First Steps in Social Emotional Learning Technology: The Impact of a Digital Diagnostic Assessment on Educator Social Emotional Learning Development

Mitch Schneider

A Dissertation Submitted to the Faculty of

The Chicago School of Professional Psychology

In Partial Fulfillment of the Requirements

For the Degree of Doctor of Education

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Ian MacLeod, Ph.D.

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Dedication

I dedicate my dissertation work to my family and social-emotional learning social venture colleagues. My mother has been a steady source of support and encouragement during the challenges of graduate school, startups, and life. My son, whose radiant energy lifts me within seconds, is a constant source of inspiration and affection. I hope my continued pursuit of higher and lifelong learning will inspire my son, nephew, and family to actively pursue their own journeys. To my sister and her husband, who treated us to some fine dining experiences. Additionally, to the memory of my father, who modeled the value of balancing hard work, family, and play.

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Abstract

With social-emotional learning's (SEL) significant impact on academic, emotional, behavioral, social, and lifelong success, it is necessary to ensure its continued adoption, implementation, and effectiveness within schools. While SEL is at its highest levels of awareness and implementation, it still faces significant barriers to effectiveness. Despite every state implementing aspects of SEL and 46 states having adopted SEL-related standards, only 24% of schools use effective SEL assessments. It is difficult to accurately evaluate SEL growth and program effectiveness without well-designed valid, and reliable SEL-based assessments (e.g., diagnostic, formative, summative, progress monitoring, and standards-based). The vast majority of SEL assessment tools are not aligned with widely accepted frameworks such as the Collaborative for Academic, Social, and Emotional Learning (CASEL) 5-component model. These assessments also suffer from several other failings: (1) not aligned with SEL standards, (2) lacking multiple reporter formats, (3) missing formative information for progress monitoring, (4) unable to deliver timely results and interpretations, and (5) fail to affect SEL development that could be available with digit assessment and intervention tools. This research found that only three tools met a majority of these criteria, none meeting all criteria. To further the development and implementation of SEL assessment instruments, the Social-Emotional Learning Digital Diagnostic Assessment (SELDDA) tool was studied to determine its impact on educator SEL development. Through quantitative analysis of reliability, validity, and usability, this study evaluated the SELDDA assessment.

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Chapter 1: Nature of the Study

Across the United States of America (U.S.), social-emotional learning (SEL) is a topic of increased focus for kindergarten to twelfth grade (K-12) schools (Morrison et al., 2019). The social-emotional aptitude of children decides how they effectively engage in empathetic behavior, prosocial behavior, and conflict resolution (Morrison et al., 2019). Social-emotional abilities also determine the capacity of students to self-regulate their behavior and create positive peer relationships (Brackett & Rivers, 2014). At the same time, students' social-emotional skills are positively linked with their educational aspirations, respect for teachers, self-efficacy, classroom participation, and ability to cope with school stressors (Zins & Elias, 2007). Educators should also be properly informed about SEL and attempt to effectively implement SEL development programs (Esen-Aygun & Sahin-Taskin, 2017). Despite the immense benefits of SEL, only a few schools in the U.S. use SEL assessment tools that are effective and efficient (DePaoli et al., 2017). This study focused on the development and review of a digital SEL assessment framework to measure the SEL skills of K-12 educators within the U.S. and support the development and accessibility of SEL initiatives. While this tool can be used for many user types, including students, educators, parents, and adults, this study focused only on educators. In addition to measuring the reliability, validity, and usability of this new SEL instrument, this study explored the impact of the integration of technology on user experience and user interaction design within the SEL assessment.

Background

SEL is the academic process by which an individual develops emotional intelligence (Durlak et al., 2011), and emotional intelligence is the process of managing motivation, emotion, relationships, and decision-making (Goleman, 1995). The concept of emotional intelligence has

existed since the time of ancient Greek philosophers, but since the 1960s, it has become a formal area of study and gained popularity through Daniel Goleman's (1995) book *Emotional Intelligence* (Durlak et al., 2011; Goleman, 1995; Goleman, 2005; Lobaskova, 2015). Upon the inclusion of 21st-century skills within education following the post-Industrial Age, there is a growing belief that students need more than academic skills to succeed in the current Information Age (Durlak et al., 2011; Elliott et al., 2018). Twenty-first-century skills, sometimes referred to as deep learning, are lifelong skills that include critical thinking, complex problem-solving, and communication (Nehring et al., 2019). Previous research studies have revealed that SEL can complement and enhance academic skills development (Durlak et al., 2011; Elliott et al., 2018). Additionally, SEL has been shown to measurably increase success in relationships, decision-making, career development, and personal well-being (Durlak et al., 2011; Elliott et al., 2018). Since the mid-1990s, the international research organization named Collaborative for Academic, Social, and Emotional Learning (CASEL) has sought to standardize, elevate, and promote the practice of SEL (Elliott et al., 2018). Founded by SEL educators, researchers, and experts, SEL education standards were implemented within preK-12 in different states in the U.S. (Ekland et al., 2018). Currently, 18 states have preK-12 SEL competency standards, eight states have pre-kindergarten through elementary SEL competency standards, and an additional 21 states have SEL-related resources (CASEL, n.d.-a; CASEL, 2018, Yoder et al., 2020). SEL competency standards and CASEL define SEL as "the process through which children and adults understand and manage emotions, set and achieve positive goals, feel and show empathy for others, establish and maintain positive relationships, and make responsible decisions" (Collaborative for Academic, Social and Emotional Learning [CASEL], n.d.-b, para.1). Further, CASEL proposed and popularized a five-competency framework (CASEL-5), including self-awareness, self-

management, social awareness, relationship skills, and responsible decision-making (CASEL n.d.-b, para. 2).

SEL Adoption Challenges

While SEL is one of the fastest-growing areas within education, SEL faces significant obstacles in adoption, implementation, efficiency, and assessment (Atwell & Bridgeland, 2019). Despite SEL's growth, one area in need of development and support is SEL assessments. Due to the lack of universally accepted SEL measurement tools, today's schools still seek accurate, CASEL-5 competency-aligned, accessible measurement tools (Atwell & Bridgeland, 2019; DePaoli et al., 2017). However, SEL requires affective and cognitive skills that do not have straightforward behavioral correlates, making the task of SEL assessment challenging (McKown, 2019). In addition, the existing SEL assessment tools are not well-suited for districts willing to assess the social-emotional competency of their staff and student population, particularly when the CASEL-5 framework is followed and when merged with self-report systems (Crowder et al., 2019).

Only 24% of the schools in the U.S. utilize an effective SEL diagnostic or program evaluation tool, and the SEL programming has yet to achieve efficiency, efficacy, or scale (Atwell & Bridgeland, 2019; DePaoli et al., 2017). While there are countless EQ, SEL, and psychometric assessments on the market, there currently only exist 28 CASEL-recognized SEL assessments, of which 10 assessments cover most elementary grades from a teacher's and/or a parent's perspective compared to over 250 SEL programs (CASEL, n.d. -c). When looking at elementary-focused SEL assessments that include both a self-assessment and a multi-rater (a parent and/or a teacher), none exist (CASEL, n.d.-c). Further, only four of the total 28 instruments follow a CASEL-5 or standards-based model (DePaoli et al., 2017; Elliott et al.,

2018; Gresham et al., 2018; McKown, 2017a; Soland et al., 2019; Stillman et al., 2018). When further filtering assessment instruments for usability, data triangulation, sensitivity, and purpose, only a few tools exist for educators (Elliott et al., 2015; Gresham et al., 2011).

Educators Drive SEL

As the primary force that drives SEL programs and practices in classrooms and schools, educators' SEL competence has a significant impact on classroom culture and students' social-emotional development (Esen-Aygun & Sahin-Taskin, 2017; Schonert-Reichl, 2017). At the same time, when the social and emotional demands of the students are poorly managed, both their behavior and their academic achievement suffer (Schonert-Reichl, 2017). Educators with well-developed social-emotional skills can help students to collaborate, encourage them to solve conflicts among themselves, and establish positive communication in their classrooms (Esen-Aygun & Sahin-Taskin, 2017; Jennings & Greenberg, 2009). Consequently, it is not effective to promote SEL in the classrooms if the educators' social-emotional well-being is ignored (Esen-Aygun & Sahin-Taskin, 2017; Schonert-Reichl, 2017). For this purpose, educators should be trained in SEL and develop regular practices to manage the students' social-emotional problems (Durlak et al., 2011; Esen-Aygun & Sahin-Taskin, 2017). However, after analyzing 3,916 courses related to teacher education programs in the U.S., Schonert-Reichl (2017) found that only 1% of the courses included information about self-awareness, 2% social awareness, 6% self-management, 7% responsible decision-making, and 13% of the courses included information about relationship skills. In another survey conducted by RAND Corporation in 2019, nearly two-thirds of American elementary teachers reported that their schools did not have a clear vision for SEL (Hamilton & Doss, 2020).

Growth of SEL

Having already surpassed $30 billion in investment in 2018 by federal, state, and local governments within the U.S., SEL is looking to grow and surpass $40 billion in the following years (Krachman & LaRocca, 2017). Primary expenditures within SEL include products, programs, trainings, and staff time (Krachman & LaRocca, 2017). This is further supported by the CASEL research, which indicates that 90% of public K-12 school principals have invested or are planning to invest in SEL tools and resources for implementation within the next few years (Atwell & Bridgeland, 2019; DePaoli et al., 2017). However, with the complexities and costs of selecting a meaningful assessment tool and the initial cost of SEL programs and training, only a few schools can implement effective SEL assessments (Atwell & Bridgeland, 2019).

Value of Assessments

With social-emotional learning's impact on emotional, behavioral, and social development, career, and lifelong success, an effective SEL program selection and implementation is necessary, which should start with and requires assessment (McKown, 2019). Without an assessment, administrators and educators do not have a reliable way to measure the effectiveness of a current SEL program, of their SEL skills, or of the current level of growth in the student's emotional intelligence (DePaoli et al., 2017; Elliott et al., 2018; Gresham et al., 2018; McKown, 2017a; Soland et al., 2019; Stillman et al., 2018). A trained educator knows the value of assessments: diagnostic, formative, summative, and standardized, and often employs a backward-curricula design to ensure that assessments accurately assess the learning objectives (Abilock, 2007). Educators seek an educator-focused, direct (scenario-based) and indirect (self-assessment), multi-rater (student and parent/teacher), CASEL- and standards-aligned, affordable, accessible (digital), and easy-to-use assessment instrument to provide them the information

regarding the achievements and progress of students in terms of their SEL. This will assist educators in self-improvement and in delivering meaningful and individualized SEL instruction (DePaoli et al., 2017; Elliott et al., 2015; Gresham et al., 2011). Furthermore, by creating a positive, productive, and less stressful school climate and culture, teachers with strong SEL competency can promote their students' SEL development (Frezza, 2018). SEL programs can also assist educators to form and sustain quality relationships with the students, which can improve students' cognitive, emotional health, and general well-being (Frezza, 2018).

Problem Statement

Esen-Aygun and Sahin-Taskin (2017) stated that educators with enhanced SEL skills could help students acquire additional social and relationship skills, in addition to developing their anger-management and problem-solving skills. Moreover, these educators are better capable of building caring and meaningful relationships among students, reducing student behavioral challenges, and helping improve student academic achievements (Esen-Aygun & Sahin-Taskin, 2017). For these reasons, effective SEL programs are equally important for educators as well as for students within schools. However, the results of a study revealed that only 53% of school principals believed that teachers in their schools were adequately prepared to successfully develop students' SEL skills (Atwell & Bridgeland, 2019).

It has also been found that while an estimated 90% of principals and educators value the impact of SEL on organizational culture and student development (Atwell & Bridgeland, 2019; DePaoli et al., 2017), program implementation and effectiveness are limited due to the lack of SEL assessment instruments, which align with CASEL-5 SEL programs or SEL standards, educator usability, accessibility, and validity (Elliott et al., 2018). As the SEL competencies of educators directly influence how they interact with students on both instructional and social

levels, effective assessment tools should be available to measure these SEL competencies of the educators (Yoder, 2014). A universal SEL assessment tool that educators and the whole school community (students, education specialists, and parents) can use could provide significant value to their SEL development. However, this SEL assessment tool must be reliable, valid, and user-friendly to be effective. Thus, it is necessary to validate and measure the accessibility of a scalable, digital, education-focused, and standards-aligned SEL assessment: SELDDA and its impacts on the SEL development of educators.

Purpose of the Study

This research study aimed to measure the impact of the Social Emotional Learning Digital Diagnostic Assessment (SELDDA) on K-12 educators' SEL development. SELDDA is a free community and school social-emotional competency (SEC) assessment tool developed by Strut Learning, a volunteer-run social venture focusing on developing academically aligned SEC and SEL technology tools to increase EQ development (Strut Learning, n.d.). According to Strut Learning (n.d.), SELDDA is one of the latest research-based, digital, web-based, and universal SEL diagnostic assessment instruments. It was organically created and aligned with CASEL's five core competencies (Strut Learning, n.d.). After CASEL, SEL, and SEL assessment research, Strut Learning (n.d.) extended the CASEL-5 model within SELDDA by adding motivation as a sixth core competency. Besides being research-based and CASEL-aligned, the SELDDA instrument was selected for its digital platform, simplicity, accessibility, zero cost, multi-rater system, and its enhanced features to support English language learners (Strut Learning, n.d.). After reviewing several similar SEL assessment tools like Devereux Student Strengths Assessment (DESSA), Panorama's SEL measure, SELweb, etc., these unique features led to selecting SELDDA for this study.

This research study evaluated the SELDDA instrument and its impact on educator SEL development 1) when used as a diagnostic assessment tool, and 2) by understanding how digital design, as defined by user experience (UX) and user interface (UI), of the instrument affects usability, reliability, and validity, thus providing knowledge on how to design new digital SEL assessment tools. Subsequently, the general reliability and validity of the SELDDA tool were assessed through research by analyzing how strongly the educators agree with their individual EQ scores and how consistently the results are generated in repeated assessments. Efforts were made to highlight the existing problems of SEL assessment tools and see how these problems can be effectively overcome with SELDDA. The goal was to foster an ecosystem whereby educators, students, and parents work together to develop a proactive EQ culture that improves staff retention, student grades and emotional management, and parent engagement. Together, they can help prepare students for academic, career, and life success. Additionally, the results may provide a greater understanding of the integration of digital technology tools within the field of SEL.

Research Questions and Hypotheses

RQ1: Does the use of SELDDA improve the development of educator's SEL within four weeks?

H01: Null Hypothesis: SELDDA will not demonstrate any significant change in the educator's SEL ratings between pre-test and post-test ratings.

H11: Alternative Hypothesis: SELDDA will demonstrate a significant change in the educator's SEL ratings between pre-test and post-test ratings.

RQ2: Does the use of the SELDDA instrument show significant levels of reliability?

H02: Null Hypothesis: SELDDA will not meet the criterion related to reliability.

H22: Alternative Hypothesis: SELDDA will meet the criterion related to reliability.

RQ3: Does the use of the SELDDA instrument show significant levels of validity?

H03: Null Hypothesis: SELDDA will not meet the criterion related to validity.

H33: Alternative Hypothesis: SELDDA will meet the criterion related to validity.

RQ4: Does the use of the SELDDA instrument show significant levels of internal consistency?

H04: Null Hypothesis: SELDDA will not meet the criterion related to internal consistency.

H44: Alternative Hypothesis: SELDDA will meet the criterion related to internal consistency.

RQ5: How user-friendly is the SELDDA instrument?

H05: Null Hypothesis: SELDDA will not meet the criterion related to usability.

H55: Alternative Hypothesis: SELDDA will meet the criterion related to usability.

Theoretical Framework

SEL draws upon many theoretical models, including models on academics, emotions, behaviors, motivation, and sociability (Durlak et al., 2011). Some foundational theories with constructed SEL include "the cognitive behavior modification model, the ecological systems theory, [and] the health-belief model" (Dwinnell, 2016, p. 21). Dwinnell (2016) and Humphrey (2013) also included theories from emotional intelligence and development psychology as well as "social-cognitive theory, prevention science theory, and learner-centered psychological principles" (Dwinnell, 2016, p. 21). Other theories that helped frame SEL include the humanist theory, the humanist theory of motivation, the cognitive appraisal theory, and Goleman's (1995) emotional intelligence theory. Meanwhile, the current SEL research and implementation leaders do not refer to specific theoretical models in their articles, reports, or websites (Gresham et al.,

2018). CASEL's Five Component model is now referred to as a theoretical model for SEL (Durlak et al., 2011; Gresham et al., 2018).

Many classical learning theories specifically focus on cognition, behavior, thought, and knowledge construction but leave out awareness, emotion, motivation, and social components essential to SEL (Dwinnell, 2016; Espelage et al., 2018; Valler-Gorfien, 2019). Best aligning as theories, the current study will discuss in particular the social-cognitive theory and emotional intelligence theory for studying SEL. The social cognitive theory (SCT), developed by Albert Bandura in 1971, proposed that much of cognitive learning happens in a social context with inter-related connections between behavior, person, and the environment (Bandura, 1971; Bandura, 1986; Dwinnell, 2016; Swearer et al., 2014). SCT strongly focuses on the internal and external factors affecting social influence. Behaviors, behaviors of others, and their resulting reactions can be observed, modeled, and incorporated by others. With a focus on how behaviors develop in social contexts and how past behaviors influence current and future social interactions, SCT is partially rooted in behaviorism. SCT also looks at the cognitive functions during social situations (Bandura, 1971; Bandura, 1986; Dwinnell, 2016; Swearer et al., 2014). Bandura (1986) indicated that not all behaviors could be observed within a social context. The decisions of when to apply and react to certain behaviors are examples of cognition. Within SCT, two vital components, namely modeling and self-efficacy, are relevant to education and SEL (Dwinnell, 2016). Modeling can provide a behavioral template for proper, desired emotional management, social behavior, relationship development, and responsible decision-making (Dwinnell, 2016; Humphrey, 2013). While often referenced as courage, bravery, or grit, self-efficacy is a cognitive function of displaying confidence (Humphrey, 2013). It is also a component of self-awareness and responsible decision-making (Humphrey, 2013). A primary

limitation of SCT is that cognitive and behavioral functions may not necessarily change with an environmental change (Dwinnell, 2016; Humphrey, 2013). Furthermore, SCT does not distinguish how or to what extent the primary factors such as behaviors, persons, and environments lead to cognition or behaviors (Dwinnell, 2016; Humphrey, 2013). With respect to SEL, it does not focus on motivation or emotion (Espelage et al., 2018).

This study will also highlight the theory of emotional intelligence (EI), popularized by Goleman (2005), and the Bar-On model of social-emotional intelligence. The theory of emotional intelligence (EI) can trace its roots back to Salovey and Mayer (Goleman, 1995; Mayer et al., 2004). Salovey and Mayer (1990, as cited in Ackley, 2016, p. 271) defined emotional intelligence as the ability to "perceive emotions, to access and generate emotions so as to assist thought, to understand emotions and emotional knowledge, and to reflectively regulate emotions so as to promote emotional and intellectual growth." Later, in the Bar-On model, emotional intelligence was defined as "an array of non-cognitive capabilities, competencies, and skills that influence one's ability to succeed in coping with environmental demands and pressures" (Bar-On, 1997, as cited in Ackley, 2016, p. 271). This definition is similar to many modern definitions. Emotional intelligence is according to Goleman (1995) "the capacity for recognizing our own feelings and those of others, for motivating ourselves, and for managing emotions well in ourselves and in our relationships" (p. 316). All three emotional intelligence models, Salovey and Mayer, Goleman, and Bar-On were developed through research and are similar. They differ in their EI-defined categories/components. These iterative definitions are an important historical context for understanding how CASEL developed its SEL framework and definition. Originally, Goleman's (1995) model of emotional intelligence included five categories: self-awareness of emotional responses, self-regulation to manage emotional

expression, motivation of self, empathy towards others and to understand others' emotions, and social skills (Goleman, 1995; Valler-Gorfien, 2019). Goleman later modified his framework to include 25 emotional intelligence competencies, which he subsequently reduced to 18 and then categorized them into four competencies: self-awareness, self-management, social awareness, and relationship management (Ackley, 2016; Goleman, 2005). These four competencies are included in the CASEL's list of competencies, through which Goleman contributed to establishing CASEL. The primary limitation of the theory of emotional intelligence is the lack of consensus over a specific definition and a set of competencies (Ackley, 2016; Lobaskova, 2015). Further, while the skills and traits behind EI are evident, there is also a debate about whether they can be classified as another form of intelligence rather than elements of intelligence (Lobaskova, 2015). Lastly, many critics argue that while Goleman is a psychologist, his approach to writing about emotional intelligence lacks academic rigor (Lobaskova, 2015).

The process of collecting information and data to inform learning and teaching within education refers to the process of education evaluation or education assessment. Classroom assessment research is based on several theoretical models from educational psychology, learning and motivation theories, and social learning theory (Brookhart, 2004). Classroom assessments are also based on the theory of measurement, including concepts such as validity, reliability, and formative and summative assessments (Brookhart, 2004). In the classroom, assessments are a continuous process of understanding how information is being exchanged. Since no single tool can effectively measure all knowledge transfer, there are several types of educational assessments. Diagnostic, placement, or pre-assessments are evaluations that offer an initial understanding of knowledge, strengths, and areas of weakness prior to instruction (Brookhart, 2004). This type of assessment allows an educator to tailor the level, type, and

strategy of instruction. Formative assessments, such as walking around the classroom, are often informal measurements to ensure engagement and understanding (Ghaicha, 2016). The summative assessment, often taken after instruction, measures cumulative knowledge or skill (Ghaicha, 2016). Understanding the types and roles of assessments in the classroom is essential in understanding how to implement and measure the SELDDA instrument. SELDDA is initially used as a diagnostic or pre-assessment measurement at the beginning of the school year. This information provides a baseline understanding of each educator and student's SEL development level. When taken at the end of the school year, it is employed as a summative and standardized skills assessment tool. SELDDA measures SEL development changes over the academic year while also norming their SEL rating to that of the general population. In addition, education assessments and the theory of measurement provide a strong foundation for understanding validity and reliability. Together, validity, the process of measuring what is intended, and reliability, ensuring consistency of measurement, are essential within the SELDDA instrument and within this study (Ghaicha, 2016).

The theory of human-computer interaction (HCI) focuses on the relationship between how humans design, interact with, and use technology (Carroll, 2013). HCI, synonymous in many ways with human factors engineering (HFE), intersects areas of computer science, cognitive-behavioral science, design, and visual arts (Carroll, 2013; Holden et al., 2016; Janssen et al., 2019). HCI developed from human-automated interaction in the 1960s and was popularized by Stuart Card, Allen Newell, and Thomas Moran's (1980) book *The Psychology of Human-Computer Interaction*. In the 1970s and 1980s, the focus was on automating psychological assessments and knowledge management (Janssen et al., 2019). With the advances in digital technology, the field branched into more complex domains such as workload

regulation, error prevention, bias prevention, and automation reliability. Since the late 1990s, the focus has been on working with dynamic and complex systems to levels of artificial intelligence. Further, with increasing access to technology, the field expanded to focus on the interaction and use of technology by non-professional and non-expert users. Creating complex systems that unskilled end-users can fully utilize led to design integration, giving rise to HCI (Janssen et al., 2019). While HCI focuses significantly on the graphic user interface (GUI), the visual display or front-end that is seen on a monitor requires a significant investment in both the back-end and the front-end development. The study and design of the front-end are facilitated by the user interface (UI) and the user experience (UX) design (Carroll, 2013). Understanding how digital technology automation and design influence interaction with educators and students is essential in understanding how individuals perceive and respond to the SELDDA assessment. Measuring the educators' understanding, usability, and trust of SELDDA within this study may highlight related issues of time (perceptual or actual time needed for the assessment), errors in response, confusion, control, attention management, emotional regulation, and fairness (humane and ethical interaction or prevention of harm). This is the foundation to provide insights into how digital technology influences interaction on cognitive, emotional, and physiological levels.

Together, these theoretical frameworks working together can provide a conceptual framework to understand SEL, the CASEL-5 model, SELDDA's 6-competency model (CASEL-5 plus EI's motivation), how to assess educator's and student's development in SEL, and the integration of SEL and technology. Social cognitive theory and emotional intelligence theory can provide a foundation for SEL, SELDDA, and an individual's SEL development. The measurement theory within classroom assessments provides a framework for SELDDA and the

overall research study. Lastly, the theory of human-computer interaction provides a framework to understand digital assessments (SELDDA) and the integration of SEL and technology.

Scope of the Study

This study sought to expand the understanding of the development and application of SEL assessments through the use and analysis of the Social Emotional Learning Digital Diagnostic Assessment tool (SELDDA) on educator's SEL development. A quantitative quasi-experimental design was employed. The independent variable was the use of SELDDA as a formative assessment. The study only attempted to review the SELDDA instrument and did not conduct any comparative analyses of various SEL assessment tools. The dependent variable was the educator's SEL competency. With the incorporation of the control group, the impact of the SEL curricula, delivered through self-directed, on-demand video instruction, which is standardized among both participant groups, was accounted for and mitigated. Other measurements, such as SELDDA usability, reliability, and validity, were also assessed. The participants of this study were K-12 educators in the U.S.

Definitions of Key Terms

Assessments. An instrument to measure change or development, often in the forms of diagnostic, formative, summative, or standardized (Baker et al., 2015; Day, 2019; Soland et al., 2019; Watling & Ginsburg, 2019).

CASEL-5. A SEL model created by Collaborative, Academic, Social, and Emotional Learning (CASEL), which includes self-awareness, self-management, social-awareness, relationship skills, and responsible decision-making (CASEL, n.d.-d).

Collaborative, Academic, Social, and Emotional Learning (CASEL). A nonprofit research organization focusing on academic study and promoting SEL (CASEL, n.d.-d).

Direct Assessment. The process of measuring change directly (e.g., performance) rather than through self-reports (Day et al., 2019; Soland et al., 2019).

Emotional Intelligence. The ability to recognize, manage, and develop one's emotions, related thoughts, behaviors, as well as thoughts of others (Soland et al., 2019).

Formative Assessment. A piece or set of information that guides the educator's practices to modify instruction for efficacy (Assessment Work Group, 2019).

High-Risk Students. Students who are identified through an assessment to exhibit significant problems and are at risk in development and learning (Gresham et al., 2018).

Human-Computer Interaction (HCI). The study of design within technology and the interaction between humans and technologies (Sim & Read, 2016).

Indirect Assessment. The process of measuring change through self-reports (non-direct action) (Day et al., 2019; Soland et al., 2019).

Multiple Rater (Multi-Rater) Assessments. An assessment framework where multiple people provide reports about the same person to increase validity (Gresham et al., 2018).

Prosocial Skills. The ability to recognize and manage emotions that affect attitude, decision-making, and relationship development (Panayiotou et al., 2019).

Social-Emotional Learning (SEL). The process of developing emotional intelligence (CASEL, n.d.-d).

SEL Competencies. Collaborative, Academic, Social, and Emotional Learning (CASEL) 's framework for developing and measuring SEL. For the specific model, see CASEL-5 (CASEL, n.d.-e).

SEL Diagnostic Assessment. A SEL assessment tool used as an initial snapshot (one moment in time) to understand a participant's SEL ratings (Baker et al., 2015; Elliott et al., 2018).

SEL Sub-Competencies. These are the secondary components that make up a competency within the area of SEL (Alexander & Vermette, 2019).

Self-Report Assessments. An assessment a participant fills out about himself, often viewed as possibly biased (Soland et al., 2019).

SEL Universal Screening Assessment. An instrument to measure if an individual is at risk of emotional, behavioral, or learning challenges (Elliott et al., 2018; Halle & Darling-Churchill, 2016).

Universal Screening Assessment. An instrument to measure if an individual is at risk of learning challenges (Elliott et al., 2018; Halle & Darling-Churchill, 2016;).

User experience (UX)/ User Interface (UI) Design. The methodology of visual and functional design in a technology-based graphic user interface (Lim et al., 2014; Sim & Read, 2016).

Significance of the Study

Current studies address the need for SEL assessments to align with the CASEL-5 model, for educator-friendly tools, and for digitizing the assessments (Day et al., 2019; Elliott et al., 2018; McKown, 2017a; Soland et al., 2019; Stillman et al., 2018). Many studies also agree that the SEL assessment should be reliable, valid, and normalized for the population (Day et al., 2019; Elliott et al., 2018; McKown, 2017a; Soland et al., 2019; Stillman et al., 2018). There is a gap in the research relating to 1) the use of an SEL diagnostic assessment for formative emotional intelligence information for the student and the teacher as a tool to increase SEL

development, and relating to 2) measuring the impact of user-friendly visual designs when implemented within the technology. This study will benefit assessment developers, researchers, principals, educators, and students. By understanding the impact of visual design, common in mainstream technology, assessment developers and researchers will improve future assessments by offering a more effective design. Further, a more user-friendly assessment may increase educator and student engagement while decreasing the time necessary for implementing and completing assessments. A wider variety of assessments can be constructed to meet more diverse populations and population subsets with scalable technology. Additionally, increasing the visibility, accessibility, and function of SEL diagnostic assessments will provide teachers with a greater understanding of themselves and guide them in selecting relevant instructional tools and aides. This will include selecting SEL programs that are better aligned with an individual or class's emotional intelligence makeup, thereby increasing differentiation, effectiveness, and learning. Increasing educator's SEL development will empower them to create a positive EQ culture and promote effective SEL frameworks (Stillman et al., 2018). As a result, student's SEL development will also be ensured (Stillman et al., 2018), which will have a major impact on their academic, emotional, social, career, and lifelong success (CASEL, 2019e).

Summary

SEL has a significant potential to increase the students' academic, social, career, and lifelong achievement (Durlak et al., 2011). However, this study has focused on enhancing the educators' social and emotional skills, as these skills are crucial for effectively developing the SEL competencies of the students (Esen-Aygun & Sahin-Taskin, 2017). To further the development, implementation, and effectiveness of SEL, accessible and effective assessment instruments are crucial (DePaoli et al., 2017). With no current SEL assessments organically

aligned to the CASEL-5 model, providing direct and indirect assessments or offering multiple raters (student and teacher or parent), it is necessary to find another, which is one of the newest assessment tools - the Social Emotional Learning Digital Diagnostic Assessment (SELDDA). This tool has been recently developed, with the researcher being part of the development team, but K-12 schools have had limited engagement due to the COVID-19 pandemic. Hence, understanding the reliability, usability, and validity of the SELDDA instrument, its impact as a diagnostic tool on educator and student SEL achievement, and the influence of user experience design can add meaningful value to the SEL knowledge community. As such, this study started to provide foundational knowledge on how best to integrate digital technology and SEL, starting with the existing digital SEL assessments and then focusing on SELDDA and its effective use for measuring educator's SEL competency. Afterward, a follow-up study with elementary students could further assess SELDDA's impact on student and classroom SEL measurement and development.

