int Math I CP	C	2.50	2.50	1.00
543734	Int Math I CP	B+	5.00	2.50	1.00

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
543734	Int Math I CP	A	2.50	2.50	1.00
544964	Int Math I CP	B-	2.50	2.50	1.00
534373	Int Math I CP	B	2.25	2.25	1.00
534373	Int Math I CP	B-	2.00	2.00	1.00
543089	Int Math I CP	C-	2.00	2.00	1.00
543251	Int Math I CP	D-	2.00	2.00	1.00
545911	Int Math I CP	B	5.00	2.00	1.00
546139	Int Math I CP	A-	2.00	2.00	1.00
545598	Int Math I CP	A	5.00	1.75	1.00
545911	Int Math I CP	A-	1.75	1.75	1.00
545911	Int Math I CP	C	5.00	1.75	1.00
130153	Int Math I CP	A	1.50	1.50	1.00
130156	Int Math I CP	B	1.50	1.50	1.00
543179	Int Math I CP	A	1.50	1.50	1.00
543627	Int Math I CP	D-	1.50	1.50	1.00
545908	Int Math I CP	A	1.50	1.50	1.00
545911	Int Math I CP	A	5.00	1.50	1.00
546139	Int Math I CP	A	5.00	1.50	1.00
546171	Int Math I CP	C-	1.50	1.50	1.00
541858	Int Math I CP	B-	1.25	1.25	1.00
544964	Int Math I CP	A-	1.25	1.25	1.00
547122	Int Math I CP	A	1.25	1.25	1.00
130155	Int Math I CP	A	1.00	1.00	1.00
534373	Int Math I CP	D-	2.00	1.00	1.00
540621	Int Math I CP	D	1.00	1.00	1.00
541082	Int Math I CP	B+	5.00	1.00	1.00
541082	Int Math I CP	D	2.00	1.00	1.00
542634	Int Math I CP	D-	1.00	1.00	1.00
542958	Int Math I CP	A	1.00	1.00	1.00

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
543089	Int Math I CP	A	1.00	1.00	1.00
543199	Int Math I CP	D-	1.00	1.00	1.00
543251	Int Math I CP	C	1.00	1.00	1.00
543734	Int Math I CP	B	5.00	1.00	1.00
543734	Int Math I CP	C-	4.00	1.00	1.00
544380	Int Math I CP	A-	1.00	1.00	1.00
545289	Int Math 1 CP P	D	5.00	1.00	1.00
545598	Int Math I CP	A-	5.00	1.00	1.00
545598	Int Math I CP	A-	1.00	1.00	1.00
546055	Int Math I CP	A	5.00	1.00	1.00
546139	Int Math I CP	C	1.00	1.00	1.00
546987	Int Math I CP	A+	1.00	1.00	1.00
130155	Int Math I CP	C	0.75	0.75	1.00
541858	Int Math I CP	B-	0.75	0.75	1.00
543199	Int Math I CP	A	0.75	0.75	1.00
534373	Int Math I CP	A	0.50	0.50	1.00
541858	Int Math I CP	C-	1.00	0.50	1.00
541858	Int Math I CP	D	0.50	0.50	1.00
542114	Int Math I CP	A	5.00	0.50	1.00
543089	Int Math I CP	C	0.50	0.50	1.00
544380	Int Math I CP	D-	0.50	0.50	1.00
544380	Int Math I CP	A	0.50	0.50	1.00
544964	Int Math I CP	A	0.50	0.50	1.00
545289	Int Math 1 CP P	B	4.00	0.50	1.00
545496	Int Math I CP	D	0.50	0.50	1.00
545496	Int Math I CP	C-	0.50	0.50	1.00
534373	Int Math I CP	B-	0.25	0.25	1.00
534373	Int Math I CP	D	0.25	0.25	1.00
543251	Int Math I CP	A	0.25	0.25	1.00

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
546055	Int Math I CP	A-	5.00	0.25	1.00
546139	Int Math I CP	A	0.25	0.25	1.00
547122	Int Math I CP	A+	0.25	0.25	1.00
541672	Int Math I CP	NC	0.00	0.00	1.00
541858	Int Math I CP	F	0.25	0.00	1.00
542634	Int Math I CP	I	0.00	0.00	1.00
543089	Int Math I CP	F	1.00	0.00	1.00
543089	Int Math I CP	F	1.50	0.00	1.00
543179	Int Math I CP	F	0.00	0.00	1.00
543199	Int Math I CP	F	1.00	0.00	1.00
543199	Int Math I CP	NM	1.00	0.00	1.00
543199	Int Math I CP	NM	0.50	0.00	1.00
543199	Int Math I CP	F	0.75	0.00	1.00
543603	Int Math I CP	F	0.00	0.00	1.00
543603	Int Math I CP	F	0.00	0.00	1.00
543627	Int Math I CP	F	0.50	0.00	1.00
543627	Int Math I CP	F	3.50	0.00	1.00
543627	Int Math I CP	F	2.50	0.00	1.00
543627	Int Math I CP	C	0.00	0.00	1.00
545496	Int Math I CP	F	0.25	0.00	1.00
546019	Int Math I CP	NM	5.00	0.00	1.00
546585	Int Math I CP	F	0.00	0.00	1.00

Note. Of the 257 student enrollments in the ACSD school year, 135 student enrollments took Algebra 1 related courses through ACSD.

Table 9

Student Records (2022 - 23)

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
544656	Int Math 1 CP P	B-	5	5	1
544656	Int Math 1 CP P	B-	5	5	1
544656	Int Math I CP	B	5	5	1
544656	Int Math I CP	B	5	5	1
545415	Int Math I CP	B	5	5	1
545415	Int Math I CP	B	5	5	1
545415	Int Math I CP	B	5	5	1
545415	Int Math I CP	B	5	5	1
546105	Int Math I CP	C	5	5	1
546105	Int Math I CP	C	5	5	1
545096	Int Math 1 CP P	A	3	3	1
545096	Int Math I CP	C	3	3	1
545096	Int Math I CP	C-	1	1	1
545600	Int Math I CP	C	4	1	1
545600	Int Math I CP	C	4	1	1
545600	Int Math I CP	C	4	1	1
546202	Int Math 1 CP P	A	1	1	1
543179	Int Math I CP	B-	5	5	1
545600	Int Math I CP	A-	5	5	1
545600	Int Math I CP	A-	5	5	1
545600	Int Math I CP	A-	5	5	1
546307	Int Math I CP	A	5	5	1
546307	Int Math I CP	A	5	5	1
546307	Int Math I CP	A	5	5	1
546307	Int Math I CP	A	5	5	1
547373	Int Math I CP	C	5	5	1

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
547373	Int Math I CP	C	5	5	1
545600	Int Math I CP	B-	4.5	4.5	1
545600	Int Math I CP	B-	4.5	4.5	1
545600	Int Math I CP	B-	4.5	4.5	1
547373	Int Math I CP	C	4	4	1
547373	Int Math I CP	C	4	4	1
543179	Int Math I CP	A	5	3.5	1
548310	Int Math I CP	C	5	2.5	1
548310	Int Math I CP	C	5	2.5	1
545672	Int Math I CP	C	2	2	1
545672	Int Math I CP	C	2	2	1
545672	Int Math I CP	C	2	2	1
547373	Int Math I CP	B	2	2	1
547373	Int Math I CP	B	2	2	1
547378	Int Math I CP	C	5	2	1
543179	Int Math I CP	A	1.5	1.5	1
547378	Int Math I CP	B	5	1.5	1
541307	Int Math I CP	C	1	1	1
541307	Int Math I CP	C-	1	1	1
541307	Int Math I CP	C	1	1	1
541307	Int Math I CP	C-	1	1	1
545672	Int Math I CP	B	1	1	1
545672	Int Math I CP	B	1	1	1
545672	Int Math I CP	B	1	1	1
546109	Int Math I CP	D	1	1	1
546109	Int Math I CP	D	1	1	1
546109	Int Math I CP	D	1	1	1
546109	Int Math I CP	D	1	1	1
547373	Int Math I CP	C	1	1	1

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
547373	Int Math I CP	C	1	1	1
549054	Int Math I CP	C	1	1	1
549054	Int Math I CP	C	1	1	1
545600	Int Math I CP	B	0.5	0.5	1
545600	Int Math I CP	B	0.5	0.5	1
545600	Int Math I CP	B	0.5	0.5	1
547378	Int Math I CP	C	5	0.5	1
549046	Int Math I CP	D	0.5	0.5	1
549046	Int Math I CP	D	0.5	0.5	1
546307	Int Math I CP	D	5	0.25	1
546307	Int Math I CP	D	5	0.25	1
546307	Int Math I CP	D	5	0.25	1
546307	Int Math I CP	D	5	0.25	1
541690	Int Math I CP	A	5	5	1
541690	Int Math I CP	A	5	5	1
543454	Int Math I CP	C-	4.5	4.5	1
543454	Int Math I CP	C-	4.5	4.5	1
547402	Int Math I CP	A	3	3	1
545672	Int Math I CP	C	2.5	2.5	1
545672	Int Math I CP	C	2.5	2.5	1
545672	Int Math I CP	C	2.5	2.5	1
546429	Int Math I CP	C+	2.5	2.5	1
546429	Int Math I CP	C+	2.5	2.5	1
546958	Int Math I CP	B	2.5	2.5	1
546958	Int Math I CP	B	2.5	2.5	1
546958	Int Math I CP	B	2.5	2.5	1
543839	Int Math I CP	B	2.25	2.25	1
543839	Int Math I CP	B	2.25	2.25	1
543839	Int Math I CP	B	2.25	2.25	1

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
546307	Int Math I CP	B	2	2	1
546307	Int Math I CP	B	2	2	1
546307	Int Math I CP	B	2	2	1
546307	Int Math I CP	B	2	2	1
547156	Int Math I CP	B+	5	2	1
547156	Int Math I CP	B+	5	2	1
547402	Int Math I CP	C-	2	2	1
548493	Int Math I CP	C	2	2	1
548493	Int Math I CP	C	2	2	1
548493	Int Math I CP	C	2	2	1
549046	Int Math I CP	A	2	2	1
549046	Int Math I CP	A	2	2	1
546958	Int Math I CP	B	1.5	1.5	1
546958	Int Math I CP	B	1.5	1.5	1
546958	Int Math I CP	B	1.5	1.5	1
547122	Int Math I CP	A	1.5	1.5	1
547156	Int Math I CP	B+	1.5	1.5	1
547156	Int Math I CP	B+	1.5	1.5	1
541307	Int Math I CP	A-	1.25	1.25	1
541307	Int Math I CP	A-	1.25	1.25	1
541690	Int Math I CP	C-	1.25	1.25	1
541690	Int Math I CP	C-	1.25	1.25	1
544426	Int Math I CP	C	1.25	1.25	1
544426	Int Math I CP	C	1.25	1.25	1
547122	Int Math I CP	A	1.25	1.25	1
549013	Int Math I CP	C+	1.25	1.25	1
541307	Int Math I CP	D-	1	1	1
541307	Int Math I CP	C	3	1	1
541307	Int Math I CP	D-	1	1	1

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
541307	Int Math I CP	C	3	1	1
543454	Int Math I CP	B+	1	1	1
543454	Int Math I CP	B+	1	1	1
545672	Int Math I CP	C	1	1	1
545672	Int Math I CP	C	1	1	1
545672	Int Math I CP	C	1	1	1
546958	Int Math I CP	A+	1	1	1
546958	Int Math I CP	A+	1	1	1
546958	Int Math I CP	A+	1	1	1
547156	Int Math I CP	B	1	1	1
547156	Int Math I CP	B	1	1	1
547402	Int Math I CP	B	1	1	1
541690	Int Math I CP	B	0.75	0.75	1
541690	Int Math I CP	C+	0.75	0.75	1
541690	Int Math I CP	B	0.75	0.75	1
541690	Int Math I CP	C+	0.75	0.75	1
543454	Int Math I CP	D-	0.5	0.5	1
543454	Int Math I CP	D-	0.5	0.5	1
545672	Int Math I CP	D-	0.5	0.5	1
545672	Int Math I CP	D-	0.5	0.5	1
545672	Int Math I CP	D-	0.5	0.5	1
546429	Int Math I CP	B-	0.5	0.5	1
546429	Int Math I CP	B-	0.5	0.5	1
547026	Int Math I CP	A+	0.5	0.5	1
547026	Int Math I CP	A+	0.5	0.5	1
547026	Int Math I CP	A+	0.5	0.5	1
549013	Int Math I CP	A	0.5	0.5	1
541307	Int Math I CP	A	0.25	0.25	1
541307	Int Math I CP	C	0.25	0.25	1

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
541307	Int Math I CP	A	0.25	0.25	1
541307	Int Math I CP	C	0.25	0.25	1
543839	Int Math I CP	B	0.25	0.25	1
543839	Int Math I CP	B	0.25	0.25	1
543839	Int Math I CP	B	0.25	0.25	1
546307	Int Math I CP	C	0.25	0.25	1
546307	Int Math I CP	B-	0.25	0.25	1
546307	Int Math I CP	B	0.25	0.25	1
546307	Int Math I CP	C	0.25	0.25	1
546307	Int Math I CP	B-	0.25	0.25	1
546307	Int Math I CP	B	0.25	0.25	1
546307	Int Math I CP	C	0.25	0.25	1
546307	Int Math I CP	B-	0.25	0.25	1
546307	Int Math I CP	B	0.25	0.25	1
546307	Int Math I CP	C	0.25	0.25	1
546307	Int Math I CP	B-	0.25	0.25	1
546307	Int Math I CP	B	0.25	0.25	1
547026	Int Math I CP	A	0.25	0.25	1
547026	Int Math I CP	A	0.25	0.25	1
547026	Int Math I CP	A	0.25	0.25	1
547122	Int Math I CP	A+	0.25	0.25	1
549054	Int Math I CP	C	0.25	0.25	1
549054	Int Math I CP	C	0.25	0.25	1
541307	Int Math I CP	F	0.75	0	1
541307	Int Math I CP	F	0.75	0	1
543454	Int Math I CP	F	1.5	0	1
543454	Int Math I CP	F	0.5	0	1
543454	Int Math I CP	F	0.5	0	1
543454	Int Math I CP	F	1	0	1

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
543454	Int Math I CP	F	5	0	1
543454	Int Math I CP	F	1.5	0	1
543454	Int Math I CP	F	0.5	0	1
543454	Int Math I CP	F	0.5	0	1
543454	Int Math I CP	F	1	0	1
543454	Int Math I CP	F	5	0	1
548317	Int Math I CP	C-	5	5	1
548317	Int Math I CP	C-	5	5	1
547156	Int Math I CP	C	4.57	4.57	1
547156	Int Math I CP	C	4.57	4.57	1
543454	Int Math I CP	C	4	4	1
543454	Int Math I CP	C	4	4	1
541690	Int Math I CP	C	3.75	3.75	1
541690	Int Math I CP	C	3.75	3.75	1
543839	Int Math I CP	C	2.5	2.5	1
543839	Int Math I CP	C	2.5	2.5	1
543839	Int Math I CP	C	2.5	2.5	1
541307	Int Math I CP	C	4.25	2.25	1
541307	Int Math I CP	C	4.25	2.25	1
543454	Int Math I CP	C	5	2	1
543454	Int Math I CP	C	5	2	1
546958	Int Math I CP	B	3.5	2	1
546958	Int Math I CP	B	3.5	2	1
546958	Int Math I CP	B	3.5	2	1
546958	Int Math I CP	B	1.5	1.5	1
546958	Int Math I CP	B	1.5	1.5	1
546958	Int Math I CP	B	1.5	1.5	1
543839	Int Math I CP	B	5	1	1
543839	Int Math I CP	B	5	1	1

