2023

# Middle School Teachers' Data Sense Making to Inform Individual Education Programs

Jemma J. Shillingford
*Walden University*

# Walden University

College of Education and Human Sciences

This is to certify that the doctoral dissertation by

Jemma Shillingford

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. Stephanie Gaddy, Committee Chairperson, Education Faculty
Dr. Emily Green, Committee Member, Education Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

Walden University
2023

Abstract

Middle School Teachers' Data Sense Making to Inform Individual Education Programs

by

Jemma Shillingford

MA, Jersey City University, 2005

BS, Jersey City University, 1997

Dissertation Submitted in Partial Proposal

of the Requirements for the Degree of

Doctor of Philosophy

Special Education

Walden University

September 2023

## Abstract

Annual goals are an essential component of Individual Educational Programs (IEP), which are developed for students with disabilities, and which are informed by data. However, the methods and practices that special educators use to make sense of data to inform the annual IEP goals represent a gap in research literature. This qualitative study was conducted to explore how sixth-through-eighth-grade special educators in urban public middle schools make sense of data that informs annual IEP goals. The research question asked how sixth-through-eighth-grade special educators in urban public middle schools make sense of data to inform annual IEP goals to target students' specific learning needs. Using purposeful sampling, 11 certified special educators who were permanently employed by the school district, and instructed students with IEPs voluntarily participated in this study. Data were collected through semi-structured interviews via Zoom conferencing. Interviews were recorded, transcribed, and coded using an in vivo approach. Seven themes emerged from the data analysis (a) changes in data use, (b) using data for goal alignment, (c) types of data collected, (d) data analysis, (e) understanding the data, (f) adding meaning to data, and (g) challenges encountered when making sense of data. District leaders, policy makers, and school administrators may use the findings of the study to influence decision-making, empower special educators, and enhance special education practices. This study has the potential to contribute to positive social change by providing scholarly information, to precisely target specific learning needs of students with disabilities in urban public middle schools.

# Middle School Teachers' Data Sense Making to Inform Individual Education Programs

by

Jemma Shillingford

MA, Jersey City University, 2005

BS, Jersey City University, 1997

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Special Education

Walden University

September 2023

# Dedication

I dedicate this doctoral study to my dear husband, Ikes, for his encouragement and emotional support through this arduous journey. Also, to my children Ikna and Obrey, as a motivation for them to accomplish their dreams and to encourage them to be the best that they can be. To my sister Nesma, brother Lloyd and brother in-law Kenny who empowered me in unique ways.

Acknowledgments

I would like to thank my Committee Chair, Dr. Stephanie Gaddy, for guiding me through writing this study. I acknowledge my colleagues and friends for giving me the confidence to persevere.

Table of Contents

List of Tables

# Chapter 1: Introduction to the Study

In urban public-school districts, high percentages of the student population receive special education. According to Barnes et al. (2019), the U.S. Department of Education reported that the number of students receiving special education in public schools increased by two million over the last 2 decades. Although inclusion is the preferred placement for students with disabilities, the U.S. Department of Education (2018) reported that about 800,000 students with disabilities receive educational services in resource rooms and self-contained special education settings (Barnes et al., 2019).

Relative to general education student population, students with disabilities have considerably lower achievement scores (Hock et al., 2017; Hurwitz et al., 2020). Because of this, researchers have argued that the learning needs of students with disabilities are not effectively targeted (Debbag, 2017; Hock et al., 2017; Hurwitz et al., 2020). Students with disabilities have limited academic and social success compared to the general education student population (Hock et al., 2017; Hurwitz et al., 2020). Administrators and school leaders are in pursuit of strategies that will adequately address the academic and social needs of students with disabilities.

Increasingly, researchers have focused on data use and its capabilities to improve students' learning. Keuning et al. (2017) highlighted data as a strategic tool for effectively targeting students' specific learning needs. Although the importance of data in education cannot be overstated, Park et al. (2017) cautioned about the distinct difference between collecting data and the actual use of data to inform students' learning. Additionally, Chen (2019) reported that only 20% of public-school teachers use data

interpretations to inform students' learning goals. Park et al. (2017) recognized the need for research on data sense making for informing annual goals for students with disabilities. In this context it is vital to conduct research to understand the use of data sense making to inform individual education programs (IEPs) for students with disabilities. Knowing how data are used to inform annual goals for IEPs will enable educators to be more decisive with data use and more resolute in writing annual IEP goals.

## Background

Several paradigm shifts have occurred in the field of special education across the last twenty years (Gavish, 2017; Hurwitz et al., 2020). More recently, the push for academic rigor in special education programs has shifted the focus to finding strategies for targeting the individual needs of the students (Gavish, 2017). Based on education policies, students experience greater academic success when their learning needs are strategically targeted through data use (Chen, 2019; Ruble et al., 2018; Wagner et al., 2017). Keuning et al. (2017) conducted research to compare intervention effects derived from data on students' achievement growth in different school settings and found that instructions can be tailored to meet students' specific learning skills through data use. Traditionally, data use in special education was limited to accountability purposes but with a shift to academic advancement for all students, data use is now focused on improving student academic performance. Ruble et al. (2018) investigated external and internal factors associated with special educators' perceptions of data use and concluded that data can be more impactful on students' success achievements when they are used to

inform annual IEP goals. These goals state students' current academic functional levels, as well as a trajectory for achieving success to the next level.

Data use is not completed with data analysis, but clearly, how information from data analysis is used to direct instruction is of most importance. Vanlommel and Schildkamp (2019) argued that data use will not automatically lead to improved student learning. Instead, it is conditioned upon various factors related to educators' data knowledge and ability to conceptualize data in the context in which it is intended. Teachers' interpretations of available data, inferences made from observations, and other available alternative data sources are all important steps in the process of data sense making. These steps must culminate in actionable information, which will lead to improvements in students' learning.

Conversely, Park and Datnow (2017) found that there was limited research knowledge to inform on how teachers derive actual knowledge from data and factors that shape data sense making. Similarly, Park et al. (2017) recognized the need for more research to describe teachers' thought processes and reflective activities during data deliberations for enacting data into actionable knowledge. Equally important, Ruble et al. (2018) recognized that data collection can be overwhelming for special educators. The overwhelming factors include (a) the scope of information needed to make decisions about the totality of each student's learning needs and (b) the ability to effectively target students' learning challenges and simultaneously improve students' learning strengths. In fact, Chen (2019) and Park et al. discovered that although teachers routinely collected

data to track students' behavior, social interactions, and academic performances, teachers' actual use of data for informing instructional goals was limited.

Wagner et al. (2017) compared special education teachers' data literacy skills to general education teachers and the researchers concluded that special education teachers required data training to improve their understanding of data analysis and data interpretations for making decisions. Although Ruble et al. (2018) assessed special education teachers' data collection practices for monitoring IEP goals, the researchers did not evaluate how special education teachers conceptualize data for developing annual IEP goals. There is a concerted effort to move away from the traditional approach of using data for accountability purposes to a more contemporary data use of supporting academic advancement.

Nicholson et al. (2017) examined skills teacher leaders used to guide colleagues on learning how to participate in data decision conversations. The researchers discovered that educators needed to develop a new mindset about what constitutes quality data for data-driven decision making. Park and Datnow (2017) investigated how teachers engage in data-driven decision making and found that districts and schools, imposed conditions for providing differentiated instructions for students based on assessments and curriculum tools. However, teachers did not trust the logical data conceptualization and the criteria provided to make sense of data.

Data use is a process of progressive actions for the purpose of data-driven decision making. Keuning et al. (2017) provided a model for data decision making and listed goal development as the second component in the process. Goals are derived from

interpretations of students' data. Furthermore, goals must be specific, measurable, attainable, relevant, and time bound. Educators' attitudes, teaching quality, and data norming affect teachers' abilities to conceptualize data (Keuning et al., 2017). Data use is now a critical aspect of teachers' professional competencies. Teachers have the responsibility of collecting, analyzing, and interpreting data to make decisions about students' learning achievements.

The student population in urban public middle schools is diverse and a large percentage of the student body are students with special needs receiving instructions in special education programs (Barnes et al., 2019). Educators are tasked with developing annual IEP goals to precisely target the specific learning needs of each student. Thus, special educators in urban public middle schools will benefit from the findings of this study. Additionally, the knowledge derived from this study may help close the gap in research knowledge on data sense making for informing annual IEP goals.

## Problem Statement

The problem addressed in this study is the need to understand how special educators in urban public middle schools make sense of data to inform annual IEP goals. Data sense making is used in classrooms for academic improvements and accountability purposes in various ways. However, there is a gap in research knowledge regarding the understanding of data sense making for informing annual IEP goals for targeting specific learning needs of students with disabilities. Data sense making is the process of analyzing performances to derive sensible, plausible understanding about students' data and enact changes in teaching and learning practices.

With the introduction of common core state standards, special educators must adjust instructional practices to reflect the increased rigor in subject content material, challenging curriculum, and standardized data. Like their general education colleagues, special educators are expected to use data to evaluate instructional practices and students' performance and to make instructional and changes based on data reports (Debbag, 2017; Ruble et al., 2018). However, researchers have recognized that although teachers engage in data interpretations, fewer public-school teachers use data interpretations to inform students' individual learning goals (Chen, 2019). Moreover, researchers suggest that a more rigorous approach to data use is needed in public schools to target individual learning needs more effectively (Debbag, 2017; Ruble et al., 2018). Expert research knowledge to substantiate special educators' use of data to inform annual IEP goals is lacking, which creates a problem (Park & Datnow, 2017; Park et al., 2017; Ruble et al., 2018; Vanlommel & Schildkamp, 2019). Presently, there is a need to understand how special educators use data to target specific learning needs of students with disabilities. Exploring special educators' data sense making will give insights into how information derive from data interpretations is used to inform annual IEP goals for students with disabilities (Vanlommel & Schildkamp, 2019).

## Purpose of the Study

The purpose of this basic qualitative study was to explore sixth-through-eighth-grade special educators' data sense making to inform annual IEP goals to target the specific learning needs of students with disabilities. Special educators include special education content teachers, speech specialists, and content specialists who collect and use

data to inform students' performance. To be meaningful, data must be organized for a particular purpose and context. According to Vanlommel and Schildkamp (2019), data will not automatically lead to improved student learning, but rather, teachers must add meaning to data in the context for which the data is used. In the context of writing annual IEP goals, educators must engage in data sense making to ascribe meaning to data. The focus is on understanding special educators' deliberate interpretations, verbal summarization, and articulations of identified patterns in data and use of that knowledge to articulate and write annual IEP goals. Data sense making is used in the process of triangulating qualitative and quantitative data as well as analyzing and interpreting data for informing IEP goals development. This study can provide special educators in urban public middle schools with the research knowledge to make sense of data to set annual IEP goals that target students' learning needs.

## Research Question

RQ: How do sixth-through-eighth-grade special educators in urban public middle schools make sense of data to inform annual IEP goals to target students specific learning needs?

## Conceptual Framework

The conceptual framework aligned with this qualitative study is constructivism learning theory, which is associated with the early works of Vygotsky (1978) and Piaget (1968). The key principles of constructivism describe the context for sense making as well as how sense making is derived. Vygotsky (1978) emphasized the social aspect of constructivism and posited that the process of making meaning is controlled by the

cultural and social condition. Conversely, Piaget's (1968) philosophy of constructivism focused on how meaning is acquired and the individuality of learning. The learning theory of constructivism was relevant to this research, as it provided the structure for understanding the principles of sense making. In the process of making sense of data, special educators build on their data literacy skills, articulate data summaries, and reorganize prior knowledge in the context of gaining new data knowledge to add meaning to data.

A working conceptualization of data sense making is that it is a process through which data are interpreted and evaluated to be sensibly understood to make decisions (Vanlommel & Schildkamp, 2019). In the process of data sense making, educators give meaning to students' data to identify learning discrepancies while simultaneously developing intervention programs to accurately target these needs. Vanlommel and Schildkamp (2019) described some integral data sense making steps, including (a) understanding the context of the data collected, (b) knowing what data to exclude, (c) cross-checking data from various sources, and (d) collaborating with other educators to eliminate bias assumptions and personal beliefs. Data sense making is a coordinated process, which must be facilitated by individuals with data training and supported with the necessary tools.

The focus of Piaget's (1968) theory of constructivism is the individual's cognitive process and how knowledge is acquired. Special educators are expected to be proficient in data sense making (Wagner, et al., 2017), yet in current research special educators are

characterized as having limited data skills. Mandinach and Gummer (2016) recognized that special educators need to learn how to engage in data sense making.

Constructivists posited that learning is a social activity and that the environment influences learning (Vygotsky (1978). In fact, education policies, such as the No Child Left Behind Act (NCLB) and Every Student Succeeds Act (ESSA) were established to advocate for the implementation of collaborative teams in schools to build teachers' competencies. Fullan and Quinn (2016) described a learning culture in which teachers work collectively in collaborative cultures to increase feelings of efficacy and transparency. Through a process of discussions and analytical inquiry from different perspectives, educators derive new knowledge about the interpretations of students' data while also developing new data skills to arrive at common goals. Schools established data teams (Schildkamp et al., 2019) with shared values to support collaboration among educators across disciplines to analyze students' data from different points of view. However, Piaget cautioned that educators must be open and willing to learn from each other for collaboration to be productive or effective.

Constructivism philosophy recognizes the individuality of the cognitive process in understanding that everyone's learning experience is unique (Piaget, 1968). Therefore, data sense making will be different for each educator, as individuals assimilate information differently. Furthermore, building new knowledge is contingent upon the interaction of prior knowledge with new knowledge, which means that in data sense making educators might have to reorganize prior data experiences to accommodate new data skills and knowledge. Undoubtedly, the structures of constructivism are used to

facilitate learning in a context and environment in which special educators are expected to engage in direct interactions with colleagues collaboratively (Vygotsky, 1978).

Circumstances mitigating educators' adeptness at data sense making are not solely related to educators' competencies and quality of data knowledge (Nicholson et al. (2017). On the contrary, situations, which are not intrinsic to educators' data competencies, are cited as contributing greatly to challenges experienced when engaging in data sense making. The environmental setting and structures established within which educators practice data sense making often create obstacles and limitations, which adversely hinder their abilities and capacities to use data knowledge and tools to influence data sense making more effectively. Chen (2019) and Nicholson et al. (2017) described time constraints, current and accessible data resources, and building capacity as some of the crucial challenges experienced in the environmental setting where data sense making is practiced and experienced.

Data sense making for informing annual IEP goals will include analyzing and evaluating data in collaborative settings in which educators and other team members interpret data displays and articulate data information given from an expert's point of view. This process of data sense making is essential for informing the IEP annual goals. Mandinach and Gummer (2016) stated that the skill of interpreting data displays and a repertoire of skills to articulate data interpretations are central to teaching and learning.

## Nature of the Study

A basic qualitative research approach is used to explore participants' real experiences in a naturalistic environment (Ravitch & Carl, 2016). Data for this study

were collected through one-on-one semi structured interviews with 11 participants who responded to open-ended questions to provide detailed narratives of their experience with the phenomenon. I used qualitative analysis to generate meaningful information to develop a broader understanding of how special educators engage in data sense making to inform annual IEP goals as well as to target specific learning needs of students with disabilities.

Researchers use a basic qualitative research study to find meaning in people's life experiences through in-depth interviews with each participant (Ravitch & Carl, 2016). Consistent with the qualitative research study approach, a small number of special educators were carefully selected to provide in-depth understanding of the phenomenon. These special educators included special education content teachers, content specialists, and subject interventionists. These certified special educators are permanently employed in urban middle public schools. The special educators instructed students with IEPs in inclusive, resource, and self-contained special education instructional programs. A major intent of conducting qualitative research is to obtain quality information rather than quantity and a small, participant sample size often provides the depth of knowledge sufficient to understand the phenomenon. Nevertheless, Ravitch and Carl (2016) explained that the sample size is dependent upon reaching data saturation or the point at which additional data are not necessary.

## Definitions

*Data:* Assessment data and other forms of student achievement data, also other forms of structurally collected qualitative or quantitative data on the functioning of the

school, including input data (student background data), process data (classroom observations and teacher interviews), context data (information about the building), and output data (student achievement data, student satisfaction questionnaire data)" (Schildkamp et al., 2017, p. 242).

*Data-use*: The process of systematically analyzing existing data sources in the school, applying the analysis outcomes to innovate teaching, curricula, school performance, and implementing and evaluating these innovations (Schildkamp et al., 2019).

*Individual Education Program (IEP):* An IEP is an individual education program scheduled for 1 year. The program is used to discern students' current education performance, long- and short-term goals, special services, and resources that the student requires, and modifications to the environment. The IEP depicts the starting time of the service along with duration and evaluation criteria (Debbag, 2017).

*Learning goals*: Learning goals refer to the performance outcomes of learning targets used to assess, monitor, and guide cognition. Learning goals should be specific, measurable, attainable, relevant, and time-bound (Camp, 2017).

*Research-based practices*: Research-based practices are identified as having the most positive impact on students learning outcomes (Cook & Odom, 2013).

*Special education*: A combination of individually planned educational services that aim to maximize an individual's probability to live independently. It is offered to students who demonstrate cognitive, behavioral, or social-emotional inadequacy (Diken, 2013, as cited in Debbag, 2017).

## Assumptions

The current study was built on the assumption that participants are not only representative of the larger population but would be candid and detailed in describing experiences and knowledge about analyzing, synthesizing, interpreting, and evaluating data for developing annual IEP goals. I also assumed that participants would want confidentiality and identity protection for participating in the study.

## Scope and Delimitation

The scope of the study was special educators in urban public middle schools. This study was delimited to certified special educators in urban public middle schools instructing in resource settings, self-contained setting, and inclusive programs. This study was delimited to special educators working with students with disabilities with IEPs in sixth-through-eighth grade.