Chapter two will provide an academic foundation to the study through a literature review of SEL, assessments, SEL assessments, human-computer interaction, and SEL technology. Together, it will highlight the importance of SEL, SEL assessments, and SEL technology, and begin the groundwork for understanding how best to integrate SEL with technology for assessments and program delivery. Chapter three will cover the research design, research questions, and methodology. Chapter four will share the data analysis results of the study, while chapter five will share the conclusion and discuss the results.

Chapter 2: Literature Review

The purpose of this literature review is to provide research-based support on digital universal SEL assessments. This topic will be divided into SEL, assessments, and technology research and then further subdivided. This chapter will initially explore the origins, models, and value of emotional intelligence and its foundation in the development of SEL. Then there follows a more in-depth review of SEL, about the leading organization within SEL, CASEL, CASEL's five-competency model, and the standards and benefits of SEL. After that, there will be a review of education assessment types, benefits and challenges, and their integration with technology. Then the popular SEL assessment tools will be analyzed, including their strengths, limitations, and methods to overcome current deficiencies. To explore solutions for enhancing SEL assessments, education technology, SEL technology, and human-computer interaction will be evaluated. Together, this literature review provides a foundation for the study and evaluation of solutions to address current SEL assessment limitations and analyze the framework of the SEL digital diagnostic assessment instrument.

Literature Research Strategy

For this literature review, secondary data were gathered from different peer-reviewed journal articles, books, and digital contents, including official websites of different relevant entities, like CASEL. The following databases were searched- ProQuest, ERIC (Education Resources Information Resources), the online library of The Chicago School of Professional Psychology, Google Scholar, Academic Research Premier (EBSCO), JSTOR, libraries of TCS Education System. The keywords used included emotional intelligence, emotional intelligence history, emotional intelligence models, SEL, and SEL assessment. The terms SEL technology, SEL challenges, collaborative for academic, social, and emotional learning, current state SEL,

assessments, education assessments, education technology assessments, assessment errors, education technology, human-computer interaction, user experience, and user interface were also used to search peer-reviewed journals and other research works published between 2016 and 2022. These searches produced 2,874 articles. After removing irrelevant results and duplicates, 260 articles were selected for the literature review of the current study. Some other related articles were snowballed from the reference sections provided in these 260 articles.

While selecting articles for this review, some relevant issues were also taken into consideration. For instance, through searching SEL and assessment in the education databases listed above, the result generated 173 articles. Out of these, 58 peer-reviewed articles were selected for this literature review that have been published in the last five years. Other articles were filtered out for various reasons. For example, articles that were not particularly focused on assessments or those that did not highlight the factors related to primary schools were excluded.

Emotional Intelligence

The concept of emotional intelligence (EQ) gained visibility in the 1990s with a growing impact (Cartwright & Pappas, 2008; Hodzic et al., 2018). Sometimes abbreviated as EI, EQ now branched out into many fields of study, including psychology, health, sciences, business, leadership, and academia and education (Cartwright & Pappas, 2008; Hodzic et al., 2018). While no consensus on a definition of emotional intelligence exists, three popular and historical definitions include:

1. Salovey and Mayer (1990):

> "Emotional intelligence is the capacity to reason about emotions and of emotions to enhance thinking. It includes the abilities to accurately perceive emotions, to access and generate emotions to assist thought, to understand emotions and

emotional knowledge, and to reflectively regulate emotions to promote emotional and intellectual growth" (p. 197).

2. Goleman (1995), as summarized by Wolff (2005):

> "Emotional intelligence is the capacity for recognizing our own feelings and those of others, for motivating ourselves, and for managing emotions effectively in ourselves and others. Emotional competence is a learned capacity based on emotional intelligence that contributes to effective performance at work" (p. 2).

3. Bar-On (2002):

> "Emotional Intelligence is an array of noncognitive capabilities, competencies, and skills that influence one's ability to succeed in coping with environmental demands and pressures" (p. 14).

While no standard definition exists, emotional intelligence is generally accepted as the awareness of emotions, the ability to regulate emotions, and the ability to leverage awareness and regulation of emotions into responsible decisions (Serrat, 2017; Sharma, 2008). According to Serrat (2017), emotional intelligence skills can be learned, which requires people to be personally motivated, extensively practice what they learned, reinforce their new skills, and give value to the feedback they receive. Emotional intelligence helps people become more successful and motivated at what they do, reduce stress and conflicts, and foster harmony and stability (Serrat, 2017). At the same time, EQ also assists in helping others become more productive and promotes love, relationships, and understanding (Serrat, 2017).

The History of Emotional Intelligence

Although the concept and framework for emotional intelligence became commonly known through the publication of Daniel Goleman's (1995) book *Emotional Intelligence*, the

study of motivation, emotions, and behavior dates back to Ancient Greece (Humphrey, 2013; Konstan, 2006; Konstan, 2015; Loehr, 2017). From Plato to Descartes, Spinoza to Hume, philosophers and scholars have theorized that emotions influence, motivate, and affect thought and behavior (Dishman, 2018; Humphrey, 2013; Konstan, 2006; Konstan, 2015; Loehr, 2017). In *The Republic*, Plato called for an education that not only addressed academics but one that included concepts of emotion and social justice (as cited in Sharma, 2008). In *Ethics*, Spinoza (1985) promoted the concepts of perseverance and social constructs in a manner that reflects the EQ's concepts of self-awareness and self-management (reviewed in Scarantino & de Sousa, 2018). Spinoza (1985) further believed that there were three components to cognition, namely emotion, intellect, and intuition (reviewed in Sharma, 2008). In *A Treatise of Human Nature*, Hume (1739) discussed that emotions influence reasons and actions and that differences in moral judgment are due to differences in emotional responses (reviewed in Danovitch & Keli, 2008). During the early 1900s, prominent psychologist Alfred Binet and physician Theodore Simon developed the first practical intelligence test for differentiating several complex mental faculties, including imagination, memory, attention, imagery, moral sentiment, aesthetic sentiment, comprehension, hand-eye coordination, motor ability, and muscular strength (reviewed in Roid & Barram, 2004). First published in 1905, it was commonly known as the Binet-Simon Scale and was a reliable and valuable diagnostic system for identifying children with mental deficiencies (Roid & Barram, 2004). Later in 1916, this test was standardized by Stanford University psychologist Lewis Terman and renamed as Stanford-Binet Intelligence Scale, now using the intelligence quotient (IQ) as the new standard for assessing intelligence (Roid & Barram, 2004).

In the 1920s, Thorndike (1920) framed the concept of social awareness, otherwise known as social intelligence or interpersonal skills. Thorndike's framework included motivation,

emotion, intelligence, and relationships as the pillars of emotional intelligence (Sharma, 2008). He further believed in the notion of multiple intelligences (Sharma, 2008). In the 1940s, Wechsler (1940) phrased the idea that intellect was not a simple intellectual process but involved many factors such as emotions, social, and environment (Sharma, 2008). Upon his intelligence framework, Wechsler (1940) developed a modern intelligence assessment: the Wechsler's Adult Intelligence Scale (WAIS), which is still used today by psychologists (Sharma, 2008).

Since the mid-20th century, recognizing non-intellectual factors in cognition, action, and decision-making gained momentum. From Wechsler (1940) to Maslow and Salovey and from Mayer to Goleman, the concept, framework, and theory of emotional intelligence developed. Emotional intelligence is unique in that it is accepted by both the scientific and the mainstream communities (Ackley, 2016). The term emotional intelligence was first published by Michael Beldoch (1964), a psychologist at Cornell University. It laid the basis for the more modern framework in Wayne Payne's (1985) publication *Study of Emotion: Developing Emotional Intelligence*. In this study, Payne (1985) outlined the challenges of emotional ignorance and emotional suppressions to promote the value of emotional awareness, managing emotions and experiences, and of emotional intelligence. Shortly after, a similar and more comprehensive framework of EQ was proposed by Salovey and Mayer (1990). In their publication, *Emotional Intelligence*, Salovey and Mayer (1990) understood EQ as the ability to integrate intelligence, emotion, empathy, and social interaction. Salovey and Mayer's (1990) ability model defined EQ as having four emotional abilities: perceiving, using, understanding, and managing. While EQ gained traction within academic and scientific communities, it was not until the publication of *Emotional Intelligence* by Daniel Goleman (1995) that it also gained visibility in the business and mainstream community. In his book, Goleman (1995) challenged any convention by

indicating that emotional intelligence is more critical than traditional intelligence (IQ), as those who are successful with reason, problem-solving, and critical reasoning are not always successful in life. In 2006, Bar-On described a cross-section of interrelated social and emotional competencies as facilitators and skills that impact intelligent behavior. No other related theory in psychology had received as much attention (Srivastava, 2005). With the addition of media attention, it led both proponents and opponents of emotional intelligence to further popularize the construct of emotional intelligence (Srivastava, 2005). A summary of the history of emotional intelligence is found in Table 1 (Learning in Action, 2018; Sharma, 2008).

Table 1

History of the Most Important Publications on Emotional Intelligence

Year	Researcher	Emotional Intelligence-Related Concepts
1677	Spinoza	Emotions + intellect = cognition
1920	Thorndike	Social intelligence
1940	Wechsler	Non-intellective intelligence
1948	Leeper	Emotional thought
1949	Mangus and Woodward	Emotional factors
1960	Lum	Motivation and self-sufficiency
1960	Mowrer	Emotions as higher-order intelligence
1964	Beldoch	Emotional intelligence
1966	Leuner	Emotional Intelligence
1977	Sharma	Non-intellectual and personality factors
1983	Gardner	Multiple intelligence
1985	Bar-On	Emotional Intelligence

1985	Payne	Emotional Intelligence
1985	Sternberg	Practical intelligence
1989	Greenspan	Emotional Intelligence
1990	Salovey and Mayer	Emotional Intelligence
1995	Goleman	Emotional Intelligence
1997	Saami	Self-sufficiency
1998	Goleman	Emotional competency

Emotional Intelligence Models

Due to the complexity, popularity, and continued study of EQ, there is no consensus on any EQ model or assessment approach (Ackley, 2016; Geher & Renstrom, 2004). However, the three most popular EQ models include the ability model developed by Peter Salovey and Jack Mayer (1990) in collaboration with David Caruso (2004), the performance model written by Daniel Goleman (2005), and the competencies model by Reuven Bar-On (Ackley, 2016). These three models fall within two reoccurring EQ frameworks: the ability framework and the mixed or trait framework (Geher & Renstrom, 2004). Ability framework, such as the ability model, is based on intelligence rather than on personality, while the mixed or trait frameworks, including the performance and competency models, are based on personality rather than on intelligence (Geher & Renstrom, 2004). EQ models and frameworks provide structure and context to understanding cognitive and noncognitive abilities, competencies, and skills to help map the relationship between emotion, thought, and behavior.

Additionally, these three models have gained prominence as many assessment instruments are based on these models, allowing for reviews of reliability and validity. A detailed

review of these models can be found in the *Mental Measurement Yearbook* (Ackley, 2016). Salovey and Mayer (1990) viewed EQ as a subset of innate intelligence. While individuals can develop and enhance their EQ, they are limited by their innate ability. Individuals differ in their ability to process and leverage emotional information and manage emotions. Hence, the ability model is based on the innate ability to understand emotions. Salovey and Mayer (1990) posited three types of intelligence: cognitive, emotional, and social. Their ability model suggests that emotional intelligence consists of specific components, including perceiving emotions, emotional facilitation of thought, understanding and analyzing emotions, and the reflective regulation of emotions. For Salovey and Mayer (1990), emotions are sources of information that help guide and make sense of social and environmental situations. One criticism of the ability model is its lack of predictive value, though ability model-based assessments often have greater validity than self-report-based assessments (Ackley, 2016; Cartwright & Pappas, 2008; Mayer et al., 2004).

The performance model developed by Goleman (1995) views emotional intelligence as an array of competencies and skills that drive leadership and performance. Goleman believed that individuals are born with certain levels of EQ, though most EQ competencies are subsequently learned. To achieve outstanding performance, one needs to master these competencies. Much of his framework promotes leadership development, allowing for its popularity in the mainstream and business communities. His model for EQ initially had 25 competencies, but over time he reduced them to 18, categorized into four groupings. These groups include self-awareness, self-management, social awareness, and relationship management. The most significant criticism of his model is that, though he developed his model through analyzing previous studies of emotion, he did not develop it through primary research,

and therefore it does not have the same rigor as research-based models (Ackley, 2016; Cartwright & Pappas, 2008; Goleman 1998; Goleman, 2005). Still, Goleman's model is based on the research of others and has transformed the field of EQ due to the visibility he drew from mainstream publications (Ackley, 2016; Cartwright & Pappas, 2008; Goleman, 1998; Goleman, 2005).

The Emotional Social Intelligence (ESI) or competency model by Bar-On (2002) is based on the belief that EQ is a set of skills that can be learned and mastered. His model started with 15 and was later refined to 16 competencies grouped into five categories. The five categories included self-perception, self-expression, interpersonal skills, decision-making, and stress management. Although some researchers have questioned Bar-On's model for construct validity, many researchers have concluded that it is both reliable and valid, allowing it now to be one of the more popular psychometric assessment models (Bar-On, 2002; Cartwright & Pappas, 2008; Ackley, 2016).

Taken together, Salovey and Mayer, Goleman, and Bar-On helped frame and advance the field of emotional intelligence. Still, Petrides (2010) proposed another EQ model, namely the trait model. This model states that EQ is determined by understanding one's abilities and has, therefore, a subjective perspective (Petrides, 2010). Petrides (2010) believed that EQ and personality traits derive from biological functions. Because of its nature-based theory, it remains challenged and less popular than the ability and mixed models.

While these theories of emotional intelligence have yet to gain universal support, as each has areas of strengths and challenges, they helped develop the understanding of emotion and intelligence to popularize and expand the field of EQ and SEL beyond psychology. This

provided a scientific background for human performance and intelligence assessments (Ackely, 2016).

Importance of Emotional Intelligence

Durlak and colleagues (2011) indicated that emotional intelligence is vital because individuals do not often learn alone; instead, they learn in collaboration with their peers, educators, and sometimes with the guidance of their families. As emotions can facilitate or impede academic engagement, commitment, work ethic, and school success, in the end, families and schools may want to address the relevant aspects of emotional intelligence for ensuring the benefit of all students (Durlak et al., 2011) and this may start with the educator and with an EQ-positive culture. Again, according to the Yale Center for Emotional Intelligence (n.d., para. 1), "emotions drive decision-making, learning, relationships, creativity, and health," showing their high significance in life. Goleman (1995) mentions that skills related to emotional intelligence are twice as important for a better performance than technical skills and IQ combined. Goleman (1995) opined that people could make a substantial difference in their personal and professional success, not due to their academic IQ but their emotional intelligence. Therefore, when it comes to enjoying a mutually rewarding personal relationship and enjoying professional success, emotional intelligence matters (Paavola, 2017).

Emotional intelligence plays an essential role in disputing resolution (Kelly & Kaminskienė, 2016). Thus, professionals helping arguing parties to reach peaceful solutions must realize the best possible ways to control and manage the parties' emotions. Furthermore, emotional intelligence is one of the variables that is positively related to the quality of life (QoL) and health (Luque-Reca et al., 2018). Emotionally intelligent people are more willing to ask for advice and support from professionals. This increases their health balance, improves their social

behavior, and benefits certain aspects of their QoL (Luque-Reca et al., 2018). Moreover, improving levels of emotional intelligence improves social relations and increases empathy levels (Schutte et al., 2007).

Leaders in the workplace need to be emotionally intelligent. Leadership fundamentally is an emotion-management process wherein the leaders must understand and manage the emotions of their followers and their own (Li et al., 2016; McCleskey, 2014). Furthermore, even micro aspects of leadership or leadership style are influenced by the leader's emotional intelligence, such as personal brand and communication tone and mediums (Li et al., 2016).

From Emotional Intelligence to Social-Emotional Learning

With the increase in the awareness of the emotional intelligence field, policymakers and researchers started to organize learning programs, focusing on children's development of social and emotional skills. The term social-emotional learning (SEL) was published in 1994, when researchers, academics, educators, and psychologists gathered at a conference hosted by the Fetzer Institute to discuss student well-being, learning, emotional intelligence, behavior prevention, and related practices and programs (Cherniss et al., 1998; Elias et al., 1997). At that time, SEL was a loose conceptual framework that centered around the school. It included character education and school culture to prevent substance abuse (Elias et al., 1997). Later, the term social-emotional learning encompassed EQ-related learning and education efforts to address the issue of emotion and behavior recognition and management (Elias et al., 1997). During that period, researchers, academics, psychologists, and educators formed a nonprofit group called the Collaborative for Academic, Social, and Emotional Learning (CASEL) that highlighted the essential roles of emotions in the students' learning process (CASEL, 2005).

In an interview by Rafael Heller with Marc Brackett, Director of the Yale Center for Emotional Intelligence, Brackett stated, “emotion affects human attention, memory, and learning,” relationships, performance, and health (as cited in Heller, 2017, p. 21). A meta-analysis of 213 studies in 2011, comparing schools using SEL programs with schools not using SEL programs, revealed that students in schools using SEL programs had significant increases in social and emotional skills, positive attitudes about school and prosocial behavior, and in academic achievement and decreases in behavior problems (Durlak et al., 2011). Building upon this 2011 meta-analysis, Brackett and Patti (2016) extended the findings to include “positive shifts in the classroom climate and the teacher’s instructional quality” (p. 20). Besides, effective SEL programs resolve some issues that individuals and schools face by tapping into the students' emotional intelligence (South, 2019).

Social-Emotional Learning (SEL)

SEL is the process of acquiring core competencies for recognizing and managing emotions (e.g., emotional intelligence), setting and achieving positive goals, making responsible decisions, establishing and maintaining positive relationships, appreciating the perspectives of others, and for constructively handling interpersonal situations (Durlak et al., 2011). Currently, there is no universally accepted definition of SEL (McKown, 2017b). Salovey and Mayer (1990) defined it as “the ability to monitor one’s own and the others’ feelings and emotions, to discriminate among them, and to use this information to guide one’s thinking and actions” (p. 189). According to Edgar and Elias (2021), “SEL refers to our capacity to recognize emotions in ourselves and others and manage them appropriately, be organized and set goals, solve problems and make decisions effectively, establish positive and productive relationships with others, and handle challenging situations capably” (p. 205). South (2019) opined that social-emotional skills

must be learned, practiced, and applied similarly to learning academic skills. McManus (2021) also contended that students' social, emotional, and cultural experiences and practices are central to inclusive and culturally relevant learning.

Quraishi (2019) referred to SEL with terms like social and emotional learning or SEL. These terms are often used interchangeably with social and emotional development, non-cognitive skills, soft skills, social, emotional, and academic development (SEAD), social and emotional competence (SEC), and 21st-century skills (Quraishi, 2019). According to the Aspen Institute (2017), educators directly or indirectly refer to SEL when they refer to educating the whole child. Furthermore, social and emotional skills help tackle many risky behaviors and play an essential role in developing healthy and responsible students, workers, and citizens (CASEL, 2013).

McKown (2017b) identified three broad categories of SEL: behavioral skills, thinking skills, and self-control skills. He posited that these skills are associated with vital interpersonal and life outcomes, which vary across individuals and are often malleable. Based on this perspective, McKown (2017b) defined SEL as “the thinking, behavioral, and self-control skills that are applied in social interactions and that influence the children’s social and other life outcomes” (p. 161). Here, thinking skills include the ability to infer the thoughts and feelings of others, behavioral skills involve the ability to start a positive interaction, and self-control skills imply the ability to stay calm when upset (Lipton & Nowicki, 2009; McKown, 2017b). McKown (2017b) further positioned that this definition can guide policymakers, assessment developers, and practitioners and can help promote related innovations.

As defined by Brackett and Rivers (2014), SEL is the “process of integrating thinking, feeling, and behaving in order to become aware of the self and of others, to make responsible

decisions, and to manage one's behaviors and those of others" (p. 4). SEL programs aim to foster the development of individuals so that they can become knowledgeable, caring, and responsible. This will contribute to their academic and professional success, their ability to develop and maintain positive relationships, and their motivation to participate in civic activities to improve communities (Payton et al., 2000). Another study result revealed that more than 95% of educators think that social and emotional skills are teachable and can effectively benefit all students (DePaoli et al., 2017).

Due to the importance of SEL, estimates are that K-12 public schools spend nearly $21-47 billion on SEL per year (Krachman & LaRocca, 2017). This sum includes investments in SEL-related programs and products (approximately $640 million) and the time the teachers, support staff, and specialists focus on SEL (about four hours per week) (Krachman & LaRocca, 2017). Recently, the Allstate Foundation committed $45 million to reach 25% of the U.S. students with SEL programming (Aspen Institute, 2017).

CASEL and its Five-Competency Model

The Collaborative for Academic, Social, and Emotional Learning, a U.S.-based international nonprofit organization, was established in 1994 at the University of Illinois in Chicago (Schonert-Reichl et al., 2017). CASEL comprises distinguished educators, researchers, and child advocates who focus on children's positive development (CASEL, n.d.-g). Since its inception, CASEL has been at the forefront of American and international initiatives to promote SEL at schools, advance the SEL science, and expand integrated, evidence-based practices of SEL (Schonert-Reichl et al., 2017). CASEL and advocates envision every school providing "evidence-based SEL programming to all students in preschool through high school" (CASEL, 2013, p. 4).

CASEL advocates and offers "leadership for high-quality SEL programming and learning standards" (Brackett & Rivers, 2014, p. 4). Through extensive research, practice, and policy, CASEL strives to ensure that all students become caring, knowledgeable, responsible, and contributing members of society (DePaoli et al., 2017). To promote SEL and expand its practices, CASEL regularly provides foundational, evidence-based resources, reports, and tools to the community (Hromek & Roffey, 2009).

CASEL has developed a five-competency model for addressing the requirements for focusing on and promoting the SEL skills development of both students and teachers (Schonert-Reichl et al., 2017). According to CASEL (n.d.-e), these five core competencies of SEL include:

1. *Self-Awareness*: The ability to accurately recognize one's own emotions, thoughts, and values and how they influence behavior. The ability to accurately assess one's strengths and limitations with a well-grounded sense of confidence, optimism, and a growth mindset.
2. *Social Awareness*: The ability to take the perspective of and empathize with others, including those from diverse backgrounds and cultures. The ability to understand social and ethical norms for behavior and recognize family, school, and community resources and supports.
3. *Self-Management*: The ability to successfully regulate one's emotions, thoughts, and behaviors in different situations — effectively managing stress, controlling impulses, and motivating oneself. The ability to set and work toward personal and academic goals.
4. *Relationship Skills*: The ability to establish and maintain healthy and rewarding relationships with diverse individuals and groups. The ability to communicate, listen

well, cooperate with others, resist inappropriate social pressure, negotiate conflict constructively, and seek and offer help when needed.

5. *Responsible Decision-Making*: The ability to make constructive choices about personal behavior and social interactions based on ethical standards, safety concerns, and social norms. The realistic evaluation of the consequences of various actions and a consideration of the well-being of oneself and others (para. 2-6).

This five-competency model, also known as CASEL-5, is shown in Figure 1.

Figure 1

Core Competencies of SEL (CASEL, n.d.-e)

Note: By CASEL, an SEL Competency Model, located on their website.

CASEL further breaks each of the competencies down into category identifiers (CASEL, n.d.-e, para. 2-6):

- Self-awareness:
    - Identifying emotions

    - Accurate self-perception
    - Recognizing strengths
    - Self-confidence
    - Self-efficacy
- Self-management:
    - Stress management
    - Impulse control
    - Self-motivation
    - Self-discipline
    - Goal-setting
    - Organizational skills
- Social awareness:
    - Perspective-taking
    - Empathy
    - Appreciating diversity
    - Respect for others
- Relationship skills:
    - Social engagement
    - Communication
    - Teamwork
    - Relationship Building
- Responsible decision-making:
    - Analyzing situations

- Identifying problems
- Reflecting
- Evaluating
- Solving problems
- Ethical Responsibility

Another essential component of SEL not highlighted by CASEL is motivation, which should have been added as a separate competency. Indeed, Fantuzzo et al. (2004) identified and promoted the inclusion of internal motivation, attention, and perseverance within SEL. Zins et al. (2007) also considered self-motivation and goal-setting as essential competencies of SEL.

Benefits of Social-Emotional Learning

Naglieri et al. (2011) highlighted the critical benefits of SEL. For instance, SEL is essential for academic success. Besides, it helps manage behavioral or emotional disorders that hamper learning. Therefore, SEL is increasingly included in the education curricula by state education departments (Naglieri et al., 2011). Implementing school-wide SEL policies and curricula fosters caring relationships between students and teachers, develops social and emotional skills in learners, teachers, and school administrators, enhances conflict resolution and cooperation among students, and develops a greater sense of safety in schools (Brackett & Rivers, 2014). This greater sense of safety in schools is fostered by SEL programs that create learning environments for helping the learners feel safe and secure. Learners also achieve success across different domains of their lives, such as personal, relationships, academics, and, finally, in the workforce (Brackett & Rivers, 2014). During the current pandemic situation, schools across the U.S. and different parts of the world are making a rapid transition to remote

and hybrid learning, as well as increasingly turning to SEL for seeking guidance to support the efforts of all members of the school community to thrive (Cipriano et al., 2020).

Benefits of Social-Emotional Learning for Students

SEL is positively related to the academic success of a student and needs to be integrated into all levels of the curricula and school culture (Mohzan et al., 2013). According to Quraishi (2019), students become more motivated to learn when they can efficiently and productively manage their emotions. He further opined that different components of SEL work, such as the foundation of children's readiness to learn, contribute to academic success, which includes motivation, focus, attention, and self-regulation (Quraishi, 2019).

According to Durlak et al. (2011), SEL is essential as students typically learn in the company of their peers, in collaboration with their teachers, and with the encouragement of their families. Managing emotions during this learning process is vital for academic success, and SEL provides a proven framework (Durlak et al., 2011; Mahoney et al., 2020). Other elements, like self-regulation and attention, are also aspects of SEL that lead to academic success (Dunn, 2019).

The Every Student Succeeds Act (ESSA), signed into law in December 2015, recommends that states are required to foster "safe, healthy, supportive, and drug-free environments that support student academic achievement, improving instructional practices for developing relationship-building skills such as effective communication" as well as to ensure "mentoring and school counseling to all students" and "implementation of school-wide positive behavioral interventions and supports" (Every Student Succeeds Act, 2015, as cited in Dunn, 2019, p. 19). SEL strategies fit within this ESSA framework and help students meet demanding academic goals and succeed in different parts of their lives (Dunn, 2019).

In their meta-analysis covering 213 studies, Durlak et al. (2011) found that SEL intervention showed a 9% improvement in school and classroom behavior and an 11% improvement in academic achievement. Furthermore, it enhanced the students' success through improved attendance, prosocial behavior, and school connectedness while reducing anxiety, depression, aggression, disruptive conduct, and violence (Durlak et al., 2011). Depending on the outcome measure, the magnitude of the effect sizes of these interventions ranged from 0.22 to 0.57, which are comparable to other well-established psychosocial interventions (Durlak et al., 2011). By extending the findings of Durlak et al. (2011), Brackett and Patti (2016) concluded that SEL leads to positive shifts in the classroom climate and enhances the quality of teacher instructions. A positive school climate ensures that students more effectively engage in learning and that fewer students exhibit disruptive behaviors (South, 2019). Further, through the management of emotions, people with higher social-emotional skills can effectively address stressful situations (Shooshtarian et al., 2013).

Researchers of the Robert Wood Johnson Foundation (2015) identified that children's early social and emotional skill also predicts their well-being in early adulthood. In addition, they found that for every 1-point increase in a child's social competence score in kindergarten, they were 54% more likely to earn a high-school diploma, two times more likely to attain a college degree in early adulthood, and 46% more likely to have a full-time job at the age of 25 (Jones et al., 2015). A well-planned and implemented SEL program can decrease emotional distress by 10%, such as depression and anxiety, improve attitudes about self, others, and school by 9%, and improve management of emotions by 23% (CASEL, 2008). After reviewing decades of research, McKown (2017b) further concluded that children do better in schools when their SEL skills are

adequately developed. Goorabi et al. (2021) also pointed out that SEL can positively influence students' academic performance and effectively solve their emotional and behavioral problems.

Benefits of Social-Emotional Learning for Educators

In addition to the benefits for students, SEL can also be valuable for educators. It can help educators to manage their classroom effectively, educate their students on managing their engagement, emotions, and behaviors, and cope with the stresses of their role, including students who are relatively challenging (Zins et al., 2007). This also creates a more orderly environment in the classroom, in which students can learn better in peer-to-peer, small group, and whole classroom activities. Not only for students, SEL skills can also help educators solve problems more skillfully in their personal lives and manage their stress more effectively (Zins et al., 2007). Greater empathy, better communication, and stronger relationships in the classroom between peers or with the educator also create a more effective classroom culture for learning (Zins et al., 2007).

Ensuring educators are knowledgeable practitioners of SEL can generate a more effective organizational culture. Training in SEL increases a teacher’s feelings of effectiveness and job satisfaction and reduces their job-related stress and student-teacher conflicts (Ingersoll, 2001). All these can minimize teacher attrition (Ingersoll, 2001). For this reason, SEL should be of importance and interest to educators, administrators, and educational policymakers as an essential element in all teacher training and professional development programs (Ingersoll, 2001). Additionally, teachers with strong SEL competencies are more effective in working with guardians and parents and collaborating with their colleagues, creating a more conducive learning climate within schools. SEL programs are also beneficial for educators who focus on special education to promote additional strategies for child and adolescent development (Zins et

al., 2007). For these reasons, Oberle and Schonert-Reichl (2017) emphasized the need to consider the SEL competence of educators and incorporate SEL in teacher education. According to Oberle and Schnert-Reichl (2017), teachers' motivation and preparedness are indispensable to implement any SEL program in the classroom. Therefore, helping teachers and administrators understand the baseline SEL competencies of their staff and students, respectively, and monitoring their development progress is an essential initial step in promoting engagement, satisfaction, and an effective learning environment.

Forcina (2012) found that SEL practices and customs reduce stress and burnout in educators and staff and assist in retention and learning continuity. During the COVID-19 pandemic, it has been observed that educators are increasingly suffering from compassion fatigue that is negatively influencing their perceived online teaching self-efficacy (Yang, 2021). Through empirical study, Yang (2021) found that educators with higher SEL competencies can more efficiently prevent this compassion fatigue.