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
543839	Int Math I CP	B	5	1	1
546109	Int Math I CP	C	2	1	1
546109	Int Math I CP	C	2	1	1
547156	Int Math I CP	C	0.5	0.5	1
547156	Int Math I CP	C	0.5	0.5	1
546585	Int Math I CP	D-	5	5	1
546171	Int Math I CP	C+	3.5	3.5	1
546171	Int Math I CP	C-	1.5	1.5	1
547254	Int Math I CP	D-	1	1	1
546171	Int Math I CP	F	0	0	1
546171	Int Math I CP	F	0	0	1
546585	Int Math I CP	F	0	0	1
548493	Int Math I CP	F	0	0	1
548493	Int Math I CP	F	0	0	1
548493	Int Math I CP	F	0	0	1
543815	Int Math I CP	C-	5	5	1
543815	Int Math I CP	C	5	5	1
543815	Int Math I CP	C-	5	5	1
543815	Int Math I CP	C	5	5	1
546157	Int Math I CP	B	5	5	1
546157	Int Math I CP	B-	5	5	1
546157	Int Math I CP	B	5	5	1
546157	Int Math I CP	B-	5	5	1
546157	Int Math I CP	B	5	5	1
546157	Int Math I CP	B-	5	5	1
546157	Int Math I CP	B	5	5	1
546157	Int Math I CP	B-	5	5	1
547196	Int Math I CP	B-	5	5	1
547196	Int Math I CP	C+	5	5	1

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
547198	Int Math I CP	C	5	5	1
547198	Int Math I CP	C	5	5	1
547198	Int Math I CP	C	5	5	1
547198	Int Math I CP	C	5	5	1
547198	Int Math I CP	C	5	5	1
547198	Int Math I CP	C	5	5	1
547199	Int Math I CP	C	5	5	1
547199	Int Math I CP	C	5	5	1
547199	Int Math I CP	C	5	5	1
547314	Int Math I CP	C-	5	5	1
547314	Int Math	F	0	0	1
548041	Int Math	B	0	0	1
548041	Int Math	B	0	0	1
546193	Int Math I CP	C+	5	5	1
546528	Int Math I CP	C	5	5	1
548765	Int Math I CP	D+	5	5	1
548765	Int Math I CP	D+	5	5	1
546193	Int Math I CP	C+	5	1	1
546193	Int Math I CP	F	3	0	1
546193	Int Math I CP	F	5	0	1
546193	Int Math I CP	F	5	0	1
546528	Int Math I CP	F	3	0	1
547199	Int Math I CP	B	5	5	1
547199	Int Math I CP	B	5	5	1
547199	Int Math I CP	B	5	5	1
547198	Int Math I CP	B	2.5	2.5	1
547198	Int Math I CP	B	2.5	2.5	1
547198	Int Math I CP	B	2.5	2.5	1
547198	Int Math I CP	B	2.5	2.5	1

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
547198	Int Math I CP	B	2.5	2.5	1
547198	Int Math I CP	B	2.5	2.5	1
547199	Int Math I CP	B+	2.5	2.5	1
547199	Int Math I CP	B+	2.5	2.5	1
547199	Int Math I CP	B+	2.5	2.5	1
547998	Int Math I CP	C+	2.5	2.5	1
547998	Int Math I CP	C+	2.5	2.5	1
547998	Int Math I CP	C+	2.5	2.5	1
547998	Int Math I CP	C+	2.5	2.5	1
546157	Int Math I CP	A-	5	5	1
546157	Int Math I CP	C-	5	5	1
546157	Int Math I CP	A-	5	5	1
546157	Int Math I CP	C-	5	5	1
546157	Int Math I CP	A-	5	5	1
546157	Int Math I CP	C-	5	5	1
546157	Int Math I CP	A-	5	5	1
546157	Int Math I CP	C-	5	5	1
546785	Int Math I CP	A	5	5	1
546785	Int Math I CP	A	5	5	1
547026	Int Math I CP	C	5	5	1
547026	Int Math I CP	D	5	5	1
547026	Int Math I CP	C	5	5	1
547026	Int Math I CP	D	5	5	1
547026	Int Math I CP	C	5	5	1
547026	Int Math I CP	D	5	5	1
547030	Int Math I CP	B-	5	5	1
547030	Int Math I CP	D	5	5	1
547030	Int Math I CP	B-	5	5	1
547030	Int Math I CP	D	5	5	1

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
547030	Int Math I CP	B-	5	5	1
547030	Int Math I CP	D	5	5	1
548490	Int Math I CP	C	2	2	1
543179	Int Math I CP	F	0	0	1
546109	Int Math I CP	F	0	0	1
546109	Int Math I CP	F	0	0	1

Note. Of the 538 student enrollments in the ACSD school year, 293 student enrollments took Algebra 1 related courses through ACSD.

Table 10

Student Earning 5 Credits or More With Grade D- or Higher (2016-2023)

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
543104	Int Math III CP	B	10.00	10.00	1.00
533689	Int Math II CP	A	5.00	5.00	2.00
534640	Int Math I CP	A	5.00	5.00	1.00
534640	Int Math I CP	A	5.00	5.00	1.00
546675	Int Math I CP	A	5.00	5.00	1.00
546785	Int Math I CP	A	5.00	5.00	1.00
534155	Integ Math II S	A-	5.00	5.00	1.00
546446	Int Math I CP	A+	5.00	5.00	1.00
406508	Int Math I S1	B	5.00	5.00	1.00
531884	Int Math I CP	B	5.00	5.00	1.00
533503	Int Math I CP	B	5.00	5.00	1.00
533689	Int Math I CP	B	5.00	5.00	2.00
535330	Int Math I CP	B	5.00	5.00	1.00
542434	Int Math 1 CP P	B	5.00	5.00	1.00
542652	Int Math I CP	B	5.00	5.00	1.00
542678	Int Math 1 CP P	B	5.00	5.00	1.00
543104	Int Math II CP	B	5.00	5.00	1.00
543201	Int Math 1 CP P	B	5.00	5.00	1.00
544942	Int Math 1 CP P	B	5.00	5.00	1.00
546943	Int Math I CP	B	5.00	5.00	1.00
544656	Int Math I CP	B	5	5	1
544656	Int Math I CP	B	5	5	1
545415	Int Math I CP	B	5	5	1
545415	Int Math I CP	B	5	5	1
545415	Int Math I CP	B	5	5	1

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
545415	Int Math I CP	B	5	5	1
533741	Int Math I S1	B-	5.00	5.00	1.00
542834	Int Math I CP	B-	5.00	5.00	1.00
543179	Int Math I CP	B-	5.00	5.00	1.00
543286	Int Math I CP	B-	5.00	5.00	1.00
543603	Int Math I CP	B-	5.00	5.00	1.00
544656	Int Math 1 CP P	B-	5	5	1
544656	Int Math 1 CP P	B-	5	5	1
534155	Integ Math II S	B+	5.00	5.00	1.00
130153	Int Math I CP	C	5.00	5.00	1.00
451413	Int Math I CP	C	5.00	5.00	1.00
451968	Int Math I S1	C	5.00	5.00	1.00
531884	Int Math I CP	C	0.50	5.00	1.00
532167	Int Math I S2	C	5.00	5.00	1.00
532973	Int Math I S1	C	5.00	5.00	1.00
533608	Algebra 1 S1	C	5.00	5.00	1.00
533608	Algebra 1 S2	C	5.00	5.00	1.00
533866	Int Math I S1	C	5.00	5.00	1.00
535073	Int Math I CP	C	5.00	5.00	1.00
535229	Integ Math II S	C	5.00	5.00	1.00
540152	Int Math I CP	C	5.00	5.00	1.00
540369	Int Math I CP	C	5.00	5.00	1.00
540369	Int Math I CP	C	5.00	5.00	1.00
540621	Int Math I CP	C	5.00	5.00	1.00
541501	Int Math I CP	C	5.00	5.00	1.00
541650	Int Math I CP	C	5.00	5.00	1.00
543104	Int Math II CP	C	5.00	5.00	1.00
543162	Int Math II CP	C	5.00	5.00	1.00

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
543199	Int Math I CP	C	5.00	5.00	1.00
543815	Int Math I CP	C	5.00	5.00	1.00
545397	Int Math 1 CP P	C	5.00	5.00	1.00
545426	Int Math I CP	C	5.00	5.00	1.00
545496	Int Math I CP	C	5.00	5.00	1.00
546528	Int Math I CP	C	5.00	5.00	1.00
546105	Int Math I CP	C	5	5	1
546105	Int Math I CP	C	5	5	1
531493	Int Math I CP	C-	5.00	5.00	1.00
542114	Int Math 1 CP P	C-	5.00	5.00	1.00
543815	Int Math I CP	C-	5.00	5.00	1.00
546019	Int Math I CP	C-	5.00	5.00	1.00
546165	Int Math I CP	C-	5.00	5.00	1.00
533903	Int Math I S2	C+	5.00	5.00	1.00
534373	Int Math I CP	C+	5.00	5.00	1.00
546122	Int Math I CP	C+	5.00	5.00	1.00
546122	Int Math I CP	C+	5.00	5.00	1.00
546436	Int Math I CP	C+	5.00	5.00	1.00
448259	Int Math I S1	D	5.00	5.00	1.00
455760	Int Math I CP	D	5.00	5.00	1.00
457340	Int Math I CP	D	5.00	5.00	1.00
531493	Int Math I S2	D	5.00	5.00	1.00
531650	Int Math I S1	D	5.00	5.00	1.00
533503	Int Math I CP	D	5.00	5.00	1.00
534333	Integ Math II S	D	5.00	5.00	1.00
534926	Int Math 1 CP P	D	5.00	5.00	1.00
534926	Int Math I S1	D	5.00	5.00	1.00
535092	Int Math I CP	D	5.00	5.00	1.00

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
535092	Int Math I CP	D	5.00	5.00	1.00
535197	Int Math I CP	D	5.00	5.00	1.00
535351	Int Math I CP	D	5.00	5.00	1.00
540132	Int Math 1 CP P	D	5.00	5.00	1.00
541082	Int Math I CP	D	5.00	5.00	1.00
541501	Int Math I CP	D	5.00	5.00	1.00
541650	Int Math I CP	D	5.00	5.00	1.00
541672	Int Math I CP	D	5.00	5.00	1.00
543603	Int Math I CP	D	5.00	5.00	1.00
546165	Int Math I CP	D	5.00	5.00	1.00
534634	Int Math I CP	D-	1.00	5.00	1.00
534756	Int Math I CP	D-	5.00	5.00	1.00
535092	Int Math I CP	D-	5.00	5.00	1.00
541672	Int Math I CP	D-	5.00	5.00	1.00
542459	Int Math I CP	D-	5.00	5.00	1.00
542958	Int Math I CP	D-	5.00	5.00	1.00
542634	Int Math I CP	D+	5.00	5.00	1.00
543251	Int Math I CP	D+	5.00	5.00	1.00
532200	Int Math I S1	NM	5.00	5.00	1.00

Note. Of the 358 student enrollments in the ACSD from the 2016-17, 2017-18, 2018-2019, 2021-22, and 2022-23 school years, 100 student enrollments earned 10 credits (a full year of Algebra 1 instruction) and earned a grade of D- or higher, which equates to meeting the CA high algebra graduation requirement. Among these students, only one student scored a two, which equates to the “nearly met” level on the CAASPP math assessment.

Appendix K

Verification of Interview Transcription

Dear Participant,

Thank you for your participation in the individual interview. Attached is a copy of the transcription of that interview. Please respond to this email confirming that you have received the written transcription. Please document any changes to the transcription as a "comment." If you do not have any comments to the transcription, please note that in the response email. If after two weeks I do not receive confirmation from you, that will constitute acceptance of the transcript.

If you have any questions or comments, I can be reached at [redacted].

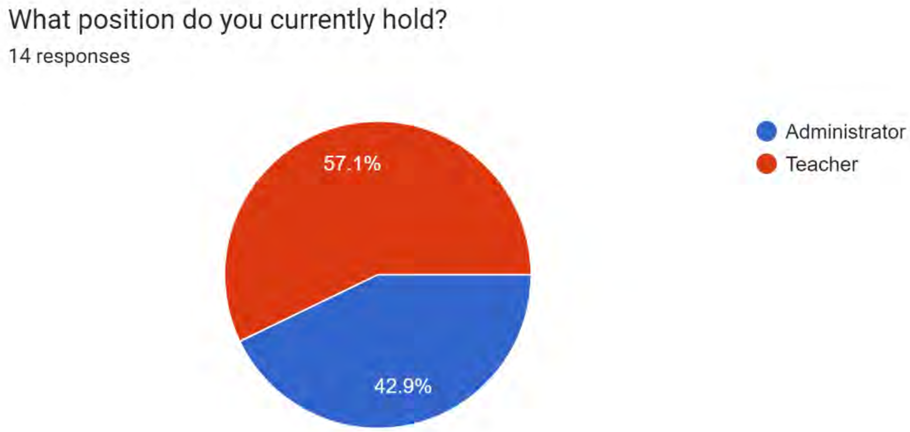
Sincerely,

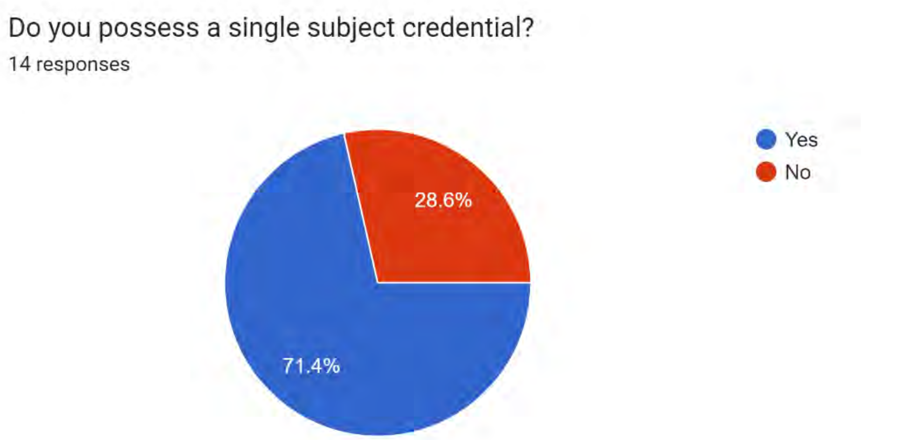
D. Sung Choe
Doctoral Candidate
[redacted]