The sample population comprised certified special educators who collect, analyze, and interpret students' data to inform annual IEP goals. These special educators include special education content teachers, instructional interventionists, and content subject specialists. Based on the gap in research literature on the topic, I was motivated to conduct this study to explore how sixth-through-eighth-grade special educators in urban public middle schools make sense of data to inform annual IEP goals.

## Limitations

Undoubtedly, weaknesses in the methodology of the basic research study might pose limitations to the study, specifically the small sample population and data saturation (Vasileiou et al., 2018). Because of the potentially small number of participants, the

study's transferability may be limited to other populations. The participants were selected for their unique positions to provide expert knowledge on the topic. Based on their unique roles and accessibility factors, the participants could not be interchanged with, for example, educators who do not teach students with IEPs.

Additionally, time constraints also presented a limitation because of the timeline to complete the study. Also, during data analysis, I meticulously filtered through each participant's data to obtain a thorough understanding of the unique experience with the phenomenon. Moreover, the public imposed restrictions due to COVID-19 affected my ability to complete the study within a concise period, as people were consumed with matters related to the pandemic. In-persons contact was discouraged, which necessitated virtual meetings. The virtual interviews limited my ability to observe subtle changes in participants' body language as they responded to questions. My limited experience in conducting research may also have contributed to the study's limitations. In addition, although I attempted to eliminate them, my personal bias and subjectivity may affect the outcomes of the findings.

The preponderance of the literature reviewed for this basic qualitative study covered studies conducted internationally. The specific context of this study was urban public middle schools with a selected population of special education teachers. The context may not represent all urban public middle schools. This basic qualitative research study is expected to contribute to building a deeper understanding of how sixth-through-eighth-grade special educators in urban inner-city public middle schools make sense of

data for informing annual IEP goals for students with disabilities to meet their specific learning needs.

## Significance

This study was uniquely suited to provide much needed knowledge on data sense making for informing annual IEP goals in the field of special education. Park and Datnow (2017) recommended further study in this area after discovering how teachers make sense of data and factors that shape data sense making are understudied. Similarly, Park et al. (2017) supported the need for this research study by presenting evidence to show that there is limited research on the process of data sense making for informing instructional practices.

Additionally, Schildkamp et al. (2017) discovered that teachers have limited knowledge concerning data use in schools despite the emphasis placed on the use of data for improving students' academic learning outcomes. Moreover, Van Boxtel (2017) revealed that an area of challenge for special education teachers is aligning the IEP goals to the state standards. The annual IEP goals describe students' present levels of performance, long and short-term goals, and special training services (Debbag, 2017). A comprehensive analysis of students' data is imperative for an accurate representation of students' weaknesses and strengths as well as manifestations of areas of special needs.

Unquestionably, based on research literature there are benefits to be gained from data use in classrooms (Keuning et al., 2017). However, educators must engage in data sense making, adding meaning to data to conceptualize how the data relates to individual students before data information can be used to target students' challenges through IEP

goals. As special educators become more skilled at data sense making for informing annual IEP goals, students with disabilities will improve in social functioning, communication, behavior, and academic abilities. These improvements will help strengthen students' skills for college and job readiness in a competitive global job market. When annul IEP goals are rigorous and meticulously structured to target specific skills and learning deficiencies, students are more likely to show substantial academic improvements.

Special educators may use the findings from this basic qualitative research study to better prepare to engage in data sense making for informing annual IEP goals. When students' learning needs are accurately targeted and supported with data, students are more likely to experience learning successes. With enhanced learning success, students will have better chances of accessing higher education and preparing for the 21st-century job market. In addition, students are more likely to become functional and productive members of society.

## Summary

In Chapter 1, I emphasized the need to understand data sense making for developing annual IEP goals. Through this research, special education teachers in urban inner-city public middle schools may have a broader understanding of how to analyze, synthesize, and evaluate qualitative and quantitative student data to inform annual IEP goal development. Although there is much research on data use in education, limited research has been conducted on how special education teachers make sense of data. Although teachers have recognized the benefits of data use, their actual use of data for

effective decision-making is limited. Furthermore, Debbag (2017) claimed that the learning needs of students with disabilities are generally not effectively targeted in public schools.

# Chapter 2: Literature Review

The problem addressed in this study is related to the lack of informed knowledge on how special educators use data sense making to inform annual IEP goals. The purpose of this study was to explore sixth-through-eighth-grade special educators' data sense making to inform annual IEP goals to target the specific learning needs of students with disabilities. In this chapter, I discuss the conceptual framework and relevant literature. Next, I provide an extensive review of empirical research literature related to data sense making for informing annual IEP goals. The key concepts examined are data sense making, data literacy, factors impacting data sense making, IEP annual goals, data use in special education programs, data skills requirements, and data use in challenging schools. I used these key concepts and terms to focus on the impact of data sense making in different contexts in the classroom while also contrasting the deficiencies of special educators' data sense making skills.

In reviewing the literature on data sense making in education, researchers have focused on data use for placement, differentiating instructions, increasing test scores, and providing education equity (Cramer & Gallo, 2017; Park et al., 2017; Vanlommel & Schildkamp, 2019; Wagner et al., 2017). However, despite the intense focus on data use in education, not all learning programs made data use a data was not priority for improving students'learning. The recent ESSA of 2015 provides for data use in all aspects of education and in all educational programs, including special education. Although some scholars are skeptical of the impact of data on students' learning (Vanlommel & Schildkamp, 2019), there are calls for increased data use for achieving

greater academic successes. Researchers revealed that having advance data knowledge, functional data teams, organizational data structures, and leadership support for data use will enhance data understanding in education (Chen, 2019; Fullan & Quinn, 2016; Mandinach & Gummer, 2016; Nicholson et al., 2017; Vanlommel & Schildkamp, 2019).

Notwithstanding these critical factors for enhancing data understanding, special education and urban schools are accruing differences in data understanding, which cannot be overlooked. Special educators' inadequate data use is exacerbated by the increasing data rigor and overwhelming data collection in special education. These factors have contributed to misconceptions in understanding students' data and diminishing ability to identify discrepancies in students' learning (Camacho et al., 2018; Chen, 2019; Chikwe & Cooper, 2019; Keuning et al., 2017; Nicholson et al., 2017; Park et al., 2017; Ruble et al., 2018; Wagner et al., 2017). Understandably, researchers have focused on the existing knowledge on data sense making in specific contexts while also making suggestions for areas in need of research developments.

## Literature Search Strategy

The literature review included 50 peer-reviewed articles focusing on data sense making for informing annual IEP goals in urban public middle schools for students with disabilities. The peer-reviewed articles were published within the last 5 years. The search terms and phrases used included *data sense making, data use, individual education plan, annual IEP goals, special education programs, data literacy, learning goals, research-based practices, and challenges in inner-city schools.* The Internet-based search engines and databases included the Walden University database, Education Resource Information

Center, ProQuest, Education Research Complete, Science Direct, Education and Urban Society, SAGE Publications, Taylor and Francis Online, EBSCO, and Google Scholar.

## Conceptual Framework

The conceptual framework of this study was supported by the constructivist theory of learning. The theory of constructivism includes tenets of sense making for developing understanding for acquiring knowledge. The theory of constructivism is associated with the early works of Piaget (1968) and Vygotsky (1978). In the context of this qualitative study, the aim was to explore special educators' data sense making to develop annual IEP goals. I used the theory of constructivism as a structure for understanding the context in which special educators facilitate data sense making.

In the constructivism theory, Piaget (1968) focused on how sense making occurs, whereas Vygotsky emphasized what influences the practice of sense making (Gash, 2019). School is a social institution with routines, culture, and structure, and educators interact with these constructs to develop knowledge and act upon that knowledge (Billingsley et al., 2019). This process of developing knowledge involves the development of capacities to enable individuals to identify discrepancies between what they know and what they are expected to know (Piaget, 1968, as cited in Gash, 2019).

I structured the research question to determine how six-through-eighth-grade special educators in urban public middle schools make sense of data to inform annual IEP goals. Data sense making involves complex and demanding cognitive processes (Wagner et al., 2017), and in the process of sense making, individuals use these cognitive processes to connect prior knowledge to newly acquired knowledge and apply the new

understanding to create change. Dewey (1938) also believed that sense making is a continuous process of reconstructing meaning. In this context educators are continuously reconstructing the understanding of data, and data use to accommodate changes in the context in which data use are conceptualized in special education (Hurwitz et al., 2020). This process involves external factors such as leadership, building organizational capacities, as well as individual internal skills and knowledge to engage the environment to conceptualize data and the context for which the data understanding will be applied.

Special educators collect and analyze qualitative and quantitative data in varied representations to identify and prioritize long-term and short-term IEP goals and to design instructions to meet these goals (Billingsley et al., 2019). Consequently, data sense making is an active process of thinking, discussing, and problem solving through interactions with other individuals and available resources. The IEP goals are used to align the individual learning programs to the state standards and educators need to have precise information from data sense making to affect realistic alignment of students' functional learning levels to the common core state standards (Van Boxtel, 2017).

Individuals bring personal experiences and knowledge to sense making (Piaget, 1968). A key tenet of constructivists' belief is that individuals vary in the process of assimilating information and that acquisition of new knowledge is contingent upon prior knowledge. Moreover, constructivists believe that knowledge is not mechanically acquired but rather knowledge is actively constructed within the constraints of the environment. Special educators need the social context of the environment to collaborate and communicate data interpretations and learn these skills from others in their social

context who are more knowledgeable (Mandinach & Gummer, 2016). Education policies such as the Individual with Disabilities Education Act, promote collaborative cultures in schools to facilitate data collaborative meetings and draw on school leadership capacities to guide and support educators' learning engagements (Fullan & Quinn, 2016).

Adults learn through problem solving and experientially by actively engaging in cooperative learning (Vygotsky, 1978). In addition, educators' prior experiences with data and teaching experiences will influence how educators actively engage in data sense making. Educators address students' data from varying perspectives (Chikwe & Cooper, 2019), and educators have pre-existing individual assumptions of students' capabilities. Having varied perspectives about students' data provides the context for data sense making discussions while developing new knowledge about the interpretations of data. Further, systematic data structures and data norms established at the school will greatly impact teachers' ability to engage in data sense making (Schildkamp et al., 2017).

Learning from the more knowledgeable others is a major tenet of constructivism (Vygotsky, 1978), and in the school environment, teachers possess different levels of data skills and knowledge and have varying experiential levels in data sense making. Therefore, data sense making must be conducted in an environment that is supportive of data collaborations and data training. An environment that nurtures educators' learning is at the center of constructivism and Piaget (1968) contended that humans create knowledge through interactions with the environment and their experiences. As educators have varying levels of data experiences and by engaging in collaborative activities to practice analyzing, synthesizing, and evaluating data, educators can become more

proficient at data sense making. Constructivists have posited that learning is best done in a social context with opportunities for building professional capacities to improve students' performance.

Ruble et al. (2018) recognized that data collection can be overwhelming for special educators. Special educators collect a variety of data and coordinate multiple sources of data to provide authentic information on students 'general performance (Schildkamp et al., 2017). The overwhelming factors include (a) the scope of information needed to make decisions about the totality of each student's learning needs and (b) the ability to effectively target students' learning challenges while simultaneously improving the students' learning strengths. It is important to crosscheck and organize data from varying sources into meaningful, useful contexts to present a picture of the student's functional, behavioral, social, and communicative abilities. Connected to that activity is the ability to make sense of the data.

The role of special educators has advanced academically, and educators must develop IEP which are challenging and specific to students' needs (Hurwitz et al., 2020). Therefore, special educators must improve in data sense making capabilities. Although data sense making is not a new skill for special educators, a shift in data focus to a growth-based philosophy adopted in special education requires educators to have advance data skills (Hurwitz et al., 2020), meaning that special educators must be retrained in their conceptualization of data use to improve students' performances.

## Literature Review of Key Concepts

The literature review is used to present current research on data sense making. In the literature review, the key concepts investigated include data sense-making, data literacy, factors impacting data sense-making, IEP annual goals, data use in special education programs, special educators' data skills requirements, and data use in challenging schools. I used these key concepts and terms to focus on the impact of data sense making in different contexts in the classroom while also contrasting deficiencies of special educators' data sense making skills.

### Data Sense-Making

The use of data for decision making in education was popularized by the No Child Left Behind Act (2001) (NCLB) and further emphasized by Every Student Succeeds Act of 2015 (ESSA). These policies propelled the use of data in all aspects of education and, most importantly, as a tool for improving students' learning. A critical aspect of data use is data sense-making, which entails analyzing data to identify trends and patterns and exploring patterns to understand students' learning habits is not practiced by teachers. Mandinach and Gummer (2016) acknowledged that currently, there is minimal research literature informing about how educators use knowledge and skills to make inferences and interpretations of students' data. Some schools have established rational criteria and whole school data norms to base data decisions. At the same time, other educators continue to support data decisions through intuition and personal knowledge.

To illustrate, Vanlommel and Schildkamp (2019) conducted a qualitative research case study focusing on how teachers make sense of data for high-stakes decisions. The

participants in this study included 56 primary school teachers randomly selected from a list of teachers in the primary schools in the same province in Belgium. The emerging theme was that various data are collected for data sense making. Examples of data collected include the systematical collection of attendance records and summative and formative test scores and the random collection of other forms of data through class observations and students' interactions. Although there were structures for collecting and analyzing data, the results indicated that some teachers felt more comfortable using personal knowledge and intuition to analyze rational data instead of the established predefined criteria. In the discourse, researchers pointed out complexities of data sense making and teachers' beliefs that influenced decisions were given minimal consideration when making decisions. Although the research was conducted on a small scale and in a specific context, its findings provide knowledge on how teachers make sense of data. Vanlommel and Schildkamp (2019) recommended replicating the findings in other high-stake contexts. They suggested further research to examine if and how a teacher's data decision-making approach differs based on the purpose of the decisions and the context in which data conversations are held.

The NCLB mandated accountability and compliance measures for data use. However, changes in education policies positioned data to be differently for academic advancements for all students. Data sense making is used for different purposes within the classroom context, primarily placement routines, differentiation, and increasing test scores. At the same time, the process of data sense making is framed by an educator's understanding of available data, quality of data, and educators' data knowledge and

experiences. Park et al. (2017) conducted a multi-site qualitative case study using data gathered from a larger case study involving fourth- and fifth-grade teachers in three public elementary schools in the United States. In this study researchers examined how data were used for classroom placement routines. Teachers were interviewed and observed during meetings. A total of 100 hours of observations were conducted to gather firsthand information. The researchers found that the processes of analyzing and interpreting data for making decisions varied based on the teachers' assumptions and goals for their students. Park et al. identified differences between collecting data and using data to base decisions and suggested further research to understand how data are used in specific contexts to improve students' learning.

Data reports and information are open to varied interpretations. Chikwe and Cooper (2019) used a qualitative phenomenological study to explore how school leaders made sense of data. Nineteen school leaders from seven California comprehensive high schools participated in the study. The authors identified that data interpretations were used as a diagnostic tool, critical roadmap, and reference point for crucial conversations. The recurring theme was that data are used to achieve equity in urban schools and in marginalized populations. According to the authors, data provide directions and information to be applied based on the decisions to be made. Still, it is up to the teachers to use the information and knowledge to accomplish goals. Moreover, to understand data, teachers must develop ways of knowing and thinking about data.

**Data Literacy**

Data literacy and the ability to understand data are crucial components of data sense making. However, there are growing concerns in research about the quality of teachers' data literacy skills and abilities to engage in data conversations (Mandinach & Gummer, 2016). In the context of teaching, data literacy is the ability to transform information into actionable instructional knowledge and practices by collecting, analyzing, and interpreting all types of student data (Mandinach & Gummer, 2016). In discussing the components of data literacy, Mandinach and Gummer described the ability to transform information into decisions and evaluate outcomes as the most relatable data sense making factors. Nonetheless, the authors argued that these components of data literacy were most neglected in data literacy descriptors for educators.

Wagner et al. (2017) conducted a qualitative research study with 36 preservice special education teachers and three experts in curriculum-based measurement (CBM). Convenience sampling was used to recruit teachers from two universities in the Midwest. The researchers used think-aloud procedures to elicit responses from the participants. The emergent themes in this study included teachers' lack of ability to read and interpret data graphs. Based on the findings, the researchers found that preservice teachers lack data literacy, sequential coherence, specificity, reflectivity, and accuracy to be fluent at data sense making. The researchers suggested future research to determine how to best promote effective communication about students' academic progress with stakeholders.

Similarly, Beck et al. (2020) conducted an emergent, qualitative research design to explore teachers' perspectives on data literacy for teaching in a study that involved 12

elementary and special education teachers. The study was set in an urban university in the southwestern United States that prepares teachers for the large, ethnically, and linguistically diverse school districts. The researchers replaced people's names and places with pseudonyms. The results revealed that participants had misconceptions regarding formative and summative data and lacked the vocabulary to engage in data conversations.

Significantly, data conversations go beyond descriptions of assessments and tests to a wide range of information about the students' general functioning. In most of the literature on data sense making in education, researchers focused on providing knowledge about data decision-making in the context of classroom routines, student placements, educational accountability, improved instructions, and improved test scores. The use of data for tailoring education goals for students with disabilities is a priority in special education. Vanlommel and Schildkamp (2019) highlighted that both rational and spontaneous data are collected and that teachers use both intuition and rational criteria in data decision-making. However, a discussion of the data sense making approach utilized for annual IEP goal development is lacking in the literature.

According to Schildkamp et al. (2017), data information provides direction. However, teachers must add meaning to data to apply the directions to students' needs. As such, special education teachers need a repertoire of data terms and understanding these terms to engage in data sense making in collaboration with colleagues. Although the significance of data literacy skills for data conversations has been highlighted in research literature, teachers' deficiencies in data literacy and fluency in data conversations about students' progress remains a problem in research. The current

research provides information on data use in the context of special education in urban public middle schools to help fill the gap in research on data sense making for informing annual IEP goals.