Benefits of Social-Emotional Learning in the Community

SEL assists people and groups in being equipped with skills, attitudes, and beliefs that are essential to make healthy, ethical, caring, and responsible decisions within a community (Elias et al., 2008). It is also vital to avoid negative behaviors that influence a community, such as substance abuse, violence, and bullying (Elias et al., 2008). Wang et al. (2016) concluded that SEL programs reduce dropout among students as well as the effects of loitering, vandalism, homelessness, and poverty. If the high-school male graduation rate were increased by only five percent, the U.S. could save as much as $18.5 billion in annual crime costs (DeBaun & Roc, 2013).

From a community perspective, SEL produces an 11-time community return on investment (Belfield, 2013; Belfield et al., 2015). Every dollar invested in SEL can produce 11 dollars in benefits, both through the reduction of social service and criminal justice costs and through the increase in employment-related tax and commerce benefits. Besides the reduction in high-school dropouts, SEL helps students have a higher income and better health, and encourages them to avoid criminal activities (Belfield, 2013; Belfield et al., 2015).

Social-Emotional Learning Standards

Considering the critical role of SEL in ensuring academic success and preventing issues related to a lack of emotional intelligence, a growing number of state education departments have already adopted or are examining different SEL standards (CASEL, 2018; Yoder et al., 2020). CASEL initiated a state-scan project for assessing the SEL standards and goals from PreKindergarten (PreK) to high school (Stahl, 2018). So far, 18 states have incorporated SEL competencies/standards (PreK-12th grade), including Illinois (2004), Maine (2012), Kansas (2012), West Virginia (2012), Washington (2016), Nevada (2017), New Jersey (2017), Michigan (2017), Tennessee (2017), Rhode Island (2017), North Dakota (2018), Minnesota (2018), New York (2018), Wisconsin (2018), Ohio (2019), Indiana (2019), Pennsylvania (2020), Arkansas (2020) (CASEL, 2018, Yoder et al., 2020). Besides, eight states have incorporated SEL competencies/standards for PreK-early elementary, including Idaho (2011), Hawaii (2014), Vermont (2015), Massachusetts (2015), Maryland (2016), Oregon (2016), Florida (2017), Connecticut (2018) (CASEL, 2018, Yoder et al., 2020). The remaining states have adopted PreK SEL standards/ competencies but have not yet extended them beyond preschool (CASEL, 2018; Yoder et al., 2020). In 2019 alone, over 200 pieces of legislation referencing SEL were introduced in the U.S. (Shriver & Weissberg, 2020).

The first comprehensive SEL standards were developed in the State of Illinois in 2003, which were based on CASEL's framework and covered preschool through high school (Maton, 2016). A broad group of school administrators, teachers, student support staff, human services professionals, and parents in Illinois with expertise in curriculum design, child development, learning, and instruction was involved in this process (Gordon et al., 2011). In 2004, Illinois officially adopted these SEL standards (Maton, 2016). Since then, other states have also come forward to develop or adapt their learning standards for SEL (Dusenbury et al., 2015). Gordon et al. (2011) mentioned that Illinois SEL state standards highlight the importance of children's social and emotional development for school readiness and success. The following three goals of the Illinois SEL standards are broad statements that describe the knowledge and skills relevant to SEL:

- "Develop self-awareness and self-management skills to achieve school and life success.
- Use social awareness and interpersonal skills to establish and maintain positive relationships.
- Demonstrate decision-making skills and responsible behaviors in personal, school, and community contexts" (Pedigo & Howell, 2019, p. 72).

In the last three decades, educators, policymakers, prevention scientists, and many others have developed and extensively evaluated many SEL programs that are evidence-based, comprehensive, and follow SEL state standards (McKown, 2017b). For example, 59% of the 562 administrators and teachers who responded in 2015 to a nationwide survey reported that they used an SEL program called SWPBIS (School-Wide Positive Behavioral Intervention and Supports), another 32% of them were using other SEL programs like Second Step or PATHS (Education Week Research Center, 2015). In a later survey conducted in 2019, 70% of the

principals believed that teachers need a formal curriculum to teach SEL skills, 87% of them think that social and emotional skills development needs to be explicitly mentioned in state education standards, and 49% of schools possess developmentally appropriate and comprehensive learning standards that describe which SEL skills students need to demonstrate at each grade level (Atwell & Bridgeland, 2019).

While assessing the SEL standards, CASEL (n.d.-c) identified the following necessary components:

1. Goals that are clearly articulated.
2. Availability of tools for supporting the high-quality implementation of SEL.
3. Guidance on how the social and emotional development of students can be supported by the adults, e.g., the ways for creating a positive learning environment.
4. Guidance for teachers for making linguistically appropriate and culturally sensitive instructions.
5. Integration of SEL with the learning goals in different other subject areas (para. 2).

Stahl (2018) recommended that educators and school leaders who are responsible for addressing and assessing SEL standards need to focus on their ongoing professional development and continuously monitor the school culture to make it suitable for imparting SEL to the learners. Stahl (2018) further recommended that SEL training be included in teacher preparation programs to ensure a successful SEL implementation. McKown (2017b) also pointed out the importance of standards-based SEL assessment tools that can help to determine whether children are meeting SEL development and standards requirements.

Current Challenges in Implementing Effective SEL Programs

According to the World Economic Forum (2016), an efficient SEL program requires a wide range of software and technology products for both educators and students, higher levels of funding and resources, a set of complementary and comprehensive training programs for parents, children, and teachers, and a widespread agreement and standardization of metrics. Arranging all these can become a big challenge for the school-wide implementation of SEL (World Economic Forum, 2016). Other barriers to a successful SEL implementation include insufficient prioritization, low funding and resources, limited awareness, a lack of consensus about measurements, and an inadequate supply of programs and products (World Economic Forum, 2016). The absence of a positive, supportive, and healthy climate and culture inside the school also creates a barrier for school administrators, teachers, and parents to dedicate their efforts to foster SEL (Sulkowski & Lazarus, 2016). Additionally, the lack of sensitivity to cultural and ethnic diversity identified in some SEL programs have negative consequences and impedes fostering SEL in all environments (Sokal & Katz, 2017).

In a study by DePaoli et al. (2017), 60% of the principals indicated a lack of teacher training as a big challenge for ensuring students' social and emotional development. Only 45% of them believed that teachers in their schools were prepared to teach SEL successfully (DePaoli et al., 2017). Moreover, administrators, teachers, and even parents are often biased toward emphasizing only students' academic achievements and ignoring students’ social and emotional developments (Elbertson et al., 2010).

The Massachusetts Consortium for Social-Emotional Learning in Teacher Education conducted a needs assessment survey of teacher educators in 2017, interviewing 76 professionals in teacher education, including teachers, administrators, mentors, and supervisors (Cressey et al.,

2017). The survey findings identified multiple obstacles to SEL implementation, including lack of experience and expertise in SEL among educators, state-mandated licensure requirements, constraints regarding curriculum, standardized testing and assessment, lack of buy-in, motivation, and other time-related pressures (Cressey et al., 2017).

Even though the five components of SEL put forward by CASEL are well-accepted, only a few assessments are available for measuring those SEL components (Elliott et al., 2019). Therefore, a lack of universal screening assessments of children's social-emotional skills poses a challenge to researchers, policymakers, administrators, educators, and interventionists who rely on assessment data to monitor and continuously improve the implementation of SEL strategies (Elliott et al., 2019). In addition, Day et al. (2019) highlighted the need for innovative and scalable digital psychometric assessments to measure children's socio-emotional functioning to facilitate early identification of learning difficulties and provide the necessary guidance to address these concerns.

Educational Assessment

Educational assessments are the process and instruments used to measure the achievement and progress of students (Sari et al., 2019). According to Raiber and Teachout (2014), an assessment is any process of collecting or analyzing information about the performance. A formal assessment process within a school involves the collection, measurement, analysis, synthesis, and interpretation of data on any variable affecting the student’s performance (Mertler, 2016). Assessment data also provide instructional guidance to educators while holding education stakeholders accountable, such as a state, a district, a school, principals, and teachers (Shepard, 2019).

Types of Assessments

There are many varieties of assessments: diagnostic, formative, summative, and standardized (Mohan, 2016). Assessments are formal or informal, normalized or not, and administrator- or student-centered (Mohan, 2016). While academic researchers and scientists may have the resources to create a formal design and follow a scientific method, including a controlled condition, educators often use informal evaluations on a daily level, such as formative assessments, or a more goal-oriented process, such as action research (Mertler, 2016). Valid formal assessments are often complicated to develop and implement and usually require significant resources, time, and expertise (Ghaicha, 2016). While evaluation of academic performance is typically formal, the measurement of non-academic components, such as psychometrics, can range from an informal to a formal assessment (Ghaicha, 2016).

In education, educators often follow a backward design model that starts with state, federal, or common core standards, learning objectives, and assessments before they develop the lesson plan and delivery strategies. This process ensures that an educator's lessons and strategies will allow students to meet learning standards and objectives. An essential part of this process is understanding students' developmental, academic, and SEL levels. The **diagnostic assessment** is a crucial tool to provide educators with a snapshot of the current condition of a learner so that content and implementation strategies become effective (Leighton & Gierl, 2007). The diagnostic evaluation is often a formal assessment delivered through a summative or standardized assessment framework that concentrates on prior learning rather than on future learning potential (Alruwais et al., 2018). The student's challenges, deficiencies, or successes are highlighted with this process, so pedagogy, curricula, and individualization can directly meet their needs (Leighton & Gierl, 2007).

Another essential education assessment is the **formative assessment**. The formative assessment, typically an informal process, is a continuous process whereby the educator collects feedback to ensure engagement, activity, and learning (Evans et al., 2014). Common formative assessments include walking around the classroom and observing student behaviors, asking simple questions for understanding, and checking the progress of a student's work. As an informal process, it provides invaluable data (Ghaicha, 2016). With this data, educators can quickly change delivery strategies, scaffolding levels, groupings, or the lesson itself. This process is called continuous because, unlike a quiz, it does not have a distinct start and end. The formative assessment is an ongoing process whenever learning transpires in the classroom. It can affect future learning sessions (Evans et al., 2014).

The **summative assessment** is the most known evaluation. In contrast to the diagnostic or pre-test evaluation that occurs before the instruction, the summative assessment is administered after instruction to test knowledge. Its function is to provide a snapshot understanding of knowledge and skills comprehension (Dixson & Worrell, 2016). Traditional summative assessments range from - but are not limited to - multiple-choice-based questions, short answer responses, to essay questions (Dixson & Worrell, 2016). Multiple-choice selections require the lowest levels of high-order thinking, while essay development requires the highest. The more project-based, 21st-century-learning frameworks apply student rubrics and project-centric assessments. The grading rubric allows students to create a scoring mechanism and understand the different elements of learning necessary for evaluation (Ghaicha, 2016). They give a clear set of guidelines on what is acceptable and unacceptable performance (Many & Bhatnagar, 2017). Inquire-based or project-based assessments allow students to demonstrate their knowledge through constructivist action, often requiring higher levels of understanding and

critical thinking, and have a final product (Lund & Kirk, 2019). Hamm and Adams (2009) support such performance assessments and state that they are better at measuring the more meaningful development - skills development, the application of knowledge, and understanding of real-world contexts - rather than evaluating basic memorized knowledge with traditional assessments. Whichever summative evaluation type is used, all should provide a strong understanding of whether the learner met the learning objectives.

The standardized tests offer a uniform evaluation. In the U.S., many states mandate the assessment of core subjects to compare student development at the school, district, state, and federal levels. Often, **standardized assessments** are designed with one of two models: norm-referred and criterion-referred (Ghaicha, 2016). In the norm-referred model, the test score distribution is established for a reference population, with the new score being presented with the corresponding percentiles related to the reference population (Ghaicha, 2016). English language arts (reading, comprehension, grammar, and vocabulary), math, science, and social studies are often evaluated with a referred norm. These baseline measurements provide data to schools, governments, and politicians on modifying and supporting local education initiatives in the best possible ways. They also provide accountability to programs and schools and deliver data for improving instruction (Dixson & Worrell, 2016; Marion & Buckley, 2016). If schools are underperforming, they may be required to implement turnaround procedures or to shut down (Dixson & Worrell, 2016). Standard tests offer parents and educators information about which students may need direct government-sanctioned interventions with section 504, individual education plans (IEP), or other specialized interventions (Corcoran et al., 2018).

While standardized tests have increased in recent years, they continue to be controversial. Some educators and administrators believe that there is an overemphasis on the value of

standardized tests, as these tests do not cover the learner's development, and biases exist against diverse learners and people of color (Bazemore-James et al., 2016). The criterion-referred model uses two or more categories that are ordered. These categories are defined as fixed thresholds in the score scale, and new scores are labeled depending on the category in which they fall (Ghaicha, 2016). The objective of standardization is to achieve an equal and fair evaluation process for comparison with a reduction in bias (Ryan et al., 2012). In such a case, each student's test score is relative to the category with which they are associated. Furthermore, it mandates that the test be conducted under uniform conditions and graded according to a fixed rubric or set of rules (Ghaicha, 2016). This reduces bias and ensures that all students are assessed on a leveled platform.

Benefits of Assessments in Education

Assessments in education help ensure the achievement of learning objectives (Bennett, 2015). With backward design curricula development, the assessments are directly developed from learning standards rather than directly from curricula. With pre-determined objectives, standards, and rubrics, students clearly understand what and how often they should acquire skills and knowledge (Ghaicha, 2016). Assessments provide teachers a roadmap to develop instructional strategies and curricula, empowering students to achieve their own academic goals (Ghaicha, 2016). This empowerment increases motivation, engagement, and positive affect (Ghaicha, 2016). Pre-test and diagnostic assessments can ensure that teachers and students know the areas to focus on effective academic and SEL development (Seipel et al., 2018). The goal is to provide as much data as possible to tailor the learning process for maximizing differentiated learning (Seipel et al., 2018). Additionally, the use of student-centered project rubrics ensures that all learners have a variety of options to demonstrate their understanding and skills, allowing

for both creativity and the development of collaboratively designed measurement frameworks (Ghaicha, 2016).

Assessments also provide a framework of accountability. According to Marion and Buckley (2016), assessments assist in evaluating programs, curricula, instructional strategies, and classroom practices. The provided data increase the effectiveness of publishers, instructional designers, administrators, and teachers. These data further introduce a change in education policy and funding. This includes ensuring that learners with special needs are identified and supported according to the Individuals with Disabilities Education Act (IDEA), which mandates schools to develop Individualized Education Plans (Al-Shammari & Hornby, 2019). Ultimately, the goal is to increase the efficacy and efficiency of learning for every individual.

Challenges of Assessments in Education

The primary disadvantage of assessments in education is the standardization of students' performance and abilities as if all students have similar abilities, beliefs, ideologies, and passions (Baird & Pane, 2019). Students are diverse and cannot be truly standardized. Measuring a range of knowledge and skills may require support and differentiation. Otherwise, it may misrepresent the true capabilities of the assessed student (Ghaicha, 2016). Conducting individualized student tests is currently not economical. Hence, in a standardized framework for comparative scores, individual scores should only represent the progress of a group, such as a class or a school, and not specifically the individual students (Wilson, 2018). Assessments often require many resources to plan, coordinate, and administer, including time, human labor, and finances (Stufflebeam et al., 2012). Klieger (2016) further stated that education assessments are often not well funded, negatively affecting the planning and implementation and thus impacting the assessment reliability. Ludvik (2013) indicated that information from assessments is not always

reviewed, analyzed, or effectively leveraged to modify instruction and learning. From a student perspective, diagnostic, summative, and standardized assessments induce anxiety, affecting results and validity (von der Embse et al., 2018). Often, when students are anxious, knowledge may temporarily be blocked, response behavior may be erratic, or the desire to stop the stressor may exceed that of a proper performance. The association of assessment anxiety may influence the school learning environment, negatively impacting both performance and learning (Vaessen et al., 2017).

The Influence of Technology on Educational Assessments

Technology has had a tremendous effect on different sectors in education - education assessments being one area. One example is scenario-based assessments, which are projected to be a significant part of testing programs in the future (de Klerk & Kato, 2017). Scenario-based assessments, modeled from game-based frameworks, provide a higher level of reliability and validity related to measuring student's skills and abilities compared to traditional assessment methods, which have relied on paper-and-pencil, performance-based assessments (Heinrich et al., 2009). Scenario-based assessments can increase engagement and the representativeness of the assessment through design, such as randomization, progression, and feedback. This was impossible in traditional paper assessments (Dassa & Nichols, 2020; de Klerk & Kato, 2017). Digital assessments can test multiple types of arguments and argumentation, such as claims and rebuttals, in a streamlined manner. In contrast, paper versions are often limited to one or two argumentations (de Klerk & Kato, 2017). Through design, digital assessments incorporate elements for reducing intentional or accidental error responses, thereby increasing reliability and validity (Heinrich et al., 2009). Further, digitizing assessments resulted in faster and more

efficient assessment systems and often provided nearly instantaneous data and feedback (Heinrich et al., 2009).

Social-Emotional Learning Assessments

SEL assessments are screening and diagnostic evaluation instruments to measure an individual's social-emotional competency. SEL assessments provide information about the current emotional state of an individual and have been associated with positive educational outcomes and positive well-being (Elliott et al., 2018). While many current SEL assessments are complicated, lengthy, and researcher-centric, they are also an essential tool in developing SEC (Blyth et al., 2018). Most SEL assessments were developed before the release and popularity of the CASEL five-competency model. However, newer SEL assessments follow the CASEL framework. The current number of visible SEL assessments is less than 30, all of which vary in their competencies assessed, target ages, and approaches (Haggerty et al., 2011; CASEL, n.d.-h). Practitioners of SEL have been working more systematically to integrate evidence-based SEL programming within teaching and learning. SEL assessments are an essential evidence-based instrument to affect methodologies in improving the SEL process and promoting a positive learning culture (Yopp et al., 2017). They are also essential in developing well-rounded individuals for society and the workforce (Yopp et al., 2017).

Further, valid SEL assessments provide data to support necessary and contiguous programs and policies (McKown, 2019c; McKown & Herman, 2020). A limited number of the most popular or newest SEL assessments are discussed here in more detail regarding their significant benefits and limitations. Further, the emphasis is given to a newly developed SEL assessment, the Social-Emotional Learning Digital Diagnostic Assessment (SELDDA), which

can assess an individual's SEL competencies with enhanced efficiency, outlined later in chapter two.

The Devereux Student Strengths Assessment

The Devereux Student Strengths Assessment (DESSA) System is an SEL assessment tool developed by the Devereux Center for Resilient Children as part of a leading SEL assessment within the Aperture Education's DESSA System. It is a cloud-based system used to assess, improve, and inform students' social and emotional skills, both in and outside the school (Haggerty et al., 2011). Moreover, as an empirical, strength-based, and standardized assessment, DESSA is designed to provide reliable data on students' emotional and social skills and the areas needed for improvement (Haggerty et al., 2011). DESSA and DESSA-Mini (a brief version of DESSA) are meant to be psychometrical and practical measures of social-emotional competencies that can be used inside and outside of school settings. They are considered behavioral rating scales that generate information, which can be used to implement large-scale SEL programs. DESSA is based on the resilience theory, exploring how an individual can overcome tough circumstances to achieve good outcomes (LeBuffe et al., 2018). To align DESSA with the CASEL framework, an Optimistic Thinking scale was added, increasing the total number of measurement scales to eight. The items assigned to each scale were based on their item-scale correlations and content correlations (LeBuffe et al., 2018).

DESSA is a standardized, strength-based behavior rating scale that is completed within five to eight minutes and can be used by parents and educators to assess students in grades K-8. There are also early childhood and high school editions (Goldstein & Brooks, 2005). Naglieri et al. (2011) have established the viability of DESSA as a tool for assessing SEL and competencies related to resilience. According to Merrell and Gueldner (2010), DESSA is a 72-item behavior-

rating scale. The 72 items on the DESSA scale are rated via a 5-point response format (never, rarely, occasionally, frequently, and very frequently), which is associated with numerical values ranging from zero to four.

The primary challenge to the DESSA system is that the time to assess each child is about 15 minutes (Merrell & Gueldner, 2010). Thus, it would take nearly 300 minutes (equivalent to five hours) for a class of 20 students, excluding the additional time necessary for training, evaluation, and analysis. Additionally, being only an observational tool, the information gained can be limiting without a self-report or a direct assessment (Elliott et al., 2018). According to Frydenberg et al. (2017), DESSA is an example of a teacher rating assessment and, as a result, requires more teacher time than traditional self-report assessments. Moreover, the observational report has limitations regarding the internally related SEL competencies such as self-awareness and social awareness (Frydenberg et al., 2017). Also, it is difficult to evaluate whether the rater is accurately rating the social-emotional competence of a student using DESSA (LeBuffe et al., 2018).

The DESSA-Mini tool, an eight-question quick analysis based on DESSA, provides a general, early indicator of SEC concerns. The specificity rate (the true negative rate (TNR)) is between 83% and 98%, with a sensitivity rate (true positive rate (TPR)) between 62% and 81%. In addition, the tool has been proved to accurately predict a student's academic challenge. After using the tool, Malti and Rubin (2018, p. 30) suggested that if a student is found to require SEL at the beginning of the year, they probably have 4.5 times more likely severe disciplinary issues at the end of the year. This affirms that DESSA is a SEL assessment tool that can successfully be deployed in schools with financial and time-related resources (Malti & Rubin, 2018). In another study, Naglieri et al. (2011) confirmed the reliability of DESSA-Mini and concluded that it is a

viable tool for universal screening of resilience-related social-emotional competencies. Kilpatrick et al. (2018) and LeBuffe et al. (2018) also established the criterion-related validity and internal consistency of DESSA-Mini.

Social Skills Improvement System

Another SEL assessment tool is the Social Skills Improvement System (SSIS), which measures the frequency of social skills on a 4-point Likert scale (0-never, 1-seldom, 2-often, and 3-always) (Elliott & Gresham, 2007; RAND Corporation, 2018b). SSIS screens and classifies students between three and 18 years who are suspected of having deficits in their social skills (Elliott & Gresham, 2007). It enables a targeted assessment of small groups or individuals and evaluates their academic competence, social skills, and problematic behaviors. SSIS was developed in 1990 and published in 2008 and takes between 10 and 25 minutes to complete (Gresham & Elliott, 2008). The SSIS software operates on Windows and Mac computers but has limited functionality on a tablet or mobile device (Gresham & Elliott, 2008). The SSIS rating scale provides a comprehensive assessment of seven areas of pro-social skills, including cooperation, communication, engagement, responsibility, assertion, self-control, and empathy (Landrum et al., 2018). It also assesses the five areas of problematic behavior: bullying, internalizing, hyperactivity, externalizing, and the autism spectrum. Additionally, the SSIS Intervention Guide and SSIS Class-wide Intervention Program help reduce identified social skills deficits. The SSIS system gives norm-referenced scores based on the 2006 U.S. Census (Elliott & Gresham, 2007).

The SSIS provides a reliable metric for measuring, assessing, and classifying social skills development for children. It also mitigates the development of social skills issues in the classroom by detecting and contextualizing concerns before they develop further. To test its

reliability, the developers used literature reviews from academic professionals. The SSIS Performance Screening Guide is efficient and reliable in measuring students' social skills (Elliott et al., 2018). The reliability and validity of the SSIS rating system have also been supported by Gresham et al. (2018). They indicated that SSIS is psychometrically adequate and is appropriate for adoption in the education sector.

After the publication and acceptance of the CASEL-5 SEL model, a new universal screening measure based on the SSIS Performance Screening Guide was developed, the Social-Emotional Learning Screening Assessment (SELA). It was initially tested with 268 Australian students over three years to assess the psychometric value. Some teachers have expressed a preference for SSIS over SELA, indicating that SELA was overly detailed and complicated (Elliott et al., 2018). Another version, the Social Skills Improvement System Social-Emotional Learning Edition (SSIS SEL), is also supported and inspired by the CASEL Social Emotional Competency framework (Gresham et al., 2018). SSIS SEL includes a norm-referenced measure of academic and of social-emotional functioning. SSIS SEL is based on SSIS reformulation, but it is more advanced with a multicomponent rating scale. However, both measures can still be used to assess the five social-emotional competencies of CASEL. Moreover, it includes a corresponding Classwide Intervention Program (CIP) and thus can be used to screen and measure progress in SEL assessment (Gresham & Elliott, 2017).

However, according to Garro (2016), SSIS has some limitations. One concern is that the reports rely solely on direct observations of problematic behaviors. Direct observation might be affected by the observer's judgment and/or bias, influencing reliability. Additionally, compared to other systems of measuring social skills development, SSIS is costly, with approximately $20 per student. Another area of concern is that there are little research and data on the two newer

SSIS versions, SELA and SSIS SEL, as most of the current research works are based on the previous SSIS assessment version. The results of another study also suggested that certain skill areas, like communication and cooperation, are impacted more by SSIS than other skill areas, including assertion and self-control (DiPerna et al., 2015).

The Delaware Social-Emotional Competency Scale

The Delaware Social-Emotional Competency Scale (DSECS-S) is a self-report scale for assessing the student's social-emotional competencies. It provides schools with an inexpensive, brief, and psychometrically sound tool for assessing a student's development and learning process (Mantz et al., 2018). It was initially developed in 2016 but published in 2017 by an expert panel, including graduate research assistants, university professors, and a representative of the Delaware Department of Education (RAND Corporation, 2018a). The four subscale factors of the DSECS-S are relationship skills, responsible decision-making, social awareness, and self-management (Mantz et al., 2018). These scale factors are consistent for all grade levels: elementary, middle, and high school, and for all racial-ethnic groups and sex (Mantz et al., 2018).

The items on the DSECS-S were developed based on CASEL's 2012 social-emotional competency framework, known as the CASEL-5 (RAND Corporation, 2018a). The subscale factors of DSECS-S are similar to CASEL's five social-emotional competencies (Mantz et al., 2018). Based on the similarity of the competency areas, the DSCEC-S is said to align well with CASEL (Mantz et al., 2018). Studies by Konishi and Wong (2018) and Kwon et al. (2012) showed that at the student level, social-emotional competencies were positively correlated with school engagement, demonstrating that students with higher social-emotional competencies performed better in school than those with lower scores. However, the results showed stronger

correlations in elementary schools than in middle or high schools. DSECS-S was designed to be used by schools and researchers to monitor the development of students' social-emotional competencies in a standardized manner (Mantz et al., 2018). Though it seems robust, DSECS-S does not provide or suggest related formative or summative educator tools to measure the ongoing development and use of social-emotional competencies. There is also difficulty in identifying an individual's motivational or emotional state. The validity and reliability of the DSECS-S instruments have been evidenced, however, in a research context. Many reviews have neglected the practical utility of the instruments in assessing school-wide SEL needs of students and the effectiveness of informing related intervention programs (Mantz et al., 2018). Thus, additional studies are needed to assess the validity of DSECS-S in a practical classroom setting - rather than just for academic research purposes (Mantz et al., 2018). Access to the assessment and pricing information was not available.

Panorama Education Social-Emotional Learning Measurement

An alternative SEL assessment tool is the Panorama Education's Social-Emotional Learning Measurement. It is an online platform that provides SEL assessments and data analytics for schools (Panorama Education, 2020). Panorama developed and published this measurement tool in 2014. It targets third to twelfth grades and offers developmentally appropriate survey versions (Panorama Education, 2019). The online self-report and observational report are based on a questionnaire that measures the behaviors, mindset, and attitudes related to success within schools and life. The intent is to provide a snapshot of the student's SEC, so teachers can appropriately modify instruction to provide additional individualized support. This tool can also help educators understand the perceptions of students, regarding how supported they feel at school (Panorama Education, 2019). It effectively measures the student’s grit, growth mindset,

self-efficacy, self-management, social awareness, emotion regulation, social perspective-taking, and classroom efforts (Panorama Education, 2019). The platform also offers a robust reporting and analysis section, including academic and school attendance data (Devaney & Moroney, 2018). Simple digital printouts are available for free, while the comprehensive digital platform costs $4000 per package (Panorama Education, 2020).

The validation of the Panorama survey scale is considered an ongoing process that evolves with repeated measures (Cohen, 2019). Currently, no academic research publication focuses on the reliability or validity of this measurement tool. Expert panels tested the reliability and validity of the survey through group interviews and focus group discussions (RAND Corporation, 2018b). The Panorama's assessment seems to align well with the CASEL-5 framework (Panorama Education, 2020). According to Panorama Education (2020), their current base package is often purchased and administered at a district level. Administration at a district level may reduce the autonomy of purchase, administration, and training at a school or classroom level. Additionally, it may be difficult to adopt all schools without published academic studies demonstrating the reliability, validity, and measurement process.

SELweb

One of the newest SEL measurement tools is SELweb, a digital, internet-based, self-administered, social-emotional competency measurement. Researchers of the Rush University Medical Center at Chicago, led by Clark McKown, developed SELweb (McKown et al., 2016). It assesses a student's ability to solve social problems, read facial expressions, tolerate frustration, and delay gratification. According to McKown et al. (2016), although the individual modules have high internal consistency, the test and retest reliability is moderate to low. Composite assessment scores were shown to have high reliability, and when combined with

individual assessment modules, they demonstrate a theoretically coherent factor structure (McKown et al., 2016; Russo et al., 2018).

The study conducted by McKown (2017a) showed that teacher-reported social skills, academic performance, and peer relations have a significant impact on SEL. Higher ratings were positively linked to teacher-reported social skills, academic competence, and peer acceptance. The study concluded that the SELweb's different modules were strongly associated with alternative measures of a similar construct. However, this was not the case for alternate measures of different constructs. Therefore, SELweb scores reflect what was designed to be measured (McKown, 2017a). McKown (2017a) concluded from his findings that SELweb demonstrates the ability to construct scalable, engaging, useful, and scientifically sound SEL assessments that are also reliable and valid. These findings have been supported by Russo-Ponsaran et al. (2019), who confirmed that SELweb produced reliable scores within normative samples. Russo-Ponsaran et al. (2019) showed evidence of a discriminant and convergence validity for three to four of the skills it was designed to measure. Therefore, they concluded that SELweb is valid in measuring SEL competencies (Russo-Ponsaran et al., 2019). Designed around the CASEL-5 model, it aligns well with CASEL standards (McKown, 2017b). SELweb is accessible to classrooms and schools at an average cost of $4 per student on an annual subscription (McKown, 2019a). McKown indicates that the system is technical and may require training and administration (McKown, 2019a).

The SELweb platform offers two versions, depending on the target age. The SELweb EE targets kindergarten to third grade, while the SELweb LE targets fourth to sixth grades. They measure SEL skills with similar rigor and consistency as that of achievement tests (McKown, 2017a). The data on SEL collected by SELweb is interpreted and shared with educators to

promote the development of social-emotional skills in students (McKown et al., 2016). The platform is divided into modules, though all modules should be administered. One module focuses on emotional recognition through facial features (McKown, 2019a). Other modules focus on perspective-taking, emotional regulation, cooperation, communication, and solving social problems (Taylor et al., 2018).