Attachment: Written transcript

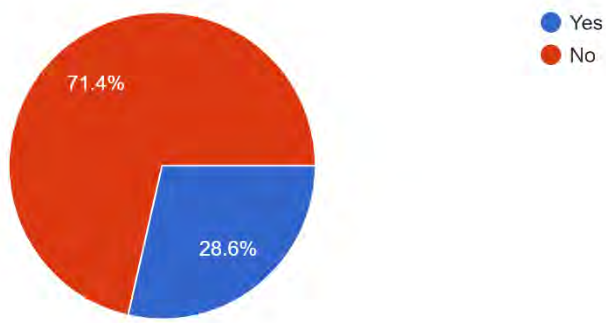
Appendix L

Screening Results

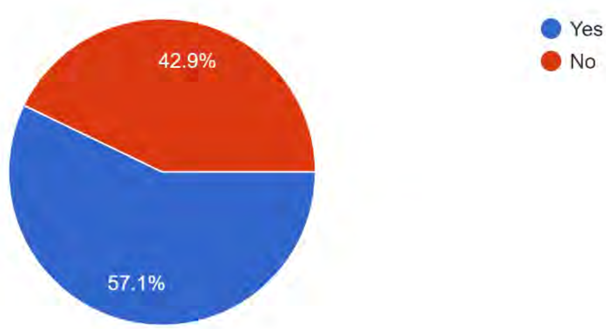




Do you possess a mathematics credential or mathematics-added authorization?
14 responses

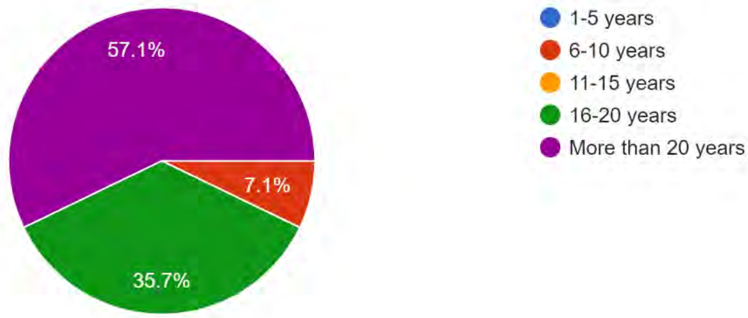


Do you possess a multiple-subject credential?
14 responses



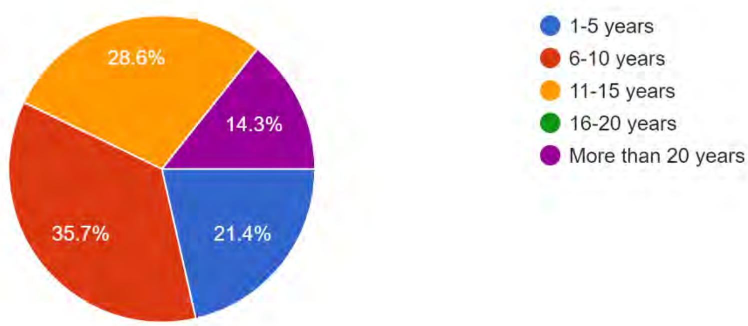
How long have you been in the teaching profession?

14 responses



How long have you worked in alternative education?

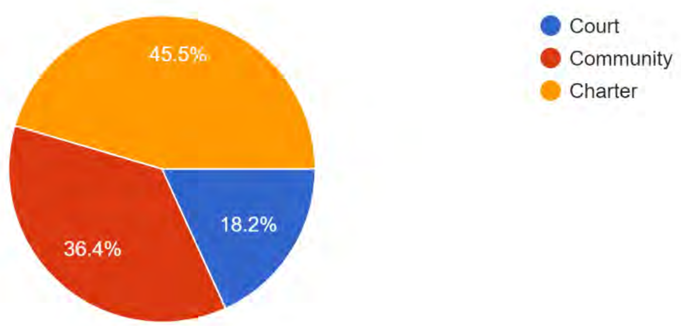
14 responses



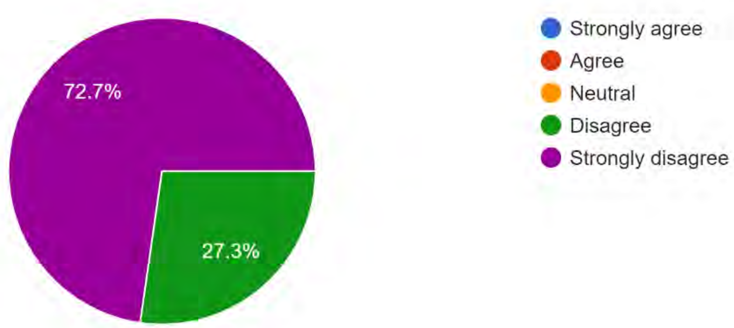
Appendix M

Survey Results

Which division do you work?
11 responses

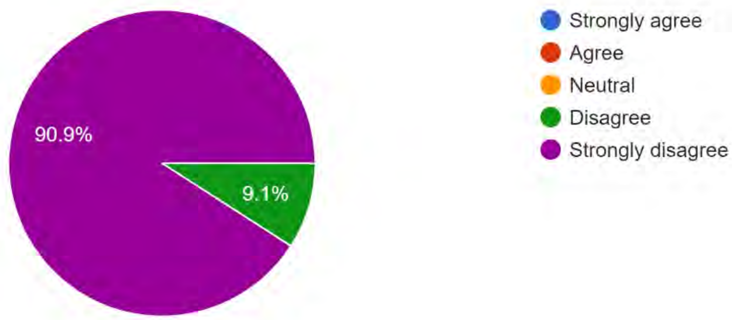


Students with learning disabilities in alternative education do well on the math portion of the CAASPP assessment test.
11 responses



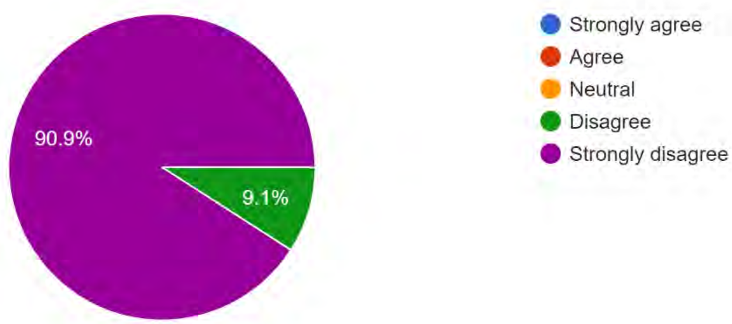
Students with learning disabilities in alternative education score proficient or above on the math portion of the CAASPP assessment.

11 responses

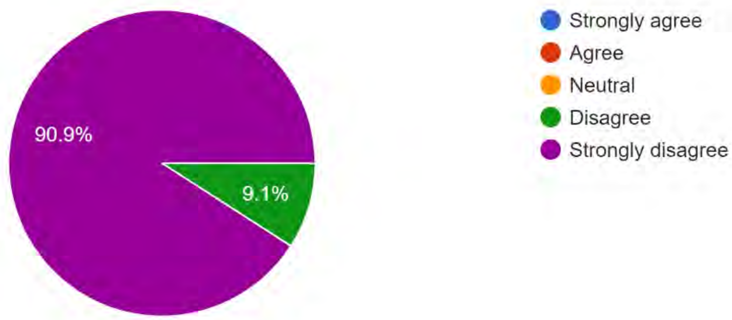


Students with learning disabilities in alternative education score proficient or above on the math portion of the CAASPP assessment.

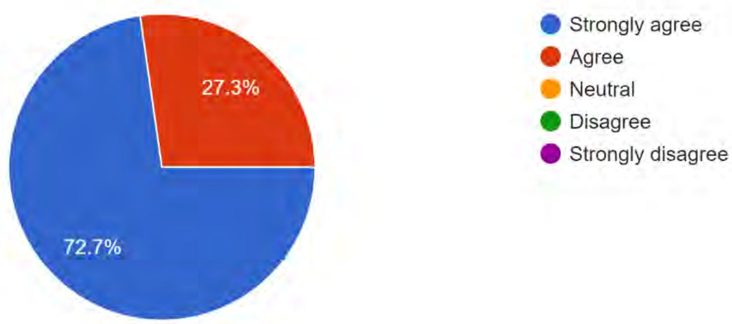
11 responses



Students with learning disabilities in alternative education score proficient or above on the math portion of the CAASPP assessment.
11 responses

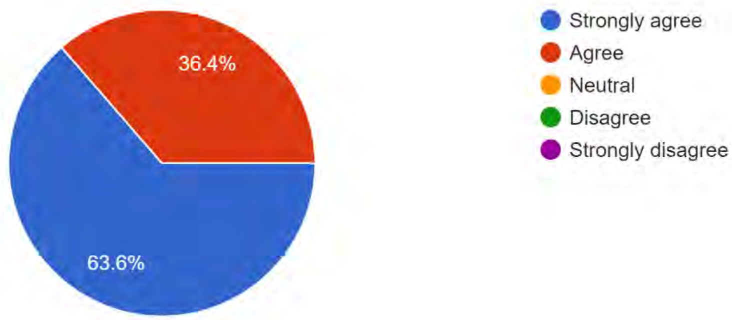


Students with learning disabilities in alternative education score below proficient on the math portion of the CAASPP assessment.
11 responses



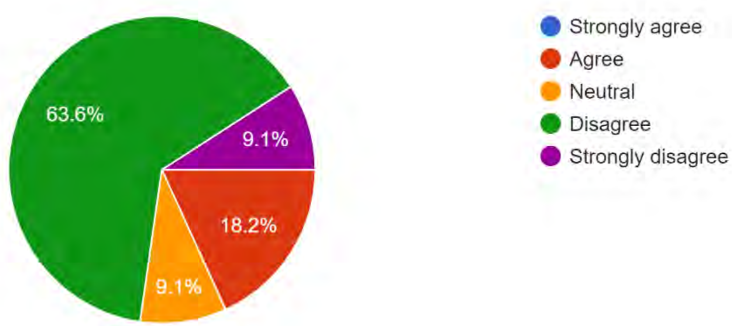
Students with learning disabilities in alternative education score far below proficient on the math portion of the CAASPP assessment.

11 responses

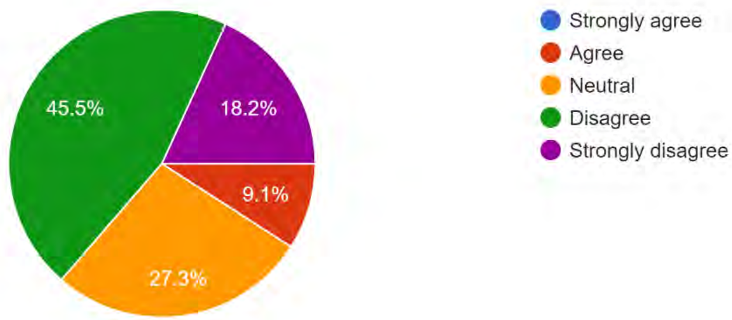


Students with learning disabilities entering alternative education have foundational skills to acquire CAASPP math content.

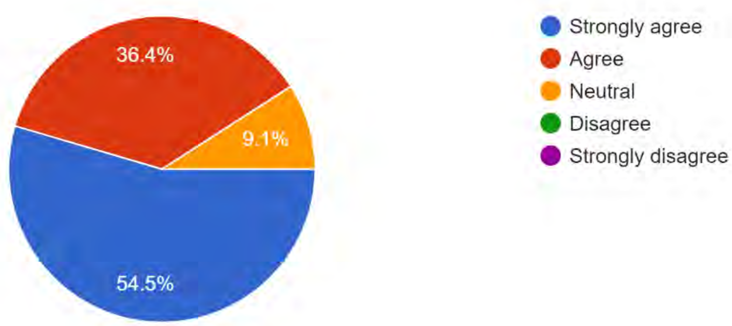
11 responses



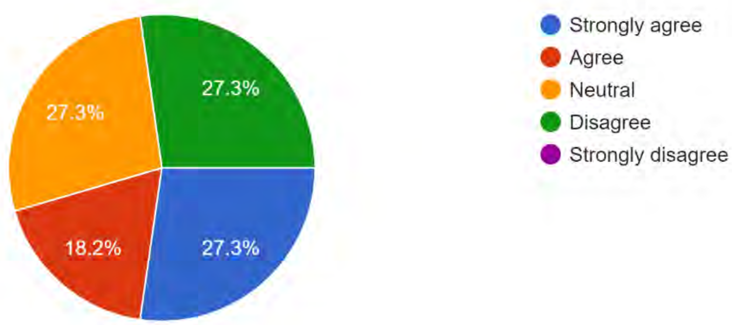
Students with learning disabilities in alternative education have adequate instructional time to prepare for the CAASPP math assessment.
11 responses



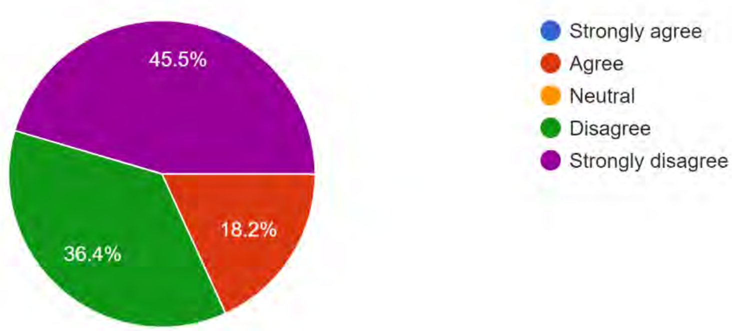
Students with learning disabilities should receive at least one hour of dedicated instructional time daily to learn foundational skills for the CAASPP math assessment.
11 responses



Students with learning disabilities should receive at least two hours of dedicated instructional time daily to learn foundational skills for the CAASPP math assessment.
11 responses

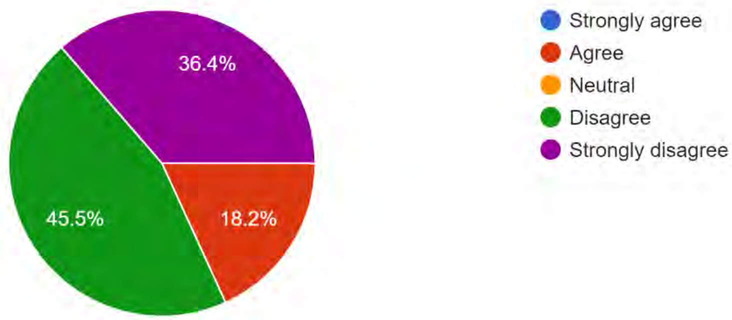


Students with learning disabilities in alternative education come prepared with Algebra 1 concepts addressed in the CAASPP assessment.
11 responses



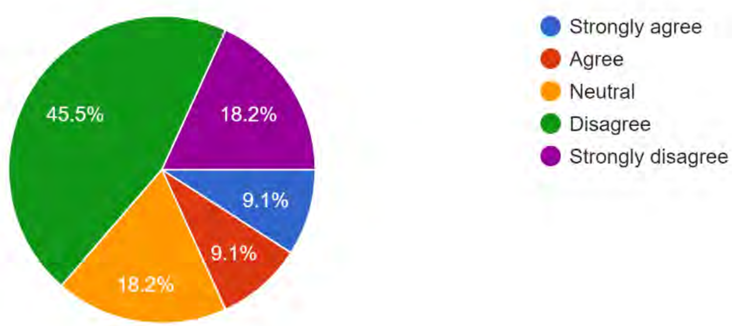
Students with learning disabilities in alternative education understand how to access mathematics instructional material independently.