**Factors Impacting Data Sense Making**

Factors enabling or hindering data use are described as data characteristics, individuals and teams, organizational capacity, and functioning. The struggle teachers experience with data use and the variations between intervention effects across different schools are identified as consistent themes in the research literature (Keuning et al., 2017; Schildkamp et al., 2019). Additionally, high teacher attrition rate in public schools creates challenges for school organizational structure as it disrupts consistency in data practices and cohesiveness in collaborative data teams. Data sense making is a critical component of data use, as it relates to conceptualizing data and transferring the understanding of the interpretation to actionable information to enact change.

The ability to graph, analyze, and interpret data to make instructional decisions is critical (Council for Exceptional Children, 2016a). Based on research literature, particular structures, routines, and norms existing at a school can influence teachers' data sense making, such as having functional data norms and data teams supported school wide. Schildkamp et al. (2019) conducted qualitative research with 1,073 Dutch secondary school teachers to investigate data use factors. Convenience sampling was used to select participants. The emerging theme in the study was that school organizational characteristics have tremendous influence on data sense making. These organizational characteristics include leaders, support teams, the availability of data, and the quality of

the data. Although the study was limited in scope because it was conducted in a specific context in a school system that differs from the United States, it has global implications for understanding data use. The study results significantly revealed that school organizational characteristics and data quality could influence data use for all purposes. Further, data user characteristics, such as teachers' data knowledge and experiences and data collaborative practices, will significantly impact data use in the classroom. Data user characteristics include having the knowledge and ability to analyze and interpret different forms of data and having pedagogical content knowledge. Significantly, data users need to understand how children learn and have the skills to use that understanding to diagnose students' learning needs and to develop data-based learning goals.

Data characteristics include having access to data and engaging in data collaboration with other teachers (Schildkamp et al., 2017). Data use is described as collecting, analyzing, interpreting, and conceptualizing data for making decisions to improve learning through effective instructions. Educators bring different levels of data skills and data knowledge to data sense making process. As such, educators should have the necessary leadership and organizational support and the structure to provide uniformity and consistency in a collaborative climate in which to share and discuss students' data.

Data-oriented schools facilitate and support teachers' data sense making skills. Keuning et al. (2017) conducted an exploratory study involving 20 primary schools to investigate the effects of educators and school organizational characteristics on data-driven decision-making for students' achievements. The researchers compared 10 schools

with strong intervention effects on students' accomplishments and 10 schools without intervention effects. Data collection tools included interviews and surveys. Factors that influenced data use included educators' data knowledge and skills, educators' attitudes towards data-based decision-making, and organization features such as leadership and collaboration. According to the study's findings, schools with strong effects on students' achievements have three main attributes, including being data-oriented, having teachers with higher teaching quality, and having staff with positive attitudes to data-based decision-making. However, the study was limited by a small sample size, which limits the generalizability of the findings.

Factors that contribute to effective data use can potentially create challenges for data sense making. Schildkamp et al. (2019) recognized that schools need support in data sense making. Drawing upon an earlier study by Schildkamp and Poortman (2015), the researchers conducted a study to investigate factors influencing data use by data teams in Swedish schools. Four schools from a municipality participated in the research, and each school had a data team supported by a coach. The teams were followed for over 15 months. Data sources included focus groups and individual interviews. The theme derived from the study is that factors impeding or promoting data use varied by the environment and context. Based on the results, the same factors have the potential to both enable and hinder data use. Factors enabling or hindering data use include the characteristics of the data individuals and teams, organizational capacity, structure, and school functioning. Significantly, the context in which data sense occurs can influence all factors. The limitations of the study were its small scale and use of self-perceptions.

Identifying factors that can both enable and impede the process of data sense making is important for understanding how these factors can be experienced in different contexts with extraneous circumstances. School characteristics including (a) leadership, (b) data norms, (c) collaboration, (d) quality and availability of data, (e) teachers' data knowledge and skills, and (f) experiences with data positively and negatively influence data sense making based on the context. Therefore, knowledge of how these factors affect special education teachers is important, as they analyze, interpret, and transform data into action to develop annual IEP goals. Moreover, the effects of the implications must be explored in the context of special education in urban public middle schools.

**Developing Annual Goals for Individual Education Plans**

Van Boxtel (2017) considered the alignment of annual IEP goals and the state standards as very important for special educators. The state standards include descriptions of the skills and knowledge students should have at a certain age. The IEP is aligned with state standards through the annual goals. In the era of Common Core, the ability to develop meaningful and specific annual IEP goals is critical for special education teachers. IEP annual goals are statements which delineate skills, knowledge, and resources for instructing students at their academic functional levels. Vân Boxtel (2017) conducted qualitative exploratory research over 5 months to examine (CCSS) expertise in preservice special education teachers. The study was conducted in highly diverse Northern and South California school districts, and participants were selected through snowball sampling. The theme of the study was centered on the knowledge that special education teachers lack the necessary skills to align the IEP to the state standards.

Van Boxtel (2017) specifically referenced special education teachers in self-contained classrooms and highlighted the need for them to receive the same expert preparation in evidence-based practices as special education teachers in inclusive settings. The author pointed out that the ability to craft and write IEP goals that are specific, measurable, attainable, realistic, and timely is a critical proficiency required by special education teachers. The development of annual IEP goals must be based on a comprehensive analysis of various students' data through collaborative data sense making. The findings revealed that special education teachers required training to develop specific, measurable, attainable, realistic, and timely goals to target students' individual learning needs. Although the small study population and the setting specificity limit the generalizability of the findings, the results revealed the needs of special educators.

A fundamental reason for understanding teachers' data sense-making for informing annual IEP goals is that the annual goals must link the IEP to the state standards. The alignment of the IEP goals to the CCSS has been cited as one of the most critical challenges faced in special education. Van Boxtel (2017) claimed that in the CCSS era, the art of crafting meaningful IEPs is vital for the special education professional. The rigor of annual goals determines the effectiveness of the IEP, and making sense of data is a significant step in developing goals, which are specific to students' learning needs. In the process of aligning the IEP to the CCSS, data must be collected and analyzed to determine students' levels of functioning as they relate to the standards. Through comprehensive data analysis, teachers can identify students' present

academic and functional performance levels to inform the development of measurable goals aligned with grade-level standards.

Special educators collect an array of social, academic, and behavioral data from various sources to identify challenges experienced by students to determine how these challenges are manifested in academic areas. Educators use data sense making to identify and understand interrelationships in data and apply the interpretations to make decisions to adjust learning environments. The critical steps of conceptualizing data involve understanding the data context and knowing which data to cross-check or exclude (Vanlommel & Schildkamp, 2019). In developing annual IEP goals, students' needs must be prioritized through collaborative data meetings with specialists and other stakeholders.

**Data Use in Special Education Programs**

Special education is a customized instructional program designed to meet the unique needs of an individual learner (Debbag, 2017). Special education is broader in scope, moving away from a medical focus to adopt a social approach that is more inclusive of children with intellectual, socioeconomic, gender, ethnic, linguistic, physical health challenges, and other conditions (Hurwitz et al., 2020). Special education efficiency is based on providing resources and services that target students' specific needs while remediating challenges to give students skills to be productive members of society. However, this can only be achieved through accurate accountability and collaborative data meetings with specialists, teachers, parents, and other service providers.

Although special educators have been using data to inform their practice, data use was mainly for compliance rather than for continued improvement of learning. Recent changes in education have positioned data to be used as a tool for improving students' learning and academic advancement (Gavish, 2017). Students receive special education instructions in inclusion settings, resource rooms, and self-contained classrooms. Referencing Endrew F. v. Douglas Country School District (2017), IEP goals should enable students with disabilities to achieve academic advancement (Hurwitz et al., 2020).

The dynamics of special education self-contained classrooms are complex and unique; however, annual IEP goals provide direction and coherence to an otherwise confusing situation. In a qualitative research study, Barnes et al. (2019) investigated 47 special education classrooms to recognize and validate excellence in learning and teaching in special education. The researchers identified the need to examine special education programs' instructional practices and social learning progress in these settings. The research was conducted over 1 year with teachers from six school districts in two Northeastern states. The researchers recruited emotional and behavioral difficulties (EBD) teachers from grades 3 to 12. The overall theme emerging from the study is that the context in which students are instructed in self-contained instructional programs is unique and challenging. The researchers concluded that IEP goals provided clarity and structure to activities in the self-contained room. Without the knowledge of the IEP goals and the specific needs of the students, it would be difficult to understand the dynamics of the self-contained special education classrooms.

Surely, educators of all grade levels and specialists ought to be adept data analysts to provide individualized instructions to students who need specialized education to succeed (Mandinach & Gummer, 2016). Contrary to that knowledge, teachers are not adequately prepared, nor do they understand what is required of them regarding the use of data for academic advancement in special education. Cramer and Gallo (2017) conducted a research study in a large urban district serving diverse populations to examine how special education teachers feel about the state standards for students with disabilities. Special education teachers were sent a copy of an electronic link to a survey via email, and 288 teachers responded. The emails were sent directly from the district special education supervisor. The emerging theme from the study is that there is a need for teacher training to adjust the state standards in special education and align the state standards to the IEP goals. Based on the findings, Cramer and Gallo (2017) concluded that implementing state standards in urban school districts with diverse learners is challenging. Most importantly, Cramer and Gallo emphasized that special education teachers need training and support to understand the standards before trying to align the IEP goals to the standards. Although the limitations related to the study were not discussed, the study was conducted in a specific context.

**Data Skills Requirements for Special Educators**

Undoubtedly, data sense making is complex and requires high-level thinking skills such as interpreting, summarizing, synthesizing, and prioritizing data. According to Keuning et al. (2017), data literacy skills and knowledge are a priority for educators. Raw data is meaningless to educators unless it is transformed to actionable knowledge.

Educators, therefore, need the necessary data literacy skills and knowledge (Keuning et al., 2017; Mandinach & Gummer, 2016).

Although the Council for Exceptional Children (CEC) asserted that these skills are essential for the teaching profession, there is currently no standardized convention for evaluating preservice teachers' skills in data literacy (see Wagner et al., 2017). Consequently, teachers bring different experiences and perspectives on data knowledge to data sense making, with implications for inconsistencies and discrepancies in understanding data. Data sense making is influenced by teachers' prior experiences with data and inferences made from students' observations. Additionally, teachers' attitudes toward data will influence how they conceptualize and value students' data. Related to data use, educators should have the ability to set challenging goals, which are informed by data analysis and interpretations (Keuning et al., 2017).

Hurwitz et al. (2020) suggested that presently, the emphasis in special education should be on academic advancement. Thus, special educators must be more analytical about students' data when responding to the students' learning needs. Gavish (2017) conducted qualitative research based on a constructivist approach to examine how special education teacher trainees perceive their professional world. The research was conducted in Israel, and the participants included 98 special education teacher trainees. The emerging theme was that teacher trainees' perceptions of special education teacher role are significantly limited by their personalities and ethical beliefs. However, contrary to their belief, special education teachers need comprehensive training in all disciplines and opportunities to engage in collaborative data meetings with specialists.

Considering the current trend in education, educators must be data literate to target students' learning needs (Mandinach & Gummer, 2016). Unquestionably, the effectiveness of special education is grounded in teachers' data use. Despite this conclusion, Ruble et al. (2018) recognized that many special education teachers have low data literacy. Ruble et al. conducted quantitative research to investigate special education teachers' views of data collection for IEP goals and data collection behavior. The participants consisted of 44 special education case managers overseeing IEPs in public schools in one Midwestern and one Southern state. Participants were randomly allocated to the experimental or control groups. The emerging theme is that while special educators recognize the significance of data use to develop IEP goals, data use is not valued. One of the study's limitations is the lack of information on teachers' experiences with data collection for annual IEP goal development.

**School Characteristics and Data Use**

In the context of urban public schools, it is important to understand the characteristics of the student population and the conditions that define teachers' instructional practices in the classroom. Urban public schools have large percentages of students from diverse cultural backgrounds receiving special education services and high teacher attrition rates, which negatively impact students' performances. In addition, beginning teachers are inadequately prepared, increasing the challenges of the urban public school to effectively engage in data-based practices to improve students' learning experiences (Chikwe & Cooper, 2019).

Education policymakers and school districts have invested in data as a strategy for improving education among marginalized populations in urban public schools. However, urban schoolteachers experience unique classroom situations, which distract from their abilities to engage effectively in data use. Camacho et al. (2018) conducted a mixed-methods study with 120 urban public-school teachers to document the prevalence of urban teachers' thoughts and feelings in response to challenging classroom situations. Teachers were recruited through listservs, and snowball sampling was utilized. Teachers expressed an inability to resolve challenging situations and other factors beyond the classroom, impacting their ability to respond to challenges. Teachers also expressed wanting a break and experiencing anxiety and emotional exhaustion, which led to an understanding of teachers' mindsets and the conditions under which they engage in data sense making. Although previously cited researchers have highlighted factors that enable and impede data sense making, the challenges experienced by urban public teachers further complicate the process of data sense making.

Researchers have found that urban public school teacher leaders need to improve their data knowledge and skills to engage teachers fluently in data conversations about students' progress. Nicholson et al. (2017) conducted a qualitative research case study with three teacher leaders to examine how teacher leaders in low-income urban schools supported colleagues to collect quality formative data and in collaborative data conversations. The research setting was a large urban school district in an ethnically diverse city in California. Data were collected mainly through semi-structured interviews during the school year. The theme centered on the need to acquire data vocabulary to

become fluent in data conversations. Based on the findings, teacher leaders had to engage in prerequisite groundwork, such as learning how to support their colleagues in analyzing students' evidence and translating the outcome into actionable knowledge. Although the study was conducted on a small scale, the study included insightful information on urban teachers' understanding of data and teachers' engagement in data conversations.

Globally, there is an urgency to engage in data sense making in public schools to identify and target students' specific learning needs and address all students' social concerns. In a related study, Chikwe and Cooper (2019) explored how school leaders make sense of data and use equity-related data to improve learning for all students. Based on the findings, data sense making has major implications for advancements, interventions, and students' resources. Chikwe and Cooper found that school leaders used data as a diagnostic tool. The diagnostic capacity of data impacts both classroom curriculum and teacher pedagogy. Most importantly, it provides teachers with essential details to assess students' abilities and give them the information to respond effectively to students' needs.

The preponderance of data collected in urban public schools is geared-toward meeting accountability mandates set by states. For this reason, school leaders must make clear distinctions between data collected for accountability purposes and data used for instructional improvements. According to Chikwe and Cooper (2019), collecting data and even analyzing the data does not mean that there will be educational improvements. How teachers make sense of data to identify students' weaknesses and strengths is vital for academic improvements.

It is essential to differentiate between data used for' accountability purposes and data for improving instruction and students' learning. Gannon-Slater et al. (2017) conducted a qualitative study in which the researchers differentiated between accountability data cultures, such as test scores used to hold teachers accountable, and organizational learning cultures that incorporate multiple measures of students' achievements and focus on improving students' achievements. Gannon-Slater et al. studied the use of data using a much larger case study. The researchers employed a qualitative case study to examine Grade-4 level teacher teams in two elementary schools in an urban Midwestern district. The researchers investigated how teachers and leaders responded to data use policies in the context of the data use cultures of organizational learning and accountability. Various types of data were collected through interviews with teachers and administrators, observations of school-level data teams, and analysis of public documents. The researchers found that accountability in data sense making involves using one data source and focusing on explaining the data regarding students' ranking on a scale. In contrast, in an organizational instruction collaborative data meeting, teachers explored various data to understand students' performance trends and diagnose potential underlying causes.

Researchers discussed the significance data play in reforming education in urban public schools with marginalized diverse student populations (Gannon-Slater et al., 2017). Urban teachers experience unique challenges, which impact their ability to engage in effective data use (Camacho et al., 2018). The type of data used and whether the emphasis is on explaining the data or using the data to identify students' strengths and

weaknesses is also significant. Researchers, Schildkamp et al. (2017), emphasized that data from different sources are needed to engage in meaningful data sense making. Special education is data-oriented, and teachers collect a variety of data from multiple sources, but researchers have shown that teachers lack training on connecting data to the instructions that students are receiving (Keuning et al., 2017; Mandinach & Gummer, 2016). Researchers have made known various ways in which teachers conceptualize data, suggesting the need for researchers to perceive how special education teachers make sense of data to comprehend students' performance trends and how the data interpretations inform the annual goals.

## Summary

In the literature review, I reviewed key terms and concepts specific to this research study to provide the knowledge to fluently articulate the gap in literature and to fill the gap in literature on special educators' data sense making for informing IEP annual goals for students with disabilities in urban middle public schools. Educators engage in data sense making to make various high-stake decisions in different classroom contexts (Gannon-Slater et al., 2017; Keuning et al., 2017; Park et al., 2017; Vanlommel & Schildkamp, 2019). Although data teams and data norms have been implemented in some schools, some of these schools are inconsistent in the approach to data sense making. However, based on the current research, data sense making is now an integral component of the process of instructional practice (Vanlommel & Schildkamp).

The ability to transform data information into actionable instructional practice is a critical skill for educators. However, Mandinach and Gummer (2016) claimed that in the

process of developing data knowledge for data literacy, educators have neglected the most crucial component, which is transforming data interpretations into actionable knowledge. The factors that enable data sense making can also challenge data sense making (Keuning et al., 2017; Schildkamp et al., 2019). Researchers have identified characteristics relating to the organization, data, and data user as critical factors influencing data sense making. Based on the literature on urban public schools, a combination of these factors can create complexities for special education teachers as they engage in data sense making for informing the annual IEP goals.

In reviewing the literature, I highlighted the need for special education teachers to have the training to set annual IEP goals that are realistic, measurable, and attainable (Van Boxtel, 2017). Annual IEP goals must align with state standards to present information about students' present functional and academic performance levels. The information for developing annual IEP goals targeted to students' needs is more accurate when based on a comprehensive analysis of a variety of students' data through collaborative data sense making.