Current Challenges of SEL Assessments

The lack of familiarity with current SEL assessment frameworks and tools poses a significant challenge in developing and implementing educational SEL assessment tools. Furthermore, as Minney (2021) highlighted, the lack of systematic approaches, supportive frameworks, and unified standards makes it challenging to deliver SEL consistently. Through empirical studies, Atwell and Bridgeland (2019) learned that only 63% of the principals and teachers indicated a basic familiarity with current SEL assessments. Additionally, 67% of teachers stated that they have little understanding of how to leverage assessment data to improve classroom instruction in the best possible manner. Lacking useful tools, most principals still use administrative records on disciplinary actions (61%) and classroom behavioral observations (65%) as SEL assessments. Only 36% of principals use student self-reports, and 32% use performance assessments on specific tasks (Atwell & Bridgeland, 2019). Additionally, at present, no tools have the flexibility to assess educators, students, and parents to ensure a cohesive EQ culture and dynamic or to work together for data triangulation to reduce bias and increase accuracy.

Negative perceptions by school principals also pose a challenge regarding the development and implementation of new educational SEL assessment tools. Atwell and Bridgeland (2019) discovered that, despite academic research, some principals are not convinced

of the effectiveness of current SEL assessments. Out of 710 K-12 principals, only 22% believed that skills related to SEL could be accurately assessed, and 55% even considered current SEL assessments as not useful. Again, some principals opined that current measures of SEL need to be improved and highlighted the need for better training for collecting and using SEL data (Atwell & Bridgeland, 2019). While CASEL's five-competency framework is now known as the generally accepted SEL framework, many SEL tools and assessments have not been updated to this new model (Cressey et al., 2017; Ekland et al., 2018; Elliott et al., 2018). Additionally, some SEL tools have been adapted or repurposed to CASEL's framework rather than organically redeveloped. Moreover, Mantz et al. (2018) found that current SEL assessments are often too narrow or too broad to adopt the CASEL-5 model. Many of the SEL assessment instruments also lack practical utility, often designed primarily for academic research or used to identify individual students who are severely deficient in SEL skills necessitating particular intervention (Mantz et al., 2018).

Most SEL assessments are either self-report assessments, otherwise known as surveys or performance-based assessments. Self-report assessments and teacher reports are the most common and widely used; they make up 90% of current social-emotional assessment tools (Curtis, 2017). The challenge with self-report assessments is subjectivity — students may only reveal what they want you to know (Curtis, 2017). Further, teacher observation reports and students' self-report rating scales are often lengthy, time-consuming, and suffer from personal bias (Mantz et al., 2018; McKown, 2019a). Additionally, inattentive responses by the students reduce the validity of these assessments (Steedle et al., 2019). Another challenge is to administer current SEL self-report assessments to young students, who may not yet have the desired level of self-awareness, familiarity with complex assessments, or understanding of how to navigate

research-centric designs (McKown, 2019a). Completing lengthy questionnaires can also become a burden for teachers to implement, grade, analyze, and report, demonstrating bias (McKown, 2019a). Day et al. (2019) also highlighted the existing shortage of scalable and innovative digital psychological assessments for measuring children's social-emotional functioning. Furthermore, the costs and complexity of digital direct SEL assessments are high (Assessment Work Group, 2019).

Many current SEL assessments are a) lacking psychometric evidence of high quality, b) only appropriate for a limited range of purposes (like the identification of strengths and weaknesses of learners), c) not suitable for use for high-stakes purposes, and d) are complicated and time-consuming for educators to implement (Ekland et al., 2018). With digital technology, assessments are more accessible and delivered online through computers, tablets, or mobile devices. However, increasing the accessibility and scalability of assessments requires more effort than merely transferring the content to a digital format (Day et al., 2019). It now requires access to technology and the internet, user account setup and management, familiarity with technology and assessment, and user experience design. In this case, user experience can relate, among others, to the font, font size, interface colors, question format, and assessment flow. Everything from traditional question order and bias from multiple sessions of the same assessment to technology-based user design must be calibrated together for reliability, validity, and usability (Soland et al., 2019).

There is a shortage of standard-based, reliable, scalable, affordable, and usable SEL assessment tools and a lack of investment to develop and validate SEL assessment systems that cover all age groups (McKown, 2017b). Additionally, every assessment tool needs tens of thousands of users and studies to increase the assessment reliability and validity and normalize

the data, especially for different demographic groupings (McKown, 2017b). As added by McKown (2019b), some challenges related to SEL assessments include:

> a) balancing the priorities of assessment developers and educators;
>
> b) ensuring that the inferences and decisions made from SELassessment scores are supported by evidence of the assessment's psychometric merit;
>
> c) establishing conditions for SEL assessment and data use that maximize benefit while mitigating risks;
>
> d) coordinating standards, assessments, programs, and professional learning; and
>
> e) balancing highly focused assessments that by design do not vary in content or format and the varied cultural contexts, in which they may be used (p. 205).

Additionally, a lack of district-level support for school SEL specialists, educators, and administrators to collaboratively review and gain familiarity with SEL assessment data creates another significant barrier (Atwell & Bridgeland, 2019; Soland et al., 2019). Dusenbury et al. (2019) realized that 50% of the states do not offer any guidance on SEL development assessments or their ability to effect change in school culture and instructional practice.

Further, there may be a level of subjectivity within the measurement parameters. This is due to a lack of SEL measuring standards and proven measurement instruments. Most researchers, administrators, and educators have not agreed on what should be assessed as a true measure of SEL (Hoerr, 2019). At times, teachers want to have more control over the types of SEL skills they measure and over when and how to measure them in an easy-to-access manner.

However, while assessment accessibility is essential, choosing what criteria to measure for SEL and how to measure it without a level of standardization will allow bias to affect the results (Hoerr, 2019).

Social-Emotional Learning Digital Diagnostic Assessment (SELDDA)

The Social-Emotional Learning Digital Diagnostic Assessment (SELDDA) is one of the newest SEL assessments, which has been developed by Strut Learning (Strut Learning, n.d.). Strut Learning is a volunteer-run social venture with a mission to create scalable SEL technologies for communities and schools. Their team of experts includes educators, academics, data scientists, and experts in SEL, technology, and UX/UI design who have worked with community partners to develop the free-forever SELDDA instrument (Strut Learning, n.d.). SELDDA is a digital, internet-based assessment that determines the current state of an individual's SEL skills, including their strengths and weaknesses regarding SEL. It shows the results electronically in a summary, detailed, comparative, or report format for current or historical assessments. These results can then be used to tailor or modify pedagogy, strategy, or curricula for enhancing the development of a learner's SEL competencies. This digital assessment overcomes different limitations of paper-based assessments, like the inability to measure ongoing developments of students and the difficulty in identifying their motivational or emotional state (Mantz et al., 2018). According to Huang et al. (2015), insufficient error responding (IER) is a source of random assessment errors when students go too fast, too slow, or continuously give similar responses without paying attention to details. This error can be efficiently handled by well-designed digital systems, such as SELDDA, which is not possible through paper-based assessments.

Strut Learning indicates that they developed SELDDA to provide an accessible SEL assessment that addresses and overcomes current assessment limitations (Strut Learning, n.d.). For instance, many ongoing SEL assessments do not align rigorously with the leading authority in SEL research, CASEL, and their five core competencies (Elliott et al., 2018). However, SELDDA was organically developed on these five competencies and is also based on the emotional intelligence theory, the predecessor to SEL. Further, SELDDA focuses on an additional complementary sixth competency, motivation, which many experts consider an equally important SEL competency (Zins et al., 2007). But this one is yet often not highlighted in SEL frameworks or assessments. These six SEL competencies make it possible to assess students in their composite emotional intelligence and SEL competence. To add higher sensitivity and insight, SELDDA has subdivided each of the six competencies into three sub-competencies, 18 sub-competencies in total. According to CASEL (n.d. -e), dividing the core SEL competencies into multiple sub-competencies can help assess these competencies in a better and more sensitive way. Before developing SELDDA, extensive academic research was conducted to enhance the reliability, validity, and usefulness of this assessment.

Most current SEL assessments are based on the individual's self-report and suffer from bias (McKown, 2019a). SELDDA has partially addressed this problem by triangulating the data received by the student (self-report), the parent's perspective of their child, and the teacher's perspective of the student. Besides a multiple reporter format, efforts have been taken to mitigate environmental effects (school vs. home vs. community/social), where the pre- and post-test versions focus more on the school environment and the optional mid-test more on the family/community environment. SELDDA attempts to be the most detailed and triangulated SEL assessment. Many other available assessments, like DESSA (Haggerty et al., 2011) or SSIS

(Gresham & Elliott, 2008), are developed primarily by researchers, which limits their practical effectiveness. In contrast, SELDDA was developed from the beginning in partnership with educators and SEL practitioners rather than only with academics and researchers, making it both academic and practical. SELDDA also provides real-world definitions, recommendations, and summaries.

Within SELDDA, there exist three types of questions. First, some demographic questions are added to allow for academic and data analytics. Some demographic questions are asked prior to the main assessment, while others are asked afterward. No personal, identifiable information is collected outside of the email address, such as no names, addresses, IP addresses, etc., since some demographic questions may negatively influence participants, such as age, race, and income. As a result, these questions are asked after the main assessment. Duncan and Peterson (2001) indicated that some pre-test demographic questions might lead some respondents to stop and drop out of the assessment prior to its conclusion. Second, the main assessment is made up of self-report questions on their individual SEL competencies. For these questions, a five-point Likert Scale is used for a particular issue, like “I understand what behaviors are appropriate based on the environment I am in.” However, according to Soland et al. (2019), the outcomes derived through these self-report questions may cause bias. Therefore, some additional direct scenario-based closed-ended questions are included for a higher level of reliability and to quantify their behaviors related to constructs like conscientiousness and academic self-management (Soland et al., 2019). One such question is: “You are feeling anxious about a work deadline. In this situation, what would you most likely do?

1. Decide not to think about it until the last minute because I will get it done.
2. Find ways to delegate my work to my coworkers, so I don’t have to do much work.

3. Have trouble sleeping at night because of overwhelming thoughts of the tasks I have to get done.
4. Reach out to my supervisor and share all of my worries about finishing the project.
5. Remain calm and find a strategy to keep me on track."

For additional reliability, third-party participants can be invited to take assessments on another individual to allow for comparative results. For example, students can have parents, teachers, and school specialists also take assessments on the student, allowing for data triangulation. This triangulation of results increases the reliability and accuracy of the composite results and reduces individual bias (Lemon & Hayes, 2020). Since individuals can also take the assessment multiple times and can compare these results over time, the comparative results can further add value to monitoring their SEL development. According to the Assessment Work Group (2019), the costs to create and access digital SEL assessments are high. This limits access and use of SEL assessments as well as both teacher and student understanding of their SEL competency, which in turn can restrict individualized SEL development (Assessment Work Group, 2019). To address this issue, the developers of SELDDA have committed to ensuring that this instrument will not incur any fees; it seeks to be free-of-charge forever, including upgrades and support.

Peterson (2016) pointed out that schools' growing use of digital technology has increased concerns about data privacy, as different applications, educational websites, and other online services can have easy access to personal data. The developers of SELDDA have emphasized privacy and confidentiality issues of students and educators and are committed to abiding by the present/future laws regarding privacy. SELDDA conforms to the Family Educational Rights and Privacy Act (FERPA) (Frank & Wagner, 2018). Their assessment does not collect identifiable

information about the student (first name, last name, birthday, address) except an email address. Also, no tech-based information will be collected through SELDDA to identify the person or location, such as Internet Protocol (IP) address or any information related to the user's device, operating system, browser, and location, which are routinely captured in other programs (Peterson, 2016). Further, SELDDA administrators, managers, and volunteers do not have access to user email addresses, the only identifiable information linked to a user. While necessary demographic information is requested, none leads to a specific individual. This information is essential to provide subgroup-related normalizing. Further, in SELDDA, most demographic questions are asked after the assessment. This can prevent any biasing effect on the evaluation (Hughes et al., 2016). Important initiatives have also been taken to ensure that parents cannot view the assessments done by the teachers.

SELDDA has shifted traditional academic surveys towards a new digital assessment. This can improve usability by integrating Human-Computer Interaction (User experience/User interface) and education technology frameworks (Hashim & Adamu, 2017). To avoid emotional and cognitive load and lag, the student version of the assessment has only one question per screen, while the adult version includes six questions per screen. This reduces the chance of individuals being overwhelmed by the number of questions displayed at one time, allowing them to focus on one concept at a time. The design is simplistic, with an effort to prevent distraction and overload. Moreover, through practice screens, 15-second help videos, and text-to-speech features, SELDDA ensures learners feel comfortable with the platform before engaging, reducing anxiety and errors (Strut Learning, n.d.).

Based on CASEL assessment reviews, reviews of academic publications, and direct observations, most of the standard SEL assessment tools currently available are based on typical

research questionnaires with a simple 5-point Likert scale (CASEL, n.d.-c). For most questions, SELDDA also follows the standard 5-point Likert scale. Additionally, SELDDA possesses some advanced features, like an auto-forwarding system, a limited number of questions per screen for increased focus, preventing unnecessary response changes, audio narration, and notifications to enhance engagements, among others, which attempts to make this tool unique, efficient, and user-friendly.

However, SELDDA also has limitations. They have not conducted any academic research on its reliability and validity. With only a limited number of users, they have not generated enough data to measure their instrument. As a result, no norming or subgroup- (race/sex) related data have been generated. The developers of SELDDA have only limited feedback on usability with students and within the classroom. Furthermore, though it is organically aligned with the CASEL framework, it does not follow a specific SEL curricula program (Koehler et al., 2013).

Education Technology

Digital technology has revolutionized many facets of life, including the way we live and learn (Lazar, 2015). It has permeated into every area of a school (Hsieh et al., 2014). School administrators must plan, purchase, and implement technologies that range from grading and attendance systems to communication and compliance platforms. For educators to be effective with technology and learning, they must implement technology standards, follow education technology models, including integrating technology pedagogy within curricula and select appropriate classroom technologies (Hsieh et al., 2014). Ensuring that students develop digital and information fluency is a complex and complicated process in the information age. At a glance, leveraging a simple digital classroom application may seem simple. Often, however, the

behind-the-scenes is an orchestral process that is often siloed (purchasing, implementation, training, support, integration) and tactical rather than strategic (Quarles et al., 2018).

Education technology is a generic term encompassing technologies developed for or used within schools. It also includes robotics, 3D printers, virtual reality, assistive devices, and a variety of software applications from enterprise administration platforms, learning management systems (LMS) to simple communication applications for parents (Dündar & Akçayır, 2017). In the past decade, the demand for educational technology in schools has steadily increased due to greater access, economies of scale, and the emphasis on blended learning, 21st-century skills, and personalization (Tugun, 2016). Most schools currently employ administrative management systems. These systems coordinate and manage schedules, grades, and staff and parent communications, enabling schools to run more efficiently. Learning management systems (LMS) provide individualized or differentiated curricula to students, who then often have the flexibility of access at school and home, allowing for blended and extended learning opportunities. LMS offer learning more cost-effectively than traditional textbooks and improve learning outcomes by adapting to the developmental and academic level of the student (Abdelaziz et al., 2011). Schools often use a simple classroom application that delivers specific curricula or supports existing traditional curricula. Public schools also have access to assistive technologies for special-needs learners that help with motor skills and speech development (Berger et al., 2017).

Since the late 1990s, schools have sought to achieve a one-to-one student-to-digital-computing device (desktop, laptop, Chromebook, or tablet) ratio (Webber, 2019). This one-to-one initiative has accelerated due to accessibility and lower costs of technology devices (Webber, 2019). A study conducted in 2018 showed that 58% of the students in U.S. schools bring their laptops to school, 32% use school laptops, 16% use school Chromebooks, and 14% use school

tablets (National Science Board, 2018). Further, Zimmerman (2018a) predicted that by 2026, digital learning will entirely replace traditional learning. Additionally, with the effects of COVID-19, education leadership better understand the need to invest in robust digital learning infrastructures for in-classroom, hybrid, and remote learning modalities; it is time to turn digital learning theory into practice (Mustapha et al., 2021). However, although there was a huge investment in technology during COVID-19, not all technologies or methods were effective and should not be carried forward (Zhao & Watterson, 2021). Learning systems that focus on being student-centered, personalized, and inquiry-based and allow for synchronous and asynchronous options should be considered (Zhao & Watterson, 2021).

Education Technology Models

With the continuous change and integration of technology within learning, various models have been developed to leverage technology to ensure the learning process's transformation effectively. The Substitution, Augmentation, Modification, and Redefinition (SAMR) model is a framework that categorizes the degrees to which technology is integrated into the classroom (Lacruz, 2018; Romrell et al., 2014). During the substitution phase, technology is leveraged similarly to its replaced traditional resources and methods. A simple PowerPoint with just text can be viewed as similar to a photocopied handout of a presentation. At the highest level of SAMR, technology delivers a transformational change (Lacruz, 2018). Here, the PowerPoint presentation may have visuals, videos, and interactive elements in this redefinition phase. Rather than merely viewing the presentation, students may be asked to add examples or responses right within the PowerPoint during the actual presentation for everyone to see.

The Technological, Pedagogical, and Content Knowledge (TPACK) model is designed to illustrate the knowledge domains a teacher needs to effectively integrate technology for learning: pedagogy, curricula, and technology (Yu & Franz, 2018). Ensuring continuity within all three domains strategically guarantees the right instructional strategies for the appropriate curricula and technology. When done effectively, a higher level of SAMR can also be achieved in addition to TPACK. For the construction of a presentation, curricula should cover the content necessary for the presentation, its creation, and the use of the related technology tool. From a pedagogical level, it is essential to ensure that students are comfortable delivering presentations, using related technologies, and have practiced engaging in these activities and tools when necessary. Regarding technology, if the presentation is supposed to be viewed asynchronously rather than in real-time, a VoiceThread with audio narration may be more appropriate. The TPACK model is a framework that does not provide specific instructions on how educators can enhance the individual components or integrate the three domains (Koehler & Mishra, 2017).

Bloom's Digital Taxonomy model, an update to Bloom's taxonomy for the digital environment, represents the three domains of learning: cognitive, affective, and psychomotor (Bloom, 1956). The domains work together to create different levels of engagement and understanding of learning. In a pyramid model, from bottom to top, the levels include remembering, understanding, applying, analyzing, evaluating, and creating. The higher the level, the greater the cognitive process and higher-order thinking (Bloom, 1956; Ursyn, 2018). Curricula and technology that employ design thinking, an approach and mindset to learning, problem-solving, and collaboration promote higher levels of Bloom's digital taxonomy (Ursyn, 2018). Rather than having students create and summarize their knowledge in a text-based

presentation, they could demonstrate their knowledge by constructing a collage, comic, or video, where they apply their knowledge in a more individualized manner (Purushothaman, 2017).

Benefits of Education Technology

Researchers have identified the power of education technology to complement the existing and emerging pedagogical approaches, like experiential, inquiry-based, project-based, and adaptive learning methods (World Economic Forum, 2015). Students can also interact with each other and with the digital content through Learning Management Systems (LMS), which helps them develop skills like collaboration and communication (World Economic Forum, 2015). Therefore, it is essential to align technologies with learning objectives and pedagogical strategies and to develop learning approaches that comprehensively and efficiently deploy technology throughout the stages of learning and instruction (World Economic Forum, 2015). Technology provides significant support within a school, from delivering instruction, supporting diverse learners, assessing learning progress, to engaging parents (Harris et al., 2016; Lazar, 2015). According to Kassymova et al. (2019), education technology interacts with learners' cognitive, interpersonal, and intrapersonal abilities. Together, these act as a robust set of complementary or substitution instruments and resources.

Further, if leveraged effectively, education technology can transform traditional learning systems and strategies (Dede, 2014). Traditional desktop computers can be replaced by more accessible and flexible devices such as laptops, Chromebooks, and tablets. This enables students to personally interact with the devices, maximizing their utility (Webber, 2019). Additionally, these devices are more cost-effective and often provide more straightforward designed learning applications that focus on academics and improving the student’s educational outcomes.

Education technology has achieved significant progress by increasing the interactivity of learners (Raja & Nagasubramani, 2018). Like visual images and multimedia designs, technology offers a greater appeal to students than any simple text (Raja & Nagasubramani, 2018). Mayer's (2011) cognitive theory of multimedia learning (CTML), published in 2003, suggests that pictures and words are processed along two non-conflicting channels; each channel can only process a limited amount of information in the working memory. By presenting information within two distinct channels, more information can be processed. However, this information needs to be complementary and reinforcing rather than distracting or conflicting (Mayer, 2011). Therefore, how information is designed and presented affects the learning process. As each person processes information differently, personalized designs can increase individual learning efficacy (Webber, 2019). Learning materials presented through multimedia offer a more interactive and robust exchange of ideas than traditional blackboards or textbooks (Bond et al., 2019). The Office of Educational Technology indicates that for students to be literate in the 21st-century, they need to learn about and be exposed to technology to engage in a global and digital workforce (King & South, 2016). Education technology makes teaching easier, economical, and accessible to anyone interested (Burbules, 2018). Through education portals, students can access education at any place using the internet (Hamidi & Chavoshi, 2018). Due to the economies of scale, the low cost of mobile devices such as smartphones, tablets, and Chromebooks makes learning through and with technology more accessible and cost-effective than traditional brick-and-mortar systems (Webber, 2019). Online platforms enable learners differentiated and personalized learning experiences while exposing them to environments not constrained by a brick-and-mortar classroom. In addition, social media tools are being used in classrooms to

enhance student's learning experiences related to communication, information discovery, and validation (Lim et al., 2014).

Digital technologies allow individuals greater abilities to express themselves through text, emojis, photos, and memes (Papanastasiou et al., 2019). Taken together, effective education technology has also enhanced learning experiences (Lazar, 2015). Through active engagement, technology increases the cognitive characteristics of learners, including information processing, critical thinking, and motivation (Stosic, 2015). According to Mayer (2011), people learn better from a combination of visuals and sound, leading to the increasing use of multimedia. Further, technology is cost-effective, efficient, and highlights the strengths and capabilities of different students in a general classroom setting (Dede, 2014).

Gamification within technologies promotes student engagement and motivation (Ghavifekr & Rosdy, 2015; Lee, 2019). With higher engagement, classroom behavior also improves for mainstream and specialized learners who may have fragile self-esteem due to learning challenges (Homer et al., 2018; Gooch et al., 2016). Gamification inspires competitive scenarios that lead to group participation, role-playing interactivity, or digital stories that increase collaborative engagement (Acquah & Katz, 2020; Elshiekh & Butgerit, 2017; Martin & Tyler, 2017). When immersed within a digital scenario, self-exploration builds a productive relationship between reality and fantasy (Martin & Tyler, 2017). Therefore, integrating education technology plays a vital role in preparing students for a 21st-century world (Hall, 2017).

Challenges of Education Technology

Rapid integration of technology within education came along with various negative impacts (Carter, 2017). These include a lack of social interaction and social development among peers as students engage more directly with technology, affecting relationships and

communication skills (Carter, 2017). Frequent use and dependence on technology reduce emotional intelligence skills and diminish empathy (Carter, 2017; Grover, 2017). While digital technologies offer more vibrant and broader experiences, they can divert attention away from reality, desensitize experiences, and increase anxiety (Ramasubbu, 2015). This disconnection with reality is heightened with gamification and virtual reality. At times, individuals confuse a virtual environment and reality and have difficulty transitioning back to reality (Penn & Hout, 2018). Grover (2017) stated that education technology could make learners less reflective and more reactive, minimizing their coping skills. For some users, technology enhances emotional immaturity, leading to angry outbursts and cyberbullying (Grover, 2017). Technology also increases isolation and reclusiveness and disables self-awareness and self-reflection, as students spend more time with their gadgets and less time managing and developing their feelings and thoughts (Grover, 2017; Muhammad et al., 2019).

Despite the positive effects of gamification in education technology, gamification has some adverse effects on education. For instance, when students lack interest in learning through traditional approaches, they focus on technological approaches (Lee, 2019). Lack of interest in learning causes learners to misunderstand the teacher, causing them to fail exams (Lee, 2019). Education technology, specifically gamification, requires substantial capital investments during incorporation; however, due to insufficient funds in most learning institutions, adoption of education technology becomes a challenge (King & South, 2016). Education technology has also increased concerns about protecting student privacy, as different educational applications, websites, and other online services create and gather student data (Peterson, 2016).

Ways to Improve Education Technology

It is often discussed that education technology has a positive impact on the cognitive development process of children (Lazar, 2015). Therefore, the earlier learners incorporate technology into their studies, the better for them and the schools. Educators should undergo regular training to sharpen their skills and foster a more meaningful class environment (Nochumson, 2018). Additionally, if educators are well-equipped with the latest technological advancement, they will pass that on to the learners. This will allow students to set their own learning goals and enhance their motivation (Nochumson, 2018). Furthermore, while integrating technology with education, a lack of institutional leadership creates a significant barrier. Hence, school districts need to step forward and become strategic in providing all the necessary training and support (Daigle, 2017).

Wilbur (2018) pointed out that a change in school culture and expectations is necessary to move toward more technology in schools. Teachers' perceptions about technology must be positive, and they need to use developmentally appropriate technology to ensure its effective use for the learners (Wilbur, 2018). At the same time, learners must learn the proper online etiquette and give their highest effort to use technology in safe, productive, respectful, and meaningful ways (King & South, 2016). Parents and teachers need to make sure that children only access age-appropriate content and do not become addicted to technology products (Pinola, 2019). The American Academy of Pediatrics (2016) recommends limits on screen time based on age. For children under the age of 18 months, limited co-watching time is recommended, while for ages 18 to 24 months, screen time should be no more than one hour a day. For children aged two to five years, screen time can be increased to three hours and incrementally increased for older

children, but with the understanding that screen time should be monitored and limited in duration (American Academy of Pediatrics, 2016).

Boyle (2016) stated that technology should help learners promote higher cognitive flexibility, allow them to discover new ideas and possibilities, and make them feel engaged or delighted. Therefore, strategic planning should occur before incorporating technology into the learning process, ensuring that both academic and non-academic skills, such as social-emotional competence, are equally developed (Boyle, 2016). Further, based on Technological Pedagogical and Content Knowledge, it is necessary to effectively integrate pedagogy, curricula, and technology for effective learning (Yu & Franz, 2018). This includes incorporating technologies that are developmentally appropriate and do not affect SEC development (Peterson, 2016). Educators need to create healthy and appropriate environments for using technology so that learners can understand how to manage effectively the use of technology (Muhammad et al., 2019). Educators also need to help students develop the appropriate social-emotional competency and digital citizen-related skills even when engaging with technology (Muhammad et al., 2019).

Social-Emotional Learning Technology

Technology has the potential to play a crucial role in fostering SEL efficiently and cost-effectively by integrating virtual and physical worlds and facilitating forms of human interaction, which was unimaginable a few years ago (World Economic Forum, 2016). Technologies like personalized learning, learning management systems (LMS), remote tutors, 3D printers, robots, and virtual, mixed, and augmented reality (AR) allow more interactive and more vibrant experiences that can assist SEL development (World Economic Forum, 2016). Technology facilitates 21st-century skills, like collaboration, persistence, and communication, which are the

core of SEL (World Economic Forum, 2016). Hence, as espoused by Williamson (2019), SEL interventions, policies, and practices are the products of the combination of technologies, procedures, and measures developed by behavioral, psychological, and economic experts.

SEL can be extended by embedding its features and frameworks into digital technologies supporting core and necessary academic skills like literacy and mathematics (World Economic Forum, 2016). These innovative new technologies, such as mobile apps and wearable assistive devices, help students become proficient in social and emotional skills by allowing them to monitor their own emotions or assist in recognizing and understanding other people's emotions (World Economic Forum, 2016). In a technology-rich, rapidly evolving world and with implementing adaptive and personalized learning frameworks, SEL-integrated technology will become both crucial and indispensable (World Economic Forum, 2015). As opined by Williamson (2019), educational technology providers are "currently positioning themselves as best practice exemplars of what works in SEL practice and measurement, supported discursively by large campaigning bodies and financially through venture capitalists and philanthropists seeking a substantial return-in-investment via impact-investing schemes" (p. 152).

Current State of Social-Emotional Learning Technology

At present, digital technologies are being used to promote aspects of SEL. As revealed in various studies, using video modeling enhances the frequency of social interaction for both children with social and emotional problems and mainstream children (Smart et al., 2016). A computer-delivered, internet-based, parent-training intervention called Infant Net, has proven useful for enhancing an infant's social engagement (Hall & Bierman, 2015). Further, several tools, like OneNote, social networking tools like Facebook, Google Apps for Education, and sites like Ponder, are helping students develop competencies like collaboration and

communication by facilitating peer-to-peer learning, group work, and peer feedback (World Economic Forum, 2015).

Innovative tools and technologies used for entertainment and learning are also being employed to help students build collaboration skills, manage their emotions, and gain greater empathy for others (World Economic Forum, 2016). These tools and technologies include virtual, augmented, and mixed reality, assistive or wearable devices, and mobile applications. For example, an app like Kidaptive's Learner Mosaic can help parents gain personalized insights into their children's progress regarding behavior and activity goals (World Economic Forum, 2016). A small wearable device like Starling can improve communication in early childhood (World Economic Forum, 2016).

Brackett et al. (2019) pointed out that technology is being integrated into SEL in different ways, such as incorporating multimedia, simulations, and games, use of blended learning, and exposing students to SEL-related, assistive technologies. Chen (2019) also identified that social networking platform called Google Jamboard enhances learner's SEL through online collaboration with the ultimate objective of improving their academic performance. Using virtual and simulated play, children also develop empathy, a vital social-emotional skill (Walker & Weidenbenner, 2019). Again, different games, like The Social Express and Ripple Effects, reduce the number of disciplinary referrals and in-school suspensions as well as enhance the children's empathy, self-awareness, social awareness, cooperation, and problem-solving abilities (King & South, 2016; Muhammad et al., 2019). Games like Minecraft and Classcraft are used in classrooms for supporting collaborative learning (Ackerman, 2017). More than 10,000 primary and secondary schools use interactive online learning games available on the site Tynker, which

can foster competencies like problem-solving, collaboration, creativity, and persistence (World Economic Forum, 2015).

At present, students can interact with each other and with the digital content through LMS, which helps them develop skills like collaboration and communication (World Economic Forum, 2015). Some digital SEL assessment tools, like SELweb (McKown et al., 2016) and Panorama Education's Social-Emotional Learning Measurement tool (Panorama Education, 2020), also use technology to measure the SEL competency of students. Therefore, it is essential to align technologies with learning objectives, pedagogical strategies, and to develop learning approaches that comprehensively and efficiently deploy SEL technology throughout the stages of learning and instruction (World Economic Forum, 2015; Ervin-Kassab, 2021).