11 responses



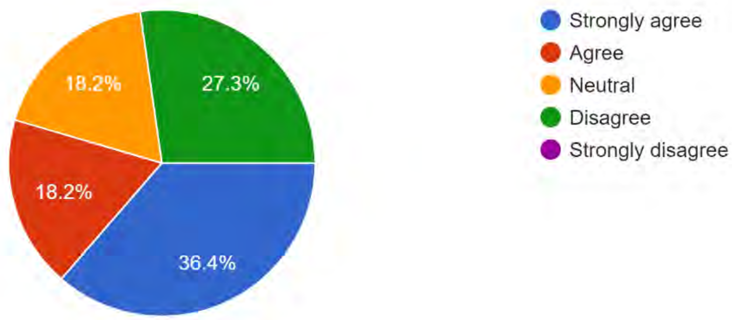
Teachers need a mathematics credential to provide mathematics instruction to support students with learning disabilities in alternative education.

11 responses



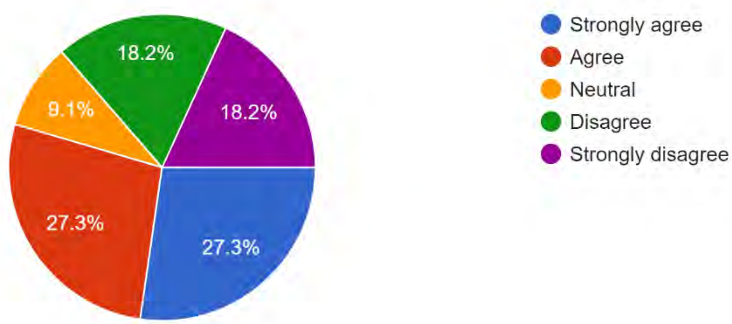
Teachers need a background in mathematics to provide mathematics instruction to support students with learning disabilities in alternative education.

11 responses



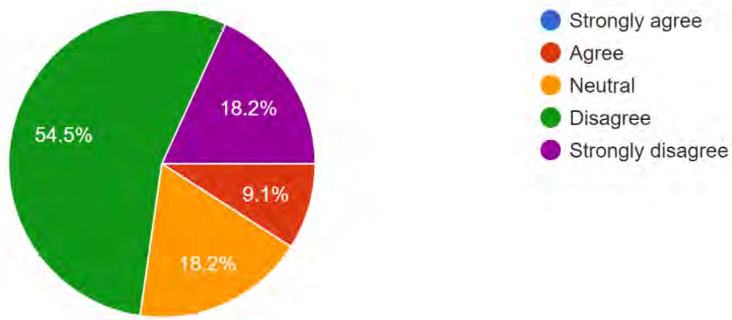
Teachers receive high-quality professional development in administering the CAASPP test.

11 responses



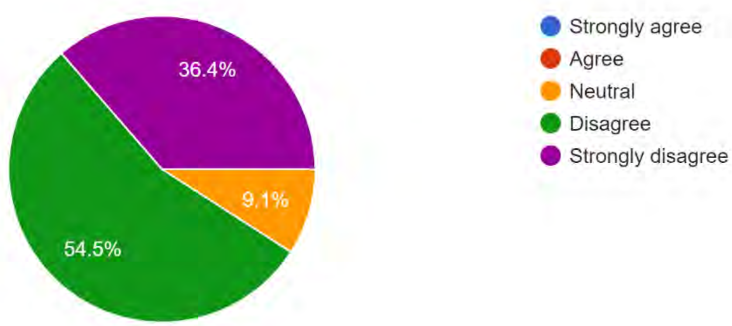
Teachers receive adequate algebra content training to support students with learning disabilities in alternative education.

11 responses

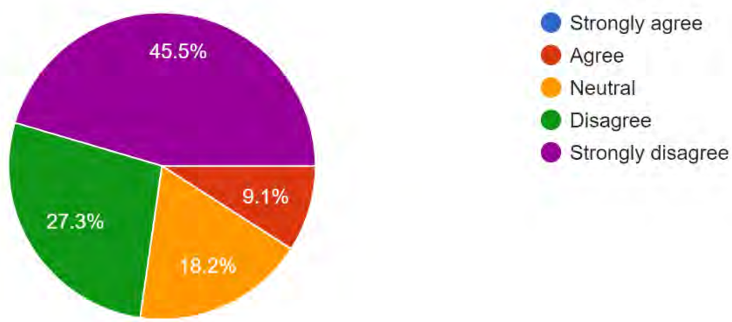


Teachers receive adequate professional development time to collaborate with others on mathematics topics.

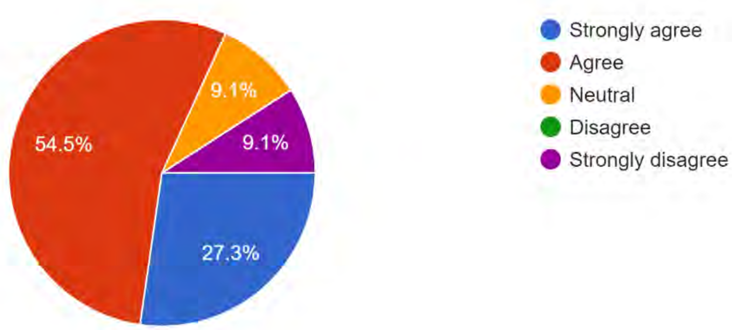
11 responses



Teachers receive regular training on mathematics curricula throughout the academic year.
11 responses

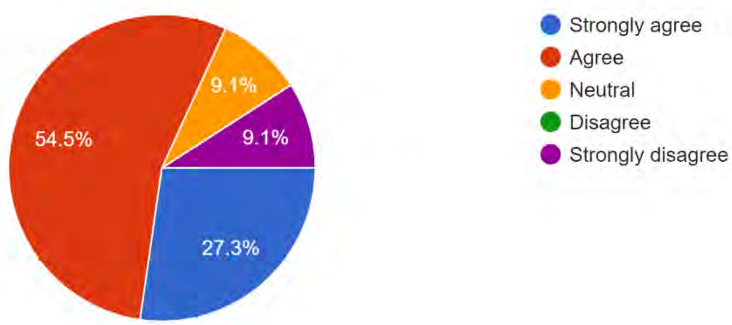


Students with learning disabilities in alternative education have access to technology to support mathematics learning.
11 responses



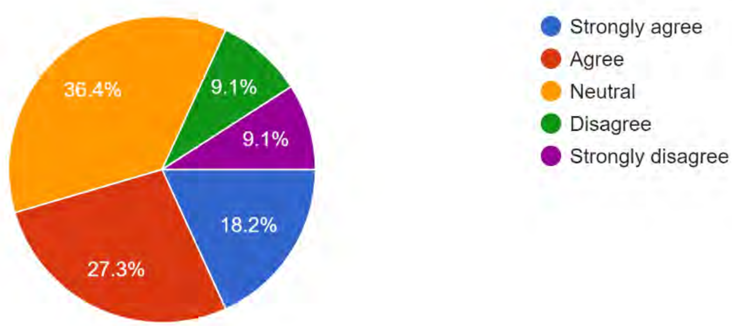
Students with learning disabilities in alternative education have access to technology to support mathematics learning.

11 responses



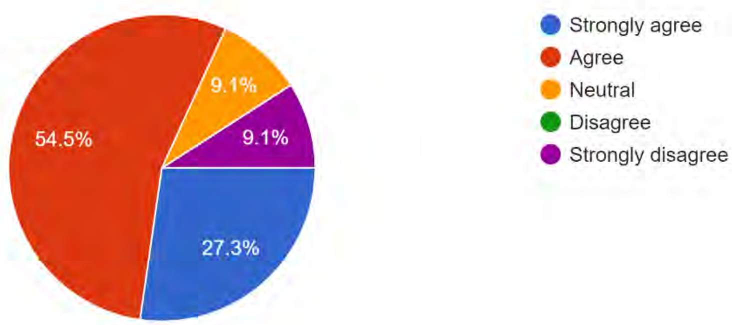
Teachers should receive mathematics training during the summer break.

11 responses



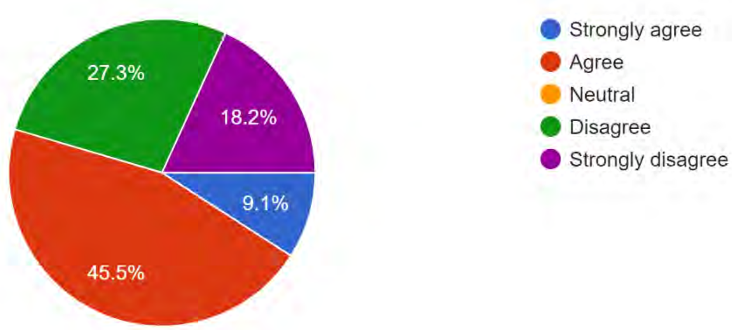
Students with learning disabilities in alternative education have access to technology to support mathematics learning.

11 responses



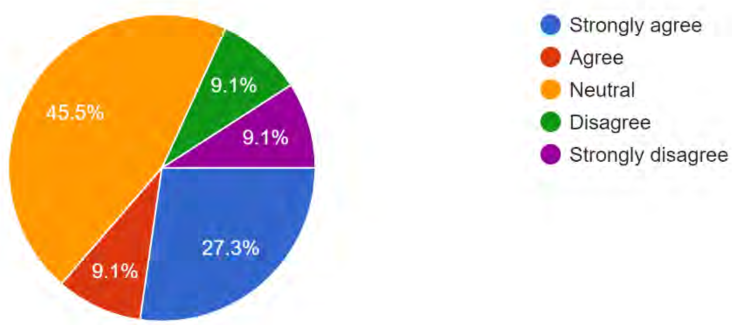
Students with learning disabilities in alternative education understand how to use technology in learning mathematics.

11 responses



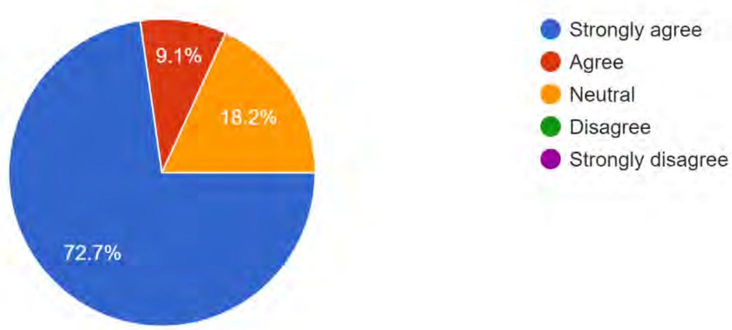
Students with learning disabilities in alternative education prefer paper and pencil over the computer when working on mathematics problems.

11 responses



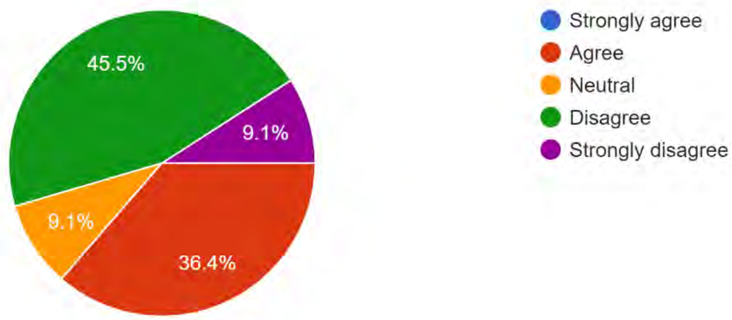
Students with learning disabilities in alternative education prefer direct instruction when learning mathematics.

11 responses



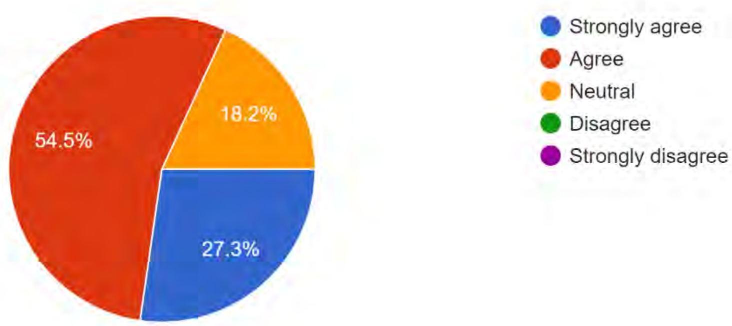
Technology hinders the mathematics learning of students with learning disabilities in alternative education.

11 responses



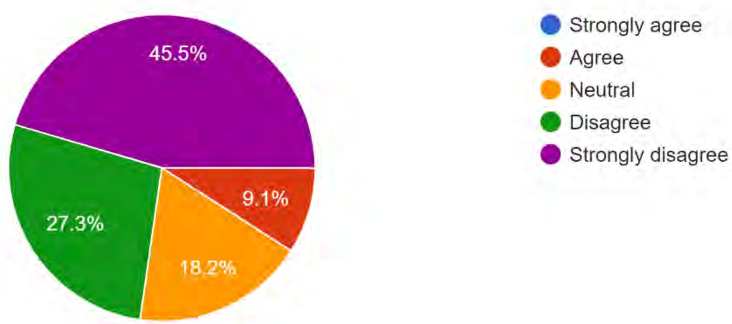
Instructional math videos provide additional support for students with learning disabilities in alternative education.

11 responses



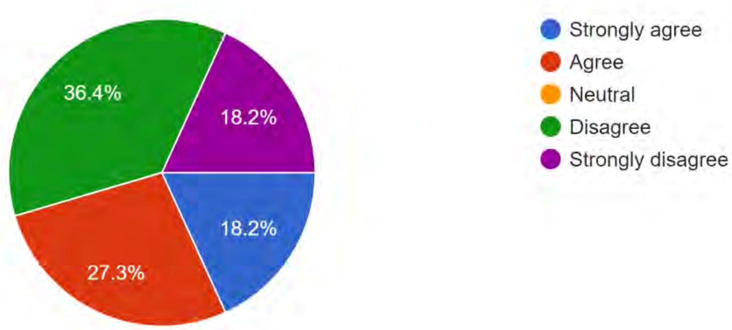
Students with learning disabilities enter the alternative education setting with foundational math skills to learn algebra concepts.