Special education programs are meant to provide educational services to students with disabilities at their functional levels (Hurwitz et al., 2020). However, with the introduction of common state standards and the increase in rigor in the curriculum, special education programs are now adopting a growth-based philosophy and higher academic standards (Hurwitz et al., 2020). Data sense making involves complex high-level cognitive skills for which educators need training (Mandinach & Gummer, 2016; Ruble et al., 2018). Data are open to varied interpretations (Chikwe & Cooper, 2019) and

teachers may interpret data differently based on their experiences with data and their data knowledge. In the absence of data skills, data norms, and established criteria, teachers base their data decisions on intuition and personal knowledge. Although data may provide directions and information, the decisions will be ultimately informed by the teachers' understanding of the direction (Chikwe & Cooper, 2019).

There is global interest in the use of data for improving education as indicated by current researchers. They include Gannon-Slater et al. (2017) and Park et al. (2017) from the United States, Vanlommel and Schildkamp (2019) from Belgium, and Schildkamp et al. (2017) from the Netherlands. However, Gannon-Slater et al. **(**2017) and Camacho et al. (2018) found that variations in the characteristics of student populations are important when promoting data use as strategy to improving students' performance.

In Chapter 2, I provided information on data sense making in various contexts in the classroom. Yet, literature on data sense making to inform annual IEP goals in the context of urban public schools was not available. The current study fills the gap in research by providing information on special education teachers' sense making in urban public schools. In Chapter 3, I present the methodology, the data collection tool, as well as the sample population of educators who provided the information to fill the gap in research on the topic.

## Chapter 3: Research Method

The purpose of this study was to explore sixth-through-eighth-grade special educators' data sense-making to write annual IEP goals based on the specific learning needs of students with disabilities. In this chapter, the research design of the study and

the rationale for selecting the research approach are addressed. Also included in this chapter are discussion of the criteria for participant selection, procedures for collecting data from the participants, ethical guidelines, and the process of gaining approval from the institutional review board (IRB). In the later section of this chapter, the data collection methods, instruments, and a description of the data analysis procedures are outlined.

## Research Design and Rationale

Qualitative researchers aim to understand and make meaning of individuals' experiences (Ravitch & Carl, 2016). A basic qualitative research design was used for this study, which was aligned with my aim to gather detailed, substantial, and quality information to provide an understanding of individuals' experiences with the phenomenon and to make meaning of these experiences. Qualitative research is rooted in the premise that individuals' life experiences are best told in their own words. In qualitative research, several approaches are employed, which involve similar characteristics and procedures but different methods of data collection and data analysis. To select an appropriate research design for answering the research question for this study, I reviewed the data collection techniques, data analysis methods, and sampling methods of various qualitative research approaches and examined the characteristics of a quantitative research study.

The research question used to shape the direction of this research was, "How do sixth-through-eighth-grade special educators in urban public middle schools make sense of data that informs annual IEP goals to target students' specific learning needs?" The

structuring of the research question and the nature of the phenomenon under investigation contributed to the choice of a qualitative research methodology for this study.

In deciding on the most appropriate research design for this study, I considered the phenomenological approach. However, this approach has a philosophical origin, and therefore, it is best suited for studying affective, emotional, and intense human experiences and realities as they are realized at that moment. In this approach, the aim is to find out what the phenomenon means to the individual and the outcome is given from an individual's point of view (Patton, 2014). In contrast, in this study, I sought to explore how the participants engage in the process of data sense making to inform IEP annual goals.

I considered using the grounded theory qualitative research approach, but the grounded theory is used when the researcher's aim is to develop concepts from data collected. The goal of conducting grounded theory research is to formulate a theory about the phenomenon and this approach requires a specific data analysis procedure (Burkholder et al., 2016; Ravitch & Carl, 2016). The research question for the present study was structured to be answered using a qualitative research method, which involves gathering detailed information about the participants' experiences of the phenomenon rather than developing a theory.

Additionally, I considered a case study, but in a case study, multiple forms of data collection approaches, including interviews, documents, observation, and artifacts are used to provide varied understandings of a case (Burkholder et al., 2016; Ravitch & Carl, 2016). Additionally, qualitative case study is used when the purpose of conducting a

study is to provide in-depth details of the life experiences of an individual or a group. Although I sought to gather in-depth, detailed information, interviewing was the only source of data collection used in this study.

A quantitative methodology was not suitable for answering the research question for these reasons. First, quantitative research is used to find relationships or causality between variables. Second, in a quantitative research design, the preferred data type is numerical data, and third, findings from quantitative studies are applied to much wider populations rather than a selected population (see Creswell, 2014). In contrast, qualitative research is about understanding and interpreting human experiences. In this qualitative study, the selected sample population was equipped with the knowledge and experience to explain the phenomenon (Patton, 2014).

The structure of the qualitative research design allows participants to give detailed substantive information about their experiences with the phenomenon (Ravitch & Carl, 2016). Through semi-structured interviews with open-ended questions, the participants responded candidly to the questions, drawing from their experiences and knowledge of the phenomenon (see Patton, 2014). A qualitative analysis of this research required rich, quality information with the depth of details necessary to develop a broad understanding of special educators' conceptualization of student data. The expectation is that the findings of this basic qualitative research study will contribute by providing the related knowledge to improve special educators' data sense-making skills for writing IEP annual goals which are based on data.

## Role of the Researcher

My role as the researcher was to ensure that the study was conducted with the highest level of rigor, consistent with qualitative research. I took measures to ensure the credibility, dependability, and transferability of the study findings (see Patton, 2014; Ravitch & Carl, 2016). In a qualitative research study, credibility refers to the reliability of the findings to reality and dependability is the stability of the data and whether the data can be used to answer the research question (see Ravitch & Carl, 2016). Transferability in a qualitative research study relates to how the study can be applied in a broader context without compromising its context-specific richness (Ravitch & Carl, 2016).

A crucial role of the researcher is to determine ways to avoid and reduce biases in the research. As a special educator in the district, I recognized that my perspective on the phenomenon might be different from that of the participants. Therefore, I implemented strategies to avoid and reduce biases in the research. As the instrument of a qualitative research study (Ravitch & Carl, 2016), the researcher must maintain professional and ethical values while engaging in the interview process. I preserved the rigor of the qualitative procedures by following the protocol and legal mandates associated with the research process. I maintained professionalism and ensured that ethical values associated with conducting research were observed during the interviewing process. I sought approval from the Walden University IRB, and I received an approval number (#06-07-22-0574506) before conducting the research.

Following a review of several qualitative research designs, I deduced that a basic qualitative research design was best suited to answer the research question. The steps I

took to maintain the rigor consistent with the research design, included (a) selecting participants who were experts on the topic, (b) following the interviewing guidelines, (c) making verbatim audio recordings of each interview, (d) maintaining a reflexivity journal in which I made notes of my actions and feelings throughout the data collection process, (e) reporting the participants' own words in data analysis, (f) providing extensive details about the setting and the demographics of the participants, (g) using open-ended questions for interviewing, and (h) conducting semi-structured interviews. As I do not hold a supervisory or administrative position in the district, conflict power was not an issue. Moreover, I am a special educator and as such, I avoided conflict of interest and biases by not interviewing colleagues and teachers from my school. I kept a researcher's journal in which I wrote my reflections about the judgments and personal beliefs I had, which might have affected my thoughts and actions throughout the interviewing process. I also engaged in self-reflection on my perspective as a special educator and my relationship with the participants during data collection. Additionally, I maintained a checklist of events for a review of the research progress and actions-taken to maintain trustworthiness and transparency. I established a good rapport with the participants to foster and maintain mutual trust.

## Methodology

### Participant Selection

This qualitative research study was conducted in a large urban public school district. There are 62 public schools in the district, including 31 schools that provide service for students in Grades K-8. The focus of this study was middle school special

educators teaching sixth through eighth grades who met the following defined criteria (a) instructing middle school students with IEPs in special education programs; (b) certified in special education, and (c) permanently employed in the school district. In this study, special education instruction programs were defined as self-contained classrooms, self-contained autism programs, resource room pull-out and push-in settings, and inclusion settings.

**Sampling**

Purposeful sampling was employed for selecting the participants. In purposeful sampling, individuals are purposefully chosen to participate in the research because of their experience and knowledge of the phenomenon. Special educators who met the criteria were identified from the population of special educators in the district. The individuals selected had the knowledge, experiences, and other information specific to the research phenomenon (Ravitch & Carl, 2016). Using a purposeful sampling approach, special educators who met the defined criteria were identified from the wider population of special educators in the district's middle schools. This sample population of special educators worked in the field and comprised the most capable experts to provide rich, in-depth information, which improved the credibility of the research study.

**Demographics**

The study was conducted in Northeastern New Jersey in a large urban city public school district. At present, the district comprises 62 public schools, including 31 schools that provide academic services for students in grades K-8 grades. A total of 11 special educators from the middle schools' six to eight special education programs formed the

sample population. This sample included teachers from self-contained, inclusion, resource pull-out and resource push-in and the autism instructional programs. Special educators included four teachers from the autism self-contained classes, three seventh and eighth grade teachers from the inclusion and resource instructional programs, two six and seventh grade inclusion and resource teachers, and two teachers who instructed sixth-to-eighth grades in the inclusion and resource instructional programs.

Although there is no simple answer to the number of participants in a qualitative research, experts recommend using a large enough, yet small enough sample size to gather sufficient details for a complete understanding of the phenomenon, while avoiding information repetition (Vasileiou et al., 2018). The concept of saturation is essential to determine the appropriate sample size in qualitative research (Ravitch & Carl, 2016). The targeted number of participants was 10-12 and 11 participants provided sufficient information to answer the research question. Saturation in qualitative research is the point at which no additional details are identified. Saturation is influenced by the order in which the interviews are analyzed, and the richness of the data gathered (Vasileiou et al., 2018).

**Instrumentation**

One of the preferred methods of data collection in qualitative research is interviewing (Ravitch & Carl, 2016) and according to Burkholder et al. (2016), semi-structured interviewing is recommended for novice researchers. I conducted semi-structured interviews via Zoom conferencing platform with each participant. I developed an interviewing guide which I used to focus the interviewing process and to maintain

consistency for each interview. The interview guide (see Appendix B) contained information for the Zoom link, telephone number, interviewing questions, the start, and end times of the interview, as well as the introductory statement and closing procedures.

The instrument consisted of 10 open-ended questions with supporting probing questions (see Appendix B). This style of questioning was chosen because it allowed the participants to be spontaneous in giving information about their experiences with the phenomenon (Ravitch & Carl, 2016). The 10 open-ended questions were structured to elicit detailed, first-hand information from the participants for the purpose of understanding their approach to data sense making for informing the IEP annual goals. I formulated additional probing questions which I asked for clarification of responses to get a thorough understanding of the participants' experiences. The questions were phrased simply and precisely to obtain the participant's real experiences with the phenomenon. I asked probing questions when the responses were not clear or ambiguous. Walden University's Institutional Review Board (IRB) reviewed the data collection instrument to ensure that the protection of human rights was guaranteed, and only after gaining approval from the IRB was the instrument implemented.

**Recruitment**

Upon receiving approval from Walden University's IRB, I began the recruitment process. The school district has a published database with a listing of all staff members organized by schools. I accessed the district's database and selected the middle schools with special educators who met the defined criteria for participating in this research study. Each school listing had the staff member's name, position held, district email

address, and school's telephone number. I then selected candidates from the middle schools' special education programs with the defined criteria for participating in the study.

**Participation**

After identifying the potential participants, I sent invitation letters via email to the identified special educators. I used the invitation letter to introduce myself as a doctoral student at Walden University and I stated my intention for conducting this research study. In the invitation letter, I stated the (a) title of the research, (b) purpose for conducting the research study, (c) criteria for participants' selection, and (d) a brief background of the study. In stating the significance of the research study, I indicated that the findings from this study would provide scholarly information to improve the understanding of the research phenomenon to fill the gap in research literature. Moreover, I stated that the knowledge from the findings would be used to advance special educators' capabilities when analyzing students' data to inform annual IEP goals and to enable them to target students' specific learning needs more precisely. Finally, I explained that I retrieved the contact information from the district's online database.

In explaining the conditions for participation, I emphasized that participation was voluntary and involved no monetary rewards. In addition, I stated there were no risks associated with participating in the study and a participant could withdraw at any point in the study without risking negative feedback or reprisal. Participants were advised that information provided by a participant who withdrew from the research would not be published. Participants were told that their identities would be concealed, pseudonyms

would be used instead of names, and that schools would not be identified by listed names. Additionally, all information would be saved as a digital file and secured with a password.

I received responses from the participants 2 weeks after sending the invitation letters. In keeping with Walden University's protocol, I emailed an informed letter of consent to individuals who responded positively to participating in the research study (see Appendix C). The consent form contained the following information: (a) study purpose, (b) procedures, (c) voluntary nature of the study (d) risks and benefits of participating in the study (e) payments, (f) privacy and confidentiality, and (f) sample of interviewing questions and contact information. Participants were informed of their rights as interviewees and their rights to know the outcome of the study. Participants acknowledged consent by replying "I Consent" via email.

A week after mailing the consent forms to the participants, I made additional contact to the participants via email, text messaging, and telephone conversations to stress the importance of responding by typing "I consent." By typing I consent, the participants were signifying that they understood the conditions and terms of the research and the interviewing procedures. Each participant consented by replying, "I consent" via email. I established and maintained conditions of mutual respect with the participants throughout the communications.

**Procedures and Data Collection**

Consistent with a qualitative research design, open-ended questions were used for interviewing (Creswell & Poth, 2018). Semi-structured interviewing was the preferred

method for allowing the participants to express their vivid experiences with the phenomenon in their own words and terms. Participants responded to 10 open-ended questions supported by probing questions. Each interview lasted approximately 40-45 minutes.

Most participants agreed to be interviewed after working hours and on weekends. A day before each scheduled interview, I made reminder calls, sent text messages, and emails to remind participants of the interview. The semi-structured interviews were conducted virtually one-on-one via Zoom conferencing platform in safe, secure, quiet spaces selected by the participants. Preparations for each interview began at least 15 minutes before the set time. Preparations included reviewing the questions, testing Internet connections, recording and audio equipment, zoom availability, and telephone communications, which were to be used in the event of internet disconnections. I used Zoom's audio recording feature to record the interviews.

The interviewing process was friendly but professional. The first 5 minutes of the interviewing sessions were devoted to reviewing the interview protocol with the participants and preparing the interviewee for audio recording. I began each interview by asking a warm-up question to put the participant at ease and to make the participant more forthcoming and spontaneous during the interview. Participants were encouraged to ask questions for clarification or further information. I reaffirmed what was stated in the consent form that participants' identities would be protected, and pseudonyms would be used for all published materials.

During the interview, I made notations of key details for probing questions, but the entire interview was audio recorded. I avoided (a) leading remarks, (b) body gestures, (c) voice tone, and (d) linguistic constructions that would communicate judgments. Participants had the opportunity to elaborate upon their answers, disagree, and raise new issues. Probing questions were asked immediately when the participants' responses were vague, incomplete, or contradictory. I allowed the participants to respond fully without interruptions and encouraged pauses to give the interviewee time to ponder on the questions and phrase their responses. The interview did not go beyond the time agreed upon with the participants.

Before ending the interview, participants were encouraged to ask questions relating to the phenomenon and to add details which they believed to be pertinent, but which were not brought out by the questions. I concluded each interview with a formal closure by thanking the participants for volunteering and for providing pertinent information of their experiences which supported the credibility of the study.

**Data Analysis Plan**

Immediately following each interview, I transcribed the contents of the interview recordings while the details were still fresh in my memory as suggested by Burkholder et al. (2016). Each transcript was a verbatim typed copy of the participants' spoken words and included the time the interview was conducted, the length of the interview. The typed copy of each transcript was saved as a Microsoft Word document and secured with a password. Pseudonyms were given to each participant to protect the participant's identity and each file was saved with the pseudonym (Ravitch & Carl, 2016).

In qualitative research, data are analyzed to find codes, themes, patterns, and categories (Ravitch & Carl, 2016). I analyzed the data manually using the in vivo coding approach. As the first step in analyzing the information, I listened to each audio recording thoroughly and read the typed transcript multiple times. I highlighted and underlined key terms and repeated words. I engaged in inductive reading in which I analyzed each question separately. I organized the information by question whereby I outlined each question on a separate paper and delineated each response for that question. I read each question and response meticulously multiple times to find patterns and highlighted and underlined catch phrases and terms.

For each question, I identified information that conveyed similar understanding, concepts, and themes. I labeled and then coded these themes and concepts. Saldaña's (2016) in vivo approach to coding data was used to analyze the data. Using this coding system, I labeled, linked, and categorized the data to find patterns to bring meaning to the data (Saldaña, 2016). I defined the codes using short phrases or single words with physical markings on the typed copy of the transcript. The data were presented with tables and charts developed using Microsoft tools and spreadsheets. By following the in vivo approach, I maintained transparency in the process of data analysis. I was thorough with the analysis process by following up on the themes and concepts. Validity strategies included complete descriptions, dialogic engagement, multiple coding, reflexivity, and disconfirming evidence.

## Issues of Trustworthiness

This qualitative study was conducted to explore how sixth-to-eighth grade special educators in urban public middle schools make sense of data that informs annul IEP goals and various steps were taken to address trustworthiness. Trustworthiness is a measure of the rigor of the research (Burkholder et al., 2016), and it is determined by the credibility, transferability, dependability, and confirmability of the research findings and how these processes are used to achieve rigor in a qualitative study (Ravitch & Carl, 2016).

In this study, to establish credibility, the qualitative research question was aligned with the qualitative research method and data collection technique. A data collection instrument consisting of 10 open-ended interviewing questions and a semi-structured approach were used in this study. Transferability in a qualitative research study relates to how the study can be applied in a broader context without compromising the context-specific richness (Ravitch & Carl, 2016). I included a detailed description of the data, and the contextual factors for readers to make comparisons to other contexts, and thereby achieved transferability. Furthermore, I provided detailed information about the study setting and the participants' demographics.