However, many SEC-related products are not developed for schools or classrooms and do not offer learning management features (e.g., teacher dashboards, the ability to change curricula, or assessments). While the development of any social-emotional competency furthers SEL development, it is the process of all five SEL competencies working together developmentally, and pedagogically that makes SEL effective (McKown, 2019c). Additionally, despite adaptive learning systems, no current SEC or SEL products offer adaption to an individual learner's emotional competency level. This confirms the shortage of technologies that can assist students in being competent in social-emotional skills through knowledge acquisition, practice, and design (McKown, 2019c).

Challenges for Integrating SEL and Technology

World Economic Forum (2016) identified five barriers to adopting SEL technologies. These barriers are: "1. limited awareness of SEL and its benefits, 2. insufficient prioritization of social and emotional skills, 3. a lack of consensus about valid and reliable SEL measurements, 4.

low levels of funding and resources for SEL, and 5. an inadequate supply of SEL programs and products" (p. 18). Through empirical study, World Economic Forum (2016) realized that both parents and teachers are not fully aware of the newest form of technology, like the educational versions of commercial games and augmented reality that foster SEL. Lack of enthusiasm for SEL technology is another barrier, as many are concerned that more screen time can replace human interaction, particularly among younger learners. The lack of widely accepted and scalable SEL measurements impedes promoting SEL to teachers and parents. Current low levels of funding and resources and lack of SEL-related training hinder the adoption of SEL technology. World Economic Forum (2016) also found that most companies (92%) developing educational technology products do not support SEL directly or indirectly. By having technologies that focus on only a limited part of SEL, they are not holistically developing SEL products. At the same time, the cost and complexities of having several technology applications are challenging for K-12 schools, which need comprehensive yet simple systems (Nadeem et al., 2018).

Miller (2017) opined that some teachers consider technology in the classroom to be problematic. They also believe that technology leads to lesser interactions among students (Quesenberry et al., 2016). In some cases, teachers do not feel comfortable using technology, which limits its use for fostering SEL (Miller, 2017). If they do not understand how technology can be effectively used for enhancing students' engagement, it may not benefit the students as expected (Hall, 2017). A study by the Boston Consulting Group and the World Economic Forum involving 2,000 educators and parents in five countries revealed that the lack of understanding and confidence about the long-term benefits of SEL in terms of academic and economic outcomes is one of the essential reasons why technology products related to SEL have been slow

to take off (Benjamin, 2016). Another chicken-egg problem exists: tech companies often show reluctance to develop SEL tech products due to the lack of demand, and at the same time, they do not visit schools to hear about the need for these products (Benjamin, 2016).

The growth of SEL technologies is also hindered by the perception that the high use of technology increases social anxiety among those students who are unable to interact effectively with someone in a face-to-face social setting. Instead, they choose online social media platforms for interacting with others (Wallace & Robichaux, 2018). Moreover, some early childhood educators are skeptical about the developmental appropriateness of technology for young children (Quesenberry et al., 2016). Higher levels of screen time also lead to different health harms for children and adolescents, like adiposity, higher depressive symptoms, unhealthy diet, and reduced quality of life (Stiglic & Viner, 2019). Besides, considering the ubiquity of handheld digital devices in recent periods, Tandon et al. (2019) opined that screen time could displace physical activity, participation in sports, and other healthy behaviors that are beneficial for children's self-esteem and social skills development. In another study, Nguyen and Landau (2019) found that children gamers become socially isolated in the long run, which paves the way for depression and other self-harming habits. Hanus and Fox (2015) also revealed that gamification or gamified courses decrease motivation, empowerment, and satisfaction over time. These research outcomes may lead to a negative perspective on SEL technology and hinder its growth unless these technologies' design aspect (e.g., gamification, leaderboard, point systems) is directly addressed.

Benjamin (2016) also identified that most of the K-12 school systems do not generally possess budgets for purchasing SEL products. This poses another big challenge for making these products popular with learners of different ages, like software or applications. Besides, as

highlighted by the Office of Educational Technology, assessment approaches have evolved but still do not utilize technology to its full potential for measuring SEL competencies (King & South, 2016). Ensuring strong computer networks poses another significant challenge (King & South, 2016). However, some positive changes are becoming evident recently, as "U.S. K-12 public schools devote a total of approximately $21–47 billion per year to SEL in terms of (1) expenditure on SEL-related products and programs and (2) teacher time focused on SEL" (Krachman & LaRocca, 2017, p. 4). The use of digital technology in SEL assessments is also growing (McKown, 2019c).

Other Considerations while Integrating SEL and Technology

Different tools and technology can be used for implementing SEL effectively. During classroom activities, teachers can use interactive whiteboards, computers, tablets, alternative and augmentative communication devices, and specialized assistive technology for developing and enhancing social-emotional skills instruction (Quesenberry et al., 2016). According to the World Economic Forum (2015), the tools used to implement SEL may include personalized and adaptive content and curricula, open educational resources, communication and collaboration tools, interactive simulations and games, digital professional development resources for teachers, and student information learning management systems.

Holloway and Escueta (2019) mentioned that technology like artificial intelligence (AI) and machine learning enables personalized learning. This "leverages technology to overcome learning constraints; gives the ability to customize learning; facilitates user-generated content and social and emotional learning; strengthens communication between student and teacher, etc." (Holloway and Escueta, 2019, p. 19). Online teaching and learning (e-learning) arrangements and social media networks are also making distance learning more accessible, providing

opportunities for personalized learning, and enhancing SEL competencies of the students through collaboration and mentoring (Chai et al., 2019).

Schools have introduced another new dimension through 1:1 technology, which refers to the “practice, in which every student has 24/7 access to a technological device over the duration of a school year” (Salwei, 2017, p. 1). According to Salwei (2017), an effective 1:1 technology program prepares students for the future with the skills they need to adapt to an ever-evolving society. For instance, 1:1 technology makes them proficient communicators, critical thinkers, creators, and collaborators so that they can compete in this global society (Salwei, 2017). Furthermore, when technology is readily available to the students, it can help them in decision-making processes and can also enhance their social well-being (Haselhorst, 2017).

As researchers and educators are paying closer attention to students' non-cognitive, social-emotional developments, it is expected that these students engage in some self-reflection of their character (Henry, 2016). For this purpose, different schools in the U.S. are currently using the online gaming platform Happify which supports SEL concepts (Henry, 2016). In another study, Özhan and Kocadere (2020) examined the factors explaining students' emotional engagement and motivation in a gamified online learning environment. They found that a gamified learning setting can have a highly significant influence on learners' motivation and, at the same time, help them achieve academic success (Özhan and Kocadere, 2020). Additionally, across ages and academic levels, game-based learning nurtures problem-solving development (Kailani et al., 2019). The results of these studies imply that gamification can positively impact the social-emotional skills of learners. At the same time, gamification can also act as a source of pressure and tension, affecting their social and emotional well-being (Cheng et al., 2019; Shahri et al.,

2014). Another study showed that gamification could result in less motivation, empowerment, and satisfaction over time (Hanus & Fox, 2015).

Human-Computer Interaction

The concept of Human-Computer Interaction (HCI) was introduced in the 1970s to understand the interaction between human beings and computers (Park & McKilligan, 2018). HCI is a scientific field that focuses on the interaction between people and computing technology and evaluates the ways humans use to interact with technology and other digital devices (Neilsen & Wilson, 2019; Park & McKilligan, 2018). HCI focuses on user's needs, and designers create products that meet these needs (Neilsen & Wilson, 2019). In software engineering, HCI assists software engineers and digital technology experts develop efficient and user-friendly interactions (Hinton, 2017). The more user-friendly the design flow and graphic user interface (GUI) of a product, the more productive and satisfied the user often feels (Hinton, 2017).

Within HCI, the user experience (UX) refers to the "overall experience related to the perception (emotion and thought), reaction, and behavior that a user feels and thinks through his or her direct or indirect use of a system, product, content, or service" (Joo, 2017, p. 9931). UX is a user's subjective experience interacting with computers or digital technology. UX aids in developing and designing user-centric technologies, which increase the value, aesthetics, and experience of a product (Djamasbi et al., 2016; Hashim & Adamu, 2017). In the design phase, developers measure usability and all aspects of an end user's interaction with a product (Hashim & Adamu, 2017).

The user interface (UI) is equally integral in the human-computer interaction process (Joo, 2017). UI displays indicate how users should interact with computer systems or digital technologies. Joo (2017) states that "a user interface (UI) refers to a system and a user interacting

with each other through commands or techniques to operate the system, input data, and use the contents" (p. 9931). A computer or mobile device display screen is an example of a user interface because it is the physical surface on which visual information is presented (Joo, 2017). Without a visual front-end UI, it would be difficult to interact with technology. UX and UI work together to provide users with the design, interface, and experience to effectively leverage and enjoy interacting with technologies (Joo, 2017).

Value of HCI and UX/UI

HCI has gained ascendancy within education technology since it helps students have faster and more meaningful access to and interaction with information (Ghavifekr & Rosdy, 2015). This improves students' engagement and retention using effective technology designs (Dobbins & Denton, 2017) and eventually enhances their social-emotional competencies. This improvement contributes positively to the attitude of teachers in schools (Nyabuga & Nyasani, 2018). A well-designed UI motivates teachers to adopt information systems in teaching rather than experience frustration, using a non-intuitive design (Nyabuga & Nyasani, 2018). Again, if developed correctly, technologies identify a user's emotions and adjust to improve their user experience (Balters & Steinert, 2017). Different user groups related to age, gender, and culture may have different user experience expectations (Fitton & Bell, 2014). Therefore, it is always necessary to collect user experience information and test user design to ensure they meet the user's needs (Fitton & Bell, 2014).

Student-centric technology design is different from technology designed for gaming or entertainment. Student-focused designs ensure engagement, learning, and reinforcement rather than just engagement and interaction (Santana-Mancilla et al., 2019). Therefore, HCI and UX/UI designs are developed to ensure that information can be processed in pedagogical, scaffolded,

and multiple information streams to meet the needs of learners (Santana-Mancilla et al., 2019). Based on the cognitive theory of multimedia learning (CTML), the pairing of words with pictures leads to faster, better, and deeper learning (Greear, 2018). The advantage of using technology in education is that it incorporates multiple streams of reinforcing information (pictures, words, and sound) through this dual cognitive processing: what is learned from one channel is supported by what is learned from the second channel. UX/UI impacts education by improving the productivity of students and enhancing their learning experience (Santana-Mancilla et al., 2019). Effective designs also maximize their value for students by reducing distractions, reinforcing learning concepts, and adapting to their academic and developmental activities (Crearie, 2018; Dumrique & Castillo, 2018).

Importance of HCI and UX/UI in Education Assessments

Computer systems influence users' human behavior and emotional states (Gonçalves et al., 2016). For that reason, design frameworks and assessments are needed to develop intuitive user interfaces, which make interaction simple, smooth, and frustration-free. During testing, psychometric sensors and triggers are analyzed to understand the user's experience and aid in the development of effective designs (Balters & Steinert, 2017).

While HCI and UX/UI enhance any technology interaction, another area of design importance is online assessments (Kapros & Koutsombogera, 2018). Digital assessments meet the criteria for academic significance and allow positive and meaningful user interaction. This ensures higher reliability, validity, and user satisfaction (Dembitzer et al., 2018; Fails et al., 2013). Everything from diagnostic, summative, and standardized assessments can be developed with a learner-centric design to improve interaction. Effective designs reduce errors, omissions, false responses, and the time necessary to complete assessments while increasing engagement

and usability. Furthermore, effective designs reduce assessment errors by displaying only one question per screen to reduce cognitive overload and emotional transference from previous questions. Together, this design increase attention to the viewable question (Mosher, 2018). HCI researchers have also indicated that it is essential to ensure that students feel comfortable with natural assessment designs to reduce text and technology anxiety. Otherwise, it may lead to frustration and affect assessment results (Dembitzer et al., 2018). The use of clean designs, universal icons, and intuitive layouts simplifies the learning process and helps reduce errors in using the application and on the assessment (Duss, 2020). Further, HCI research states that effective assessment designs reduce frustration and anxiety (text and technology) and produce more accurate results. (Dembitzer et al., 2018). Effective designs also increase access to a broader and more diverse set of learners with practical, supportive tools and designs such as text-to-speech, multiple languages, and adjustment for color-blindness (Kandler, 2018).

Summary

Results of several studies have revealed that SEL plays a vital role in decreasing the behavior problems of students, enhancing their social-emotional competencies, positive attitudes about school, and helping them achieve academic success and make responsible decisions (Brackett & Rivers, 2014; Durlak et al., 2011; McKown, 2017b; Payton et al., 2000). At the same time, SEL competence is also vital for the educators to create a congenial atmosphere inside the classrooms and manage the emotions and behaviors of the students (Zins et al., 2007). For this reason, assessing the SEL competency of the students and the educators are equally important.

Considering the immense importance of SEL in developing a child, who can achieve success in the 21st century, educators, policymakers, and school administrators are putting

significant emphasis on SEL. The purpose of this research study was to assess the impact of an enhanced digital diagnostic SEL assessment tool and evaluate its reliability, validity, and usability. This literature review has highlighted the issues relevant to emotional intelligence, social-emotional learning, assessments, SEL assessments, SEL technology, education technology, and user experience. The CASEL's five-competency model and its role in systematic SEL have also been explained. Additionally, the benefits and limitations of leading SEL assessment tools, including DESSA, SSIS, DSECS-S, SELweb, and Panorama Education SEL measurement, have been discussed in detail. As the literature has indicated, no SEL assessment instrument has proven reliable, valid, efficient, and universally accepted for elementary schools in the U.S. Considering this gap, this study will be valuable in presenting a digital diagnostic SEL assessment framework that will solve the inherent problems of the current assessments and will be acceptable to teachers and school administrators.

The next chapter focuses on the methodology used to accomplish the research goals. Quantitative quasi-experimental research will be used to answer the research questions that will also show the reliability, efficacy, usability, and validity of the SEL digital diagnostic assessment (SELDDA) tool.

Chapter 3: Research Design and Method

This study focused on assessing the reliability, validity, and usability of a SEL assessment tool, the Social-Emotional Learning Digital Diagnostic Assessment (SELDDA). Another goal of this study was to determine the impact of SELDDA on the SEL development of K-12 educators. The current chapter describes the rationale behind choosing the quantitative design, specific participants for this study, and the sampling procedure. The data collection and analysis procedures and the research instruments are also explained in detail. Further, study limitations and ethical considerations are discussed in this chapter.

Research Design

The primary goal of this study was to evaluate the reliability, validity, and usability of a universal SEC assessment tool. The Social-Emotional Learning Digital Diagnostic Assessment (SELDDA) is a digitally accessible, academic, and standards-aligned universal diagnostic assessment (Strut Learning, n.d.). In 2021, it was one of the most recently published digital SEL assessment tools. Another goal of this study was to analyze the impact of SELDDA as a diagnostic pre-assessment instrument on the SEC development of K-12 educators in the U.S. The study employed a quantitative approach for data collection (Neth et al., 2020). According to Mohajan (2020), quantitative research is a framework and strategy that generates and collects numerical data for analysis from a stated population. The primary reason for selecting a quantitative approach was to assess SELDDA's reliability, validity, and usability from a statistical perspective. A quantitative methodology is powerful because it includes both survey data and statistical analysis (Rahman, 2017). With this methodology, the hypothesis and dependent variables can be statistically analyzed for impact and significance. This includes measuring the impact of using SELDDA to develop educator's SEC and also allows for

correlational analysis to help uncover which demographic factors have the strongest relationships to SEC development. Taking a quantitative approach allows replication of the study with different populations and sample sizes, allowing for greater generalizability. The quantitative method is rather quick for collecting data (Rahman, 2017).

For this study, the quantitative questions are listed below:

1. Does the use of SELDDA improve the development of educator's social-emotional learning within four weeks?
2. Does the use of the SELDDA instrument find significant levels of reliability?
3. Does the use of the SELDDA instrument find significant levels of validity?
4. Does the use of the SELDDA instrument find significant levels of internal consistency?
5. How user-friendly is the SELDDA instrument?

Quasi-Experimental Design of this Study

For this study, a quasi-experimental design was employed. This design is similar to experimental research and leverages a quantitative approach, though without the randomization of subjects (Maciejewski, 2020). This method is used when there are ethical or logistical challenges in conducting a randomized control trial (Gopalan et al., 2020). The independent variable was SELDDA for formative instruction. The educator's SEL competency was the dependent variable in this study. In addition, other measurements, such as the reliability, validity, and usability of SELDDA, were assessed. A comparative analysis of other marketplace SEL assessment tools was not conducted, only a review of the SELDDA instrument.

For this study, the quantitative method was adopted for measuring the impact of SELDDA on the development of social-emotional skills among educators. Further, SELDDA's reliability, validity, and usability were assessed through this quantitative method. As Elman et al.

(2020) mentioned, the quantitative approach is helpful because it saves time and resources due to statistical data as a tool. As a researcher follows clear guidelines and objectives, the quantitative research approach becomes replicable and can be applied at any other time or place with the desire for similar results (Elman et al., 2020). In addition, a quantitative study helps mitigate personal bias (Savela, 2018).

Population and Sample

As defined by Banerjee and Chaudhury (2010), "A population is a complete set of people with a specialized set of characteristics, and a sample is a subset of the population" (p. 63). Different research studies are generally carried out on a sample of subjects instead of the entire population. The challenge for the researcher is to draw a suitable sample from the target population to generalize the study results (Banerjee & Chaudhury, 2010). This section describes the population and sample used for this study.

Population

The study was conducted online with K-12 educators serving in various schools in the U.S. Social media direct messages were used via Facebook and LinkedIn (Premium) to recruit K-12 educators, as well as posts to public Facebook groups. As LinkedIn Groups are private, no LinkedIn Groups were used. The public Facebook groups that were used for recruitment were focused on K-12 educators and social-emotional learning: Social Emotional Learning, Emotional Intelligence, AERA Social-Emotional, Learning Special Interest Group, The Emotional Intelligence Network, Social-Emotional Learning in Education, Social-Emotional Learning, School Social Work Resources for Social-Emotional Learning and Mindfulness, Social-Emotional Learning - Helping Our Littles, Empowering Kids with Social-Emotional Learning, Social-Emotional Learning Foundation (SELF), # MrsDonna's Full Figured Multicultural Social

Learning Group, Social and Emotional Learning (SEL) Advocates, Creating the Calm-Social Emotional Parenting and Teaching, Connect 4 SEL (Social Emotional Learning), Mrs. Knapp's Social-Emotional Learning Activities Group, Social-Emotional Learning with Ms. Cram, Lakes Elementary Social-Emotional Learning, SEL (Social-Emotional Learning) Subscription Box For Families, Social-Emotional Learning with Mrs. Hibbler, Emotional Intelligence Forum, Emotional Intelligence Practitioners, K-12worksheet.com, K-12 Resources for Teaching Online, Discovery K-12 Online Homeschool, K-12 Learning Possibilities in Pandemic Times, and K-12 Online Learning Collective.

For direct messages via Facebook and LinkedIn and public Facebook group posts, a message was sent or posted with a hyperlink to the study recruitment document. Within the recruitment document were the general details of the study and recruitment inclusion requirements, as well as a hyperlink to the online recruitment/ screening form. Anyone with access to the message or post had access to the recruitment document and the recruitment/ screening form to offer participation or inquire about additional details through email to the researcher. Participants filled out the online consent form and received study participation instructions via email if they qualified. To qualify, participants met the inclusion criteria of being an active U.S. K-12 educator with SEL familiarity. If participants did not qualify, they received a brief ‘Thank you, but you do not qualify.’ email response. Participants watched on-demand SEL video workshops during the study, approved for Illinois State Board of Education (ISBE) teacher professional learning credits, and engaged in the SELDDA assessment and post-assessment survey.

Sample

Convenience sampling, also called the availability sample based on non-probability sampling (Stratton, 2019), was used for this study. This sampling technique enabled data collection from a sample that was already available for the study and set to meet its objectives (Stratton, 2019). This process reduced any interruptions and captured the effects of SELDDA in an online, non-experimental setting. Testing SELDDA in an online learning environment, with which the participants are familiar, further facilitated the research. Another method used for this study was snowball sampling based on networking and referrals (Parker et al., 2019). Initially, a small number of participants were targeted on Facebook and LinkedIn social media platforms for recruitment who fit the aforementioned research criteria. Facebook was selected due to the higher number of educator and SEL public groups. Additionally, LinkedIn was selected because of the platform's professional rather than social nature for direct communication with SEL education professionals.

This study collected primary data from 60 English-speaking educators in the U.S. The age range of the participants was between 21 and 66 years, the primary age range for current educators within the U.S. The inclusion criteria also required participants to be familiar with and deliver SEL. In addition to convenience sampling, another reason for selecting this sample size was feasibility. Through extensive online user experience, it was determined that it would be challenging to gather survey data from a large number of educators due to lower engagement levels resulting from the COVID-19 pandemic (Goldberg, 2021). The pandemic has increased anxiety and compassion fatigue, making the education sector more complex and challenging. As a result, recruitment for online studies has become increasingly challenging (Yang, 2021). However, the sample size was sufficient for the quantitative quasi-experimental design of this

study, as all participants are educators, within the K-12 range, within the U.S., and have a similar understanding of SEL. For these reasons, it was considered that 60 participants would be sufficient to identify persistent patterns from the study results for this study. According to Patton (2001), a small sample size allows the researcher to gain an in-depth look at the area of inquiry for making the case reasonable in scope. Again, as Faber and Fonseca (2014) and Noi and Kappas (2018) argued, if the sample size is too large, it may amplify the detection of differences, resulting in statistical differences that may be irrelevant. Another obstacle was that using a larger number of cases could also involve more financial and human resources than necessary for getting the expected response (Faber & Fonseca, 2014).

Furthermore, all of these educators were licensed, serving in various schools, including public, charter, and private schools located in different parts of the U.S. The recruitment and screening form also confirmed that these educators were familiar with and regularly implemented a standards-based SEL curriculum. Nevertheless, using convenience sampling involved some selection biases, as some of the participants of this study were easier to select than others for being somehow familiar with the researcher (Parket et al., 2019). Before involving the educators in this study, they were provided with necessary information about the study during the recruitment and consent phases. Participation in this study was voluntary, and educators had the option to opt-out of the study at any time.

Procedures

The researcher took the necessary steps to familiarize the participants with SELDDA and its alignment with the current SEL curriculum. Participants were informed about the study's goals and provided detailed instructions on all aspects of the study, in which they engaged: SEL Videos, SELDDA, and post-assessment survey. This included a step-by-step guide with

screenshots. At each stage of the process: recruitment, consent, videos, and assessment, there were optional opportunities through email check-ins for the participant to ask questions, discuss the process, or voluntarily withdraw. Before collecting data, the study was fully approved by The Chicago School of Professional Psychology internal review board (IRB). Additionally, informed consent was collected from all participants (Appendix 1).

The data was collected online, as many schools were closed or allowed only limited outside access for researchers due to the COVID-19 pandemic. The on-demand videos and SEL questionnaire were used to gather the necessary data. On-demand, teacher professional development certified workshops on emotional intelligence/SEL were conducted for free through the EQuip to Achieve learning platform, which belongs to Strut Learning. Educators were provided instructions and hyperlink access to SELDDA for self-registration, SEL videos, and the Google Form survey.

During the recruitment and screening process, it was also ensured that all the educators were familiar with and regularly implemented a standards-based SEL curriculum in their instruction. This selection was accomplished by only recruiting within groups related to K-12 educators and SEL, ensuring that only individuals who met all inclusion criteria were invited to participate in the study. After the initial pre-test assessments were given to the intervention groups, a follow-up post-test assessment was administered to the control and intervention groups within four weeks. In a longer research time window, too many external factors could affect the reliability of the collected data. If too short, not enough change would exist between the control and intervention groups' impact, nor would it give individuals the time to complete all aspects of the study. The benefit of the test-retest process with the intervention group was that it provided room for comparing the results from different periods. As noted by Aldridge et al. (2017), the

test-retest reliability assessment is vital in developing a psychometric tool, in this study, measuring the SELDDA assessment tool.

The 60 educators were divided into a control group and an intervention group, as shown in Table 2. Thirty educators were included in the control group (C.G.). This control group provided a way to assess the efficacy of the SELDDA assessment framework in enhancing the educators' social-emotional competencies (SECs). The control group did not participate in any pre-test assessments/interventions and only took the post-test assessments. To the other 30 educators, the intervention group, SELDDA was provided for both pre-and post-test assessments. SELDDA is an enhanced academic research assessment framework whereby 72 questions are listed as six questions per page. Here, the visual display, layout, and format facilitate user interaction. SELDDA employs user experience and user interaction design and is auto-advanced after making selections. Furthermore, it offers additional features such as text-to-speech and extended user feedback, such as notifications about their pace.

Table 2

Control and Intervention Group Details

Groups	Pre-Test Assessment	SEL Videos	Post-Test Assessment	Post-Test Survey
Control Group	No	Yes	SELDDA	Yes
Intervention Group	SELDDA	Yes	SELDDA	Yes

The control group compared the natural SEC development within four weeks with on-demand SEL programming compared to the intervention groups, which further employed SELDDA as a universal SEC instrument/ pre-test. This allowed for comparing the effects of

having and not having a universal SEL screen assessment, namely SELDDA, as part of the SEL curriculum. If the intervention groups that employed SELDDA had a significant difference compared to the control group, then the use of SELDDA would possibly influence the SEC development.

As most schools and educators do not assess their SEC (Atwell & Bridgeland, 2019), an SEL assessment tool can explain an individual's strengths and growth areas within SEL. With this information, an individual or school can better target professional development towards developing growth areas or further strengthening strong areas. The assessment may allow for a more targeted intervention as it provides recommendations and optional activities for SEC growth. A second assessment can help measure the impact of the professional development activities on the individual's SEC development. However, it is possible by initially engaging in an SEL assessment even before a formal intervention that the individual may develop greater awareness of SEL, their own SEC, and engage in greater awareness and informal interventions. Some possible examples are that the individual better understands SEL competencies and sub-competencies, is more intentionally self-reflective, or self-selects to engage in informal related interventions (read an SEL book, etc.). This may lead to a greater self-awareness or social awareness and may result in related activities, including meditation, journaling, or deep breathing.

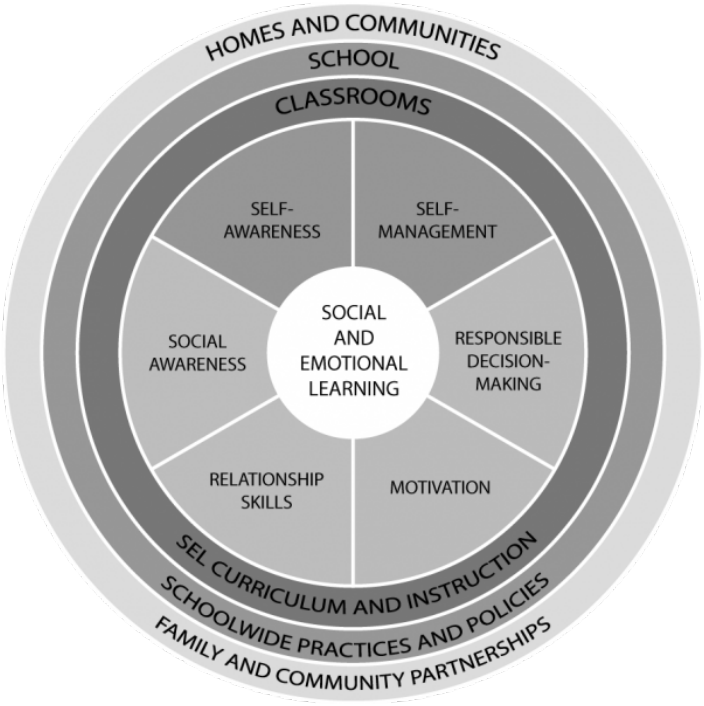
Therefore, this study aims to evaluate the SELDDA instrument and its impact on 60 U.S. K-12 educators' SEL development when used as a diagnostic assessment tool providing formative information with recommended skills development. The study was conducted online and individually coordinated with participants and was not affiliated or partnered with a physical site or school. Through the assessment tool, it is possible for educators to self-assess their SEL

skills. Further, repeatedly using this tool (pre-and post-tests) may also impact educators' SEL development and possibly with SEL professional development workshops. The comparison between the control and intervention groups can highlight this possible significance.

In addition to measuring the impact of SELDDA on educators' SEC development, this study also sought to understand the reliability, validity, and usability of SELDDA as a universal SEC instrument. SELDDA follows the concepts related to emotional intelligence, SEL, and the CASEL-5 competency model (Strut Learning, n.d.). It was further adapted by Strut Learning for a six-competency model, expanding upon the CASEL-5 competency model with the addition of motivation as the sixth competency (Strut Learning, n.d.). As shown in Figure 2 and Figure 3, the six competencies, namely Self-Awareness, Self-Management, Responsible Decision-making, Social Awareness, Relationship Development, and Motivation, were then subdivided equally into 18 sub-competencies: Emotional Awareness, Self-Perception, Optimistic Outlook, Internal Regulation, Behavior Control, Goal Pursuance, Appreciating Social & Environmental Diversity, Adaptive Behavior, Resource & Support Recognition, Communication, Social Engagement, Interdependence, Constructive Thinking, Consequence Evaluation, Respect for Self & Others, Enthusiasm, Initiative, and Resilience (Strut Learning, n.d.).

Figure 2

SELDDA SEL Competencies (Strut Learning, n.d.)



Note: By STRUT Learning, an SEL Competency Model adapted from CASEL, located on the STRUT Learning website.

Figure 3

SELDDA SEL Sub-Competencies (Strut Learning, n.d.

Note: By STRUT Learning, SEL sub-competencies, located on their website.

Four questions were developed for each of the 18 sub-competencies, for a total of 72 assessment questions. For these assessments, the randomization of the questions was turned off to limit external influencing factors. To test for reliability and validity, a statistical evaluation analyzed how similar the responses would be for each of the four questions per sub-competency and how similar the sub-competencies were to the primary competency. The digital design of SELDDA was evaluated by assessing its user experience (UX) and user interface (UI). Again, through a Google Form survey, the participants were asked these questions:

1. In general, did you think the design (layout, colors, and look) of the SEL Quiz was easy to use?
2. Did you think the design (layout, colors, and look) of the SEL Quiz made it easy to navigate (go) from one question to the next?

Through these questions, the instrument's usability and digital design were briefly evaluated.