11 responses



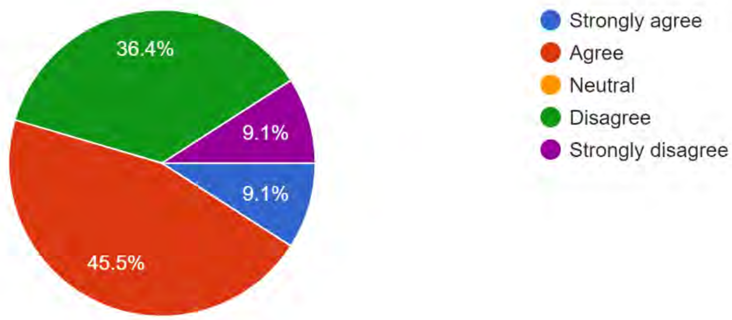
Students with learning disabilities in alternative education possess a proficient understanding of addition.

11 responses



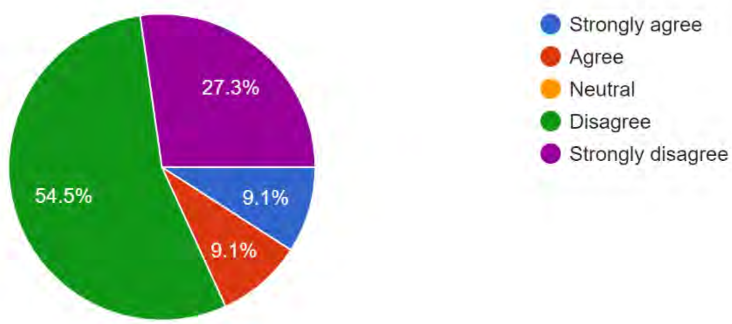
Students with learning disabilities in alternative education possess a proficient understanding of subtraction.

11 responses



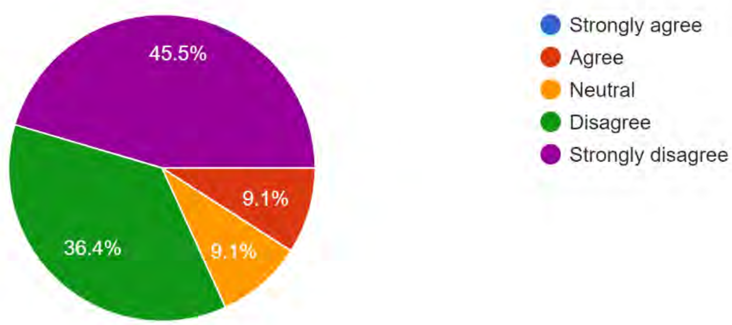
Students with learning disabilities in alternative education possess a proficient understanding of multiplication.

11 responses



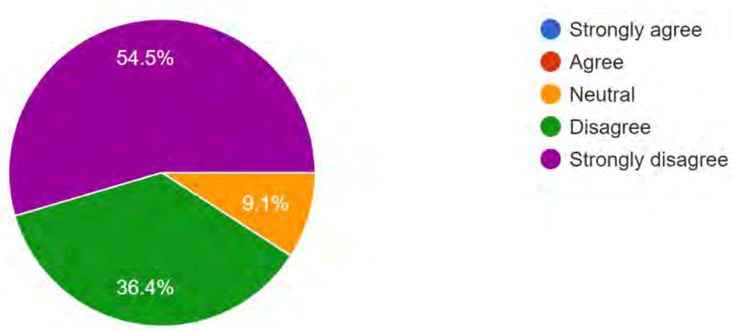
Students with learning disabilities in alternative education possess a proficient understanding of division.

11 responses

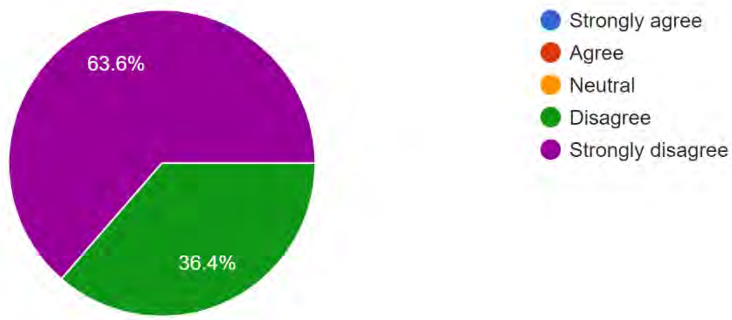


Students with learning disabilities in alternative education possess a proficient understanding of orders of operations.

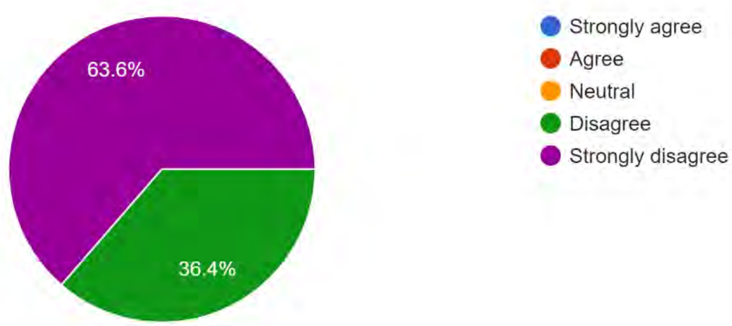
11 responses



Students with learning disabilities in alternative education possess a proficient understanding of ratios and proportions (fractions).
11 responses

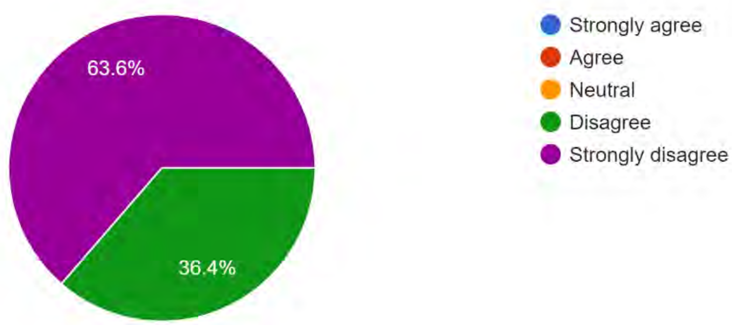


Students with learning disabilities in alternative education possess a proficient understanding of percentages.
11 responses



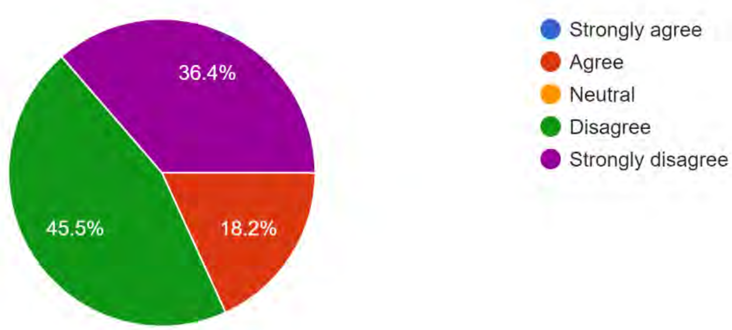
Students with learning disabilities in alternative education possess a proficient understanding of decimals.

11 responses

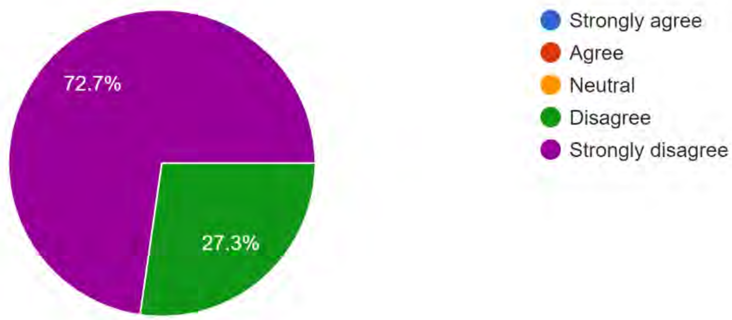


Students with learning disabilities in alternative education possess a proficient understanding of the number system.

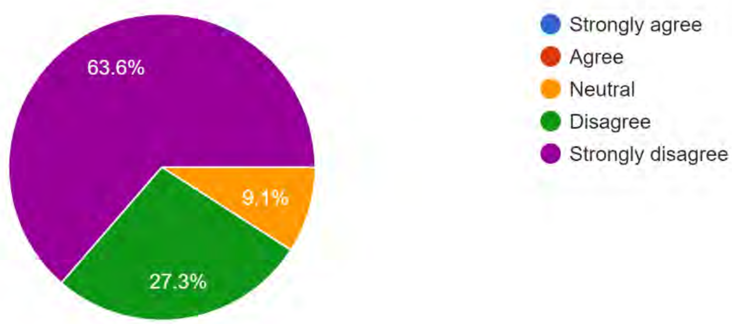
11 responses



Students with learning disabilities in alternative education possess a proficient understanding of geometry (perimeter and area of a square, rectangle, and triangle).
11 responses

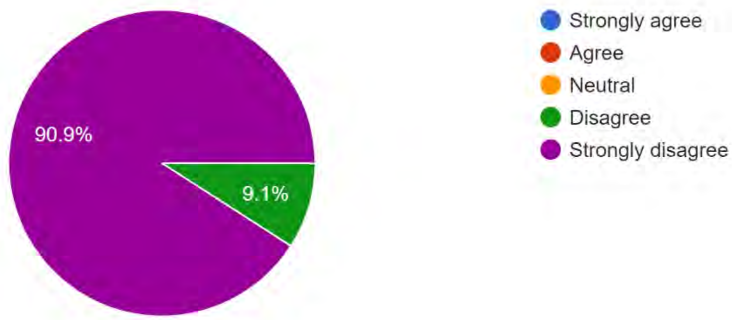


Students with learning disabilities in alternative education possess a proficient understanding of solving basic expressions (2x + 1=7).
11 responses



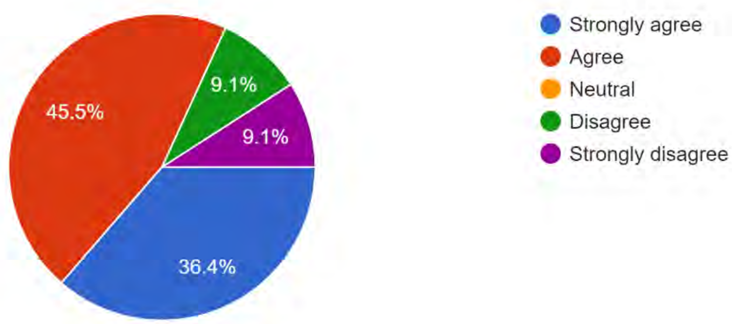
Students with learning disabilities in alternative education possess a proficient understanding of the distributive property (a[b+c] = ab + ac).

11 responses



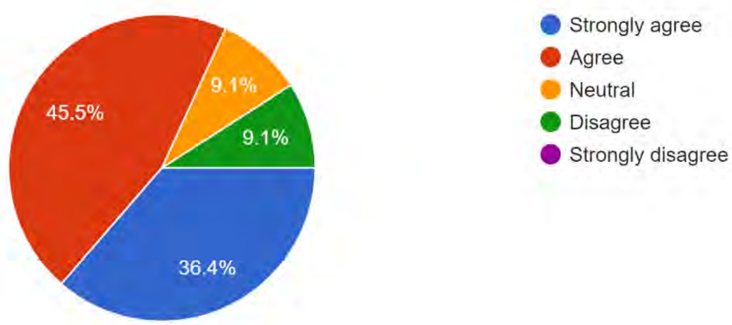
Students with learning disabilities in alternative education should have two consecutive years of mathematics preparation before taking the CAASPP math assessment.

11 responses



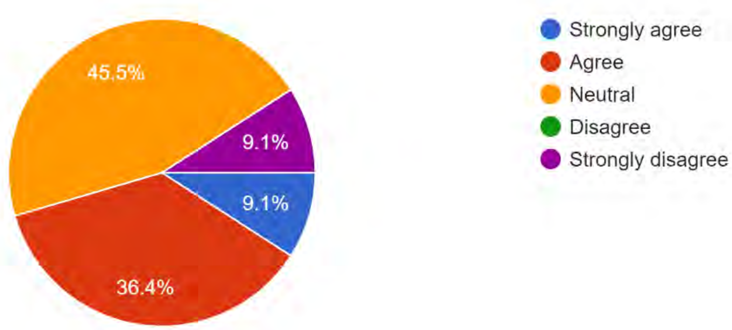
Students with learning disabilities in alternative education do not remain enrolled long enough to access mathematics instruction to reach proficiency levels.

11 responses

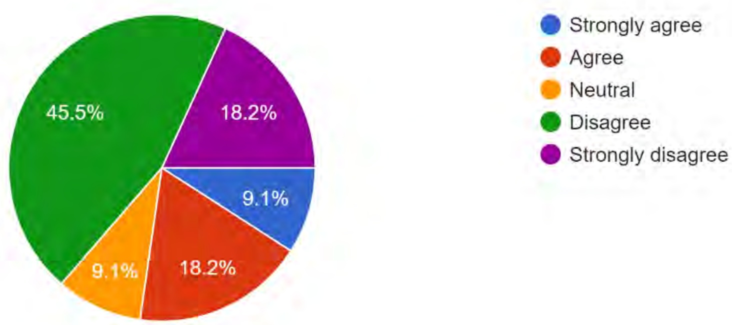


Students with learning disabilities in alternative education should be able to demonstrate algebra proficiency through an alternative measure to the CAASPP.

11 responses



The IEP's specific learning disability (SLD) designation is adequate to provide math instructional guidance for students with learning disabilities in AE settings.
11 responses



Appendix N

Student Archival Records

Student Records (2016 - 17)

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
406508	Int Math I S1	B	5.00	5.00	1.00
451968	Int Math I S1	C	5.00	5.00	1.00
531650	Int Math I S1	D	5.00	5.00	1.00
531884	Int Math I CP	B	5.00	5.00	1.00
531884	Int Math I CP	C	0.50	5.00	1.00
532200	Int Math I S1	NM	5.00	5.00	1.00
532973	Int Math I S1	C	5.00	5.00	1.00
533503	Int Math I CP	D	5.00	5.00	1.00
533503	Int Math I CP	B	5.00	5.00	1.00
533608	Algebra 1 S1	C	5.00	5.00	1.00
533608	Algebra 1 S2	C	5.00	5.00	1.00
533741	Int Math I S1	B-	5.00	5.00	1.00
533866	Int Math I S1	C	5.00	5.00	1.00
534634	Int Math I CP	D-	1.00	5.00	1.00
531493	Int Math I S1	A	5.00	3.00	1.00
532552	Int Math I S1	C-	3.00	2.50	1.00
532973	Int Math I S1	C	3.00	2.50	1.00
533741	Int Math I S1	A-	4.00	2.50	1.00
406508	Int Math I S1 P	F	0.00	2.00	1.00
407139	Int Math I S1	C	2.00	2.00	1.00
407139	Int Math I S1	C	1.00	2.00	1.00
530336	Int Math I S1	C	2.50	2.00	1.00
531649	Int Math I S1	D	2.00	2.00	1.00
531649	Int Math I S1	F	0.50	2.00	1.00
531649	Int Math I S1	F	0.00	2.00	1.00

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
532552	Int Math I S1	C-	2.00	2.00	1.00
532763	Int Math I S1	D	1.00	2.00	1.00
531493	Int Math I S2	D	5.00	1.00	1.00
534458	Int Math I S2	D	5.00	0.50	1.00
534714	Int Math I S2	D	5.00	0.50	1.00
406508	Integrated Math	C	1.00	0.00	1.00
406508	Integrated Math	C	1.00	0.00	1.00
407139	Int Math I S2	C	2.00	0.00	1.00
407139	Int Math I S2		1.00	0.00	1.00
407139	Integrated Math	NG	0.00	0.00	1.00
407139	Integrated Math	F	0.00	0.00	1.00
420732	Int Math I S2	A	5.00	0.00	1.00
420732	Integrated Math	D	2.00	0.00	1.00
420732	Int Math I S2	C	1.00	0.00	1.00
451968	Int Math I S2	C	5.00	0.00	1.00
531878	Int Math I S2	F	0.00	0.00	1.00
532200	Int Math I S2	C+	1.00	0.00	1.00
532200	Int Math I S2	C	1.00	0.00	1.00
532552	Int Math I S2	C-	3.00	0.00	1.00
532552	Int Math I S2	D	2.00	0.00	1.00
532763	Int Math I S2	C	5.00	0.00	1.00
532973	Int Math I S2	C	5.00	0.00	1.00
533503	Int Math I S2	NM	0.00	0.00	1.00
533648	Integrated Math	C	2.50	0.00	1.00
533648	Integrated Math	C	2.50	0.00	1.00
533903	Int Math I S2	C+	5.00	0.00	1.00
534333	Int Math I S2	F	0.00	0.00	1.00
534714	Int Math I S2	D	2.00	0.00	1.00
534738	Int Math I S2	F	0.00	0.00	1.00

Note. Of the 122 student enrollments in the 2016-17 ACSD school year, 58 student enrollments took Algebra 1 related courses through ACSD.