Dependability is the stability of the data and whether the data can be used to answer the research question (Ravitch & Carl, 2016). The research procedures I implemented in this study are consistent with the qualitative methodology. For example, I used (a) purposeful sampling, (b) interviewing to collect rich details about the participants' experiences with the phenomenon, and (c) open-ended questions. In addition, participants were experts on the topic and thus provided rich, in-depth

information. I maintained the fidelity of their experiences by recording their spoken words and making verbatim typed transcripts of the audio recordings.

To ensure confirmability of the study I avoided personal bias by practicing reflexivity and keeping a reflective journal of my actions and personal thoughts. Throughout the research process, I actively examined my prior knowledge and experiences with data and how my perspective impacted the research. Additionally, I disclosed that although I am a special educator in the district, I did not hold a position of power.

A committee comprising a chairperson, methodologist, and committee member supervised this study. The committee members monitored the integrity of the methodology and the research process thoroughly. I kept a reflective journal in which I recorded my actions, thoughts, and personal perceptions while conducting this research.

## Ethical Procedures

Walden University's IRB approved this study before I began data collection. In this case, the IRB conducted a review of the study's ethical foundation. The IRB process began when I submitted the proposal for review to the university research review (URR). The URR provided feedback to guide the quality and integrity of the research study. I made revisions based on the feedback from the URR. I revised the proposal iteratively based on the IRB's ethical feedback until it met the university's ethical standards.

Although it was necessary to follow ethical codes to guide the study procedures, the relationship and rapport established with the participants helped to enhance the study's ethics (Patton, 2014). As the interviewer, I played a pivotal role in maintaining

the ethical value of the study. I was transparent, honest, and clear about the purpose of the research and I ensured that participant selection was conducted with respect, honesty, and transparency. Each participant signed a consent form to validate their understanding of the terms for participating in the study and to show clear understanding of the research process. The promise of confidentiality was guaranteed, and participant identity protection was confirmed. Participants were advised that participation was voluntary and that individuals were free to withdraw from the study prematurely and not be judged. However, no one withdrew from the study.

## Summary

In chapter 3, I explained the rationale for using a basic qualitative research design, the research methodology, which included sampling and instrumentation, data collection, and data analysis plan. The researcher's role during participant recruitment and the logistics of the interview process were also discussed in the chapter. I concluded the chapter with a detailed explanation of addressing trustworthiness and ethical measures in the study. In Chapter 4, the analysis of data and the results of data analysis are presented.

# Chapter 4: Results

## Introduction

The purpose of this research study was to explore how special educators in urban public middle schools make sense of data to inform IEP annual goals for students in Grades 6–8. In the first section of this chapter, I present information about the study setting and participants' demographics. The latter part of the chapter consists of a discussion of the data collection process, the data analysis approach, and the findings from the data analysis. Data were analyzed using the in vivo coding approach (see Saldaña, 2016). Codes were identified and linked to develop themes to convey the participants' experiences of the phenomenon.

## Research Question

The research question for this basic qualitative research was, "How do special educators in urban public middle schools make sense of data to inform annual IEP goals to target students' individual learning needs in Grades 6–8?" Annual IEP goals are based on data and educators must engage in data sense making to add meaning data. The focus of this study was on understanding special educators' deliberate interpretations, verbal summarization, and articulations of identified patterns in data and the use of that knowledge to articulate and write IEP goals. In the following section, I describe the research setting for this study.

## Setting

The study was conducted in a Northeastern region in a large urban city school district with 62 public schools, including 31 schools serving students in Grades K-8. This

study was concentrated in middle school sixth-through-eighth-grade special education programs. Due to the existing social distancing rules implemented during the COVID-19 pandemic, interviews were conducted virtually via Zoom. The school district's website contains a published list of teachers, teaching positions, teaching locations, and district contact information. Using this information, I contacted special educators from the district's public middle school sections who met the defined criteria.

## Demographic

To participate in this study, participants were required to meet defined criteria. The criteria for participating in the study were as follows: (a) must be special educators from the urban public school district, (b) certified in special education, (c) permanently employed in the district, and (d) instructing students with IEPs in middle schools. The special education programs were described as inclusion, self-contained, and resource pull-out and push-in instructional programs. A breakdown of the participants included three inclusion instructional teachers, two resource pull-out instructional teachers, two resource push-in instructional teachers, two autism self-contained instructional teachers, and two special educators from specific disabilities self-contained classrooms. Teachers who instructed in the inclusion programs were departmentalized based on subject and these teachers instructed two grade levels. The participants in this study possessed teaching experiences ranging from 5 to 25 years. Some teachers disclosed having experience with teaching multiple programs and grade levels. There were veteran teachers with 25 years of teaching experience and at least two participants who began

teaching during the pandemic. Therefore, the teaching experience of the latter group spanned virtually from the start of the COVID-19 pandemic to the interview date. A breakdown of the participants' grade levels, content subject taught, and the special education program is presented in Table 1.

**Table 1**

*Participants' Demographics*

| # of teachers | Grade levels | Content subjects | Special education programs |
|---|---|---|---|
| 3 | 7,8 | ELA & math | Inclusion |
| 2 | 6,7 | ELA interventionist<br>Math interventionist | Resource pull-out |
| 2 | 6,7,8 | ELA special educator<br>Math special educator | Resource push-in |
| 2 | 7,8 | All core content | Autism self-contained classroom |
| 2 | 6,7,8 | All core content | Special learning disabilities self-contained classrooms |

The participants reported that in past teaching experience, they worked in different grade levels and taught in other urban schools and in private schools. Participants taught in various capacities, such as self-contained classrooms, resource programs, and inclusion programs, and a few participants were content interventionists and content specialists. Some participants began their teaching careers as paraprofessionals and substitute teachers whereas others followed the traditional program

by attending teacher training colleges or began teaching through the alternate teaching route programs.

## Data Collection

Upon receiving approval from Walden University's IRB (#06-07-22-0574506), I began the process to collect data. I accessed the school district's website to identify potential participants and selected participants who met the established criteria using purposeful sampling. I sent an invitation letter via email in which I introduced myself and the purpose of the study. Interested participants responded via email with the first participant responding 2 weeks after the emailed invitation was sent. Next, I sent a consent form in which I delineated the purpose of the study, the interviewing protocol, data management and security, confidentiality, and the participants' rights. In return, the participants responded "I consent" via email. Through a series of telephone calls and emails, interviews were scheduled, and Zoom was selected as the platform for conducting the interviews. All participants were familiar with this platform, which also features audio recording options. Mutually, dates and times were agreed on, and each participant chose a safe and secure space to be interviewed.

I conducted one-on-one interviews in a private, secured space, which was free from distractions. A semi-structured interviewing approach was used to collect the data. Using this interviewing approach, participants spoke freely providing lengthy, detailed descriptions of their experiences without interruptions. I also asked probing questions for clarification or elaboration. Each interview lasted 40 - 45 minutes, and no participants requested to end the interview prematurely. Each interview was audio recorded and made

free of any technological challenges. The recordings were clear, and all participants complied with the terms and conditions articulated in the consent form they consented to.

The interview protocol developed for this study (see Appendix B) was used to guide and maintain fluency of the interviewing as well as transparency during the interviewing process. Using the script from the protocol, I reiterated the purpose of the study and the expected duration of the interview and reminded participants of their rights as interviewees. Finally, before the start of the interview, I invited each participant to ask questions to clarify any concerns.

Interviews were conducted mainly during the weekends and after working hours and the data collection process lasted over a period of 4 months. Each interview lasted 40 - 45 minutes and was conducted on the day and time most convenient for each participant. The interview consisted of 10 open-ended questions, which were meticulously developed to elicit detailed and expert information from the 11 participants. The interview structure was the same for each interview.

## Data Analysis

I collected firsthand detailed information from a selected subset of special educators representing the population of middle school special educators. The data collection device consisted of 10 open-ended questions, I used a semi-structured interviewing style to obtain information from the participants (see Ravitch & Carl, 2016). Interviews were conducted via Zoom, and I used the platform's audio recording feature to record each interview. Immediately following each interview, I listened to the audio recording in its entirety to familiarize myself with the participant's individual ways of

phrasing sentences, word patterns, and habit of stressing certain words. Next, using Microsoft tools, I made a verbatim typed copy of each recording. I meticulously checked the typed copy for errors and cross checked each typed copy with the corresponding audio recording. After making sure the audio recordings and the typed transcripts matched word for word, I began the process of coding the data.

**Interview Analysis**

Coding is described as an exploratory problem-solving technique for interpretation of data without specific formulas to follow (Saldaña, 2016). I crafted 10 open-ended questions to elicit pertinent information about the participants' experiences with the phenomenon. In vivo described by Saldaña (2016), was used for organizing the data to discover patterns, similarities, and differences in the audio recordings of each participant. I immersed myself in understanding the data through multiple readings. I used an inductive reading approach, which entailed reading a participant's interview transcript and then the questions to identify patterns and themes, which were used to answer the research question.

A typed copy of each interview question was printed to manually code the data and analyze the information. In the precoding stage, I highlighted and underlined information to separate keywords and phrases used in similar contexts by the participants. To organize the data, I documented each question as a separate entity and grouped all responses related to that question accordingly. I meticulously examined the information to look for similarities and differences in the responses and noted instances

of strong and emotional language. Causation of actions, which led to other reactions, repetitive patterns, and commonalities of experiences were identified in the information.

Phrases and keywords were identified as codes. The codes were consolidated according to meaning to develop more defined themes repeated throughout the interviews. The following seven themes were identified from the data: (a) changes in data use, (b) using data for goal alignment, (c) types of data collected, (d) data analysis, (e) understanding data, (f) adding meaning to data, and (g) challenges encountered when making sense of data These emerging themes were used to answer the research question: How do sixth-through-eighth-grade special educators in urban public middle schools make sense of data to inform annual IEP goals?

A list of codes and examples of the categories are presented in Table 2. Excerpts of participants' spoken words, which were aligned with each category and are also presented in Table 2.

**Table 2**

*Examples of Codes*

| Code | Category | Excerpts from participants |
|---|---|---|
| Curriculum Modifications<br>Intense Levels/abilities<br>Increased data rigor<br>Common core state standards | Changes in special educations | "There is a lot of breaking down I have to do."<br>"The most changes are in the curriculum The special education students have to follow the same curriculum as the general education students."<br>"It is more academic."<br>"Instructions have changed because when I first started instruction was based on the students' functional levels."<br>"I need training to do the modifications. |

| | | |
|---|---|---|
| | | "It is a challenge to accommodate all the needs of the students to have them learn and not feel frustrated." |
| | | "Every year there is a new curriculum with very little training." |
| State standards | Common core | "Tailoring the instructions is very hard." |
| Aligning goals | state standards | "How can I actually get them to the level to match what the common core or the curriculum is asking them to do." |
| Tailoring instructions | | |
| Standardized data | Data types and | "I use pretty much teacher-made assessments." |
| Diagnostics | data collected | "I do all the required state assessments." |
| Formative | | "I do the diagnostics and base line assessments." |
| Informal/formal observations | | I use work samples." |
| anecdotal | | "I collect anecdotal data." |
| Summative | | "I collect different types of data." |
| Essential elements (DLM) | | "I collect work binders with the students' work." |
| | | "I collect environmental data." |
| | Data | "You have to look at the data that you collected from the test you designed to see the student's functional levels." |
| Misleading inconsistencies | discrepancies and | "Special education students should not be tested on the same standards as the general education students." |
| Standardized scores | inconsistencies | "I can literally look at the data and they are pretty much going to be low in every single area." |
| Guessing responses | | "Students' data not connected to their goals." |
| Skills not taught | | |
| Material not at functional levels | | |
| Intuition | Using personal | "If half of the class is not getting something then that is something that has to be retaught." |
| Prior knowledge of students | knowledge and observation | "I learn from experience that this is something that is hard for the students." |
| guessing | | I use what I know about the student." |
| Comparing formative and standardized data | | "I create a spreadsheet." |
| adding data | | "I meet with whom I am meeting, and we look at the data. Okay, did you see growth? Did you see movements?" |
| Crossing data from different sources | | |
| Adding meaning to data | | |

| | | |
|---|---|---|
| Communicating<br>collaborating<br>Prioritizing | | "When I am looking at the data, I prioritized based on the IEP goals."<br>"Understanding how far the student has come from where the student started."<br>"I create visuals because numbers are numbers, and they are confusing."<br>"I have their work samples with comments and grades and a tracker. I compare the assessments grades with my notes. The grade is not just a number."<br>"It is important to collaborate with colleagues and to ask questions. This is how we learn." |
| Poor scheduling<br>Lack of organizational support<br>Conflicting information administrations<br>Lacking data literacy<br>Understanding the curriculum<br>Training | Challenges and concerns with data use | "There was not enough put in place to understand the data. I believe that there is a lot more training to be done."<br>"No one is there to look at my data. In five years, no one has looked at my data."<br>"I do not feel as equipped as the general education teachers. I think that some of the systems in place are a little confusing."<br>"My concern is that I am not able to meet with my students as I would like, and it is hard to collect data."<br>"Pressure from administration to do what the curriculum states." |

**Research Log and Journal**

I developed an interviewing protocol and used it as a guide (see Appendix B) to maintain focus on the interviewing process as well as consistency in all interviews (Ravitch & Carl, 2016). I maintained a reflexive journal to reduce bias in the research and to help to organize my thoughts throughout the research process (Ravitch & Carl, 2016). Through journal writing, I recognized how my assumptions and actions might be impacting the direction of the research.

I noted participants' hesitations and pauses as they contemplated the questions and questions and made comments about the context of the questions. Some participants asked me to repeat questions for clarification, whereas others were cautious about the way they articulated their responses. When participants felt questions were challenging, they sought and made affirmations by inquiring about the adequacy of their responses. In response, I reminded the participants that this was their experience, and therefore, I could not comment. Additionally, any response I could give would be biased to the research. I reflected upon the confidence and convictions with which other participants responded and referenced the vivid examples they provided to support their experiences.

## Results

I explored sixth-to-eighth-grade special educators' data sense making that informs IEP annual goals using a basic qualitative research approach and semi-structured interviewing style. In this section, I present the results of the analysis of data from the interview responses. The research question was, "How do sixth-through-eighth-grade special educators in urban public middle schools make sense of data to inform annual IEP goals?" The following seven themes emerged from the analysis: (a) changes in data use, (b) using data for goal alignment, (c) types of data collected, (d) data analysis, (e) understanding data, (f) adding meaning to data, and (g) challenges encountered when making sense of data. Each theme is addressed with direct quotes from participants to make the connection to answer the research question. I conclude Chapter 4 with evidence of trustworthiness and a summary of the findings. Table 3 is used to show a visual of the

codes identified as the first codes. These codes are linked and consolidated to form second codes and subsequently emerging themes.

**Table 3**

*Emergent Themes from Data Analysis*

| First codes | Second codes | Themes |
|---|---|---|
| New material<br>Academic advancements<br>Misconceptions<br>instructional shifts<br>Modifications/accommodations<br>Frustration<br>Rigor<br>Increase data use | Academic advancements<br>Shifts in instructional practice<br>Increase data use<br>Rigor in content | 1. Changes in data use<br>2. Using data for goal alignments |
| Common core standards<br>Informal data<br>Formal data<br>Summative data<br>Standardized data<br>Computer-based data<br>Diagnostics data<br>Environmental data<br>required data<br>parent data | Formative data<br>Summative data<br>Standardized data<br>Computer-based data | 3. Types of data collected |
| Standardized assessments not fair<br>No exposure standardized assessments material<br>Needs not considered<br>Guessing responses in standardized assessments<br>Testing skills not taught<br>Invalid standardized scores | Misleading standardized scores<br>Students guessing responses<br>Skills not taught<br>Material not at functional levels | 4. Data analysis |
| Using gut feelings<br>Understanding data<br>Prior knowledge of students<br>Intuition<br>Guessing responses | Intuition<br>Prior knowledge of students<br>guessing | 5. Understanding the data |

| | | |
|---|---|---|
| Comparing informal and standardized scores<br>Scores too low<br>Scores too high | Comparing formative and standardized data | |
| Cross-checking data<br>Data from different sources<br>Adding meaning to data<br>Communicating data interpretations<br>Data discussions (teachers, specialists, parents, CST)<br>Comparing data from varied sources<br>Spreadsheet<br>Charts, graphs, percentages, | Crossing data from different sources<br>Adding meaning to data<br>Communicating data interpretations | 6. Adding meaning to data |
| Limited data knowledge and skills<br>Insufficient time to collect formative data<br>Misleading standardized test scores<br>Lack of organizational support<br>Misdirection form administrations<br>Lack of support staff<br>Poor scheduling<br>Conflicting directions | Poor scheduling<br>Lack of organization support<br>Conflicting information from CST and administrations | 7. Challenges encountered in the process of data sense-making |

**Theme 1: Changes in Data Use**

Participants pointed out that the shift in data use in special education led to greater academic accountability and students were held at higher academic standards, which created the expectations that the students would benefit from following the regular curriculum. By redirecting the use of data to focus on academic data, teachers felt inclined to adjust the process of adding meaning to data for informing the IEP annual goals to target the students' specific learning needs. Recent changes in data use included

advanced content materials and rigor in instructional practices with a greater focus on academic data.

Participants described various actions that have been undertaken in the process of working with the shift in data use. They included (a) modifying the general education curriculum, (b) conceptualizing the CCSS goals in the context of the IEP goals, and (c) learning about the state assessment data, as essential knowledge and prerequisite information needed to adjust the analysis and interpretation of academic data. Special education programs have shifted from using data for accountability purposes that ensure that students receive services related to their disabilities to using data to guide students' academic advancements. These changes are reflected in (a) the focus on summative and formative data, (b) prioritizing data, (c) understanding data, (d) developing data reports, and (e) data discussions. For example, participant 2 explained, "We use data to figure out what students need to learn, and we adjust our instructions from that point on." However, teachers need to add meaning to the data before adjusting instructional practices. Participant 7 explained that data had dual use, stating,

> Understanding data helps both me and the students. I use data for academic purposes because it helps me get a better understanding of where the kids are, or What they need and how to focus on the IEP goals and the skills that they need.