Instrumentation

As Sileyew (2019) mentioned, instrumentation refers to the tools or means used by the researchers to analyze or measure the items of interest in data collection. In a quantitative research study, the instruments for collecting quantitative data need to be psychometrically sound so that the researcher can better interpret the collected data (Frels & Onwuegbuzie, 2013). Consequently, the researcher must be careful while designing and administering the research instrument to a population sample (Rashid et al., 2021). In this section, the instruments used for this study, SELDDA and the Google Form, are described in detail.

The data collection was done through the SELDDA questionnaire that was based on a 5-point Likert scale, as shown in Appendix II. SELDDA displays six questions per screen to make it more user-friendly and less distracting and automatically advances to the next question when all answers are provided. SELDDA also allows access to the previous question page but limits this option to only one previous page, though they may employ the previous button at any time. Within SELDDA, key demographic questions were placed after the SEC questions to reduce initial bias or trauma effects. With SELDDA, educators can receive text-to-speech/ audio support (Van et al., 2017) if they want questions to be read aloud. Informational help and instruction videos are also provided. Further, user messages provide information, such as if the response rate is slow or fast, or they can indicate a similarity of responses if too many similar answers are provided.

SELDDA is a 72-item questionnaire used to assess students or educators on their composite emotional intelligence (E.Q.) level (Strut Learning, n.d.; Wheeler, 2018) while highlighting their areas of strength and areas for improvement. In addition, evaluating E.Q. can lead to self-improvement and personal growth and enhance the ability to relate to others, empathize with them, and handle conflicts. The SELDDA scale has items like "I control my feelings and don't let them run out of control," "I ask for more instruction when I don't understand a task," or "I know what good behavior is expected of me at work." All of these are related to the 18 SEL sub-competencies. Students or educators must respond to one of the five choices on a 5-point Likert scale: "Almost Never," "Rarely," "Sometimes," "Often," and "Almost Always." The participants will be required to answer all the questions.

Through this SELDDA assessment, educators are asked about how well they

- set and achieve positive goals for themselves,

- understand and manage their emotions,
- establish and maintain positive relationships with others,
- feel and show empathy for others,
- are motivated and stay motivated, and
- make responsible decisions (Strut Learning, n.d).

The primary data collection for this study was done in two phases (pre- and post-tests) within four weeks, with video intervention between the two phases. Everyone was required to watch three (one-hour) on-demand SEL videos online as part of their SEL development workshops. The participants accessed the SEL professional development videos through the shared Google Drive folder for viewing. Additionally, they were asked if they watched the videos in the post-SELDDA Google Form survey. These self-reports ensured the integrity of the intervention.

The first data was collected from the educators belonging to the intervention groups. Their SEL competencies were assessed through the SELDDA questionnaire during that period. The control and the intervention group took a post-test within four weeks with the SELDDA. After that, primary data was collected from the educators through a Google Form to evaluate the usability, validity, and reliability of the SELDDA instrument. The Google Form is quantitative and followed a 5-point Likert scale related to validity, usability, and SEC development. To ensure the consistency of the user experience, the participants were asked to use only computers for answering the SELDDA questions. There would be an interval between pre- and post-test assessments to ensure that everything is not done at the same time.

The SELDDA instrument and the Google Form survey were used to answer the research questions, as shown in Table 3:

Table 3

Research Questions and Surveys

Research Questions	Data Coming from SELDDA	Data Coming from Google Survey
1. Does the use of SELDDA improve the development of social-emotional learning within four weeks?	Yes	No
2. Does the use of the SELDDA instrument find significant levels of reliability?	Yes	Yes
3. Does the use of the SELDDA instrument find significant levels of validity?	Yes	Yes
4. Does the use of the SELDDA instrument find significant levels of internal consistency?	Yes	No
5. How user-friendly is the SELDDA instrument?	No	Yes

Data Analysis Procedures

Choosing appropriate statistical techniques in a quantitative research study is essential (Abuela & Harwell, 2020). The techniques used for the data analysis in this study are outlined in this section. The pre-test and post-test results were analyzed for evaluating the SEL intervention outcomes within a 4-week period, assessing the reliability, validity, and usability of the SELDDA framework. For this purpose, a paired sample t-test was used. In addition, Pearson's chi-squared test, a correlation test, a two-way Analysis of Variance (ANOVA), and the Analysis of Covariance (ANCOVA) were applied. These tests helped determine the statistical differences that resulted from the SEL intervention and the use of SELDDA. IBM SPSS software was used for conducting the data and statistical analysis. SPSS is the most widely used package available for data analysis and an easily accessible software (Lin, 2020).

Paired Sample T-Test

A paired sample t-test is a statistical technique used to compare two correlated or paired samples (Mishra et al., 2019). This type of test is used when the samples are in matched pairs or in before-after studies. The current study used the paired sample t-test to compare the pre- and post-test outcomes.

Pearson's Chi-squared Test

Pearson's chi-squared test is generally used to test whether there exist any statistically significant relationships between two categorical variables (Benhamou & Melot, 2018). Here, the null hypothesis of the chi-squared test implies that there is no relationship between those variables; rather, they are independent (Benhamou & Melot, 2018). This chi-squared test evaluated whether there exist any relationships between the dependent (educator's SEL competency) and independent variables (SELDDA as a formative assessment) in this study.

Correlation Test

Pearson's correlation coefficient (R) is used to test the degree of correlation between two or more variables (Armstrong, 2019). Furthermore, it determines whether there is any statistically significant positive or negative relationship between the variables (Armstrong, 2019). Schober et al. (2018) argued that Pearson's R is an appealing choice for researchers for its easy calculation and interpretation. At the same time, it can easily be extended for further analyses. For this study, simple correlations (Pearson's R) were calculated between pre- and post-test data to understand the strength of their relationships.

ANOVA and ANCOVA

Analysis of Variance (ANOVA) is a popular statistical method used to analyze the mean differences across several groups (Zhou & Skidmore, 2017). Analysis of Covariance

(ANCOVA) is another statistical method used in various fields, including psychology and education, for analyzing quantitative data from experimental and quasi-experimental studies (Leppink, 2018). Both ANOVA and ANCOVA are used for comparing datasets. For this study, ANOVA and ANCOVA were applied for comparing the dependent and independent variables.

Validity and Reliability

To assess the validity of the SELDDA instrument, the researcher determined how strongly the educators agreed with their individual EQ scores. At the same time, he identified the level of consistency of the results generated through repeated assessment of the social-emotional competency of the educators, indicating the level and extent of SELDDA's validity. Before starting to collect primary data, the data collection instruments were reviewed, discussed, and refined by the supervising committee of this study. This further enhanced the credibility of these instruments and made them clearer and more unambiguous (Hayashi et al., 2019).

This study involved data triangulation, including different samples and methods for collecting data. According to Lemon and Hayes (2020), data triangulation adds to and helps confirm the overall integrity of the participants' responses. Consequently, the approach used for confirmability within this study can be ensured. Furthermore, as described by Cohen et al. (2011), assertions about dependability were expected within this study as the findings and recommendations were fully supported by the data received from the participants of this study. Also, according to Munthe-Kaas et al. (2019), a study is considered transferable if the study results can be transferred to other contexts with other participants.

Again, the validity of a quantitative study depends on its internal and external validity (Hayashi et al., 2019; Korotchenko, 2021). The internal validity of this study is established because its results have been obtained only by manipulating the independent variables. On the

other hand, a study is considered externally valid if its results are generalizable to environments, groups, and contexts outside of the experimental settings (Korotchenko, 2021). Thus, necessary steps were taken to confirm this study's internal and external validity. It has to be noted that according to Siegmund et al. (2015), a practically relevant study may not have high external validity.

The issues related to content validity and criterion-related validity were relevant in this study. Content validity measures the extent to which the content of the items of an instrument adequately measures or represents the assessed information (Yusoff, 2019). In this study, content validation involved critically examining the basic structure of the SELDDA instrument, reviewing the procedures used for developing the questionnaire, and considering the instrument's applicability to answer the research questions, as suggested by Yusoff (2019). Again, the criterion-related validity of an instrument indicates the extent to which the scores or outputs from the instrument correspond to the previously predicted outcome (Taherdoost, 2016). The correlation analysis method was used to determine whether criterion-related validity exists in this study. Scores from the SELDDA instrument were correlated with some predicted scores to evaluate the criterion-related validity.

The reliability of a study is related to the consistency of its results. It is defined by Pace et al. (2012) as the “extent, to which an assessment provides the same results in different situations” (p. 3). To evaluate this study's reliability, efforts were taken to assess whether the responses to the SELDDA questionnaire were similar in both the pre- and post-tests and whether the responses related to the sub-competencies were comparable to that of primary competencies.

The reliability and stability of the SELDDA instrument were assessed through the test-retest method. In this method, the same instrument is administered to the same sample at two

separate time points (Noble et al., 2019). The degree of reliability is estimated by the correlations of scores from repeated measurements (Stevens, 2019). The instrument can be considered reliable if the scores are highly correlated at two different times (Stevens, 2019). For this, the bivariate correlation or Cronbach's alpha (α) is used, which is often interpreted as the average of all possible split-half coefficients (Mohajan, 2017). If the value of Cronbach's α is 0.7 or higher, then the instrument is considered reliable and consistent (Mohajan, 2017).

Another well-known statistical tool called Intra-class Correlation Coefficient (ICC) (Liljequist et al., 2019) was also used in this study to measure the reliability of the SELDDA instrument. ICC is a variance ratio derived from ANOVA (Liljequist et al., 2019). If the ICC value is close to one, then it can be said that the instruments possess excellent reliability (Liljequist et al., 2019).

Assumptions

According to Carver et al. (2004), researchers make assumptions about three objects while conducting studies: people, products, and processes. To have greater confidence about the study's outcomes and avoid any sort of misinterpretations, these assumptions made by the researchers play a vital role. Besides, researchers make assumptions about their environment when considering the threats to validity in their study design (Carver et al., 2004).

For this study, some assumptions were made. Correctly interpreting the results of this study would become difficult if any of the assumptions were proved to be incorrect. The assumptions are listed below:

- It was assumed that the participants would answer honestly or be honest enough such that the tests of reliability would still provide a meaningful analysis.

- It was assumed that the participants were confident about the importance of SEL and participated fully.
- It was further assumed that the methodology chosen for this study was the most appropriate one.
- It was also assumed that the data collection instruments were meaningful and reliable to the study.
- It was further assumed that the sample chosen for this study was representative of a similar population.
- Finally, it was assumed that the educators would be comfortable with using the technology needed for this study.

Limitations

One of the major limitations of this study was the sample size, considering the large population in the U.S. As convenience sampling was used in this study instead of random sampling, it was difficult to guarantee that the results of this study would apply to an even larger population (Peck & Short, 2018).

Another limitation lied in the data collection mode. It is often argued that the self-response of participants is a limitation due to an increase in responder bias and subjectivity (Lucas, 2018). This affected the results obtained in this study. In addition, the researcher was personally involved in developing the SELDDA questionnaire, so there could be some personal bias or stake in the results of this study. In order to resolve this matter, the following steps were taken:

1. All communications to individuals were as scripted as possible.

2. All the participants were provided full disclosure of all information needed to make an informed decision to participate in this study.
3. All the questions included in the SELDDA questionnaire and Google Form survey were neutrally worded while ensuring that the answer options were not leading.
4. As the survey was conducted online, no researcher/interviewer bias was involved.
5. Every limitation and the ethical issue was clearly explained.

Ethical Assurances

Necessary approval was obtained prior to conducting the study from the dissertation supervising committee and The Chicago School of Professional Psychology's Institutional Review Board (IRB), and the necessity of this process was highlighted by Arynchyna et al. (2019). All stakeholders and participants received detailed information about the study and had the full option to withdraw from the study at any time without judgment, penalty, or reprisal. All disclosures notices were communicated in writing. All participation in this study was voluntary. The study did not interfere with the educator's profession. Moreover, only data relevant to the study was collected; no additional information was collected from the participants. The SELDDA instrument and the researcher held all collected data. The researcher maintained all paper and digital files secured and locked to avoid valuable information leaks. All data followed strict IRB policies. All standard privacy and information protection considerations were made before, during, and after the study. Of note, there was a relatively small incentive for participating in this study. Educators received an Illinois State Board of Education (ISBE) Professional Development credit towards their Professional Educator License continuing education requirements as available and accepted by their governing state. This included a certificate for each of the 1-hour SEL workshops they attended as a form of micro-credentialling.

In addition, they got full access to SELDDA for their classroom or school, though SELDDA was and is already free for communities and schools.

Summary

This chapter discussed the research design of this study, participants, sampling, and data collection and analysis procedures. It then concluded by discussing this study's limitations and ethical considerations. The next chapter highlights the results obtained from the data collection and its overall significance on the outcomes of this study.

Chapter 4: Findings

This chapter presents the results of this research study in the order, in which the research instruments were introduced. First, the survey is presented based on the Social-Emotional Learning Digital Diagnostic Assessment (SELDDA) questionnaire with 72 items, followed by the results of the user-feedback survey using Google Forms. This study aimed to assess the reliability, validity, and usability of the SELDDA tool. As discussed previously, SELDDA is a research-based, digital, web-based, and universal instrument for assessing the social-emotional skills of an individual.

Another goal of this study was to determine the impact of SELDDA on educator SEL development. The focus was given to understanding how digital technology can be effectively integrated within the field of SEL. A quasi-experimental design was implemented in this study, and the following research questions guided the study and development of survey questions:

1: Does the use of SELDDA improve the development of an educator's social-emotional learning within four weeks?

2: Does the use of the SELDDA instrument find significant levels of reliability?

3: Does the use of the SELDDA instrument find significant levels of validity?

4: Does the use of the SELDDA instrument find significant levels of internal consistency?

5: How user-friendly is the SELDDA instrument?

Demographic Analysis of the Participants' SELDDA Assessment

The study was conducted with 60 licensed K-12 educators serving in various schools across the U.S. Recruitment of participants took place online through LinkedIn direct messages and Facebook direct messages and public groups, as listed in Chapter 3. All participants were English-speaking, aged 23 to 63 years, and familiar with SEL. The study leveraged convenience

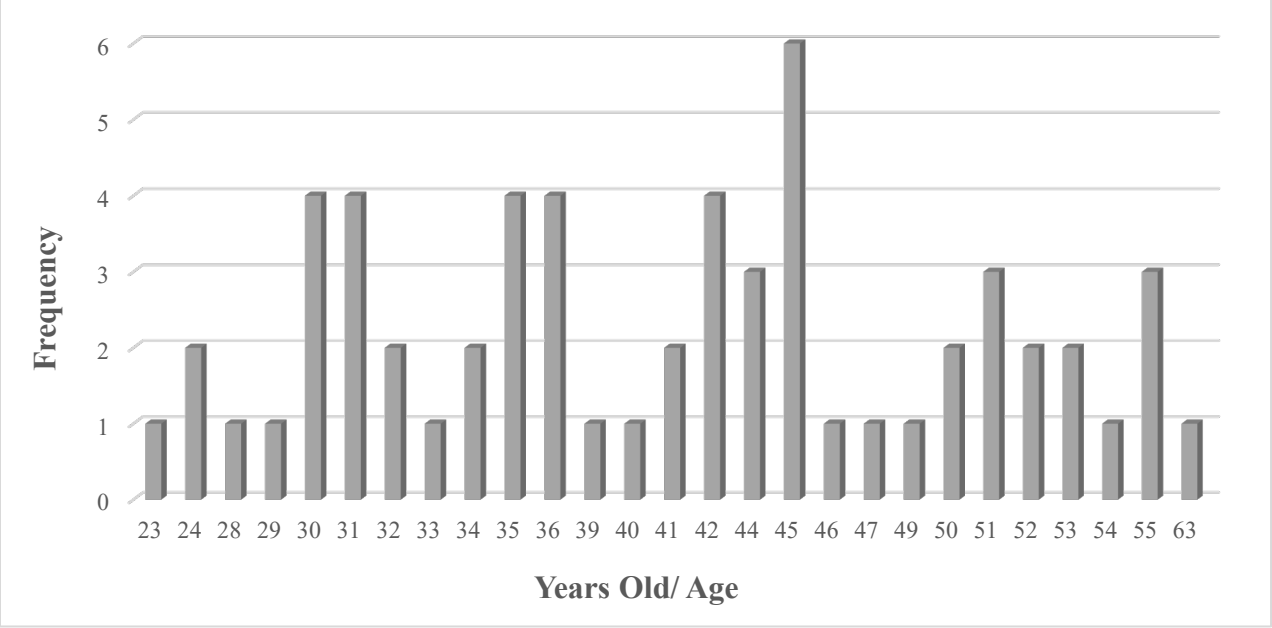
and snowball sampling. The 60 participants were divided equally into control and intervention groups and were assigned in an alternating sequence. The SELDDA assessment included demographic questions in the pre-and post-test to understand participant backgrounds and characteristics. This section will review the demographics of all participants.

Age Demographics

Since age can impact the familiarity with SEL, the age ranges of the participants were analyzed. Participants' ages ranged from 23 to 63 years (Figure 4 and Table 4). The most frequent age range was 30 to 31 and 42 to 45. For the control group, ages ranged from 23 to 63 years, and the ages 31, 45, and 51 were the most frequent. The intervention group ages ranged from 24 to 55 years, with 30, 42, and 45 as the most frequent ages.

Figure 4

Age Distribution of All Participants



Gender Demographics

Interestingly, while the age range was well distributed, the gender distribution showed another picture. From the analysis of participants' gender, the largest group was female, with a count of 51 (85%), while males were in the minority with nine (15%) (Table 4). In the control group, out of 30 participants, the female and male representation was 90% and 10%, respectively. In the 30-person intervention group, female representation was 80% and 20% for males.

Racial Demographics

Participants self-identified as 5% Asian, 1% Latino or Hispanic, and 93.3% White (Table 4). The control group consisted of 3.3% Latino or Hispanic and 96.7% White. Ten percent were Asian within the intervention group, and 90% were White. White was the most significant racial demographic within all groups.

Primary Spoken Language Demographics

Since the racial demographics showed that part of the participants had a different racial background, it was important to know their primary spoken language. Ninety-seven percent of participants primarily spoke English, whereas 1.70% primarily spoke either Chinese, Polish, or other languages (Table 4). The control group spoke 100% English. Ninety percent of participants primarily spoke English within the intervention group, while 3.3% each spoke Chinese, Polish, or other languages. English was the main language for all groups.

Marital Status Demographics

Being married or in a relationship influences a person’s handling of emotions. Therefore, their marital status can influence the SEL outcomes. From an analysis of all participants, 68.3% of all participants, 70% of the control group, and 66.7% of the intervention group were in a

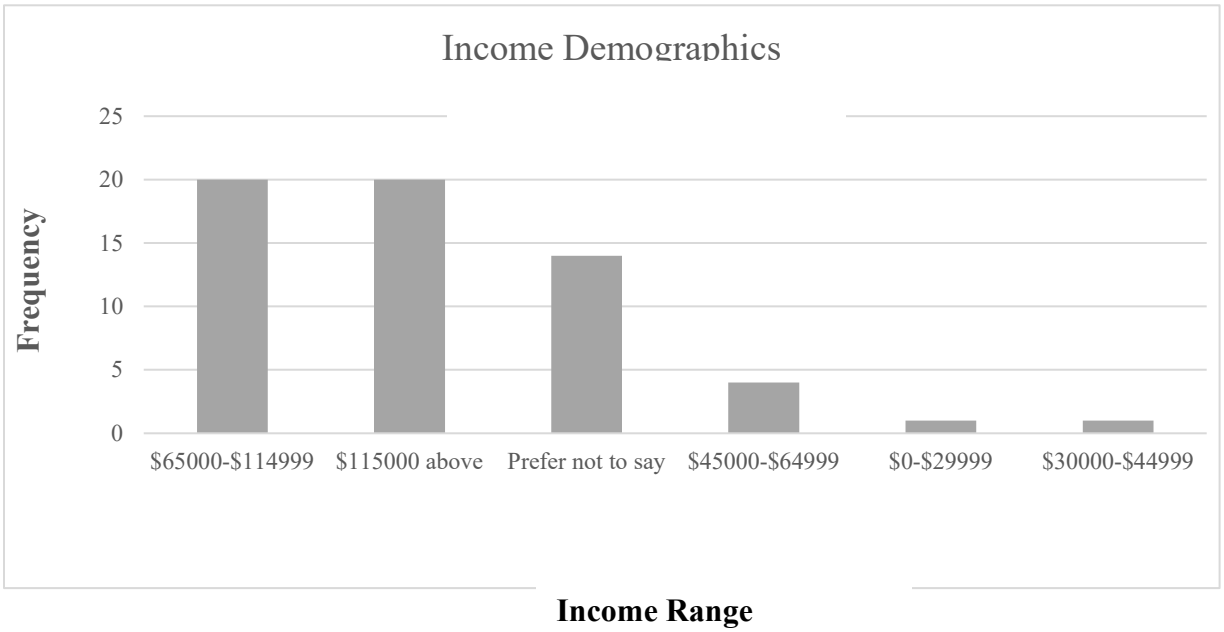
marriage or domestic partnership (Table 4). In comparison, 20% were single or never married for all groups. Additionally, 6.7% of all participants, 3.3% of the control group, and 10% of the intervention group were divorced. Lastly, 1.7% overall and among the intervention group were widowed. The remainder preferred not to indicate their marital status. Being married or in a domestic partnership was the most common status for all groups.

Income Demographics

Social-economic status often plays a significant role in human development, including SEC. An analysis of study participants showed that 33.3% of the total population, 26.7% of the control group, and 40% of the intervention group had an income ranging between $65,000 and $114,999 (Figure 5 and Table 4). Another 33.3%, 43.3%, and 23.3% had an income of $115,000+ in the total, control, and intervention groups, respectively. Further, 6.7% overall and 13.3% of the intervention group had an income of $45,0000 - $64,9999. Lastly, 23.3%, 26.7%, and 20% of the overall, control, and intervention group participants, respectively, preferred not to say. All other income options had few responses, with less than 2% in each case.

Figure 5

Income Distribution of All Participants



Educational Demographics

Also, the level of education may influence an individual's development of SEC, it was analyzed. In the analysis, the frequency analysis of education level showed that a master's degree was the most common in all participant groups: 81.7% overall, 80% in the control group, and 83.3% in the intervention group (Table 4). All other education levels were of a minority percentage.

Country Demographics

Geography may influence an individual's maturational development and was therefore analyzed. Within the country's demographics, 98.3%, 100%, and 96.7% of the total, control, and intervention groups, respectively, were from the U.S. (Table 4). Meanwhile, 1.7% of the total population and 3.3% of the intervention group worked remotely from India. This participant was an active U.S. K-12 educator but telecommuting from India, which still met the inclusion criteria for this study.

Table 4

Demographic Frequencies of Total, Control, and Intervention Group Populations

Age Demographic								
Total Population			**Control Group**			**Intervention Group**		
Age	**N**	**%**	**Age**	**N**	**%**	**Age**	**N**	**%**
45	6	10.0	45	3	10.0	30	3	10.0
30	4	6.7	51	3	10.0	42	3	10.0
31	4	6.7	31	2	6.7	45	3	10.0
35	4	6.7	32	2	6.7	31	2	6.7
36	4	6.7	35	2	6.7	34	2	6.7

42	4	6.7	36	2	6.7	35	2	6.7
44	3	5.0	44	2	6.7	36	2	6.7
51	3	5.0	55	2	6.7	41	2	6.7
55	3	5.0	23	1	3.3	24	1	3.3
24	2	3.3	24	1	3.3	28	1	3.3
32	2	3.3	30	1	3.3	29	1	3.3
34	2	3.3	33	1	3.3	44	1	3.3
41	2	3.3	39	1	3.3	46	1	3.3
50	2	3.3	40	1	3.3	47	1	3.3
52	2	3.3	42	1	3.3	50	1	3.3
53	2	3.3	49	1	3.3	52	1	3.3
23	1	1.7	50	1	3.3	53	1	3.3
28	1	1.7	52	1	3.3	54	1	3.3
29	1	1.7	53	1	3.3	55	1	3.3
33	1	1.7	63	1	3.3			
39	1	1.7						
40	1	1.7						
46	1	1.7						
47	1	1.7						
49	1	1.7						
54	1	1.7						
63	1	1.7						
Total	**60**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**

Primary Spoken Language

Total Population			Control Group			Intervention Group		
Langauage	**N**	**%**	**Langauge**	**N**	**%**	**Language**	**N**	**%**
English	57	95.0	English	30	100.0	English	27	90.0
Chinese	1	1.7				Chinese	1	3.3
Polish	1	1.7				Polish	1	3.3
Other	1	1.7				Other	1	3.3
Total	**60**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**

Educational Level

Total Population			Control Group			Intervention Group		
Degree	**N**	**%**	**Degree**	**N**	**%**	**Degree**	**N**	**%**
Master's Degree	49	81.7	Master's Degree	24	80.0	Master's Degree	25	83.3
4 Year College	5	8.3	4 Year College	3	10.0	4 Year College	2	6.7
Professional Degree	4	6.7	Professional Degree	2	6.7	Professional Degree	2	6.7
Some Post-Graduate	1	1.7	Some Post-Graduate	1	3.3	Professional Certificate/ License	1	3.3

Professional Certificate/ License	1	1.7						
Total	**60**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**

Marital Status

Total Population			**Control Group**			**Intervention Group**		
Status	**N**	**%**	**Status**	**N**	**%**	**Status**	**N**	**%**
Marriage or Domestic Partnership	41	68.3	Marriage or Domestic Partnership	21	70.0	Marriage or Domestic Partnership	20	66.7
Single or Never Married	12	20.0	Single or Never Married	6	20.0	Single or Never Married	6	20.0
Divorced	4	6.7	Prefer Not to say	2	6.7	Divorced	3	10.0
Prefer Not to say	2	3.3	Divorced	1	3.3	Widowed	1	3.3
Widowed	1	1.7						
Total	**60**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**

Location

Total Population			**Control Group**			**Intervention Group**		
Location	**N**	**%**	**Location**	**N**	**%**	**Location**	**N**	**%**
U.S.	59	98.3	US	30	100.0	US	29	96.7

India	1	1.7	0		100.0	India	1	3.3
Total	**60**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**

Gender

Total Population			**Control Group**			**Intervention Group**		
Gender	**N**	**%**	**Gender**	**N**	**%**	**Gender**	**N**	**%**
Female	51	85.0	Female	27	90.0	Female	24	80.0
Male	9	15.0	Male	3	10.0	Male	6	20.0
Total	**60**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**

Race

Total Population			**Control Group**			**Intervention Group**		
Race	**N**	**%**	**Race**	**N**	**%**	**Race**	**N**	**%**
White	56	93.3	White	29	96.7	White	27	90.0
Asian	3	5.0	Latino or Hispanic American	1	3.3	Asian	3	10.0
Latino or Hispanic American	1	1.7						
Total	**60**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**

Income

Total Population			Control Group			Intervention Group		
Income	**N**	**%**	**Income**	**N**	**%**	**Income**	**N**	**%**
$65000-$114999	20	33.3	$115000 above	13	43.3	$65000-$114999	12	40.0
$115000 above	20	33.3	Prefer not to say	8	26.7	$115000 above	7	23.3
Prefer not to say	14	23.3	$65000-$114999	8	26.7	Prefer not to say	6	20.0
$45000-$64999	4	6.7	$30000-$44999	1	3.3	$45000-$64999	4	13.3
$0-$29999	1	1.7				$0-$29999	1	3.3
$30000-$44999	1	1.7						
Total	**60**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**

Procedures and Data Analysis

Primary data were collected using the SELDDA questionnaire and a Google Form survey. The SELDDA assessment consisted of self-report questions and a five-point Likert Scale to analyze the survey responses, with 1= strongly disagree and 5= strongly agree, indicating each answer's conviction. Some direct scenario-based closed-ended questions were also included in SELDDA to achieve a higher level of reliability. The second survey is a Google Form survey that asked educators about their experience with the SELDDA assessment. The data are presented using tables and charts to view and analyze responses. Only the researcher had access to the data by maintaining a private username and password.

The SELDDA questionnaire was used to assess the social-emotional competency of educators. The 60 participants were divided equally into a control (30) and an intervention (30) group. Participants were assigned alternatingly during the recruitment phase, first to the control group and then to the intervention group. While no participant asked to withdraw from the study, 10 original participants did not finish the study. After several follow-up communications with these participants, new recruits were assigned to the control and intervention groups accordingly. The only reason for involuntary withdrawal was a lack of time to complete the study. Data of the 10 participants, who did not complete the study, were not included.

Only the 30 intervention group participants took the 72-question SELDDA assessment as a pre-test. All 60 participants watched three one-hour on-demand SEL professional development video workshops, accessible through a private Google Drive link. Participants reported viewing the videos through email and in the Google Form survey. Afterward, all participants took the 72-question SELDDA assessment (a post-test for the intervention group) and the Google Form survey. No participant reached out with issues of access to SELDDA, the SEL video workshops, or the Google Form survey. Likewise, no participant reached out with issues with or of the study or study process during or after the study besides the 10 participants that did not have time to complete the study.

Competency Results of Participants

From the analysis of the SELLDA survey of all participants (60), the highest-rated competency, responsible decision-making (M = 87.04), ranged from a value of 62 to 100 (a range of 38) out of a total of 100 (Figure 6 and Table 6). The second-highest competency was self-awareness (M = 77.56), ranging from 63 to 90 (a range of 27). The lowest competency, self-management (M = 74.37), ranged from 53 to 88 (a range of 35).

Figure 6

Responsible Decision-Making Distribution of All Participants

The highest competency for the control group (30) was responsible decision-making (M = 86,) ranging between 62 and 98 (Table 6). The second-highest competency was relationship skills (M = 82.56), with a range of 72 to 95. The lowest competency was self-management (M = 74.67), with a range of 55 to 88.

The highest competency for the intervention group pre-test (30) was responsible decision-making (M = 86.78), with a range of 72 to 100 (Table 6). The second-highest competency was relationship skills (M = 81.17), with a range of 62 to 95. Self-management (M = 73.06), the lowest competency, had a range of 53 to 88.

For the intervention group post-test, the highest competency was responsible decision-making (M = 88.33) with a range of 77 to 100 (Table 6). The second-highest competency was relationship skills (M = 81.56), with a range of 58 to 97. Self-Management (M = 75.39) was the lowest competency, with a range of 55 to 88.