Student Records (2017 - 18)

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
457340	Int Math I CP	D	5.00	5.00	1.00
532167	Int Math I S2	C	5.00	5.00	1.00
534926	Int Math 1 CP P	D	5.00	5.00	1.00
534926	Int Math I S1	D	5.00	5.00	1.00
535092	Int Math I CP	D	5.00	5.00	1.00
535197	Int Math I CP	D	5.00	5.00	1.00
540132	Int Math 1 CP P	D	5.00	5.00	1.00
540152	Int Math I CP	C	5.00	5.00	1.00
540369	Int Math I CP	C	5.00	5.00	1.00
540369	Int Math I CP	C	5.00	5.00	1.00
531420	Int Math I CP	D	5.00	3.00	1.00
532655	Int Math I CP	D	2.50	2.50	1.00
532655	Int Math I S1	C-	2.50	2.50	1.00
541126	Int Math 1 CP P	B	5.00	2.50	1.00
541126	Int Math 1 CP P	B	2.50	2.50	1.00
531420	Int Math I CP	D	2.00	2.00	1.00
532655	Int Math I CP	C+	2.00	2.00	1.00
532655	Int Math I S2	C	2.00	2.00	1.00
540152	Int Math I CP	D-	2.00	2.00	1.00
417457	Int Math I CP	B	4.00	1.50	1.00
531981	Int Math I CP	B	5.00	1.50	1.00
532259	Int Math I CP	A	5.00	1.50	1.00
532773	Int Math I S1	C-	1.50	1.50	1.00
531981	Int Math I S2	B	5.00	1.00	1.00
532167	Int Math I S1	C-	1.00	1.00	1.00
532773	Int Math I CP	C	1.00	1.00	1.00
532919	Int Math I CP	B	1.00	1.00	1.00

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
534839	Int Math I S1	D	1.00	1.00	1.00
535176	Int Math I S1	B	1.00	1.00	1.00
541020	Int Math I CP	C	1.00	1.00	1.00
532655	Int Math I CP	C	0.50	0.50	1.00
455760	Int Math I S2	F	0.00	0.00	1.00
457340	Int Math I CP	F	0.00	0.00	1.00
531420	Int Math I S2	F	0.00	0.00	1.00
532919	Int Math I CP	F	5.00	0.00	1.00
533746	Int Math I CP	F	0.00	0.00	1.00
533746	Int Math I S1	NM	0.00	0.00	1.00
533746	Int Math I S1	F	0.00	0.00	1.00
534839	Int Math I CP	F	5.00	0.00	1.00
534839	Int Math I CP	F	5.00	0.00	1.00
535006	Int Math I S1	F	0.00	0.00	1.00

Note. Of the 95 student enrollments in the 2017-18 ACSD school year, 41 student enrollments took Algebra 1 related courses through ACSD.

Student Records (2018 - 19)

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
448259	Int Math I S1	D	5.00	5.00	1.00
451413	Int Math I CP	C	5.00	5.00	1.00
455760	Int Math I CP	D	5.00	5.00	1.00
531493	Int Math I CP	C-	5.00	5.00	1.00
531493	Int Math I S2	D	5.00	5.00	1.00
533689	Int Math I CP	B	5.00	5.00	2.00
533903	Int Math I S2	C+	5.00	5.00	1.00
534640	Int Math I CP	A	5.00	5.00	1.00
534640	Int Math I CP	A	5.00	5.00	1.00
534756	Int Math I CP	D-	5.00	5.00	1.00
535073	Int Math I CP	C	5.00	5.00	1.00
535092	Int Math I CP	D	5.00	5.00	1.00
535092	Int Math I CP	D-	5.00	5.00	1.00
535330	Int Math I CP	B	5.00	5.00	1.00
535351	Int Math I CP	D	5.00	5.00	1.00
541501	Int Math I CP	D	5.00	5.00	1.00
541501	Int Math I CP	C	5.00	5.00	1.00
541650	Int Math I CP	D	5.00	5.00	1.00
541650	Int Math I CP	C	5.00	5.00	1.00
542459	Int Math I CP	D-	5.00	5.00	1.00
542652	Int Math I CP	B	5.00	5.00	1.00
542834	Int Math I CP	B-	5.00	5.00	1.00
448259	Int Math 1 CP P	C	4.50	4.50	1.00
533095	Int Math I CP	C-	4.00	4.00	1.00
533689	Int Math I CP	B	5.00	4.00	2.00
541382	Int Math I CP	C	4.00	4.00	1.00
541742	Int Math I CP	D-	4.00	4.00	1.00

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
541020	Integrated Math	D	3.50	3.50	1.00
451941	Int Math I S1 P	C	3.00	3.00	1.00
534511	Int Math 1 CP P	B-	4.00	3.00	1.00
535330	Int Math I CP	C	5.00	3.00	1.00
541149	Int Math I CP	B-	3.00	3.00	1.00
532041	Int Math I CP	D	2.50	2.50	1.00
535073	Int Math I CP	D-	2.50	2.50	1.00
535073	Int Math I CP	B-	2.50	2.50	1.00
541382	Int Math I CP	D	2.50	2.50	1.00
451941	Int Math I S1	D	2.00	2.00	1.00
531975	Int Math I CP	C	2.00	2.00	1.00
532041	Int Math I CP	C	2.00	2.00	1.00
535007	Int Math 1 CP P	A	5.00	2.00	1.00
535229	Int Math I S2	D	2.00	2.00	1.00
541149	Int Math 1 CP P	B	2.00	2.00	1.00
541329	Int Math I CP	A	5.00	2.00	1.00
541382	Int Math I CP	C-	2.00	2.00	1.00
531975	Int Math I CP	C	1.50	1.50	1.00
532041	Int Math I CP	D	2.50	1.50	1.00
532259	Int Math I CP	A	5.00	1.50	1.00
532259	Int Math I CP	A	3.50	1.50	1.00
534399	Int Math I CP	B+	5.00	1.50	1.00
535073	Int Math I CP	C	1.50	1.50	1.00
540011	Int Math I CP	C-	1.50	1.50	1.00
541031	Int Math I CP	D	1.50	1.50	1.00
541329	Int Math I CP	A	1.50	1.50	1.00
532041	Int Math I CP	C	1.00	1.00	1.00
532041	Int Math I S2	B	1.00	1.00	1.00
533095	Int Math I CP	A-	1.00	1.00	1.00

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
534368	Int Math I CP	B	1.00	1.00	1.00
534511	Int Math 1 CP P	B	5.00	1.00	1.00
534634	Int Math I CP	D-	1.00	1.00	1.00
535007	Int Math I CP	A	5.00	1.00	1.00
535073	Int Math I S1	D	1.00	1.00	1.00
535204	Int Math I CP	C-	1.00	1.00	1.00
535204	Int Math I CP	D	1.00	1.00	1.00
535204	Int Math I CP	C	5.00	1.00	1.00
541020	Int Math I CP	C	1.00	1.00	1.00
541031	Int Math I CP	C	1.00	1.00	1.00
541031	Int Math I CP	C-	1.00	1.00	1.00
541501	Int Math I CP	D-	1.00	1.00	1.00
541650	Int Math	D-	1.00	1.00	1.00
542572	Int Math I CP	C	1.00	1.00	1.00
542588	Int Math I CP	D-	1.00	1.00	1.00
448259	Int Math I CP	C	0.50	0.50	1.00
451413	Int Math I CP	B	0.50	0.50	1.00
531975	Int Math I CP	B	5.00	0.50	1.00
531975	Int Math I CP	C	3.50	0.50	1.00
533764	Int Math I CP	B	5.00	0.50	1.00
533764	Int Math I CP	B	1.00	0.50	1.00
541020	Int Math I CP	A-	0.50	0.50	1.00
541380	Int Math I CP	B	0.50	0.50	1.00
541380	Int Math I CP	B-	2.50	0.50	1.00
455760	Int Math I S2	F	0.00	0.00	1.00
530134	Int Math I CP	NM	0.00	0.00	1.00
532041	Int Math I CP	F	0.00	0.00	1.00
532041	Int Math I CP	F	0.00	0.00	1.00
532041	Int Math I CP	F	0.00	0.00	1.00

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
532907	Int Math I CP		10.00	0.00	1.00
533095	Int Math I CP	F	0.00	0.00	1.00
534368	Int Math I CP	F	0.00	0.00	1.00
534368	Int Math I CP	F	5.00	0.00	1.00
534368	Int Math I CP	F	5.00	0.00	1.00
534376	Int Math I CP	F	0.00	0.00	1.00
534376	Int Math I CP	F	0.00	0.00	1.00
534376	Int Math I CP	F	0.00	0.00	1.00
534376	Int Math I CP	F	0.00	0.00	1.00
534376	Int Math I CP	F	0.00	0.00	1.00
534634	Int Math I CP	F	5.00	0.00	1.00
535204	Int Math I CP	F	0.00	0.00	1.00
535351	Int Math I CP	F	5.00	0.00	1.00
541742	Int Math I CP	F	0.00	0.00	1.00
542380	Int Math I CP	F	5.00	0.00	1.00
542588	Int Math I CP	F	0.00	0.00	1.00
542898	Int Math I CP	F	0.00	0.00	1.00
543216	Int Math I CP	F	0.00	0.00	1.00

Note. Of the 277 student enrollments in the ACSD school year, 114 student enrollments took Algebra 1 related courses through ACSD. Student 533689 received a 2 on the performance level, which equates to the below proficient level.

Student Records (2021 - 22)

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
130153	Int Math I CP	C	5.00	5.00	1.00
534373	Int Math I CP	C+	5.00	5.00	1.00
540621	Int Math I CP	C	5.00	5.00	1.00
541082	Int Math I CP	D	5.00	5.00	1.00
541672	Int Math I CP	D-	5.00	5.00	1.00
541672	Int Math I CP	D	5.00	5.00	1.00
542114	Int Math 1 CP P	C-	5.00	5.00	1.00
542434	Int Math 1 CP P	B	5.00	5.00	1.00
542634	Int Math I CP	D+	5.00	5.00	1.00
542678	Int Math 1 CP P	B	5.00	5.00	1.00
542958	Int Math I CP	D-	5.00	5.00	1.00
543179	Int Math I CP	B-	5.00	5.00	1.00
543199	Int Math I CP	C	5.00	5.00	1.00
543201	Int Math 1 CP P	B	5.00	5.00	1.00
543251	Int Math I CP	D+	5.00	5.00	1.00
543286	Int Math I CP	B-	5.00	5.00	1.00
543603	Int Math I CP	D	5.00	5.00	1.00
543603	Int Math I CP	B-	5.00	5.00	1.00
543815	Int Math I CP	C-	5.00	5.00	1.00
543815	Int Math I CP	C	5.00	5.00	1.00
544942	Int Math 1 CP P	B	5.00	5.00	1.00
545397	Int Math 1 CP P	C	5.00	5.00	1.00
545426	Int Math I CP	C	5.00	5.00	1.00
545496	Int Math I CP	C	5.00	5.00	1.00
546019	Int Math I CP	C-	5.00	5.00	1.00
546122	Int Math I CP	C+	5.00	5.00	1.00
546122	Int Math I CP	C+	5.00	5.00	1.00

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
546165	Int Math I CP	D	5.00	5.00	1.00
546165	Int Math I CP	C-	5.00	5.00	1.00
546436	Int Math I CP	C+	5.00	5.00	1.00
546446	Int Math I CP	A+	5.00	5.00	1.00
546528	Int Math I CP	C	5.00	5.00	1.00
546675	Int Math I CP	A	5.00	5.00	1.00
546785	Int Math I CP	A	5.00	5.00	1.00
546943	Int Math I CP	B	5.00	5.00	1.00
540621	Int Math I CP	B-	4.00	4.00	1.00
544380	Int Math I CP	C-	4.00	4.00	1.00
546055	Int Math I CP	C	3.75	3.75	1.00
130156	Int Math I CP	C	3.50	3.50	1.00
541858	Int Math I CP	C-	3.50	3.50	1.00
543179	Int Math I CP	A	5.00	3.50	1.00
543627	Int Math I CP	D	3.50	3.50	1.00
546171	Int Math I CP	C+	3.50	3.50	1.00
541082	Int Math I CP	C	3.00	3.00	1.00
541672	Int Math I CP	C-	3.00	3.00	1.00
542958	Int Math I CP	A	3.00	3.00	1.00
543286	Int Math I CP	A-	3.00	3.00	1.00
545911	Int Math I CP	C	3.00	3.00	1.00
130155	Int Math I CP	B+	2.75	2.75	1.00
534373	Int Math I CP	A	2.50	2.50	1.00
541858	Int Math I CP	C	3.50	2.50	1.00
543201	Int Math 1 CP P	A	2.50	2.50	1.00
543201	Int Math I CP	A	5.00	2.50	1.00
543286	Int Math I CP	C	2.50	2.50	1.00
543734	Int Math I CP	B+	5.00	2.50	1.00
543734	Int Math I CP	A	2.50	2.50	1.00