Participants were critical of the magnitude of adjustments required to ensure data use in special education instructional programs and make the general education curriculum accessible to students with disabilities. Participants stated that (a) the content has been made more challenging, (b) more rigor added to instructional practices, and (c)

the conceptual levels of difficulties have been altered in each grade for students to achieve their learning goals. For example, the participants described that data and data reports from these modifications were inconclusive because data could not be used to make decisions about students' learning and develop students' IEP goals. The participants reported not being able to make sense of the data because the modifications were not clearly explained. Participant 1 explained, "In my experience there is a lack of clarity with what exactly is supposed to be happening with the modifications."

The participants explained that some students in the self-contained instructional programs function at K-3 level despite their age-appropriate grade levels being sixth-to-eighth grades and modifying academic content and conceptual understanding to the K-3 academic levels for grades six-to-eight is not practical. One major concern cited was that the content often becomes distorted in the modification process and the students do not benefit from the instruction. Participant 7 stated, "It takes a lot of breaking down of the language and skills to tailor the content and to be thorough with the material to meet the needs of each student." In this example, Participant 2 explained, "We are expected to teach a new pedagogy, but I find that my students learn better when I design lessons the way that I know my students will learn." According to participants, there are noticeable patterns of low scores for students with IEPs generated from the new methods of instructions, and in the process of making sense of data the content material and instructional methods must be evaluated to justify the scores.

**Theme 2: Using Data for Goal Alignments**

The participants were unprepared for the drastic curriculum change in special education and the consequential changes affected their interpretation of students' data interpretations in developing annual IEP goals. The annual goals state what students should be doing. Participants explained that data from formative assessments are essential in the process of aligning CCSS to annual IEP goals. To determine the most appropriate standards for each student, participants used formative data from classroom tasks, assignments, observations, and assessments to determine the skills that students would find challenging. Participants from the inclusion and resource programs used the CCSS age-appropriate goals, but, as the participants explained, data reports from skills assessed at age-appropriate grade levels must be analyzed according to the skills and functional levels delineated in the IEP annual goals, which are the students' academic functional levels.

**Theme 3: Types of Data Collected**

Participants described different types of data including unit assessments, diagnostics assessments, benchmark data, and computer-based programs from the district, which included Khan Academy, Aleks, and Lexia, among other programs. Participants from the autism programs specifically mentioned using dynamic learning modules (DLM) assessments and computer-based instructional programs as data sources. DLM assessments are alternate assessments administered to low-functioning students. The participants clarified that although all students, including those with IEPs and other low

functioning students, must be exposed to the CCSS curriculum, state standardized assessments are not administered to all students.

According to the participants, whereas the administrators emphasized quantitative data from test scores, both summative and state assessments, special educators relied on formative data and non-cognitive data collected during instructions to inform the IEP annual goals. Teachers collected state and district-required data from state assessments and district diagnostics assessments, and although these teachers considered the diagnostic assessments useful as benchmark indicators, they believed that the state assessments do not benefit the students with IEPs. They gave several reasons for concluding that state assessments are not beneficial to students with IEPs. These included (a) too many skills being tested at a time, (b) the results not immediately available for teachers to plan reteaching, (c) the reports being for ranking purposes, and (d) the questions and skills not analyzed to determine students' strengths and weaknesses.

In this example, Participant 1 explained, "There are different assessments that we are required to give, but I also look at my informal data that I take from anecdotal notes, or my observations of the students." Most participants stated that the emphasis is on informal data, as this type of formative data provides accurate representations of what the students are capable of accomplishing. Examples of formative data discussed included (a) teachers' observation, (b) students' work samples, (c) end-of-lesson responses (e) running records of the students while they are engaged in learning, (f) weekly quizzes in which one skill is tested, (g) students' oral responses to questions, (h) students' interactions with their environment, and (i) projects and portfolios. Based on the teachers' experience with

testing students and from student observations, teachers know that students perform poorly when the tests are long and when multiple skills are assessed in the same test set. According to Participant 11,

> I use my own data to assess the students. I believe that my assessment is short, and I get a real sense of the students' understanding because they are not rushed, and they are not thinking that I am doing it because everyone is doing it.

An analysis of the interviews indicated that the inclusion and resource instructional programs allow more summative and standardized data to be collected than the self-contained instructional programs. Students with IEPs who are enrolled in the inclusion and resource programs are required to take the state assessments at the age-appropriate grade levels with accommodation stated in the IEP. Diagnostic assessments are administered at the beginning of each quarter and the data used to make decisions for reteaching skills. Participants valued these assessments because diagnostic data provided a baseline for instructions. Participant 7 explained, "I administer diagnostic assessments at the beginning, middle, and at the end of the year and I use the data to measure whether the students are mastering the goals."

The new curriculum is based on the data driven CCSS and the data reports will set the instructional pace. Participant 9 explained that data from the standardized assessments give information on whether the child is proficient, partially proficient, or not proficient in certain skills. However, the participants explained that if the tested skills are not in the students' IEP annual goals, then the data are not useful to inform the IEP goals. When analyzing data from state assessments, it is not enough to look at the numerical scores.

Rather, a breakdown of the scores regarding the assessed skills is important for informing the IEP goals. Thus, the teachers are more reliant on formative data, both quantitative and qualitative data, collected in the classroom and during instruction. Participant 6 from the self-contained classroom described the type of data collected as follows:

> I have work binders in which I collect everything. I take notes about the work in the binders, and I use that as data which I record on the computer. I have observation data that I use. I conduct discrete trials and I collect data when I track students' behavior.

Importantly, Participant 10 explained that a student's individual needs are unique to the individual, and therefore, the data must be unique to that individual. Participant 10 shared,

> I collect different kinds of data beginning with diagnostic data at the start of the year. I also collect data from Mom and Dad to see what the student's environment is like and I collect data about the things that interest the students.

Similarly, Participant 9 stated that information must be collected from all areas and through all avenues to successfully provide support to the students. Probably, the most significant finding about the data collected was that for the data to be meaningful they must reflect the skills in the student's IEP goals.

**Theme 4: Data Analysis**

Participants expressed skepticism regarding the accuracy of data from standardized assessments. According to the participants, the fact that students with IEPs are required to take standardized assessments is unreasonable for various reasons. These

are (a) often the tested skills are not aligned with the students' IEP goals, (b) students do not always know the tested material, (c) students are not assessed at their academic functional levels, and (d) the accommodations from their IEP goals are not always followed. Participant 3 was candid in stating that the scores or grades of special education students should not be analyzed using the same criteria as the general population because standardized assessments are given at the age-appropriate grade levels and not at the students' academic functional levels. The participants used the phrase "required tests" to describe state assessments, indicating that these assessments must be administered to students who are eligible and cleared for testing.

Students with IEPs in the inclusion, resource, and self-contained programs are required to take these assessments based on their intelligence test scores. However, the participants contended that the students have social, emotional, and behavioral challenges, which can greatly impact their test-taking abilities. Some examples of the impact that participants provided include (a) the students' ability to remain focused for long periods and (b) the ability to read long texts on the computer screen. Additionally, students' daily routines are disrupted for the duration of testing. Examples given were that students are (a) moved to other rooms to be tested by other teachers and (b) the students must remain inside for longer periods. Participants characterized standardized assessments as long and difficult for the students. These changes can affect the students' emotional stability and cause them to react negatively during testing and perform poorly on the tests. Often, students guess the responses to complete the assessments and get out of the testing environments. Participants concluded that most students with IEPs do not

perform to the best of their abilities on these assessments. Thus, the participants stated that they look for discrepancies in the standardized scores. Examples of discrepancies included (a) if the scores are too high, (b) if the scores are too low, (c) patterns of guessing, and (d) rushed testing. Participant 11 explained,

> Standardized assessment data do not give a true picture of student's'. performance because it does not measure the students' interaction with the test, and it is not given at their academic functional levels stated in the IEP goals. And additionally, students may not have been exposed to all the tested materials.

The validity of data sense making depends on the accuracy of the data and whether the students are assessed on skills delineated in their IEP goals. Participants claimed that the data from formative tests are more accurate for the following reasons: (a) students are tested on skills based on their IEP goals, (b) conditions and accommodations are aligned with the IEP goals, and (c) noncognitive information is incorporated in the data. When teachers grade students' work in the classroom, they incorporate aspects of the students' behaviors and other non-cognitive information such as social, communication, portfolio, and other forms of information. The data derived from collaborating these grades are essential for informing annual IEP goals because they include (a) information for setting the conditions, (b) instructional practices, (c) strategies and resources, (d) targeted skills, and (e) specialists to provide the instructions for students to master the skills.

**Theme 5: Understanding the Data Collected**

In explaining their process of making sense of the data, the participants revealed a strong reliance on intuition and personal belief when standard grading criteria are absent, and discrepancies are realized in standardized assessments. Participants revealed that predefined criteria for assessing students' work are lacking. In this example, Participant 9 reported, "My experience of grading is taking the number and applying the number to where you can understand where the student is functioning." The findings revealed that for formative assessments, such as teacher-made tests, quizzes, and end-of-chapter responses, teachers do not use the same standard grading criteria they use for the general education population for students with IEPs. However, when these students take the standard assessments, they are graded using standard-based criteria. Participants claimed that grading these students with standard-based criteria is wrong for many reasons, including (a) students with IEPs are not tested on their functional levels, (b) the students' IEP goals and instructional practices are not aligned with the state standards, and (c) noncognitive information is not included in the data. Therefore, when students received their standardized scores, teachers used intuition and personal knowledge of the students to make sense of the data. As suggested by the participants, using intuition and personal knowledge is subjective, as teachers can develop different perceptions of students, resulting in inconsistencies in the information from data sense making.

Participant 8 described intuition as experiential learning developed over years and something that is neutral and done naturally. Participant 6 declared, "Intuition is critical, because when students' responses were not clear, I used intuition and what I know about

the students to understand my students' responses." Based on the findings, there are clear indications that special educators' interpretations of students' data on standardized assessments mostly depend on (a) the information they gather about students while working in classrooms and (b) knowledge about how students interact with test questions. In this example, Participant 9 explained how data are used,

> The standardized tests give a broad line of whether the child is proficient, partially proficient, or not proficient at all. But you have to look at all the data from your teaching and from tests that you designed to see what functional level the student is performing on in order to know what remediation you need to put in place.

Similarly, Participant 10 explained that there is more to it than just the data, including the atypical experiences students might have on the day of the test. In this example, Participant 9 explained,

> I am always thinking about the students' feelings when I am testing the students. Was the student ready for the test? Did the student have a good day before taking that test? Did the students have breakfast? So, I am always thinking about the student because I know that if they are not together the test results might change depending on how the student is feeling for that day. I think this plays a big role in the students' scores.

**Theme 6: Adding Meaning to Data**

From the findings, teachers use different steps to make sense of data. These steps include (a) cross-checking the data from different sources, (b) using technology to display the data to identify patterns and trends, (c) getting different perspectives from

other teachers and specialists, (d) using noncognitive data information to understand core content data, (e) analyzing tested skills to determine levels of complexities, and (f) prioritizing data. Participants stressed the point that students have different needs and therefore making sense of data will depend upon (a) special education instructional program and (b) students' specific academic or non-academic needs. Participant 9 explained how data are correlated:

> Communication is what helps me to understand data to reach the IEP goals. I take the assessment data, classwork data, participation data, group work data, data from parents and I communicate with the PT/OT, and speech therapists to see where students need help.

Teachers also created spreadsheets to present and display data for discussions with other professionals and colleagues. Participant 9 described using spreadsheets to display the data, patterns and trends in the data are easily identified.

Some participants reported attending professional learning committee meetings (PLC) and grade level meetings (GLM) with general education teachers and coaches weekly, and on occasions when they discussed data use, teachers were asked to report on their students' data. Participant 9 shared the following:

> I bring my data and my anecdotal notes with me. I have students' work samples with my comments and the tracker with the grades. I want everybody to see that it's not just a number, but there is meaning added to that number. I want to discuss the students' performance on the assessments and get a different perspective on how I graded the responses.

Participants stated the need for professional data meetings for special education teachers. At the PLC and grade-level meetings, the focus is generally on data from the general education population. Further, not enough time is spent on helping teachers to analyze the standardized test scores.

Based on the findings, participants in inclusion and resource programs focused on core content data to make decisions about students' academic progress. These areas are assessed via standardized assessments in math, language arts, and science. Teachers used scores from summative weekly tests, end-of-unit assessments, independent computer leveled scores, and projects to make these decisions. These scores are evaluated to determine whether the students met the success criteria indicated in the IEP annual goals. Because the success criteria are different for each student, data are not analyzed as in clusters. Participants in these programs explained that to make sense of the data, they look at specific skills to determine the complexity levels and whether students were exposed to the skills at their academic levels. In addition, they considered if students would benefit from reteaching the skill or if prerequisite skills were missing. The information from these types of data is used to inform the IEP. In this example, Participant 7 explained, "Well there is a lot to understand; Was the test on level with the IEP goals? Was the skill too high or was it too low?" In another example, Participant 10 made this contribution about the skills, "Sometimes I feel that certain skills were not taught or were not covered, and students did not know the skills, so it made a big difference in the scores."

Participants from the self-contained programs indicated that the social and behavioral data are important and are considered in the process of data sense making. In answering this question, Participants 6 and 8 from the self-contained instructional program shared,

> The core content subjects are important, but the IEP goals are the most important, so I must make sure that I am addressing those first, the language arts, phonics, math and communications. But then all the developmental and behavioral things should be taken into consideration before other skills can be addressed.

Participants from the self-contained autism programs explained that the focus is on meeting the students' social, behavioral, and communication needs, which can interfere with the students' ability to achieve academic success. Therefore, noncognitive data are used to enhance academic data. The data collected on behavioral, social, and communication performance are used to make sense of the data from the content subject areas to determine whether students' performances are affected by the underlying behaviors and social challenges. In answering the question, Participant 10 stated, "I always ask, what was the student behavior during the test? Would the grade be different if the conditions were met?" Participants explained that they do not present data as class or group data because the students are of different abilities and therefore data are individualized to each student.

**Theme 7: Challenges Encountered when Making Sense of Data**

Participants encountered various challenges in the data sense-making process. Examples of these challenges included (a) limited data skills and knowledge, (b)

insufficient time to collect informal data, (c) not having enough paraprofessionals to help with data collection, (d) complaints about pressure from administrators, and (e) discrepancies in standardized test scores. Scheduling challenges are specific to participants in the inclusion and resource programs. Participant 9 explained, "When you have to service multiple classes you are looking at multiple data, multiple information, and multiple students, and sometimes the disadvantage is not having the support you need." Participants described instructing multiple groups of students within a 30-minute period, which is not enough to collect important formative data. Participants believed that failure to collect adequate formative data is a great disadvantage to students, as formative data are used to measure students' performance at their functional academic levels.

Participants expressed difficulties in understanding data. Based on the interviews, participants pointed out that their limited data literacy skills and added rigor in data use adversely affected their ability to be competent in data sense making. Participant 7 explained, "Some data challenges I experienced are not being able to use the data to pinpoint students' misconceptions, and not being able to target the students 'individual needs. It is hard because there are lots of different things in the curriculum." The participants showed open transparency for data training. Participant 7 shared, "Data training is needed in all areas. I need to know that I am reading the data correctly and I am making the right decisions."

Pressure from some administration was a recurring theme in the interviews. For example, Participant 9 shared, "The administration is telling you this is what needs to be done, but the challenge is that student's IEP goals state differently." Other participants

stated that what they know about data that should be used to inform IEP goals is not aligned with the information they receive from some administrations about data that informs the IEP goals. Participants described a lack of coherence between the child study team and administration on (a) instructional practices of students with IEPs, (b) modifying the curriculum, and (c) testing of students with IEPs. Participants admitted that these challenges adversely impact the process of data sense making.

## Evidence of Trustworthiness

In qualitative research, trustworthiness is determined by the dependability, confirmability, transferability, and credibility of the research findings (Ravitch & Carl, 2016). Trustworthiness is also measured by the rigor of the research (Burkholder et al., 2016). I practiced reflexivity throughout the process of data collection to reduce the possibilities of personal bias (Ravitch & Carl, 2016). The steps taken to develop and maintain trustworthiness in this study are discussed in the following sections.

### Dependability

Dependability in a qualitative study refers to the stability and consistency of the research findings (Ravitch & Carl, 2016). In other words, repeating the study in the same context with the same sample population would yield similar results. Dependability relates to verifying that the rigor of the research method was maintained and the precision with which the research method was followed. The decisions made throughout the data collection process were consistent with the qualitative method because I used (a) purposeful sampling, (b) semi-structured interviewing, and (c) open-ended questions. In addition to maintaining the rigor of the qualitative method, I ensured that the participants

were experts in the field of special education and able to deliver rich information for understanding the phenomenon. Through semi-structured interviews, participants provided rich, detailed information about their experiences with the phenomenon and each interview was audio recorded. I replayed each recording to capture the accuracy of the participants' experiences and made copies of the typed transcripts.

**Confirmability**

Confirmability relates to the extent to which the findings are based on the participants' responses (Ravitch & Carl, 2016). In addition, confirmability relates to the objectivity of the researcher and the measures taken to reduce researcher bias. For example, I disclosed that I am a special educator in the district, but I do not hold any supervisory position in the school district. Furthermore, immediately following each interview, I referred to my reflexive journal and reflected on how my perceptions as a special educator might have impacted the research process.