Table 5

Competency Frequencies of the Total, Control, and Intervention Group

Main Competencies Scores Frequency of SELDDA

Self-Awareness

Total Group			Control Group			Pre-Intervention			Post Intervention		
Score	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**
63	2	2.2	68	2	6.7	63	2	6.7	65	1	3.3
65	1	1.1	70	1	3.3	68	5	16.7	67	1	3.3
67	1	1.1	72	1	3.3	70	1	3.3	70	2	6.7
68	7	7.8	73	2	6.7	73	1	3.3	72	2	6.7
70	4	4.4	75	4	13.3	75	2	6.7	73	2	6.7
72	3	3.3	77	5	16.7	77	6	20.0	75	3	10.0
73	5	5.6	78	2	6.7	78	3	10.0	77	6	20.0
75	9	10.0	80	1	3.3	80	1	3.3	78	1	3.3
77	17	18.9	82	3	10.0	82	1	3.3	80	3	10.0
78	6	6.7	83	1	3.3	83	2	6.7	83	3	10.0
80	5	5.6	83	3	10.0	85	3	10.0	85	2	6.7
82	4	4.4	85	3	10.0	87	1	3.3	87	2	6.7
83	9	10.0	87	2	6.7	88	1	3.3	88	1	3.3
85	8	8.9							90	1	3.3
87	5	5.6									
88	2	2.2									
90	1	1.1									
Total	**90**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**

Relationship Skills

Total Group			Control Group			Pre-Intervention			Post Intervention		
Score	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**
58	1	1.1	72	4	13.3	62	1	3.3	58	1	3.3
62	1	1.1	73	1	3.3	63	1	3.3	63	1	3.3

63	2	2.2	75	1	3.3	68	2	6.7	67	2	6.7
67	2	2.2	77	1	3.3	73	2	6.7	70	1	3.3
68	2	2.2	78	4	13.3	75	2	6.7	73	2	6.7
70	1	1.1	82	4	13.3	77	2	6.7	75	1	3.3
72	4	4.4	83	2	6.7	78	1	3.3	77	1	3.3
73	5	5.6	85	3	10.0	78	1	3.3	78	1	3.3
75	4	4.4	87	4	13.3	80	1	3.3	80	3	10.0
77	4	4.4	90	2	6.7	82	1	3.3	82	1	3.3
78	1	1.1	93	2	6.7	83	3	10.0	83	3	10.0
78	6	6.7	95	2	6.7	85	3	10.0	85	2	6.7
80	4	4.4				87	3	10.0	87	1	3.3
82	6	6.7				88	2	6.7	88	1	3.3
83	8	8.9				90	2	6.7	90	5	16.7
85	8	8.9				93	1	3.3	92	1	3.3
87	8	8.9				95	2	6.7	95	2	6.7
88	3	3.3							97	1	3.3
90	9	10.0									
92	1	1.1									
93	3	3.3									
95	6	6.7									
97	1	1.1									
Total	**90**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**

Responsible Decision-Making

Total Group			**Control Group**			**Pre-Intervention**			**Post Intervention**		
Score	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**
62	1	1.1	62	1	3.3	72	1	3.3	77	1	3.3
72	1	1.1	73	1	3.3	77	3	10.0	78	1	3.3
73	1	1.1	80	3	10.0	77	1	3.3	80	3	10.0
77	4	4.4	82	5	16.7	80	3	10.0	82	3	10.0
77	1	1.1	83	4	13.3	82	2	6.7	83	1	3.3

78	1	1.1	85	1	3.3	83	1	3.3	85	1	3.3
80	9	10.0	87	1	3.3	85	2	6.7	87	4	13.3
82	10	11.1	87	1	3.3	87	2	6.7	88	1	3.3
83	6	6.7	90	5	16.7	88	3	10.0	88	1	3.3
85	4	4.4	92	3	10.0	90	1	3.3	90	3	10.0
87	7	7.8	93	1	3.3	92	3	10.0	92	3	10.0
87	1	1.1	95	1	3.3	93	3	10.0	95	3	10.0
88	1	1.1	97	2	6.7	95	2	6.7	97	3	10.0
88	4	4.4	98	1	3.3	97	1	3.3	98	1	3.3
90	9	10.0				98	1	3.3	100	1	3.3
92	9	10.0				100	1	3.3			
93	4	4.4									
95	6	6.7									
97	6	6.7									
98	3	3.3									
100	2	2.2									
Total	**90**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**

Motivation											
Total Group			**Control Group**			**Pre-Intervention**			**Post Intervention**		
Score	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**
63	2	2.2	63	1	3.3	63	1	3.3	65	1	3.3
65	1	1.1	68	1	3.3	67	1	3.3	67	3	10.0
67	4	4.4	72	1	3.3	70	1	3.3	72	1	3.3
68	1	1.1	75	4	13.3	72	1	3.3	73	3	10.0
70	1	1.1	77	2	6.7	75	2	6.7	75	1	3.3
72	3	3.3	78	5	16.7	77	1	3.3	77	2	6.7
73	3	3.3	80	1	3.3	78	1	3.3	78	1	3.3
75	7	7.8	82	2	6.7	78	4	13.3	80	2	6.7
77	5	5.6	83	2	6.7	80	3	10.0	82	4	13.3
78	10	11.1	85	2	6.7	82	3	10.0	85	4	13.3

80	6	6.7	87	3	10.0	83	3	10.0	88	1	3.3
82	9	10.0	88	3	10.0	85	3	10.0	88	2	6.7
83	5	5.6	90	1	3.3	88	1	3.3	90	2	6.7
85	9	10.0	92	1	3.3	90	3	10.0	92	2	6.7
87	3	3.3	98	1	3.3	92	1	3.3	97	1	3.3
88	1	1.1				95	1	3.3			
88	6	6.7									
90	6	6.7									
92	4	4.4									
95	1	1.1									
97	1	1.1									
98	1	1.1									
Total	**90**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**

Self-Management

Total Group			**Control Group**			**Pre-Intervention**			**Post Intervention**		
Score	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**
53	1	1.1	55	1	3.3	53	1	3.3	55	1	3.3
55	2	2.2	60	1	3.3	57	1	3.3	60	1	3.3
57	1	1.1	62	1	3.3	58	1	3.3	63	2	6.7
58	1	1.1	63	1	3.3	60	1	3.3	65	1	3.3
60	3	3.3	65	1	3.3	62	2	6.7	68	3	10.0
62	3	3.3	67	1	3.3	63	1	3.3	72	2	6.7
63	4	4.4	70	5	16.7	68	2	6.7	73	2	6.7
65	2	2.2	73	1	3.3	70	2	6.7	75	1	3.3
67	1	1.1	73	2	6.7	72	1	3.3	77	2	6.7
68	5	5.6	75	3	10.0	73	2	6.7	78	4	13.3
70	7	7.8	77	2	6.7	75	4	13.3	80	2	6.7
72	3	3.3	78	2	6.7	77	2	6.7	82	3	10.0
73	1	1.1	80	1	3.3	78	3	10.0	83	2	6.7
73	6	6.7	82	2	6.7	80	1	3.3	85	2	6.7

75	8	8.9	85	2	6.7	82	1	3.3	88	2	6.7
77	6	6.7	87	2	6.7	83	1	3.3			
78	9	10.0	88	2	6.7	85	1	3.3			
80	4	4.4				87	1	3.3			
82	6	6.7				88	2	6.7			
83	3	3.3									
85	5	5.6									
87	3	3.3									
88	6	6.7									
Total	**90**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**

Social Awareness

Total Group			**Control Group**			**Pre-Intervention**			**Post Intervention**		
Score	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**
53	1	1.1	68	1	3.3	53	1	3.3	60	1	3.3
60	1	1.1	70	1	3.3	63	2	6.7	62	1	3.3
62	1	1.1	72	4	13.3	65	2	6.7	65	1	3.3
63	2	2.2	75	6	20.0	70	2	6.7	67	2	6.7
65	3	3.3	77	3	10.0	72	1	3.3	70	1	3.3
67	2	2.2	78	2	6.7	73	4	13.3	73	1	3.3
68	1	1.1	80	6	20.0	75	2	6.7	75	3	10.0
70	4	4.4	82	2	6.7	77	5	16.7	77	5	16.7
72	5	5.6	83	2	6.7	80	3	10.0	78	1	3.3
73	5	5.6	87	2	6.7	83	3	10.0	80	3	10.0
75	11	12.2	90	1	3.3	87	3	10.0	82	2	6.7
77	13	14.4				88	1	3.3	83	3	10.0
78	3	3.3				92	1	3.3	87	2	6.7
80	12	13.3							88	3	10.0
82	4	4.4							97	1	3.3
83	8	8.9									
87	7	7.8									

88	4	4.4									
90	1	1.1									
92	1	1.1									
97	1	1.1									
Total	**90**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**

Table 6

SELDDA Competencies Questionnaire Survey Control Group Test, Pre-Intervention Group Test, and Post-Intervention Group

Main Competencies		**Self-Awareness**	**Relationship Skills**	**Responsible Decision-Making motivation**	**Self-Management**	**Social Awareness**	**Total Main Competencies Score**
Control	Mean	78.39	82.56	86.00	81.11	74.67	77.83	480.56
	N	30	30	30	30	30	30	30
	Std. Dev.	5.351	7.108	7.601	7.367	8.725	5.182	32.537
	Sum	2352	2477	2580	2433	2240	2335	14417
	Variance	28.636	50.524	57.778	54.278	76.131	26.849	1058.682
Pre Intervention	Mean	76.39	81.17	86.78	80.83	73.06	75.94	474.17
	N	30	30	30	30	30	30	30
	Std. Dev.	6.796	8.755	7.440	7.255	9.490	8.607	36.742
	Sum	2292	2435	2603	2425	2192	2278	14225
	Variance	46.185	76.658	55.349	52.635	90.054	74.081	1349.953
	Mean	77.89	81.56	88.33	80.50	75.39	77.94	481.61

Post Intervention	N	30	30	30	30	30	30	30
	Std. Dev.	6.387	9.864	6.551	8.455	8.472	8.472	35.335
	Sum	2337	2447	2650	2415	2262	2338	14448
	Variance	40.792	97.305	42.912	71.483	71.778	71.783	1248.550
Total	Mean	77.56	81.76	87.04	80.81	74.37	77.24	478.78
	N	90	90	90	90	90	90	90
	Std. Dev.	6.197	8.573	7.197	7.628	8.860	7.558	34.679
	Sum	6980	7358	7833	7273	6693	6952	43090
	Variance	38.401	73.493	51.795	58.192	78.501	57.129	1202.605

Sub-Competency Results of Participants

For all participants (60), the highest sub-competency was respect for self and others (M = 88.11), ranging from 65 to 100 out of 100 (Table 7). The second highest sub-competency was consequence evaluation (M = 87.67), which ranged from 55 to 100. The lowest sub-competency was self-perception (M = 70.89), ranging from 55 to 90.

The highest sub-competency for the control group was respect for self and others (M = 87.67), with a range of 65 to 100. Meanwhile, the lowest competency was self-perception (M = 79.50), with a range of 65 to 80.

The highest sub-competency for the intervention group pre-test was consequence evaluation (M = 88) with a range of 65 to 100. The lowest sub-competency for the intervention group pre-test was internal regulation (M = 67.67) with a range of 30 to 100.

The highest sub-competency for the intervention group post-test was consequence evaluation (M = 89.88) with a range of 70 to 100. The lowest sub-competency for the intervention group post-test was internal regulation (M = 69.83) with a range of 35 to 100.

Table 7

Sub-Competency Frequencies of the Total, Control, and Intervention Group

Emotional Awareness											
Total Group			**Control Group**			**Pre Intervention**			**Post Intervention**		
Score	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**
60	1	1.1	65	1	3.3	65	1	3.3	60	1	3.3
65	2	2.2	75	4	13.3	70	2	6.7	70	1	3.3
70	3	3.3	80	4	13.3	75	4	13.3	75	5	16.7
75	13	14.4	85	8	26.7	80	9	30.0	80	6	20.0
80	19	21.1	90	9	30.0	85	4	13.3	85	5	16.7
85	17	18.9	95	2	6.7	90	2	6.7	90	3	10.0
90	14	15.6	100	2	6.7	95	5	16.7	95	2	6.7
95	9	10.0				100	3	10.0	100	7	23.3
100	12	13.3									
Total	**90**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**

Communication											
Total Group			**Control Group**			**Pre Intervention**			**Post Intervention**		
Score	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**
50	1	1.1	65	3	10.0	55	1	3.3	50	1	3.3
55	2	2.2	70	5	16.7	60	2	6.7	55	1	3.3
60	2	2.2	75	7	23.3	65	2	6.7	65	2	6.7
65	7	7.8	80	6	20.0	70	8	26.7	70	9	30.0
70	22	24.4	85	6	20.0	75	7	23.3	75	5	16.7
75	19	21.1	90	3	10.0	80	4	13.3	80	6	20.0
80	16	17.8				85	1	3.3	85	1	3.3

85	8	8.9				90	4	13.3	90	4	13.3
90	11	12.2				95	1	3.3	100	1	3.3
95	1	1.1									
100	1	1.1									
Total	**90**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**

Constructive Thinking

Total Group			**Control Group**			**Pre Intervention**			**Post Intervention**		
Score	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**
65	3	3.3	65	2	6.7	65	1	3.3	70	2	6.7
70	3	3.3	75	1	3.3	70	1	3.3	80	7	23.3
75	3	3.3	80	10	33.3	75	2	6.7	85	9	30.0
80	25	27.8	85	8	26.7	80	8	26.7	90	5	16.7
85	25	27.8	90	3	10.0	85	8	26.7	95	4	13.3
90	12	13.3	95	3	10.0	90	4	13.3	100	3	10.0
95	11	12.2	100	3	10.0	95	4	13.3			
100	8	8.9				100	2	6.7			
Total	**90**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**

Enthusiasm

Total Group			**Control Group**			**Pre Intervention**			**Post Intervention**		
Score	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**
50	4	4.4	50	1	3.3	50	1	3.3	50	2	6.7
55	4	4.4	55	1	3.3	55	2	6.7	55	1	3.3
60	7	7.8	60	1	3.3	60	3	10.0	60	3	10.0
65	6	6.7	70	8	26.7	65	2	6.7	65	4	13.3
70	18	20.0	75	4	13.3	70	5	16.7	70	5	16.7
75	9	10.0	80	8	26.7	75	3	10.0	75	2	6.7
80	15	16.7	85	1	3.3	80	4	13.3	80	3	10.0
85	10	11.1	90	2	6.7	85	4	13.3	85	5	16.7
90	10	11.1	95	1	3.3	90	5	16.7	90	3	10.0

95	3	3.3	100	3	10.0	95	1	3.3	95	1	3.3
100	4	4.4							100	1	3.3
Total	**90**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**

Self-Perception

Total Group			**Control Group**			**Pre Intervention**			**Post Intervention**		
Score	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**
55	2	2.2	65	6	20.0	55	1	3.3	55	1	3.3
60	3	3.3	70	17	56.7	60	2	6.7	60	1	3.3
65	18	20.0	75	5	16.7	65	6	20.0	65	6	20.0
70	37	41.1	80	2	6.7	70	11	36.7	70	9	30.0
75	17	18.9				75	7	23.3	75	5	16.7
80	11	12.2				80	3	10.0	80	6	20.0
85	1	1.1							85	1	3.3
90	1	1.1							90	1	3.3
Total	**90**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**

Behavior Control

Total Group			**Control Group**			**Pre Intervention**			**Post Intervention**		
Score	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**
40	2	2.2	55	1	3.3	40	1	3.3	40	1	3.3
50	1	1.1	60	5	16.7	55	1	3.3	50	1	3.3
55	2	2.2	65	6	20.0	60	3	10.0	60	2	6.7
60	10	11.1	75	2	6.7	65	7	23.3	65	3	10.0
65	16	17.8	80	4	13.3	70	1	3.3	70	3	10.0
70	4	4.4	85	6	20.0	75	5	16.7	75	6	20.0
75	13	14.4	90	4	13.3	80	3	10.0	80	3	10.0
80	10	11.1	95	1	3.3	85	2	6.7	85	6	20.0
85	14	15.6	100	1	3.3	90	4	13.3	90	2	6.7
90	10	11.1				95	3	10.0	95	2	6.7
95	6	6.7							100	1	3.3

100	2	2.2									
Total	**90**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**

Adaptive Behavior

Total Group			**Control Group**			**Pre Intervention**			**Post Intervention**		
Score	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**
50	2	2.2	60	5	16.7	50	1	3.3	50	1	3.3
55	2	2.2	65	2	6.7	55	1	3.3	55	1	3.3
60	7	7.8	70	7	23.3	60	2	6.7	65	3	10.0
65	9	10.0	80	9	30.0	65	4	13.3	70	8	26.7
70	26	28.9	85	2	6.7	70	11	36.7	75	7	23.3
75	8	8.9	90	4	13.3	75	1	3.3	80	4	13.3
80	17	18.9	100	1	3.3	80	4	13.3	90	4	13.3
85	2	2.2				90	6	20.0	95	1	3.3
90	14	15.6							100	1	3.3
95	1	1.1									
100	2	2.2									
Total	**90**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**

Consequence Evaluation

Total Group			**Control Group**			**Pre Intervention**			**Post Intervention**		
Score	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**
55	1	1.1	55	1	3.3	65	1	3.3	70	1	3.3
65	1	1.1	70	1	3.3	75	1	3.3	80	7	23.3
70	2	2.2	75	2	6.7	80	8	26.7	85	6	20.0
75	3	3.3	80	5	16.7	85	5	16.7	90	4	13.3
80	20	22.2	85	10	33.3	90	6	20.0	95	4	13.3
85	21	23.3	90	3	10.0	95	1	3.3	100	8	26.7
90	13	14.4	95	5	16.7	100	8	26.7			
95	10	11.1	100	3	10.0						
100	19	21.1									

Total	**90**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**

Initiative

Total Group			Control Group			Pre Intervention			Post Intervention		
Score	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**
70	9	10.0	70	3	10.0	70	3	10.0	70	3	10.0
75	6	6.7	75	2	6.7	75	2	6.7	75	2	6.7
80	12	13.3	80	2	6.7	80	5	16.7	80	5	16.7
85	24	26.7	85	8	26.7	85	7	23.3	85	9	30.0
90	19	21.1	90	8	26.7	90	6	20.0	90	5	16.7
95	16	17.8	95	6	20.0	95	5	16.7	95	5	16.7
100	4	4.4	100	1	3.3	100	2	6.7	100	1	3.3
Total	**90**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**

Optimistic Outlook

Total Group			Control Group			Pre Intervention			Post Intervention		
Score	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**
35	1	1.1	45	1	3.3	40	1	3.3	35	1	3.3
40	1	1.1	60	2	6.7	50	1	3.3	50	1	3.3
45	1	1.1	70	4	13.3	55	2	6.7	55	3	10.0
50	2	2.2	75	6	20.0	60	2	6.7	65	1	3.3
55	5	5.6	80	6	20.0	70	3	10.0	70	3	10.0
60	4	4.4	85	4	13.3	75	5	16.7	75	4	13.3
65	1	1.1	90	3	10.0	80	10	33.3	80	8	26.7
70	10	11.1	95	2	6.7	85	3	10.0	85	5	16.7
75	15	16.7	100	2	6.7	95	1	3.3	90	1	3.3
80	24	26.7				100	2	6.7	95	1	3.3
85	12	13.3							100	2	6.7
90	4	4.4									
95	4	4.4									
100	6	6.7									

Total	**90**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**

Goal Pursuance

Total Group			Control Group			Pre Intervention			Post Intervention		
Score	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**
50	1	1.1	55	1	3.3	50	1	3.3	70	7	23.3
55	1	1.1	60	3	10.0	60	3	10.0	75	7	23.3
60	6	6.7	65	1	3.3	65	1	3.3	80	5	16.7
65	2	2.2	70	3	10.0	70	4	13.3	85	4	13.3
70	14	15.6	75	7	23.3	75	6	20.0	90	4	13.3
75	20	22.2	80	5	16.7	80	6	20.0	95	2	6.7
80	16	17.8	85	7	23.3	85	4	13.3	100	1	3.3
85	15	16.7	90	3	10.0	90	2	6.7			
90	9	10.0				95	2	6.7			
95	4	4.4				100	1	3.3			
100	2	2.2									
Total	**90**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**

Interdependence

Total Group			Control Group			Pre Intervention			Post Intervention		
Score	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**
60	6	6.7	60	2	6.7	60	2	6.7	60	2	6.7
70	4	4.4	70	2	6.7	70	1	3.3	70	1	3.3
75	12	13.3	75	2	6.7	75	4	13.3	75	6	20.0
80	14	15.6	80	5	16.7	80	6	20.0	80	3	10.0
85	8	8.9	85	6	20.0	85	1	3.3	85	1	3.3
90	12	13.3	90	3	10.0	90	4	13.3	90	5	16.7
95	19	21.1	95	4	13.3	95	8	26.7	95	7	23.3
100	15	16.7	100	6	20.0	100	4	13.3	100	5	16.7
Total	**90**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**

Respect for Self & Others

Total Group			Control Group			Pre Intervention			Post Intervention		
Score	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**
65	1	1.1	65	1	3.3	70	3	10.0	70	2	6.7
70	5	5.6	75	1	3.3	75	1	3.3	75	1	3.3
75	3	3.3	80	8	26.7	80	4	13.3	80	4	13.3
80	16	17.8	85	4	13.3	85	6	20.0	85	6	20.0
85	16	17.8	90	6	20.0	90	5	16.7	90	5	16.7
90	16	17.8	95	6	20.0	95	8	26.7	95	4	13.3
95	18	20.0	100	4	13.3	100	3	10.0	100	8	26.7
100	15	16.7									
Total	**90**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**

Resilience

Total Group			Control Group			Pre Intervention			Post Intervention		
Score	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**
55	1	1.1	55	1	3.3	65	4	13.3	60	1	3.3
60	3	3.3	60	2	6.7	70	2	6.7	65	4	13.3
65	10	11.1	65	2	6.7	75	4	13.3	70	1	3.3
70	5	5.6	70	2	6.7	80	4	13.3	75	5	16.7
75	13	14.4	75	4	13.3	85	7	23.3	80	4	13.3
80	14	15.6	80	6	20.0	90	5	16.7	85	3	10.0
85	16	17.8	85	6	20.0	95	2	6.7	90	6	20.0
90	16	17.8	90	5	16.7	100	2	6.7	95	2	6.7
95	4	4.4	100	2	6.7				100	4	13.3
100	8	8.9									
Total	**90**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**

Social Engagement

Total Group			Control Group			Pre Intervention			Post Intervention		
Score	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**

50	2	2.2	65	1	3.3	50	1	3.3	50	1	3.3
60	4	4.4	70	2	6.7	60	2	6.7	60	2	6.7
65	2	2.2	75	4	13.3	65	1	3.3	70	3	10.0
70	6	6.7	80	7	23.3	70	1	3.3	75	1	3.3
75	7	7.8	85	4	13.3	75	2	6.7	80	5	16.7
80	18	20.0	90	7	23.3	80	6	20.0	85	5	16.7
85	12	13.3	95	1	3.3	85	3	10.0	90	7	23.3
90	23	25.6	100	4	13.3	90	9	30.0	95	3	10.0
95	8	8.9				95	4	13.3	100	3	10.0
100	8	8.9				100	1	3.3			
Total	**90**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**

Internal Regulation

Total Group			**Control Group**			**Pre Intervention**			**Post Intervention**		
Score	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**
30	1	1.1	55	4	13.3	30	1	3.3	35	1	3.3
35	2	2.2	60	2	6.7	35	1	3.3	40	1	3.3
40	1	1.1	65	7	23.3	50	4	13.3	50	1	3.3
50	5	5.6	70	5	16.7	55	2	6.7	55	3	10.0
55	9	10.0	75	1	3.3	60	3	10.0	60	4	13.3
60	9	10.0	80	5	16.7	65	3	10.0	65	4	13.3
65	14	15.6	85	4	13.3	70	5	16.7	70	4	13.3
70	14	15.6	90	2	6.7	75	2	6.7	75	2	6.7
75	5	5.6				80	2	6.7	80	2	6.7
80	9	10.0				85	4	13.3	85	4	13.3
85	12	13.3				90	2	6.7	90	2	6.7
90	6	6.7				100	1	3.3	95	1	3.3
95	1	1.1							100	1	3.3
100	2	2.2									
Total	**90**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**

Resource & Support Recognition											
Total Group			**Control Group**			**Pre Intervention**			**Post Intervention**		
Score	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**
35	2	2.2	55	2	6.7	35	1	3.3	35	1	3.3
45	2	2.2	60	2	6.7	45	1	3.3	45	1	3.3
50	1	1.1	65	1	3.3	50	1	3.3	55	1	3.3
55	4	4.4	70	1	3.3	55	1	3.3	60	2	6.7
60	4	4.4	75	11	36.7	65	1	3.3	70	2	6.7
65	2	2.2	80	9	30.0	70	3	10.0	75	5	16.7
70	6	6.7	85	1	3.3	75	3	10.0	80	7	23.3
75	19	21.1	90	3	10.0	80	10	33.3	85	2	6.7
80	26	28.9				85	2	6.7	90	6	20.0
85	5	5.6				90	7	23.3	95	2	6.7
90	16	17.8							100	1	3.3
95	2	2.2									
100	1	1.1									
Total	**90**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**

Appreciating Social & Environmental Diversity											
Total Group			**Control Group**			**Pre Intervention**			**Post Intervention**		
Score	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**	**Score**	**N**	**%**
55	1	1.1	60	1	3.3	60	4	13.3	55	1	3.3
60	6	6.7	70	3	10.0	70	7	23.3	60	1	3.3
65	1	1.1	80	15	50.0	80	12	40.0	65	1	3.3
70	15	16.7	90	10	33.3	90	3	10.0	70	5	16.7
75	5	5.6	100	1	3.3	100	4	13.3	75	5	16.7
80	31	34.4							80	4	13.3
85	3	3.3							85	3	10.0
90	18	20.0							90	5	16.7
95	1	1.1							95	1	3.3
100	9	10.0							100	4	13.3

Total	**90**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**	**Total**	**30**	**100.0**

Table 8

SELDDA Sub Competencies Questionnaire Survey Control Group, Pre- and Post-Intervention Group Pre-Test

Sub-Competencies		Emotional Awareness	Communication	Constructive Thinking	Enthusiasm	Self-Perception	Behavior Control	Adaptive Behavior	Consequence Evaluation	Initiative
Control	Mean	85.50	77.67	84.67	77.50	70.50	76.00	75.67	85.67	86.33
	N	30	30	30	30	30	30	30	30	30
	Std. Dev.	7.81	7.512	8.70	12.16	4.03	12.76	10.89	9.63	8.09
	Sum	2565	2330	2540	2325	2115	2280	2270	2570	2590
	Variance	60.95	56.44	75.75	147.85	16.12	162.76	118.51	92.64	65.40
Pre Intervention	Mean	84.00	75.00	84.83	75.00	70.00	74.33	73.00	88.00	85.67
	N	30	30	30	30	30	30	30	30	30
	Std. Dev.	9.60	9.75	8.25	12.39	6.03	13.63	10.95	9.25	8.48
	Sum	2520	2250	2545	2250	2100	2230	2190	2640	2570
	Variance	92.07	94.83	68.075	153.46	36.21	185.75	120.00	85.52	71.95
Post Intervention	Mean	85.67	75.50	86.50	74.17	72.17	76.17	75.33	89.33	85.00
	N	30	30	30	30	30	30	30	30	30
	Std. Dev.	10.73	10.54	7.79	13.267	7.62	13.37	11.06	8.58	7.99
	Sum	2570	2265	2595	2225	2165	2285	2260	2680	2550
	Variance	115.06	110.95	60.60	176.00	58.08	178.76	122.30	73.68	63.79
Total	Mean	85.06	76.06	85.33	75.56	70.89	75.50	74.67	87.67	85.67
	N	90	90	90	90	90	90	90	90	90
	Std. Dev.	9.38	9.316	8.20	12.55	6.07	13.13	10.91	9.19	8.11
	Sum	7655	6845	7680	6800	6380	6795	6720	7890	7710
	Variance	87.92	86.80	67.30	157.55	36.84	172.50	118.99	84.38	65.84

Sub-Competencies		Optimistic Outlook	Goal Pursuance	Interdependence	Respect for Self and Others	Resilience	Social Engagement	Internal Regulation	Resource and Support Recognition	Appreciating Social and Environmental Diversity
Control	Mean	79.17	76.67	85.67	87.67	79.50	84.33	71.33	75.50	82.33
	N	30	30	30	30	30	30	30	30	30
	Std. Dev.	12.04	9.59	11.50	8.58	11.16	9.444	10.90	9.035	8.17
	Sum	2375	2300	2570	2630	2385	2530	2140	2265	2470
	Variance	144.97	91.95	132.30	73.68	124.74	89.195	118.85	81.638	66.78
Pre Intervention	Mean	75.17	77.17	85.83	87.50	81.83	82.67	67.67	76.17	78.67
	N	30	30	30	30	30	30	30	30	30
	Std. Dev.	13.61	11.42	11.45	8.88	10.21	11.943	16.54	14.000	11.96
	Sum	2255	2315	2575	2625	2455	2480	2030	2285	2360
	Variance	185.32	130.49	131.18	78.88	104.28	142.644	273.68	196.006	142.99
Post Intervention	Mean	75.83	80.17	86.00	89.17	82.33	83.17	69.83	77.67	80.83
	N	30	30	30	30	30	30	30	30	30
	Std. Dev.	14.57	8.76	11.85	9.20	11.87	12.351	15.73	14.782	12.11
	Sum	2275	2405	2580	2675	2470	2495	2095	2330	2425
	Variance	212.21	76.70	140.35	84.63	140.92	152.557	247.39	218.506	146.70
Total	Mean	76.72	78.00	85.83	88.11	81.22	83.39	69.61	76.44	80.61
	N	90	90	90	90	90	90	90	90	90
	Std. Dev.	13.41	9.99	11.47	8.82	11.05	11.214	14.53	12.747	10.88
	Sum	6905	7020	7725	7930	7310	7505	6265	6880	7255
	Variance	179.87	99.89	131.60	77.85	122.09	125.746	210.80	162.497	118.44

Research Questions

This section will address the five research questions from Chapter 3 by analyzing the study data. The null or alternative hypothesis can be addressed through frequency, correlation, paired T-tests, and ANOVA analysis.

Research Question 1

The first research question was: Does the use of SELDDA improve the development of educator's SEL within four weeks?

H01: Null Hypothesis: SELDDA will not demonstrate any significant change in the educator's SEL ratings between pre-test and post-test ratings.

H11: Alternative Hypothesis: SELDDA will demonstrate a significant change in the educator's SEL ratings between pre-test and post-test ratings.

The SELDDA questionnaire was used to answer this research question. For comparing the outcomes of the pre-and post-test, the paired sample t-test was used. It requires a normal distribution, so the sample data were numeric and continuous. In addition, Pearson's correlation coefficient (R) was calculated between pre-and post-test data to understand their relationships' strength. Furthermore, a one-way analysis of variance (ANOVA) was applied to determine the statistical differences that resulted from the use of SELDDA. After the data were gathered, it was exported from SELDDA and Google Sheets to SPSS for statistical analysis.