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
544964	Int Math I CP	B-	2.50	2.50	1.00
534373	Int Math I CP	B	2.25	2.25	1.00
534373	Int Math I CP	B-	2.00	2.00	1.00
543089	Int Math I CP	C-	2.00	2.00	1.00
543251	Int Math I CP	D-	2.00	2.00	1.00
545911	Int Math I CP	B	5.00	2.00	1.00
546139	Int Math I CP	A-	2.00	2.00	1.00
545598	Int Math I CP	A	5.00	1.75	1.00
545911	Int Math I CP	A-	1.75	1.75	1.00
545911	Int Math I CP	C	5.00	1.75	1.00
130153	Int Math I CP	A	1.50	1.50	1.00
130156	Int Math I CP	B	1.50	1.50	1.00
543179	Int Math I CP	A	1.50	1.50	1.00
543627	Int Math I CP	D-	1.50	1.50	1.00
545908	Int Math I CP	A	1.50	1.50	1.00
545911	Int Math I CP	A	5.00	1.50	1.00
546139	Int Math I CP	A	5.00	1.50	1.00
546171	Int Math I CP	C-	1.50	1.50	1.00
541858	Int Math I CP	B-	1.25	1.25	1.00
544964	Int Math I CP	A-	1.25	1.25	1.00
547122	Int Math I CP	A	1.25	1.25	1.00
130155	Int Math I CP	A	1.00	1.00	1.00
534373	Int Math I CP	D-	2.00	1.00	1.00
540621	Int Math I CP	D	1.00	1.00	1.00
541082	Int Math I CP	B+	5.00	1.00	1.00
541082	Int Math I CP	D	2.00	1.00	1.00
542634	Int Math I CP	D-	1.00	1.00	1.00
542958	Int Math I CP	A	1.00	1.00	1.00
543089	Int Math I CP	A	1.00	1.00	1.00

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
543199	Int Math I CP	D-	1.00	1.00	1.00
543251	Int Math I CP	C	1.00	1.00	1.00
543734	Int Math I CP	B	5.00	1.00	1.00
543734	Int Math I CP	C-	4.00	1.00	1.00
544380	Int Math I CP	A-	1.00	1.00	1.00
545289	Int Math 1 CP P	D	5.00	1.00	1.00
545598	Int Math I CP	A-	5.00	1.00	1.00
545598	Int Math I CP	A-	1.00	1.00	1.00
546055	Int Math I CP	A	5.00	1.00	1.00
546139	Int Math I CP	C	1.00	1.00	1.00
546987	Int Math I CP	A+	1.00	1.00	1.00
130155	Int Math I CP	C	0.75	0.75	1.00
541858	Int Math I CP	B-	0.75	0.75	1.00
543199	Int Math I CP	A	0.75	0.75	1.00
534373	Int Math I CP	A	0.50	0.50	1.00
541858	Int Math I CP	C-	1.00	0.50	1.00
541858	Int Math I CP	D	0.50	0.50	1.00
542114	Int Math I CP	A	5.00	0.50	1.00
543089	Int Math I CP	C	0.50	0.50	1.00
544380	Int Math I CP	D-	0.50	0.50	1.00
544380	Int Math I CP	A	0.50	0.50	1.00
544964	Int Math I CP	A	0.50	0.50	1.00
545289	Int Math 1 CP P	B	4.00	0.50	1.00
545496	Int Math I CP	D	0.50	0.50	1.00
545496	Int Math I CP	C-	0.50	0.50	1.00
534373	Int Math I CP	B-	0.25	0.25	1.00
534373	Int Math I CP	D	0.25	0.25	1.00
543251	Int Math I CP	A	0.25	0.25	1.00
546055	Int Math I CP	A-	5.00	0.25	1.00

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
546139	Int Math I CP	A	0.25	0.25	1.00
547122	Int Math I CP	A+	0.25	0.25	1.00
541672	Int Math I CP	NC	0.00	0.00	1.00
541858	Int Math I CP	F	0.25	0.00	1.00
542634	Int Math I CP	I	0.00	0.00	1.00
543089	Int Math I CP	F	1.00	0.00	1.00
543089	Int Math I CP	F	1.50	0.00	1.00
543179	Int Math I CP	F	0.00	0.00	1.00
543199	Int Math I CP	F	1.00	0.00	1.00
543199	Int Math I CP	NM	1.00	0.00	1.00
543199	Int Math I CP	NM	0.50	0.00	1.00
543199	Int Math I CP	F	0.75	0.00	1.00
543603	Int Math I CP	F	0.00	0.00	1.00
543603	Int Math I CP	F	0.00	0.00	1.00
543627	Int Math I CP	F	0.50	0.00	1.00
543627	Int Math I CP	F	3.50	0.00	1.00
543627	Int Math I CP	F	2.50	0.00	1.00
543627	Int Math I CP	C	0.00	0.00	1.00
545496	Int Math I CP	F	0.25	0.00	1.00
546019	Int Math I CP	NM	5.00	0.00	1.00
546585	Int Math I CP	F	0.00	0.00	1.00

Note. Of the 257 student enrollments in the ACSD school year, 135 student enrollments took Algebra 1 related courses through ACSD.

Student Records (2022 - 23)

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
544656	Int Math 1 CP P	B-	5	5	1
544656	Int Math 1 CP P	B-	5	5	1
544656	Int Math I CP	B	5	5	1
544656	Int Math I CP	B	5	5	1
545415	Int Math I CP	B	5	5	1
545415	Int Math I CP	B	5	5	1
545415	Int Math I CP	B	5	5	1
545415	Int Math I CP	B	5	5	1
546105	Int Math I CP	C	5	5	1
546105	Int Math I CP	C	5	5	1
545096	Int Math 1 CP P	A	3	3	1
545096	Int Math I CP	C	3	3	1
545096	Int Math I CP	C-	1	1	1
545600	Int Math I CP	C	4	1	1
545600	Int Math I CP	C	4	1	1
545600	Int Math I CP	C	4	1	1
546202	Int Math 1 CP P	A	1	1	1
543179	Int Math I CP	B-	5	5	1
545600	Int Math I CP	A-	5	5	1
545600	Int Math I CP	A-	5	5	1
545600	Int Math I CP	A-	5	5	1
546307	Int Math I CP	A	5	5	1
546307	Int Math I CP	A	5	5	1
546307	Int Math I CP	A	5	5	1
546307	Int Math I CP	A	5	5	1
547373	Int Math I CP	C	5	5	1
547373	Int Math I CP	C	5	5	1

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
545600	Int Math I CP	B-	4.5	4.5	1
545600	Int Math I CP	B-	4.5	4.5	1
545600	Int Math I CP	B-	4.5	4.5	1
547373	Int Math I CP	C	4	4	1
547373	Int Math I CP	C	4	4	1
543179	Int Math I CP	A	5	3.5	1
548310	Int Math I CP	C	5	2.5	1
548310	Int Math I CP	C	5	2.5	1
545672	Int Math I CP	C	2	2	1
545672	Int Math I CP	C	2	2	1
545672	Int Math I CP	C	2	2	1
547373	Int Math I CP	B	2	2	1
547373	Int Math I CP	B	2	2	1
547378	Int Math I CP	C	5	2	1
543179	Int Math I CP	A	1.5	1.5	1
547378	Int Math I CP	B	5	1.5	1
541307	Int Math I CP	C	1	1	1
541307	Int Math I CP	C-	1	1	1
541307	Int Math I CP	C	1	1	1
541307	Int Math I CP	C-	1	1	1
545672	Int Math I CP	B	1	1	1
545672	Int Math I CP	B	1	1	1
545672	Int Math I CP	B	1	1	1
546109	Int Math I CP	D	1	1	1
546109	Int Math I CP	D	1	1	1
546109	Int Math I CP	D	1	1	1
546109	Int Math I CP	D	1	1	1
547373	Int Math I CP	C	1	1	1
547373	Int Math I CP	C	1	1	1

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
549054	Int Math I CP	C	1	1	1
549054	Int Math I CP	C	1	1	1
545600	Int Math I CP	B	0.5	0.5	1
545600	Int Math I CP	B	0.5	0.5	1
545600	Int Math I CP	B	0.5	0.5	1
547378	Int Math I CP	C	5	0.5	1
549046	Int Math I CP	D	0.5	0.5	1
549046	Int Math I CP	D	0.5	0.5	1
546307	Int Math I CP	D	5	0.25	1
546307	Int Math I CP	D	5	0.25	1
546307	Int Math I CP	D	5	0.25	1
546307	Int Math I CP	D	5	0.25	1
541690	Int Math I CP	A	5	5	1
541690	Int Math I CP	A	5	5	1
543454	Int Math I CP	C-	4.5	4.5	1
543454	Int Math I CP	C-	4.5	4.5	1
547402	Int Math I CP	A	3	3	1
545672	Int Math I CP	C	2.5	2.5	1
545672	Int Math I CP	C	2.5	2.5	1
545672	Int Math I CP	C	2.5	2.5	1
546429	Int Math I CP	C+	2.5	2.5	1
546429	Int Math I CP	C+	2.5	2.5	1
546958	Int Math I CP	B	2.5	2.5	1
546958	Int Math I CP	B	2.5	2.5	1
546958	Int Math I CP	B	2.5	2.5	1
543839	Int Math I CP	B	2.25	2.25	1
543839	Int Math I CP	B	2.25	2.25	1
543839	Int Math I CP	B	2.25	2.25	1
546307	Int Math I CP	B	2	2	1

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
546307	Int Math I CP	B	2	2	1
546307	Int Math I CP	B	2	2	1
546307	Int Math I CP	B	2	2	1
547156	Int Math I CP	B+	5	2	1
547156	Int Math I CP	B+	5	2	1
547402	Int Math I CP	C-	2	2	1
548493	Int Math I CP	C	2	2	1
548493	Int Math I CP	C	2	2	1
548493	Int Math I CP	C	2	2	1
549046	Int Math I CP	A	2	2	1
549046	Int Math I CP	A	2	2	1
546958	Int Math I CP	B	1.5	1.5	1
546958	Int Math I CP	B	1.5	1.5	1
546958	Int Math I CP	B	1.5	1.5	1
547122	Int Math I CP	A	1.5	1.5	1
547156	Int Math I CP	B+	1.5	1.5	1
547156	Int Math I CP	B+	1.5	1.5	1
541307	Int Math I CP	A-	1.25	1.25	1
541307	Int Math I CP	A-	1.25	1.25	1
541690	Int Math I CP	C-	1.25	1.25	1
541690	Int Math I CP	C-	1.25	1.25	1
544426	Int Math I CP	C	1.25	1.25	1
544426	Int Math I CP	C	1.25	1.25	1
547122	Int Math I CP	A	1.25	1.25	1
549013	Int Math I CP	C+	1.25	1.25	1
541307	Int Math I CP	D-	1	1	1
541307	Int Math I CP	C	3	1	1
541307	Int Math I CP	D-	1	1	1
541307	Int Math I CP	C	3	1	1

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
543454	Int Math I CP	B+	1	1	1
543454	Int Math I CP	B+	1	1	1
545672	Int Math I CP	C	1	1	1
545672	Int Math I CP	C	1	1	1
545672	Int Math I CP	C	1	1	1
546958	Int Math I CP	A+	1	1	1
546958	Int Math I CP	A+	1	1	1
546958	Int Math I CP	A+	1	1	1
547156	Int Math I CP	B	1	1	1
547156	Int Math I CP	B	1	1	1
547402	Int Math I CP	B	1	1	1
541690	Int Math I CP	B	0.75	0.75	1
541690	Int Math I CP	C+	0.75	0.75	1
541690	Int Math I CP	B	0.75	0.75	1
541690	Int Math I CP	C+	0.75	0.75	1
543454	Int Math I CP	D-	0.5	0.5	1
543454	Int Math I CP	D-	0.5	0.5	1
545672	Int Math I CP	D-	0.5	0.5	1
545672	Int Math I CP	D-	0.5	0.5	1
545672	Int Math I CP	D-	0.5	0.5	1
546429	Int Math I CP	B-	0.5	0.5	1
546429	Int Math I CP	B-	0.5	0.5	1
547026	Int Math I CP	A+	0.5	0.5	1
547026	Int Math I CP	A+	0.5	0.5	1
547026	Int Math I CP	A+	0.5	0.5	1
549013	Int Math I CP	A	0.5	0.5	1
541307	Int Math I CP	A	0.25	0.25	1
541307	Int Math I CP	C	0.25	0.25	1
541307	Int Math I CP	A	0.25	0.25	1

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
541307	Int Math I CP	C	0.25	0.25	1
543839	Int Math I CP	B	0.25	0.25	1
543839	Int Math I CP	B	0.25	0.25	1
543839	Int Math I CP	B	0.25	0.25	1
546307	Int Math I CP	C	0.25	0.25	1
546307	Int Math I CP	B-	0.25	0.25	1
546307	Int Math I CP	B	0.25	0.25	1
546307	Int Math I CP	C	0.25	0.25	1
546307	Int Math I CP	B-	0.25	0.25	1
546307	Int Math I CP	B	0.25	0.25	1
546307	Int Math I CP	C	0.25	0.25	1
546307	Int Math I CP	B-	0.25	0.25	1
546307	Int Math I CP	B	0.25	0.25	1
546307	Int Math I CP	C	0.25	0.25	1
546307	Int Math I CP	B-	0.25	0.25	1
546307	Int Math I CP	B	0.25	0.25	1
547026	Int Math I CP	A	0.25	0.25	1
547026	Int Math I CP	A	0.25	0.25	1
547026	Int Math I CP	A	0.25	0.25	1
547122	Int Math I CP	A+	0.25	0.25	1
549054	Int Math I CP	C	0.25	0.25	1
549054	Int Math I CP	C	0.25	0.25	1
541307	Int Math I CP	F	0.75	0	1
541307	Int Math I CP	F	0.75	0	1
543454	Int Math I CP	F	1.5	0	1
543454	Int Math I CP	F	0.5	0	1
543454	Int Math I CP	F	0.5	0	1
543454	Int Math I CP	F	1	0	1
543454	Int Math I CP	F	5	0	1

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
543454	Int Math I CP	F	1.5	0	1
543454	Int Math I CP	F	0.5	0	1
543454	Int Math I CP	F	0.5	0	1
543454	Int Math I CP	F	1	0	1
543454	Int Math I CP	F	5	0	1
548317	Int Math I CP	C-	5	5	1
548317	Int Math I CP	C-	5	5	1
547156	Int Math I CP	C	4.57	4.57	1
547156	Int Math I CP	C	4.57	4.57	1
543454	Int Math I CP	C	4	4	1
543454	Int Math I CP	C	4	4	1
541690	Int Math I CP	C	3.75	3.75	1
541690	Int Math I CP	C	3.75	3.75	1
543839	Int Math I CP	C	2.5	2.5	1
543839	Int Math I CP	C	2.5	2.5	1
543839	Int Math I CP	C	2.5	2.5	1
541307	Int Math I CP	C	4.25	2.25	1
541307	Int Math I CP	C	4.25	2.25	1
543454	Int Math I CP	C	5	2	1
543454	Int Math I CP	C	5	2	1
546958	Int Math I CP	B	3.5	2	1
546958	Int Math I CP	B	3.5	2	1
546958	Int Math I CP	B	3.5	2	1
546958	Int Math I CP	B	1.5	1.5	1
546958	Int Math I CP	B	1.5	1.5	1
546958	Int Math I CP	B	1.5	1.5	1
543839	Int Math I CP	B	5	1	1
543839	Int Math I CP	B	5	1	1
543839	Int Math I CP	B	5	1	1