Another way I maintained confirmability for this research was by selecting the most appropriate research design method. I utilized a basic qualitative research design, which allowed the participants to give rich, substantial details, capturing their experiences regarding the topic to answer the research question. I used the participants' direct quotes in data analysis when explaining the findings to avoid researcher bias (Patton, 2014). Additionally, to maintain confirmability, I consistently referred to the themes generated and ensured that connections were made to answer the research question. For example, I used the in vivo coding approach to identify the keywords and linked common codes together to develop the themes.

**Transferability**

Transferability relates to whether the findings have the potential to be applied in other contexts or wider populations (Burkholder et al., 2016). To ensure transferability, I provided a full description of the setting and demographics of the participants and explained why these participants were selected. In addition, I supplied adequate descriptions of the context in which data were collected to enable readers to gain a sufficient understanding of the phenomenon. Secondly, the findings were detailed in descriptive narratives to enable readers to make judgments about the implications of the findings for future research on making sense of data that inform the IEP annual goals. The findings from this study may help to address the gap in the research literature and contribute to a wider body of research on the topic (Ravitch & Carl, 2016).

**Credibility**

In a qualitative research study, credibility refers to the reliability of the findings to reality. Credibility relates to the data instrument used to collect the data (Ravitch & Carl, 2016). To ensure credibility, the most suitable data collection technique, research method, and data analysis approach were utilized for this research. For example, I began by asking open-ended questions, which allowed the participants to provide detailed information. Secondly, I conducted semi-structured interviews, which enabled the participants to talk freely about their experiences with the phenomena. Additionally, I interviewed middle school special educators with varied teaching backgrounds and experiences to add greater credibility to the findings.

## Summary

The research question that guided this study was: How do sixth-through-eighth-grade special educators in urban public middle schools make sense of data to inform annual IEP goals? The research question was supported by the conceptual framework, which was aligned with constructivism learning theory. Through purposeful sampling, 11 participants were recruited from six middle schools in the district to provide expert knowledge on the topic. The sample group was a subset of the population of special educators in middle schools.

The only source of data collection was interviewing. Interviews were conducted virtually via Zoom using semi-structured interviewing style. The interviews were audio recorded, and a verbatim typed transcript was made immediately following each interview. Saldaña's (2016) in vivo coding approach was used to analyze the participants' detailed information. Through a process of inductive reading and interactive manual coding of the data, seven themes were developed that were used to answer the research question.

In Chapter 5, the interpretations of the findings are addressed with connections made to the literature review developed in Chapter 2. Further, the study limitations are discussed, and suggestions for future research are presented. Additionally, the implications for affecting positive change are presented.

# Chapter 5: Discussion, Conclusions, and Recommendations

## Introduction

The purpose of this basic qualitative research study was to explore sixth-through-eighth-grade special educators' data sense making to inform IEP annual goals. I conducted semi-structured interviews via Zoom conference with a sample of 11 special educators to collect expert information necessary to answer the research question. I used in vivo coding approach to organize the data to answer the research question: How do sixth-through-eighth-grade special educators in urban public middle schools make sense of data to inform annual IEP goals to target students' specific learning needs? Data were coded based on similarity in ideas, causation of actions, unique details, and strong or emotional language. Codes were identified and linked to develop themes. The following seven themes were generated from the data: (a) changes in data use, (b) using data for goal alignment, (c) types of data collected, (d) data analysis, (e) understanding the data collected, (f) adding meaning to data, and (g) challenges impacting data sense-making. The research findings are based on the analysis of these themes.

In Chapter 5, the study findings are presented, and connections are made to current literature and the conceptual framework, that guided this research. Also included and discussed in this chapter are implications, limitations of the study, and recommendations for future research. A qualitative research design was best suited for this study because the qualitative research approach includes an appropriate framework and methodology for collecting in-depth information necessary to understand individual experiences with a phenomenon (see Ravitch & Carl, 2016). Thus, I used a basic

qualitative research method, which was suitable for exploring the phenomenon. Participants delivered rich, substantial detailed information, which provided the narrative and concepts to follow thought processes, reasoning trends, and inferences to understand how special educators make sense of data that informs annual IEP goals for targeting students' specific learning needs.

## Interpretation of the Findings

Following the protocol from Walden University, I applied for approval to conduct the research study. After obtaining approval from Walden University's IRB (06 07 22 05745060), I began the process of data collection, which included (a) developing the data instrument, (b) recruiting the participants, and (c) conducting the research. I formulated and used 10 open-ended questions to elicit quality, detailed information in the participants' own words about their experiences with the phenomenon. I conducted semi-structured interviews to collect data. I used in vivo coding to analyze the data and developed the following seven themes: (a) changes in data use, (b) using data for goal alignment, (c) types of data collected, (d) data analysis, (e) understanding the data, (f) adding meaning to data, and (g) challenges impacting data sense making.

In discussing the findings, I made connections to the current literature presented in Chapter 2 to support, confirm, or add to existing research literature on the phenomena. First, participants emphasized the need to describe the interrelatedness among the curriculum, CCSS, standardized assessments, and data sense making. In making the argument for the reasoning trends and the strategies employed when making sense of data, participants described the alignment of the curriculum, CCSS, and assessment data

in the context of special education as disconnected and perplexing to special educators. Additionally, participants explained how their understanding of these constructs influenced their abilities to determine which data were suited for informing annual IEP goals and shaped their approach to adding meaning to data. Participants were unprepared for using the prescriptive academic standards with students with disabilities and, in their own words explained, "Students with disabilities should not be using the general education curriculum and common core state standards." This finding confirmed current research on the topic. Van Boxtel (2017) concluded that teachers lack confidence in their abilities to work with CCSS. Further, Van Boxtel claimed that concerns about CCSS extend beyond the classroom to teacher training programs, as professors acknowledged lacking confidence and feeling insecure in the preparation and knowledge of CCSS (Van Boxtel, 2017).

Current education policies advocate that all students must be exposed to the CCSS and the new curriculum (ESSA, 2015). However, participants in this study indicated they felt the rigor of the state standards increased the complexities of the curriculum and made it more challenging for special educators to modify for students with disabilities. In related research, Cramer and Gallo (2017) conceded that the increased rigor in instructional practices poses challenges to special education teachers. The current literature does not address special educators' perspectives on using standards to guide instructions for students with disabilities (Cramer and Gallo, 2017).

Another finding is that teachers use intuition and personal knowledge when adding meaning to standardized and summative data. In existing research on the use of

intuition in data sense making, Vanlommel and Schildkamp (2019) warned that teachers' use of intuition and personal knowledge in data sense making may lead to invalid interpretations in the absence of rational criteria. In this study, participants indicated they used intuition and personal knowledge to combat invalid data from standardized assessments. Teachers explained intuition as guessing the validity of the scores. If the scores were too high or too low, teachers made inferences on the skills assessed and the personal knowledge of the students.

A crucial discovery made in the present study is the immense value teachers place on formative data, which includes informal, formal, and non-cognitive data about students' interactions during instructions and in the learning environments. Participants consider formative data to be a more reliable reflection of students' capabilities. Participants described formative data as information collected during instructions to understand students' thinking and to provide feedback. According to the participants, formative data are important because the tests and quizzes are given weekly to assess one skill specific to the students' needs. Furthermore, the information from formative data is individualized to each student and reflective of a student's cognitive, social, and behavioral needs. Keuning et al. (2017) contended that data sense-making is influenced by teachers' prior experiences with data and inferences made by teacher observations. Participants used inferences made during instructions and from formative assessments to understand the results from standardized assessments and other summative assessments better.

Regarding data accuracy, participants consider standardized and summative data to be fallible and not reliable to inform IEP goals. First, according to participants, CCSS standards are rigorous and challenging for students with learning needs. Second, the standardized assessments are administered at age-and grade-appropriate levels rather than at students' academic functioning levels. Third, teachers know that their students with IEPs who take the standardized assessments function two to three levels below age-appropriate grade levels. Further, participants claimed that standardized scores are used for ranking students, but do not capture students' specific learning needs. This argument is consistent with Chen (2019) who warned that summative test scores have minimal instructional value in identifying what a student knows or does not know as well as providing information to answer why a student does not know. Similarly, Ruble et al. (2018) argued that data from standardized assessments and curriculum-based tests are not always appropriate for measuring students' understanding.

Regarding the understanding of data, findings indicated clear contrast between teachers' use of formative and summative or standardized data. Teachers maintained that summative and standardized data are not reliable for informing IEP annual goals because these assessments are given at the end-of-unit of work or yearly, as is the case with standardized assessments. Second, a wide range of skills is assessed requiring students to recall information from varied sources. Additionally, feedback is not immediately forthcoming to the students to adjust instructions. Comparably, researchers have argued that summative and standardized assessments measure curriculum content rather than students' learning (Sulaiman et al., 2019). Formative assessments are procedures for

collecting information about students in the classroom (Sulaiman et al., 2019). Teachers admitted that data from formative assessments are easier to understand because, generally, these types of data measure understanding of one skill and teachers find the information concise and direct.

Participants revealed experiencing various challenges with data literacy and organizational practices that impact the process of data sense making. According to Camacho et al. (2018), challenges experienced in the classroom adversely impact teachers' mindsets, and hinder their ability to meaningfully engage in data sense making. A key factor contributing to the challenges is the participants' limited data skills and knowledge. Mandinach and Gummer (2016) informed that teachers lack the advanced data training necessary to transform data interpretations into actionable knowledge. Schildkamp et al. (2019) asserted that teachers need professional data training to be more knowledgeable and competent at data sense making. Wagner et al. (2017) compared special educators' data literacy skills to general education teachers and concluded that special educators required more quality data training for improving their understanding of data analysis and data interpretations for making decisions.

Participants were highly critical of the quality of data training provided in teacher training programs. Participants described their level of data training as basic and antiquated and not at the advanced level required to transform the data interpretation into actionable knowledge for current data sense making. In this example, a participant explained, "Data training was not a priority at the time I went to college. Only in the past 10 years did data become important in education." From the findings, there is evidence of

the need for training of special educators in data literacy. Wagner et al. (2017) warned that there are currently no standardized conventions guiding preservice teachers' data literary skills. Mandinach and Gummer (2016) also contended that special educators must be data literate if they are to target students' learning needs more precisely.

Cramer and Gallo (2017) noted the disconnect between the teachers' belief in data collection and the actual data use to improve students' learning. Some participants described scheduling as a challenge that restricts the amount of formative data collected and limits the quality of data for informing the IEP. Teachers from the inclusion and resources instructional programs service many students, and their instructional times are limited to 30-minute periods. These short instructional periods diminish the instructional quality and limit teachers' time to collect informal data. Whereas teachers described standardized data as inconsistent, misleading, and untimely, they believed formative data are consistent, timely, and relevant to students' learning. Current research confirmed the importance of creating opportunities for teachers to be effective at data use in schools. This approach includes leaders creating and providing support in scheduling and modeling effective data use (Schildkamp et al., 2017).

The conceptual framework for the current study was the theory of constructivism, which is rooted in the early works of Piaget (1968), Dewey (1938), and Vygotsky (1978). The conceptual framework is used to provide the construct for understanding how special educators add meaning to data to inform annual IEP goals to target students' specific learning needs. In the philosophy of constructivism, Piaget focused on how sense making occurs, whereas Vygotsky concentrated on the factors and conditions that influenced

sense making. Vanlommel and Schildkamp (2019) described data sense making as a process through which teachers add meaning to data to be sensibly understood to make decisions. In the present study, data sense making is described as the process of adding meaning to the data to inform IEP goals to target students' learning needs more specifically.

A key tenet of constructivism is in the process of sense making; new knowledge is contingent upon prior knowledge and personal experiences (Piaget, 1968). The findings revealed that when special educators engage in data sense making, they are continuously building new data understandings and adjusting their old cognition to new knowledge. Recent academic changes in data use require teachers to reconsider how they make sense of data and the context in which meaning is added to data. In addition to making sense of data, special educators are learning to adjust to new knowledge of data characteristics and the relationship of these characteristics with their data skills, data knowledge, and data understanding.

In the process of making sense of the data, special educators connect (a) prior teaching experiences, (b) data knowledge, and (c) knowledge of students' learning needs to the newly acquired CCSS knowledge to add meaning to the data generated from new curriculum and instructional practices. Sense making is a continuous reconstruction theory (Dewey, 1938), and in the present research, special educators consistently reconstruct their knowledge about interpreting data by connecting prior knowledge of the curriculum and data to newly acquired knowledge.

Vygotsky (1978) posited that adults learn through problem-solving. In the current study, special educators went through a process of problem-solving to understand data generated from standardized assessments and to determine if data could be used to inform annual IEP goals. In their approach to making sense of the data, special educators (a) identified flaws in the standardized data, (b) determined the cause of the problem, and (c) implemented appropriate strategies to add meaning to the data. The identified inconsistencies and variability of the data meant that the data could not be used to inform the annual IEP goals. IEP goals are based on authentic and accurate information about the students' present functional levels and capabilities. Special educators in the current study used their knowledge of the students' capabilities along with information from formative data collected during instructions to help in making sense of the standardized assessment scores.

Participants in this study were drawn from varied data backgrounds. The constructivism philosophy recognizes the individuality of the cognitive process when building new knowledge (Piaget, 1968). The participants expressed having different levels of data experiences with some participants indicating that they needed more guidance and directions. As one participant commented, "In my experience there is a lack of clarity with what exactly is supposed to be happening with the modifications and the data." Participants are expected to make changes in instructional practices based on obtaining data to ensure that instruction is more consistent with the students' academic needs.

Adults learn experientially by actively engaging in cooperative learning (Vygotsky, 1978). Special educators attended professional learning committee meetings and grade-level meetings and acknowledged the benefits of collaborating with general education colleagues, specialists, and coaches. The participants explained that although these meetings are not specific to the needs of the special educators, they benefited by asking questions about CCSS and data use. Special educators need the same expert training on data as their general education colleagues. Thus, special educators are learning from more knowledgeable teachers. This relationship emphasizes Vygotsky's (1978) idea of learning through the help of those who are more knowledgeable. In addition, Piaget (1968) contended that humans create knowledge through interactions between their experiences.

Constructivists posit that knowledge is not mechanically acquired but actively constructed within the constraints of the environment. The educators actively analyzed the scores by probing through the difficulty levels of the skills and cross-checking the data with informal and formal data collected during instructions to get the most accurate information from data. Sense making is a continuous reconstruction theory (Dewey, 1938), and in this research, special educators consistently reconstructed their knowledge about interpreting data by connecting prior knowledge of the curriculum, students' capabilities, students' information, and varied data perspectives to newly acquired knowledge to better conceptualize data to inform IEP annual goals.

## Recommendations

The study findings revealed that the participants were lacking in data skills and knowledge and teachers were limited in their abilities to make sense of data. In addition, the participants experienced difficulties understanding standardized data. Based on the study findings several recommendations are made.

Participants indicated they are unprepared for using the prescriptive academic standards with students with disabilities. Therefore, the first recommendation is for the district to evaluate the emphasis placed on standardized data to measure students' learning progress in special education. Standardized assessments are used to measure the effectiveness of CCSS, and although this approach is logical for the general education population, it may not be optimal for students with special needs. CCSS standards are designed with great implications for urban schools to advance college and career readiness for all students, including students with special needs (Cramer & Gallo, 2017). However, the implementation of CCSS in special education has proven to be challenging for most urban schools (Cramer & Gallo, 2017), and analyzing data generated from CCSS instructional practices is complicated. Van Boxtel (2017) concurred that there is no clear path to providing rigorous access to CCSS for students with disabilities. The rigid, stringent, and conforming structure in which CCSS are presented in instructional practices makes it difficult for students with special needs to advance academically. The district should continue to research and implement recommendations presented in current research (e.g., Van Boxtel, 2017) on common core expertise for special education teachers.

The second recommendation is that the district should provide opportunities for special education teachers coming to the district to receive advanced data training like their colleagues in general education. This change will not only alleviate some of the challenges new special educators are experiencing with understanding data but also maintain fluency and consistency with data literacy. Many of the experienced special educators in the study stated that data training was not a requirement when they began teaching. However, this has changed, and the focus is now on data for academic advancement and the demand for data advance training has intensified. By partnering with teacher training programs in the community, the district can get the needed resources to provide in-service data training for experienced special educators to equip them with the data skills necessary for current data use in education.

Additionally, the district can take more active and aggressive roles in developing professional data literacy training for in-service teachers, which are based on the district's criteria for data literacy. Participants expressed the need for data training to develop more advanced data literacy skills and knowledge based on CCSS current expectations for teachers' data understanding for improving academic advancement. Training could be accomplished in the PLC collaborative school-wide meetings by implementing data norms and utilizing trained capacity data professionals. Such an approach may require establishing data leadership teams in the schools (Schildkamp et al., 2019).

Another recommendation is for the district to review the method by which students with disabilities are evaluated to determine eligibility to take standardized assessments, which are administered at grade and age-appropriate levels. Participants

reported that these decisions were made by the special education central district leaders without the input from teachers who are more knowledgeable about the students' academic capabilities. Furthermore, the information and reports on the students' IEPs about their academic and social performances are disregarded and not upheld when making these decisions. According to participants students with IEPs who are functioning three levels below the grade and age-appropriate academic levels are administered the standardized assessments at grade and age-appropriate levels.

A key recommendation is for the district to practice transparency in data use in special education, especially in using data from standardized assessments to inform annual IEP goals. There is a need for school administrators to encourage teachers to use accurate and relevant data in special education to inform annual IEP goals. The annual IEP goals are structured to state a student's current academic functional level, conditions for learning, how the instructions are provided, and who provides the instructions. The expectation should be that when students with disabilities are assessed at levels above their academic functioning levels, the resulting data cannot be used to inform a student's annual IEP goals.