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
546109	Int Math I CP	C	2	1	1
546109	Int Math I CP	C	2	1	1
547156	Int Math I CP	C	0.5	0.5	1
547156	Int Math I CP	C	0.5	0.5	1
546585	Int Math I CP	D-	5	5	1
546171	Int Math I CP	C+	3.5	3.5	1
546171	Int Math I CP	C-	1.5	1.5	1
547254	Int Math I CP	D-	1	1	1
546171	Int Math I CP	F	0	0	1
546171	Int Math I CP	F	0	0	1
546585	Int Math I CP	F	0	0	1
548493	Int Math I CP	F	0	0	1
548493	Int Math I CP	F	0	0	1
548493	Int Math I CP	F	0	0	1
543815	Int Math I CP	C-	5	5	1
543815	Int Math I CP	C	5	5	1
543815	Int Math I CP	C-	5	5	1
543815	Int Math I CP	C	5	5	1
546157	Int Math I CP	B	5	5	1
546157	Int Math I CP	B-	5	5	1
546157	Int Math I CP	B	5	5	1
546157	Int Math I CP	B-	5	5	1
546157	Int Math I CP	B	5	5	1
546157	Int Math I CP	B-	5	5	1
546157	Int Math I CP	B	5	5	1
546157	Int Math I CP	B-	5	5	1
547196	Int Math I CP	B-	5	5	1
547196	Int Math I CP	C+	5	5	1
547198	Int Math I CP	C	5	5	1

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
547198	Int Math I CP	C	5	5	1
547198	Int Math I CP	C	5	5	1
547198	Int Math I CP	C	5	5	1
547198	Int Math I CP	C	5	5	1
547198	Int Math I CP	C	5	5	1
547199	Int Math I CP	C	5	5	1
547199	Int Math I CP	C	5	5	1
547199	Int Math I CP	C	5	5	1
547314	Int Math I CP	C-	5	5	1
547314	Int Math	F	0	0	1
548041	Int Math	B	0	0	1
548041	Int Math	B	0	0	1
546193	Int Math I CP	C+	5	5	1
546528	Int Math I CP	C	5	5	1
548765	Int Math I CP	D+	5	5	1
548765	Int Math I CP	D+	5	5	1
546193	Int Math I CP	C+	5	1	1
546193	Int Math I CP	F	3	0	1
546193	Int Math I CP	F	5	0	1
546193	Int Math I CP	F	5	0	1
546528	Int Math I CP	F	3	0	1
547199	Int Math I CP	B	5	5	1
547199	Int Math I CP	B	5	5	1
547199	Int Math I CP	B	5	5	1
547198	Int Math I CP	B	2.5	2.5	1
547198	Int Math I CP	B	2.5	2.5	1
547198	Int Math I CP	B	2.5	2.5	1
547198	Int Math I CP	B	2.5	2.5	1
547198	Int Math I CP	B	2.5	2.5	1

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
547198	Int Math I CP	B	2.5	2.5	1
547199	Int Math I CP	B+	2.5	2.5	1
547199	Int Math I CP	B+	2.5	2.5	1
547199	Int Math I CP	B+	2.5	2.5	1
547998	Int Math I CP	C+	2.5	2.5	1
547998	Int Math I CP	C+	2.5	2.5	1
547998	Int Math I CP	C+	2.5	2.5	1
547998	Int Math I CP	C+	2.5	2.5	1
546157	Int Math I CP	A-	5	5	1
546157	Int Math I CP	C-	5	5	1
546157	Int Math I CP	A-	5	5	1
546157	Int Math I CP	C-	5	5	1
546157	Int Math I CP	A-	5	5	1
546157	Int Math I CP	C-	5	5	1
546157	Int Math I CP	A-	5	5	1
546157	Int Math I CP	C-	5	5	1
546785	Int Math I CP	A	5	5	1
546785	Int Math I CP	A	5	5	1
547026	Int Math I CP	C	5	5	1
547026	Int Math I CP	D	5	5	1
547026	Int Math I CP	C	5	5	1
547026	Int Math I CP	D	5	5	1
547026	Int Math I CP	C	5	5	1
547026	Int Math I CP	D	5	5	1
547030	Int Math I CP	B-	5	5	1
547030	Int Math I CP	D	5	5	1
547030	Int Math I CP	B-	5	5	1
547030	Int Math I CP	D	5	5	1
547030	Int Math I CP	B-	5	5	1

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
547030	Int Math I CP	D	5	5	1
548490	Int Math I CP	C	2	2	1
543179	Int Math I CP	F	0	0	1
546109	Int Math I CP	F	0	0	1
546109	Int Math I CP	F	0	0	1

Note. Of the 538 student enrollments in the ACSD school year, 293 student enrollments took Algebra 1 related courses through ACSD.

Student Earning 10 Credits with Grade D- or Higher (2016-2023)

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
543104	Int Math III CP	B	10.00	10.00	1.00
533689	Int Math II CP	A	5.00	5.00	2.00
534640	Int Math I CP	A	5.00	5.00	1.00
534640	Int Math I CP	A	5.00	5.00	1.00
546675	Int Math I CP	A	5.00	5.00	1.00
546785	Int Math I CP	A	5.00	5.00	1.00
534155	Integ Math II S	A-	5.00	5.00	1.00
546446	Int Math I CP	A+	5.00	5.00	1.00
406508	Int Math I S1	B	5.00	5.00	1.00
531884	Int Math I CP	B	5.00	5.00	1.00
533503	Int Math I CP	B	5.00	5.00	1.00
533689	Int Math I CP	B	5.00	5.00	2.00
535330	Int Math I CP	B	5.00	5.00	1.00
542434	Int Math 1 CP P	B	5.00	5.00	1.00
542652	Int Math I CP	B	5.00	5.00	1.00
542678	Int Math 1 CP P	B	5.00	5.00	1.00
543104	Int Math II CP	B	5.00	5.00	1.00
543201	Int Math 1 CP P	B	5.00	5.00	1.00
544942	Int Math 1 CP P	B	5.00	5.00	1.00
546943	Int Math I CP	B	5.00	5.00	1.00
544656	Int Math I CP	B	5	5	1
544656	Int Math I CP	B	5	5	1
545415	Int Math I CP	B	5	5	1
545415	Int Math I CP	B	5	5	1
545415	Int Math I CP	B	5	5	1
545415	Int Math I CP	B	5	5	1
533741	Int Math I S1	B-	5.00	5.00	1.00

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
542834	Int Math I CP	B-	5.00	5.00	1.00
543179	Int Math I CP	B-	5.00	5.00	1.00
543286	Int Math I CP	B-	5.00	5.00	1.00
543603	Int Math I CP	B-	5.00	5.00	1.00
544656	Int Math 1 CP P	B-	5	5	1
544656	Int Math 1 CP P	B-	5	5	1
534155	Integ Math II S	B+	5.00	5.00	1.00
130153	Int Math I CP	C	5.00	5.00	1.00
451413	Int Math I CP	C	5.00	5.00	1.00
451968	Int Math I S1	C	5.00	5.00	1.00
531884	Int Math I CP	C	0.50	5.00	1.00
532167	Int Math I S2	C	5.00	5.00	1.00
532973	Int Math I S1	C	5.00	5.00	1.00
533608	Algebra 1 S1	C	5.00	5.00	1.00
533608	Algebra 1 S2	C	5.00	5.00	1.00
533866	Int Math I S1	C	5.00	5.00	1.00
535073	Int Math I CP	C	5.00	5.00	1.00
535229	Integ Math II S	C	5.00	5.00	1.00
540152	Int Math I CP	C	5.00	5.00	1.00
540369	Int Math I CP	C	5.00	5.00	1.00
540369	Int Math I CP	C	5.00	5.00	1.00
540621	Int Math I CP	C	5.00	5.00	1.00
541501	Int Math I CP	C	5.00	5.00	1.00
541650	Int Math I CP	C	5.00	5.00	1.00
543104	Int Math II CP	C	5.00	5.00	1.00
543162	Int Math II CP	C	5.00	5.00	1.00
543199	Int Math I CP	C	5.00	5.00	1.00
543815	Int Math I CP	C	5.00	5.00	1.00

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
545397	Int Math 1 CP P	C	5.00	5.00	1.00
545426	Int Math I CP	C	5.00	5.00	1.00
545496	Int Math I CP	C	5.00	5.00	1.00
546528	Int Math I CP	C	5.00	5.00	1.00
546105	Int Math I CP	C	5	5	1
546105	Int Math I CP	C	5	5	1
531493	Int Math I CP	C-	5.00	5.00	1.00
542114	Int Math 1 CP P	C-	5.00	5.00	1.00
543815	Int Math I CP	C-	5.00	5.00	1.00
546019	Int Math I CP	C-	5.00	5.00	1.00
546165	Int Math I CP	C-	5.00	5.00	1.00
533903	Int Math I S2	C+	5.00	5.00	1.00
534373	Int Math I CP	C+	5.00	5.00	1.00
546122	Int Math I CP	C+	5.00	5.00	1.00
546122	Int Math I CP	C+	5.00	5.00	1.00
546436	Int Math I CP	C+	5.00	5.00	1.00
448259	Int Math I S1	D	5.00	5.00	1.00
455760	Int Math I CP	D	5.00	5.00	1.00
457340	Int Math I CP	D	5.00	5.00	1.00
531493	Int Math I S2	D	5.00	5.00	1.00
531650	Int Math I S1	D	5.00	5.00	1.00
533503	Int Math I CP	D	5.00	5.00	1.00
534333	Integ Math II S	D	5.00	5.00	1.00
534926	Int Math 1 CP P	D	5.00	5.00	1.00
534926	Int Math I S1	D	5.00	5.00	1.00
535092	Int Math I CP	D	5.00	5.00	1.00
535092	Int Math I CP	D	5.00	5.00	1.00
535197	Int Math I CP	D	5.00	5.00	1.00

Masked ID Number	Course Title	Mark	Credit Attempted	Credit Completed	Performance Level
535351	Int Math I CP	D	5.00	5.00	1.00
540132	Int Math 1 CP P	D	5.00	5.00	1.00
541082	Int Math I CP	D	5.00	5.00	1.00
541501	Int Math I CP	D	5.00	5.00	1.00
541650	Int Math I CP	D	5.00	5.00	1.00
541672	Int Math I CP	D	5.00	5.00	1.00
543603	Int Math I CP	D	5.00	5.00	1.00
546165	Int Math I CP	D	5.00	5.00	1.00
534634	Int Math I CP	D-	1.00	5.00	1.00
534756	Int Math I CP	D-	5.00	5.00	1.00
535092	Int Math I CP	D-	5.00	5.00	1.00
541672	Int Math I CP	D-	5.00	5.00	1.00
542459	Int Math I CP	D-	5.00	5.00	1.00
542958	Int Math I CP	D-	5.00	5.00	1.00
542634	Int Math I CP	D+	5.00	5.00	1.00
543251	Int Math I CP	D+	5.00	5.00	1.00
532200	Int Math I S1	NM	5.00	5.00	1.00

Note. Of the 358 student enrollments in the ACSD from the 2016-17, 2017-18, 2018-2019, 2021-22, and 2022-23 school years, 100 student enrollments earned 10 credits (a full year of Algebra 1 instruction) and earned a grade of D- or higher, which equates to meeting the CA high algebra graduation requirement. Among these students, only one student scored a two, which equates to the “nearly met” level on the CAASPP math assessment.

Appendix O

Themes and Sub-Themes (Table 11)

Themes & Subthemes

Theme	Subtheme	Subtheme
Curriculum	Teachers' content	Pedagogical knowledge
Instruction and Technology	Differentiating instruction	Personalizing instruction
The IEP Designation	Dyscalculia	Modifications and Accommodations

Appendix P

Final Report to ACSD

D. Sung Choe
Phone: 949-783-8988
Email: dschoe@liberty.edu

[redacted]
Executive Director
Alternative Education Division
[redacted]

Dear Dr. [redacted],

As part of my agreement with [redacted], I provide an Executive Summary of my dissertation's findings. I thank the teachers and administrators who supported me in this research. I would like to particularly acknowledge [redacted] for providing me with archival student data and the Assessment, Accountability, and Continuous Improvement branch of the Educational Services Division.

The Executive Summary follows on the next pages.

Again, thank you for your support and leadership. If there is any way I can support RCOE to address the curricular and pedagogical recommendations from this dissertation's research, please do not hesitate to contact me.

D. Sung Choe
Doctoral Candidate
Liberty University
DATE

cc: [redacted]

EXECUTIVE SUMMARY

Introduction/Title of Research

Title: Educators' Perceptions for Low Performance on Mathematics State Assessment Among High School Algebra Students with Learning Disabilities in an Alternative Education Program in California.

The problem is that high school algebra students with LD in AE programs perform below or far below basic levels on the California State mathematics standards test despite receiving passing grades in the related algebra course.

The purpose of this case study was to understand educators' perceptions regarding factors that influence high-school algebra students with LD in an AE setting to score below and far below basic proficiency levels on the California math standards test despite receiving credit for the algebra course. These performance levels are referred to as Level 1 (Standard Not Met) and Level 2 (Standard Nearly Met).

Central Research Question

The central research question of this case study was: What are educators' perspectives on possible explanations for the low performance on mathematics state assessments among high school algebra students with learning disabilities in AE settings despite receiving graduation credit for Algebra 1?

Methodology

The methodology used was an intrinsic case study approach employing a survey, individual interviews, and student archival records. No students or their family members were contacted. All identifying information was masked to ensure confidentiality. From a participant pool of 60 teachers and administrators, 14 responded to a screening questionnaire. Of the 14 respondents, 11 completed the survey, and 10 participated in the interviews. The IT department provided student data. All student identification information was masked; the IT department assigned the students random numbers. Student archival records of semester math grades and their math state assessment scores were provided from the 2016-17 school year to the present. No information was available for the 2020-21 school year due to COVID-10 restrictions. Of the 1288 student enrollments in Algebra 1 and corresponding math courses, 641 students received directed instruction from RCOE teachers. Student data was delimited based on five credits earned out of five credits attempted, earning a grade of D- or higher.

Findings

The findings pronounced the theme of curriculum and instruction, emphasizing teachers' content and pedagogical knowledge and differentiating and personalizing instruction for students. Educators noted the importance and need for teacher training in foundational math concepts, instructional strategies, and the concept of dyscalculia. Educators noted the heavy reliance on technology (videos from Canvas and YouTube) to provide mathematics instruction to their students. Of the 641 student enrollments, only one student earned a Level 2 mark (standard nearly met) on the math portion of the CAASPP. All other students earned a Level 1 (standard not met). Compared to the previous CAST test, these rankings would be below proficiency (Level 2) and far below proficiency (Level 1).

Recommendations

The following recommendations are offered based on these findings.

1. Professional development should target teachers' content knowledge of foundational math topics.
2. Professional development should focus on the concepts of dyscalculia.
3. Teachers should be trained to appropriately use technology in their instructional practices related to math concepts.
4. Training should be provided for implementing appropriate scaffolded and differentiated mathematics instruction.

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