## Limitations of the Study

The significance of a study's findings is diminished because of the impact of the limitations on the methodology of the study design (Vasileiou et al., 2018). This qualitative study was conducted on a small scale with a small sample size, which limits the findings of the study. Second, the study was concentrated on a specific urban location and focused on a specific population. The ability to generalize the findings of this study

to the wider population of special educators would be limited due to the small sample selected and the specific location in which the study was conducted. Another limitation relates to the COVID-19 pandemic restrictions, including discouraging in-person contact. In this regard, interviews were conducted virtually via Zoom meeting platform.

## Implications

The overarching goal of this study was to provide expert information to help understand how special educators make sense of data that inform annual IEP goals. The implications of this study are far-reaching and relevant to various entities of the educational system, including the district, administrators, special educators, and teacher training programs. The participants described their vulnerability regarding data sense making and identified areas of data skills and literacy they want to improve and new data skills they need to develop. The results of this study may be applied to address the issue of data training for both new and experienced special educators through the implementation of data leadership teams and district and teacher training organization partnerships for quality advanced data training. The results of this study may be applied to assess how CCSS are implemented in special education and used to develop strategies for providing training to guide special educators in understanding the standards before attempting to modify the standards to align with the IEP goals.

Further, the findings of this research study contribute to informing administrators' misconceptions about collecting relevant data that inform annual IEP goals. The special education department, in conjunction with the administration, should provide updated training for administrators to keep them informed and knowledgeable about special

education policies, including the Individuals with Disabilities Education Act of 2004. Additionally, the findings will enlighten administrators about the quality of data necessary for informing annual IEP goals to target the specific learning needs of students more effectively.

I did not cover the validity of the interpretative decisions and how they impact the IEP annual goals. A longitudinal study with a larger sample of special educators from other urban schools should be conducted to evaluate teachers' interpretations of the data that are manifested in student learning. The knowledge derived from this study helps to close the gap in research knowledge on data sense making for informing annual IEP goals. Special educators could benefit from these findings, especially those in urban public middle schools where there are large, diverse student populations with learning disabilities.

Implications for positive social change include empowering special educators with skills to be more proficient and competent in meeting students' learning needs, contributing to the academic success of more students. Understanding how to make sense of data that informs annual IEP goals has great implications for special educators and students with learning needs. Special educators are expected to be data literate and have the ability and competency to understand data in various contexts. Having the knowledge and understanding of how to make sense of data in the context of developing annual IEP goals empowers special educators to be more competent in targeting the specific learning needs of students with disabilities, resulting in a positive and coherent school climate.

When annual IEP goals are written to target students' specific needs, students achieve greater academic success.

## Conclusion

I explored how sixth-through-eighth-grade special educators in urban middle public schools make sense of data that inform annual IEP goals. The problem is that how special educators make sense of data that inform annual IEP goals for targeting students' specific learning needs is not widely understood. This problem stems from the lack of researched information about data sense making in the context of informing annual IEP goals (Park & Datnow, 2017; Ruble et al., 2018). This problem is significant to special educators because special educators in urban school districts are experiencing immense pressure from data-driven curricula to shift to data use to improve students' academic performances. Special educators are expected to use academic data to provide tailored instructions (Debbag, 2017; Ruble et al., 2018). However, these special educators do not have expert training of the same quality as their general education colleagues (Wagner et al., 2017) and, according to Chen (2019), only a few teachers use data interpretation reports and information to inform students' individual learning goals.

I conducted a qualitative research study in an urban public school district to gather data to understand the phenomenon. Using purposeful sampling, I selected participants from special education middle school programs who met the defined criteria to participate in the study. I used the district's school database to recruit participants for the research study and 11 special educators with the defined criteria were interviewed. Participation was voluntary and confidential, and participants' identities were protected.

The data collection instrument consisted of 10 open-ended questions and semi-structured interviews were conducted virtually via Zoom Conferencing. Each interview was audio recorded and verbatim typed transcripts of the audio recordings were made immediately following each interview. Expert, firsthand, in-depth information, rich in details and experiences about the special educators' process of data sense making of the data that informs annual IEP goals were collected. Data were analyzed using in vivo coding (Saldaña, 2016) to find patterns of key terms and ideas.

Seven themes were developed from the analysis of the participants' detailed in-depth information, which provided the narratives to answer the research question: How do sixth-through-eighth-grade special educators in urban public middle schools make sense of data that inform annual IEP goals? Data sense making is the practice of adding meaning to data to be sensibly understood (Vanlommel & Schildkamp, 2019). In this study, special educators made sense of data in the context of informing IEP annual goals to target students' specific learning needs. The knowledge gained from this study fills the gap in research on the topic.

The expectations for this study are that district leaders, school administrators in urban school districts, and policy makers will use the findings to understand how special educators make sense of data to inform annual IEP goals. It is also expected that the findings will motivate district and school administrators to provide quality data training for special educators and encourage district leaders to re-examine the practice of administering age- and grade-appropriate standardized assessments to students with IEPs who are functioning 2-3 levels below grade-appropriate levels. Finally, it is anticipated

that the findings of this study will contribute to empowering special educators to be more proficient at adding meaning to data to target students individual learning needs more effectively for achieving greater academic success.

# References

Barnes, T. N., Cipriano, C., Flynn, L., Rivers, S. E., & Xu, W. (2019). Validating the recognizing excellence in learning and teaching (RELATE) tool for special education classrooms. *Journal of Experimental Education*, *87*(3), 415–429. https://doi.org/10.1080/00220973.2018.1465383

Beck, J. S., Morgan, J. J., Brown, N., Whitesides, H., & Riddle, D. R. (2020). "Asking, learning, seeking out": An exploration of data literacy for teaching. *The Educational Forum*, *84*(2), 150–165. https://doi.org/10.1080/00131725.2020.1674438

Billingsley, B., Bettini, E., & Jones, N. D. (2019). Supporting special education teacher induction through high-leverage practices. *Remedial and Special Education, 40(6),* 365–379. https://doi.org/10.1177/0741932518816826

Burkholder, G. J., Cox, K. A., & Crawford, L. M. (2016). *The scholar-practitioner's guide to research design*. Laureate publishing.

Camacho, D. A., Vera, E., Scardamalia, K., & Phalen, P. L. (2018). What are urban teachers thinking and feeling? *Psychology in the Schools, 55*(9), 1133–1150. https://doi.org/10.1002/pits.22176

Camp, H. (2017). Goal setting as teacher development practice. *International Journal of Teaching and Learning in Higher Education, 29*(1), 61–72. https://eric.ed.gov/?id=EJ1135994

Chen, L. (2019). Enhancing teaching with effective data mining protocols. *Journal of Educational Technology System*, *47*(4), 500–512. https://doi.org/10.1177/004723951983546

Chikwe, M., & Cooper, R. (2019). School leaders' sense-making and use of equity-related data to disrupt patterns of inequality. *Journal of Educational Leadership and Policy Studies, 3*(3), 1–21. https://eric.ed.gov/?id=EJ1252030

Cook, B. G., & Odom, S. L. (2013). Evidence-based practices and implementation of science in special education. *Exceptional Children, 79*(2), 135–144. https://doi.org/10.1177/001440291307900201

Council for Exceptional Children. (2016a). Initial specialty set: Learning disability Specialty set. https://www.cec.sped.org/Standards/Special-Educator-Professional Preparation-Standards/CEC-Initial-and-Advance-Specialty-Sets

Cramer, E. D., & Gallo, F. (2017). Special educators' perceptions of state standards in a large, urban school district. *Journal of Urban Learning Teaching and Research*, *13*(1) 34–44. https://eric.ed.gov/?id=EJ1150164

Creswell, J. W. (2014). *Research design: Qualitative, quantitative and mixed methods approach* (4th ed.). Sage.

Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design choosing among five approaches* (4th ed.). Sage.

Debbag, M. (2017). Opinions of prospective classroom teachers about their competence for individualized education program (IEP). *Universal Journal of Educational Research*, *5*(2), 181–185. https://eric.ed.gov/?id=EJ1129411

Dewey, J. (1938). The determination of ultimate values or aims through antecedent or a priori speculation or through pragmatic or empirical inquiry. *Teachers College Record*, *39*(10), 471–485. https://doi.org/10.1177/016146813803901038

Every Student Succeeds Act. (2015). *Public Law 114-95.* https://www.govinfo.gov/app/details/PLAW-114publ95

Fullan, M., & Quinn, J. (2016). *Coherence: The right drivers in action for school, districts, and system*. Sage.

Gannon-Slater, N., La Londe, P. G., Crenshaw, H. L., Evans, M. E., Greene, J. C., & Schwandt, T. A. (2017). Advancing equity in accountability and organizational cultures of data use. *Journal of Educational Administration, 55*(4), 361–375. https://doi.org/10.1108/JEA-09-2016-0108

Gash, H. (2019). Constructivism and mystical experience. *Constructivist Foundations 15*(1), 1–9.

Gavish, B. (2017). Special education trainee teachers' perceptions of their professional world: Motives, roles, and expectations from teacher training. *Teachers and Teaching Theory and Practice, 23*(2), 153–170. https://doi.org/10.1080/13540602.2016.1204285

Hurwitz, S., Perry, B., Cohen, E. D., & Skiba, R. (2020). Special education and individual academic growth: A longitudinal assessment of outcomes for students with disabilities. *American Educational Research Journal, 57(2),* 576–611. https://doi.org/10.3102/0002831219857054

Hock, M. F., Brasseur-Hock, I. F., Hock, A. J., & Duvel, B. (2017). The effects of a comprehensive reading program on reading outcomes for middle school students with disabilities. *Journal of Learning Disabilities*, *50*(2), 195–212. https://doi.org/10.1177/0022219415618495

Keuning, T., Van Geel, M., & Visscher, A. (2017). Why a data-based decision-making intervention works in some schools and not in others. *Learning Disabilities Research & Practice*, *32*(1), 32–45. https://doi.org/10.1111/ldrp.12124

Mandinach, E. B., & Gummer, E. S. (2016). What does it mean for teachers to be literate: Laying out the skills, knowledge, and dispositions: *Teaching and Teacher Education, 60,* 366–376. http://dx.doi.org/10.1016/j.tate.2016.07.011

Nicholson, J., Capitelli, S., Richert, A. E., Wilson, C., & Bove, C. (2017). Teacher leaders building foundations for data-informed teacher learning in one urban elementary school. *The New Educator, 13*(2), 170–189. http://dx.doi.org/10.1080/1547688X.2016.1140856

No Child Left Behind Act. (2001). *Public Law 107-110* (ED556108). https://files.eric.ed.gov/fulltext/ED556108.pdf

Park, V., & Datnow, A. (2017). Ability grouping and differentiated instruction in an era of data-driven decision making. *American Journal of Education*, *123*(2), 281–306. https://eric.ed.gov/?id=EJ1129300

Park, V., St. John, E., Datnow, A., & Choi, B. (2017). The balance act: Students class-room placement routines and the uses of data in elementary schools. *Journal of Educational Administration, 55*(4), 390–406. https://doi.org/10.1108/JEA-09-2016-0098

Patton, M. Q. (2014). *Qualitative research & evaluation methods: Integrating theory and practice* (4th ed.). Sage.

Piaget, J. (1968). Piaget's point of view. *International Journal of Psychology*, 3(4), 281–299. https;//doi.org/10.1080/00207596808246651

Ravitch, S. M., & Carl, N. M. (2016). *Qualitative research: Bridging the conceptual theoretical, and methodological.* Sage.

Ruble, L. A., McGrew, J. H., Wong, W. H., & Missal, K. N. (2018). Special education teachers' perceptions and intentions toward data collection. *Journal of Early Intervention, 40*(2), 177–191. https://doi.org/10.1177/1053815118771391

Saldaña, J. (2016). *The coding manual for qualitative researchers* (3rd ed.). Sage.

Schildkamp, K., & Poortman, C. (2015). Factors influencing the functioning of data teams. *Teachers College Record, 117*(4), 1–42. https://doi.org/10.1177/016146811511700403

Schildkamp, K., Poortman, C., Luyten, H., & Ebbeler, J. (2017). Factors promoting and hindering data-based decision-making in schools. *School Effectiveness and School Improvement, 28*(2), 242–258. https://doi.org/10.1080/09243453.2016.1256901

Schildkamp, K., Smit, M., & Blossing, U. (2019). Professional development in the use of data: From data to knowledge in data teams. *Educational Research*, *63*(3), 393–411. https://doi.org/10.1080/00313831.2017.1376350

Sulaiman, T., Rahim, S. S. A., Hakim, M. N., & Omar, R. (2019). Teachers' perspectives of assessment and alternative assessment in the classroom. *International Journal of Innovative Technology and Exploring Engineering*, *8*(7S2), 426–431. https://www.ijitee.org/wp-content/uploads/papers/v8i7s2/G10730587S219.pdf

U.S. Department of Education. (2018). Characteristics of public-school teachers. *National Center for Education Statistics*. https://nces.ed.gov/programs/coe/indicator/clr

Van Boxtel, J. M. (2017). Common core expertise for special education teachers: What do special education administrators think is important? *Teachers Education Quarterly*, *44*(3), 57–73. https://www.jstor.org/stable/90010903

Vanlommel, K., & Schildkamp, K. (2019). How do teachers make sense of data in the context of high-stakes decision-making? *American Educational Research Journal*, *56*(3), 792–821. https://doi.org/10.3102/0002831218803891

Vasileiou, K., Barnett, J., Thorpe, S., & Young, T. (2018). Characterizing and justifying sample size sufficiency in interview-based studies: Systematic analysis of qualitative health research over a 15-year period. *BMC Medical Research Methodology*, *18*(148), 1–18. https://doi.org/10.1186/s12874-018-0594-7

Vygotsky, L. S. (1978). Socio-cultural theory. *Mind in Society*, *6*, 52–58. http://etec.ctlt.ubc.ca/510wiki/Sociocultural-Constructivist

Wagner, D. L., Hammerschmidt-Snidarich, S. M., Espin, C. A., Seifert, K., & McMaster, K. L. (2017). Pre-service teachers' interpretation of CBM progress monitoring data. *Learning Disabilities Research & Practice*, *32*(1), 22–31. https://doi.org/10.1111/ldrp.12125

# Appendix A: Teacher Invitation Letter

Hello Teachers,

I am Jemma Shillingford, a special education teacher in the X School system. Presently, I am a doctoral student at Walden University, and I am conducting a qualitative research study on data sense-making for informing annual goals for individual education programs. The purpose of this study is to explore how sixth- through eighth-grade special educators 'data make sense to write annual IEP goals to target the specific learning needs of students with disabilities. This student will be conducted in the urban middle public schools.

I am extending an invitation to special educators in the self-contained programs, resource programs, and inclusion programs in the middle school grades sixth- through eighth grade, to participate in this qualitative research. For this study special educators will include special education content teachers, content specialists, and speech teachers. If you are interested, you will be asked to participate in an interview, 40-45 minutes long. There are 10 open-ended questions which will be supported with probing questions. The aim of the interview is to collect detailed, expert information about the topic. The interviews will be conducted one-on-one virtually, and all the interviews will be audio recorded.

Your participation is voluntary, and non-compensatory. Confidentially is greatly respected and all identities will be protected. Interesting respondents will receive additional information about the study in a scheduled meeting. If you agree to be a participant in this research an Informed Consent Agreement form will be emailed to you. Indicate agreement by replying "I consent."

The findings from this study will help special educators to more effectively develop annual IEP goals to target students' specific learning needs. The findings will also contribute to the advancement of special education in urban school districts. I am looking forward to your participation.

Attached is my contact information and email.
jshillingford@gmail.com
(973-223-xxxx)

Jemma Shillingford
Special Education Teacher

# Appendix B: Interview Protocol

Research Title: Middle School Teachers' Data Sense Making to Inform Individual Education Programs.

Interviewee: Educator X
Grade Level:
Date:
Time:

Interviewer: Jemma Shillingford

Hello ---------

Thank you for volunteering to participate in this research study. You were selected because you can provide expert detailed information about the topic of this study. Your time will be respected and therefore the interview will not go beyond the agreed time. With your consent the interview will be recorded and following the interview I will make a verbatim typed transcript of the entire interview. The typed transcript will be saved as a Microsoft document and secured with a password. There are fifteen open-ended questions and based on your initial response I will determine if follow-up questions are required to elicit additional details or to clarify information.
Do you have any questions?

RQ: How do sixth- through eighth-grade special educators in urban public middle schools make sense of data to inform annual IEP goals?

Introductory warm-up: I am a special education teacher and I share some of your experiences.
Opening question: What motivated you to become a special education teacher?

The following questions are derived from research question:

Research Questions

1. What is your role as a special educator?

Probe: Please explain how your perception of that role changed while teaching.
Probe: Can you say what contributed to that change?

2. What is your experience working with students with disabilities?

Probe: Tell me, what are some concerns you have about writing IEP goals that are specific to the students' needs?

3. What is the focus of data at your school?

Probe: Please describe the data norms at your school?
Probe: Tell me, are there established criteria for data use?

4. What kind of student data do you collect?
Probe: Please explain how you use the data you collect.
Probe: Can you say more about formative and standardized data?

5. How do you prioritize students' data to inform annual IEP goals?
Probe: Please explain the importance of annual IEP goals?
Probe: Can you say more about the development of the IEP goals?

6. What data skills and knowledge do you bring to data analysis?
Probe: Please explain what you are looking for when you analyze students' data.
Probe: Tell me what questions you ask when you analyze students' data?

7. How is data presented for analysis?
Probe: Can you say more about the effectiveness of the data presentations?
Probe: Please describe the data you get from digital programs?
Probe: Can you tell me the extent to which you use intuition when analyzing students' data?

8. What are the circumstances under which you engage in data analysis?

Probe: Please describe the context and structure of a typical data meeting?
Probe: Tell me who attends data meetings and in what capacities?
Probe: Please describe the collective data knowledge and skills at the data meetings?

9. How do you transition the data interpretation information to students' learning?
Probe: Please explain how the data interpretation information is used to align the IEP to the state standards?

10. What data skills would you like to develop better?
Probe: Can you say more about the capacity at your school to develop your data skills?