Paired Sample T-tests

The result of the paired sample t-test, as shown in Table 9, confirms that the null hypothesis was rejected ($t(60) = -3.933$, $p<0.05$, $d=29$). According to Cohen et al. (2011), this represents a small to medium effect. With a p-value of 0.000, it can be concluded that the total scores of the pre-test intervention competencies were significantly different from the total scores

of the post-test intervention group competencies. However, though the p-value indicates a statistically significant difference between the pre-intervention group and the post-intervention group, it cannot be concluded that it was from the SELDDA tool, since the two groups were also subjected to the SEL video. So, the effect might have been from the SEL video. This is further supported by the p-value of 0.903, testing the difference between the control group's total SEL scores and the post-intervention group's SEL scores. As such, it can be concluded that there was a significant difference between the SEL scores of the control group and those of the post-intervention.

Table 9

Paired Samples T-Test of Competencies

		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig.(2-tailed)
					Lower	Upper			
Pair 1	**Score of Control & Pre Intervention**	25.59	183.6838	33.53592	-42.99988	94.17744	0.763	29	0.452
Pair 2	**Total Score of Control & Post Intervention**	-4.24	188.29258	34.37736	-74.55416	66.06505	-0.123	29	0.903
Pair 3	**Total Score of Pre Intervention & Post Intervention**	-29.83	41.54772	7.58554	-45.34751	-14.31916	-3.933	29	0.000

Pair 4	**Average Score Control &Pre Intervention**	1.03	7.65807	1.39817	-1.83365	3.88549	0.734	29	0.469
Pair 5	**Average Score Control & Post Intervention**	-0.24	7.97125	1.45534	-3.21726	2.73577	-0.165	29	0.870
Pair 6	**Average Score of Pre Intervention Post Intervention**	-1.27	1.76036	0.32140	-1.92399	-0.60934	-3.941	29	0.000

ANOVA Analysis

The ANOVA analysis of the competencies returned p-values greater than the 0.05 level of significance at a 95% confidence interval (Table 10). This indicates that there was no significant difference between the competency scores of the groups. Also, as depicted in Table 11, all the p-values of the sub-competencies are lower than 0.05, indicating their level of significance. As such, it cannot be concluded that there was a significant difference between the groups' sub-competencies (Table 11), which reiterates that there was no significant effect of the SELDDA tool on the SEL skills of the educators within four weeks. Moreover, it cannot be concluded that SELDDA improved the educators' SEL development within four weeks.

Table 10

ANOVA Analysis of Competencies

	Sum of Squares	**Df**	**Mean Square**	**F**	**Sig. /p**

Self-Awareness	Between Groups	64.99	2	32.493	0.843	0.434
	Within Groups	3352.75	87	38.537		
	Total	3417.73	89			
Relationship Skills	Between Groups	30.81	2	15.403	0.206	0.814
	Within Groups	6510.11	87	74.829		
	Total	6540.92	89			
Responsible Decision-Making	Between Groups	84.67	2	42.337	0.814	0.446
	Within Groups	4525.12	87	52.013		
	Total	4609.80	89			
Motivation	Between Groups	5.62	2	2.810	0.047	0.954
	Within Groups	5173.48	87	59.465		
	Total	5179.10	89			
Self-Management	Between Groups	85.62	2	42.808	0.540	0.585
	Within Groups	6900.93	87	79.321		
	Total	6986.55	89			
Social Awareness	Between Groups	75.80	2	37.899	0.658	0.520
	Within Groups	5008.66	87	57.571		
	Total	5084.45	89			

Table 11

ANOVA Analysis of Sub-Competencies

	Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**

Emotional Awareness	Between Groups	50.56	2	25.278	0.283	0.754
	Within Groups	7774.17	87	89.358		
	Total	7824.72	89			
Communication	Between Groups	120.56	2	60.278	0.690	0.504
	Within Groups	7604.17	87	87.404		
	Total	7724.72	89			
Constructive Thinking	Between Groups	61.67	2	30.833	0.452	0.638
	Within Groups	5928.33	87	68.142		
	Total	5990.00	89			
Enthusiasm	Between Groups	180.56	2	90.278	0.567	0.569
	Within Groups	13841.67	87	159.100		
	Total	14022.22	89			
Self-Perception	Between Groups	77.22	2	38.611	1.049	0.355
	Within Groups	3201.67	87	36.801		
	Total	3278.89	89			
Behavior Control	Between Groups	61.67	2	30.833	0.175	0.839
	Within Groups	15290.83	87	175.757		
	Total	15352.50	89			
Adaptive Behavior	Between Groups	126.67	2	63.333	0.527	0.592
	Within Groups	10463.33	87	120.268		
	Total	10590.00	89			
Consequence Evaluation	Between Groups	206.67	2	103.333	1.231	0.297
	Within Groups	7303.33	87	83.946		
	Total	7510.00	89			

Initiative	Between Groups	26.67	2	13.333	0.199	0.820
	Within Groups	5833.33	87	67.050		
	Total	5860.00	89			
Optimistic Outlook	Between Groups	275.56	2	137.778	0.762	0.470
	Within Groups	15732.50	87	180.833		
	Total	16008.06	89			
Goal Pursuance	Between Groups	215.00	2	107.500	1.078	0.345
	Within Groups	8675.00	87	99.713		
	Total	8890.00	89			
Interdependence	Between Groups	1.67	2	0.833	0.006	0.994
	Within Groups	11710.83	87	134.607		
	Total	11712.50	89			
Respect for Self & Others	Between Groups	50.56	2	25.278	0.320	0.727
	Within Groups	6878.33	87	79.061		
	Total	6928.89	89			
Resilience	Between Groups	137.22	2	68.611	0.556	0.575
	Within Groups	10728.33	87	123.314		
	Total	10865.56	89			
Social Engagement	Between Groups	43.89	2	21.944	0.171	0.843
	Within Groups	11147.50	87	128.132		
	Total	11191.39	89			
Internal Regulation	Between Groups	203.89	2	101.944	0.478	0.622
	Within Groups	18557.50	87	213.305		

	Total	18761.39	89			
Resource & Support Recognition	Between Groups	73.89	2	36.944	0.223	0.800
	Within Groups	14388.33	87	165.383		
	Total	14462.22	89			
Appreciating Social & Environmental Diversity	Between Groups	203.89	2	101.944	0.858	0.428
	Within Groups	10337.50	87	118.822		
	Total	10541.39	89			

Research Question 2

The second research question was: Does the use of the SELDDA instrument find significant levels of reliability?

H02: Null Hypothesis: SELDDA will not meet the criterion related to reliability.

H22: Alternative Hypothesis: SELDDA will meet the criterion related to reliability.

A Google Form was used to get the answer to this research question. The following table shows that most of the respondents fell within the “Agree” and “Strongly agree” range (Table 12). For instance, 100% of the respondents strongly agreed, when asked whether they understood all the SEL quiz questions; whereas 73.33% strongly agreed, when they were asked whether they were comfortable while taking the SEL quiz. When asked whether they were given enough time to complete the SEL quiz, 95% of the participants strongly agreed, and 100% strongly agreed, when asked whether they were actively participating while taking the SEL quiz. Only 5% disagreed, when asked whether they were comfortable taking the SEL quiz, representing a very small proportion of the participants. As such, it can be concluded that the use of the SELDDA

instrument finds significant levels of reliability. This confirms the reliability of the SELDDA instrument regarding the assessment of educators' SEC.

Table 12

Google Survey of Participant Engagement & Understanding

Survey Items	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
Item 1: Did you understand all of the SEL Quiz questions?	0	0	0	0	60 (100%)
Item 2: Did you feel comfortable while taking the SEL Quiz?	0	3 (5%)	2 (3.33%)	11(18.33%)	44 (73.33%)
Item 3: Were you given enough time to complete the SEL Quiz?	0	0	0	3 (5%)	57 (95%)
Item 4: Were you actively participating (not tired/ not bored) while taking the SEL Quiz?	0	0	0	0	60 (100%)
Total (n) = 60					

Research Question 3

The third research question was: Does the use of the SELDDA instrument find significant levels of validity?

H03: Null Hypothesis: SELDDA will not meet the criterion related to validity.

H33: Alternative Hypothesis: SELDDA will meet the criterion related to validity.

According to Rashid et al. (2021), an instrument for collecting the data can be found valid if it can measure successfully what the researcher wants it to measure. The researcher can draw conclusions based on solid evidence by unpacking the data through various lenses. The validity of the instrument can also be confirmed when the findings are credible and accurate as perceived by the researcher, the participants of the study, and those who would deeply examine the study.

From the analysis results, 71.66% strongly agreed, when they were asked whether they agreed with the score of their competency based on the SELDDA survey tool (Table 13). Another 70% of them strongly agreed with the scores they got from their top sub-competency; 73.33% strongly agreed with the scores of their lowest competency, while 33.33% strongly agreed with the scores of their lowest sub-competency. On the other hand, only 10% disagreed with the scores of their lowest sub-competency, 6.66% strongly disagreed with the scores of their lowest sub-competency, while only 1.66% strongly disagreed with the results of their lowest competency. From these results, it is clear that the SELDDA instrument finds significant levels of validity.

Table 13

SELDDA Post-Assessment Questions to Measure Result Quality

	Strongly	**Disagree**	**Neutral**	**Agree**	**Strongly**

	Disagree				**Agree**
Do You Agree with the score of your top competency?	0	0	2 (3.33%)	7 (11.66%)	43 (71.66%)
Do You Agree with the score of your top sub-competency?	0	0	3 (5%)	7 (11.66%)	42 (70%)
Do You Agree with the score of your lowest competency?	1 (1.66%)	0	2 (3.33%)	5 (8.33%)	44 (73.33%)
Do You Agree with the score of your lowest sub-competency?	4 (6.66%)	6 (10%)	6 (10%)	16 (26.66%)	20 (33.33%)
Total (n) = 60, Missing = 8					

A Google survey on the quality of SELDDA to measure SEC showed that 70% of the participants strongly agreed, when they were asked whether they thought that the questions asked in the SEL assessment were related to their motivation, emotions, and behaviors (Table 14). When asked whether they thought a better understanding of their motivation, emotions, and behaviors would improve their teaching, 76.66% strongly agreed. Furthermore, when asked whether they better understood their motivation, emotions, and behaviors (SEL) and that it might help them to be happier, 98.33% of them strongly agreed. Also, when asked whether they agreed with their E.Q. score as the outcome of the SELDDA questionnaire, 66.66% of them strongly agreed. And when asked if they thought the COVID-19 situation had a strong impact on their emotional intelligence, 60% of them strongly agreed, while 35% of them agreed. Only 3.33% of

the participants disagreed when asked whether the questions in the SEL quiz related to their motivation, emotions, and behaviors.

The validity of the instrument can also be confirmed, when the findings are credible and accurate as perceived by the researcher, the participants of the study, and those who would deeply examine the study. Moreover, based on the research findings, the SELDDA instrument finds significant levels of validity.

Table 14

Google Survey on Quality of SELDDA to Measure SEC

Survey Items	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
Item 1: Do you think the questions asked in the Item 1: SEL Quiz are related to your motivation, emotions, and behaviors?	0	2 (3.33%)	4 (6.66%)	12 (20%)	42 (70%)
Item 2: Do you think, if you better understood your motivation, emotions, and behaviors (SEL), it might improve your teaching?	0	0	0	14 (23.33%)	46 (76.66%)

Survey Items	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Item 3: Do you think, if you better understood your motivation, emotions, and behaviors (SEL), it might help you to be happier?	0	0	0	1 (1.66%)	59 (98.33%)
Item 4: Do you agree with your E.Q. score as the outcomes of the SELDDA questionnaire?	0	0	5 (8.33%)	15 (25%)	40 (66.66%)
Item 5: Do you think COVID-19 situation has a strong impact on your emotional intelligence?	0	0	3 (5%)	21 (35%)	36 (60%)
Total (n) = 60					

Research Question 4

The fourth research question asked: Does the use of the SELDDA instrument find significant levels of internal consistency?

H04: Null Hypothesis: SELDDA will not meet the criterion related to internal consistency.

H44: Alternative Hypothesis: SELDDA will meet the criterion related to internal consistency.

In this study, the internal consistency was assessed for the overall SELDDA instrument, which had 72 questions divided into six competencies and 18 sub-competencies for 24 elements. For maintaining the integrity of the survey, the participants were required to respond to all the questions of the SELDDA questionnaire. The Cronbach's alpha was 0.910. According to Lamb (2017), any value above 0.7 is acceptable for new measures. The Cronbach's alpha measures the extent, to which all the items in the test behave similarly homogenous. As such, the value of 0.910 for SELDDA internal consistency shows that the SELDDA instrument has significant levels of internal consistency. The statistics related to the internal consistency of the overall SELDDA scale are indicated in Table 15. The SELDDA internal consistency with key competencies removed showed Cronbach's alpha values of 0.902 for relationships skills, 0.902 for motivation skills, 0.912 for internal regulation, and 0.912 for appreciating social and environmental diversity (Table 16). Therefore, all these competency skills have high internal consistency based on Cronbach's alpha scores. The Google survey had a Cronbach alpha of 0.780, which is still acceptable (Table 17). It can be concluded that the Google survey had significant internal consistency. Therefore, the use of the SELDDA instrument finds significant levels of internal consistency.

Table 15

SELDDA Internal Consistency of SELDDA's Competencies and Sub-competencies

Cronbach's Alpha	***N* of Items**
0.910	24

Table 16

SELDDA Internal Consistency with highest and lowest Reliability score

	Cronbach's Alpha Value, if competency was deleted	
Relationship Skills	**0.902**	Competency with Highest Reliability Score
Motivation	**0.902**	Competency with Highest Reliability Score
Internal Regulation	**0.912**	Competency with Least Reliability Score
Appreciating Social and Environmental Diversity	**0.912**	Competency with Least Reliability Score

Table 17

Google Survey Internal Consistency

Cronbach's Alpha	***N* of Items**
0.780	11

Research Question 5

The fifth research question was: How user-friendly is the SELDDA instrument?

H05: Null Hypothesis: SELDDA will not meet the criterion related to usability.

H55: Alternative Hypothesis: SELDDA will meet the criterion related to usability.

Based on the results from the Google survey, 95% of the participants strongly agreed that the design of the SEL quiz was easy to use, with an additional 3% agreeing (Table 18). When they were asked whether they thought the design of the SEL quiz made it easy to navigate from one question to the next, 100% of them strongly agreed. This indicates that the SELDDA instrument is considered user-friendly, where all participants either strongly agreed or agreed that the design made it easy to navigate and use.

Table 18

Google Survey Usability Questions

Survey Items	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Item 1: In general, did you think the design (layout, colors, and look) of the SEL Quiz was easy to use?	0	0	0	3 (5%)	57 (95%)
Item 2: Did you think the design (layout, colors, and look) of the SEL Quiz made it easy to navigate (go) from one question to the next? Total (n) = 60	0	0	0	0	60 (100%)

Summary

In this study, K-12 educators were surveyed to understand how an SEL digital diagnostic assessment like SELDDA can help them improve their social-emotional competencies. Educators' social-emotional skills were assessed with 72 questions included in the SELDDA instrument. Moreover, using pre- and post-test assessments, the usefulness of SELDDA in enhancing social-emotional intelligence has been analyzed. The results confirmed that the SELDDA tool could effectively enhance the social-emotional skills of the educators, who can, in turn, play an influential role in positively motivating the students.

Furthermore, the survey was conducted to assess the reliability, validity, internal consistency, and user-friendliness of the SELDDA instrument so that it can be efficiently implemented in K-12 classrooms settings. These were also confirmed from the participants' responses using a Google Form survey. The results of this survey have indicated that using SELDDA can efficiently help educators better understand their motivation, emotions, and behaviors and those of their students. Eventually, these will create an effective learning environment that promotes engagement and satisfaction. The next chapter will interpret the data and provide a conclusion and recommendations.

Chapter 5: Summary, Conclusions, and Recommendations

Social-emotional competencies help determine how individuals can self-regulate their behavior and create positive relationships with others (Brackett & Rivers, 2014). These competencies also prevent negative emotions (Rahmawati et al., 2021) and help people engage in prosocial and empathetic behavior and manage conflicts effectively (Morrison et al., 2019). Moreover, within schools, educators working in a K-12 environment can find SEL beneficial for instructing their students about the best possible ways to manage their emotions and behaviors and cope effectively with stresses (Zins et al., 2007). At the same time, if educators want to ensure an effective implementation of SEL in classrooms, they need to be proficient in SEL and know how to model and implement SEL (Oliveira et al., 2021). Consequently, educators should strive to enhance their social-emotional competency (SEC), which will help them personally and professionally and aid in the successful and meaningful implementation of SEL programs within their classrooms (Esen-Aygun & Sahin-Taskin, 2017; Frezza, 2018). When educators and students focus on SEL, they create a strong prosocial culture within the classroom and school (Oliveira et al., 2021). This positive culture can be furthered by the inclusion of administration, parents, and the community.

Across the U.S., only 24% of schools utilize effective SEL diagnostic or program evaluation tools, although every state implements some aspect of SEL programs, and 46 states have already adopted SEL-based standards (Atwell, & Bridgeland, 2019; CASEL, 2021; DePaoli et al., 2017). Moreover, SEL programming has yet to achieve efficiency, efficacy, or scale in these schools (Atwell, & Bridgeland, 2019). If schools cannot implement a standards-based, well-designed, valid, reliable, and progress-monitoring SEL-based assessment, it becomes difficult for them to effectively evaluate the SEL baseline or growth of educators or students to

measure the effectiveness of SEL programs or the learning climate (Atwell & Bridgeland, 2019; DePaoli et al., 2017; Mantz el al., 2018; Minney, 2021). Notably, during the widespread COVID-19 pandemic and the use of remote-learning strategies, SEL needed and still needs to be prioritized by all U.S. schools (Hamilton & Ercikan, 2021).

This study investigated the impacts of using the Social-Emotional Learning Digital Diagnostic Assessment (SELDDA) tool on educator SEL development. SELDDA is a new research- and web-based universal SEL diagnostic assessment instrument published in 2020. SELDDA researchers developed the assessment to follow and align with SEL state standards and with CASEL's five core competencies, including a sixth competency, namely motivation (Strut learning, n.d.). Through a quasi-experimental quantitative analysis, this study also evaluated the reliability, validity, and usability of the SELDDA assessment.

Sixty K-12 educators from the U.S. participated in this study and were divided equally into a control and intervention group. Of note, one U.S. participant was working remotely from India. Each educator was familiar with SEL and regularly implemented a standards-based SEL curriculum in their instruction. As part of this study, participants filled out a 72-item SELDDA questionnaire based on a 5-point Likert scale, viewed three 1-hour SEL videos, and took a post-Google Form survey within four weeks. While members of the intervention group participated in a pre-test survey with the SELDDA questionnaire, the control group did not. The outcomes of this study confirmed the reliability, validity, and usability of the SELDDA tool. There was also a general increase in SEC scores between the pre- and post-test within the intervention group, demonstrating that even a short SEL interval can record an impact. However, while the intervention group scores were higher than for the control, the difference was minor and did not significantly demonstrate that SELDDA as a pre-test considerably impacted SEC development.

While SELDDA may be an effective universal SEC diagnostic tool to aid educators and students in understanding their SEC, the current understanding is that it needs to be paired with SEL interventions to create measurable SEC development.

Interpretation of Results

The control group was not subjected to the pre-test SELDDA tool and only assessed social-emotional competency development once within the four weeks. These participants watched the SEL videos and then had their social-emotional competencies measured using the SELDDA tool. The purpose of the control group was to establish an SEC baseline and determine whether the SEL videos alone had an impact on educator social-emotional competencies. Meanwhile, the intervention groups participated in the SELDDA assessment before (pre-test) and after (post-test) watching the SEL videos. The purpose of the pre-test and post-test was to determine, if there was an increase in the SEC within the intervention group. Any change in SEC development would be attributed to either or both the SELDDA pre-test and SEL videos. As a result, to isolate the impact of the SELDDA pre-test, it was necessary to compare the SEC measurements of the intervention and control groups who both watched the SEL videos.

Demographic Interpretation

Participant demographics: age, gender, race, primary language, marriage status, income, education level, and location were collected and analyzed. Participant demographics of this study were relatively homogenous, and there was little difference between the control and intervention groups. Additionally, the make-up of the participants would indicate that they would have a high SEC rating relative to the general population. For the most part, participant demographics should have had little impact on the difference between the control and intervention group scores. If

there was a slight impact, the control group had participant demographics with slightly higher SEL tendencies.

While the population ranged in age from 23 to 63 years, most participants of both groups were in their 30s and 40s. At this age range, individuals are at a high SEC stage (Korotai & Mrnjaus, 2021; Scheibe et al., 2021; Sechi et al., 2021). At younger ages, they are still developing their SECs within multiple domains, and at older ages, they start to experience cognitive declines (Scheibe et al., 2021; Zullo et al., 2021). Most participants were female (85%), and both groups had a similar gender make-up. While age, culture, and other factors can influence SEC development, American female educators often have higher SEC ratings than males (Di et al., 2022; Min et al., 2021). Another demographic parameter is the ethnical background. Most of the participants (93.3%) were White and were similarly distributed between both groups. For their primary language, 97% spoke English, and there was little difference between the control and intervention groups. It was similar with the marital status, where 68.3% of participants were married, and both groups had similar distributions. A healthy marriage is often associated with higher levels of mental health and communication, which may indicate or lead to higher levels of SEC (Santrock, 2018). Further, with all participants employed as U.S. educators, most had an income at or above the national average. The largest segment in both groups had incomes ranging between $65,000 and $114,999. It is well documented that lower socioeconomic environments decrease the development of SEC and that there is a positive correlation between higher SEC and higher incomes (Sanchez-Gomez et al., 2021; Santrock, 2018). Additionally, most participants (81.7%) had at least a master's degree, which can also positively correlate to an increased SEC development (Kim et al., 2021). Lastly, all participants' national identity is American. With SEL research founded in the U.S. and all American schools

integrating some aspects of SEL, it is natural to assert that these participants have a higher awareness and understanding of SEL than most people within and outside the U.S. (CASEL, 2021).

While the demographic make-up of both the control and intervention groups were similar, the control group did have a higher percentage of participants whose primary language was English, a higher percentage of White racial backgrounds, more marriages, and higher incomes, all of which are attribute to higher levels of SEC and may have led to higher SEC ratings. Further, while the SEC in the post-intervention group was higher than that for the control group, it is possible that if the populations were additionally similar, there would be a greater difference in the SEC measurement between the post-intervention and control groups.

Competency Interpretation

The SELDDA model for SEL recorded six competencies and 18-sub-competencies. The intervention group took the SELDDA assessment as a pre-test and post-test and had therefore two scores. There was no significant difference between either group's competency or sub-competency scores based on the ANOVA analysis. For all groups, the mean competency scores ranged from a low of 73.06 for the pre-intervention group’s rating of social awareness to a high of 88.33 for the post-intervention group’s rating of responsible decision-making. As all scores are out of 100 and not normalized, these scores are high SEC ratings. Further, the distribution of scores for the six competencies is narrow, with a range of only 15.27. The overall high ratings are most likely attributed to the sample’s demographics, which correlate with higher SEC values.

While the total mean scores were similar between the control group (M = 480.56), pre-test intervention group (M = 474.17), and post-test intervention group (M = 481.61), the post-test intervention group's mean scores were higher than the pre-test intervention group mean score.

Further, the paired sample t-test confirmed a small to medium effect, supporting a statistical difference between the pre-test and post-test intervention scores. The results support the rejection of research question one's null hypothesis: SELDDA will not demonstrate any significant change in the educator's SEL ratings between pre-test and post-test ratings. Therefore, taking the SELDDA assessment twice or watching SEL videos increased SEC development.

However, the post-intervention group mean was slightly higher than the control group, with only a difference of 1.05, indicating that the change in SEC for the intervention group was mainly attributed to the SEL videos. The P-value of 0.903, testing the difference between the control group's total SEL scores and the post-test intervention group's SEC scores, adds additional support. Therefore, taking SELDDA as a pre-test did not significantly impact educators' SEC development. With the control group having participants that correlate to higher SEC development than the intervention group, it is possible that given a more similar sample, there would be a greater difference attributed to a SELDDA pre-test.

Interestingly, only three hours of SEL videos and an SEL assessment resulted in a measurable SEC development. Further, even this small research interval of four weeks confirmed that SELDDA is sensitive enough to measure a minimal SEC development. Therefore, SELDDA can provide meaningful assistance to educators to measure and target SEC development. With regular SEL professional development and a meaningful SEL assessment tool, significant SEC development and culture could be established, positively impacting student SEC development.

Of note, this study took place during the COVID-19 pandemic at the beginning of 2022. While schools had approximately two years to adjust to COVID-19 and all educators had reasonable access to vaccines, 60% of the participants strongly agreed and another 35% agreed that the pandemic impacted their SEC. No participant indicated that COVID-19 did not impact

their emotional health. Therefore, participants' SEC scores may be lower than in pre-pandemic times.

SELDDA Reliability, Validity, and Usability Interpretation

A vital tool in developing an individual's SEC is the use of a universal SEL assessment tool. Unfortunately, there is a lack of universally accepted SEL measurement tools, especially ones that align with the CASEL-5 competency framework and are accessible, reliable, and valid (Atwell & Bridgeland, 2019; Crowder et al., 2019; DePaoli et al., 2017; McKown, 2019). The lack of effective tools may be a contributing factor to why only 24% of schools in the U.S. utilize an effective SEL assessment tool (Atwell & Bridgeland, 2019; DePaoli et al., 2017). To ensure that SELDDA meets the necessary criteria to be a universal SEL assessment tool, measurements, and analyses on its reliability, validity, and usability were conducted. The results of this study confirmed SELDDA's reliability, validity, and usability with the sample population.

SELDDA Reliability Interpretation

The reliability and stability of the SELDDA assessment tool were assessed through participant self-reports and the test-retest method, which can measure the internal consistency through Cronbach's alpha. The results of a post-SELDDA survey indicated that participants understood all the SELDDA questions (100% strongly agreed), felt comfortable taking SELDDA (73.33% strongly agreed, and 18.33% agreed), had enough time to complete SELDDA (95% strongly agreed, and 5% agreed), and were actively participating during the assessment (100%). These results indicate that participants were active and comfortable taking SELDDA, and their scores should be reliable. As the participants are educators and voluntarily opted-in to the study, it makes sense that they were active in the study. At the same time, an interest in a study does not

guarantee priority, time, and focus throughout the study. This is evidenced by 10 participants involuntary dropping out due to a lack of study completion.

Meanwhile, internal consistency was measured for the overall SELDDA instrument, including its six competencies and 18 sub-competencies. The Cronbach's alpha was 0.910, indicating a strong level of internal consistency. Even when removing the scores for a particular competency, SELDDA's internal consistency remained very high (between 0.902 to 0.912). This analysis shows that among all groups, SELDDA remained reliable and consistent. Participants' responses over the 72 questions, four per sub-competency and 12 per competency, were consistent. The reliability of SELDDA ensures that related questions, such as those within a sub-competency or competency, will have similar scores compared to those of another sub-competency or competency. These results lead to the rejection of research question two's null hypothesis that SELDDA will not meet the criterion related to reliability, and of research question four's null hypothesis that SELDDA will not meet the criterion related to internal consistency. Alternatively, this confirms the reliability and consistency of the SELDDA instrument in assessing educators' SEC. Of note, reliability at a competency and sub-competency level were assessed, but not at a specific question level to determine, which of the 72 questions were the most reliable and consistent.

SELDDA Validity Interpretation

While the reliability of an instrument ensures that scores are consistent over time and with different users, it is equally important to ensure the accuracy of what is being measured. To assess the validity of SELDDA in measuring SEC, two different self-reports were analyzed. One self-report within SELDDA asked users whether they agreed with their SEC results. Another

survey, after the SELDDA assessment, also asked about their understanding and agreement with their SEC results.

The results of the SELDDA post-assessment questions indicated that the majority of all participants either strongly agreed or agreed with their SEC results: highest competency (71.66% strongly agreed, and 11.66% agreed), highest sub-competency (70% strongly agreed, and 11.66% agreed), lowest competency (73.33% strongly agreed, and 8.33% agreed), and lowest sub-competency (33.33$% strongly agreed, and 26.66% agreed). No participant disagreed with their highest competency or sub-competency results. However, 1.66% strongly disagreed with their lowest competency, and 16.66% disagreed (strongly disagreed and disagreed) with their lowest sub-competency results. There was little disagreement with scores and nearly all of these disagreements related to the identification of their weakest SEC skills. It may be easier to accept feedback on one's strengths than on challenges. Overall, the results demonstrate that individuals felt their SEC scores aligned well.

The results from the post-SELDDA survey further supported SELDDA's validity. Participants responded that the questions within SELDDA were related to SEL (70% strongly agreed, and 20% agreed), that the results of SELDDA helped them better understand SEC (98.33% strongly agreed, and 1.66% agreed), and that they agreed with their SELDDA results (66.66% strongly agreed, and 25% agreed). These responses indicate that SELDDA does measure SEC, the SEC results are meaningful, and participants mostly agree with their results. Therefore, research question three's null hypothesis: SELDDA will not meet the criterion related to validity, was rejected. SELDDA is considered a valid measure of SEC development.

SELDDA Usability Interpretation

Although an assessment might be considered reliable and valid, it may not be well adopted or effective if it is not accessible. With digital technology, effective UXUI is essential to ensure that there is little friction for users to accomplish their goals. Assessments can be challenging and stressful, and a user experience that makes the process easy and intuitive enhances reliability.

The post-SELDDA survey measured the usability of SELDDA. Participants responded that they thought the SELDDA design was easy to use (95% strongly agree, and 5% agreed), and the SELDDA's design made it easy to navigate (100% strongly agree). As a result, research question five's null hypothesis: SELDDA will not meet the criterion related to usability, was rejected. All participants found SELDDA user-friendly.

SELDDA Found Reliable, Valid, and User-Friendly

A well-designed, valid, and reliable SEL-based assessment is indispensable for evaluating SEL programs' growth and effectiveness (Mondi et al., 2021). Through this study, it has been shown that SELDDA met all the following criteria: reliability, validity, and consistency, which are not fulfilled entirely by previously developed SEL assessment tools. This makes SELDDA more effective in assessing the SEL competencies of individuals, as highlighted below:

1. SELDDA is fully aligned with CASEL's 5-component model and SEL standards.
2. SELDDA is capable of delivering timely interpretations, instantaneous results, and recommendations.
3. SELDDA uses formative information for progress monitoring.
4. SELDDA has multiple reporter formats.

5. SELDDA can ensure SEL development.

Discussion of the Results in Relation to the Literature

This study revealed that SELDDA has high levels of reliability, validity, and usability as an SEL assessment tool. Therefore, this section will briefly compare its value to previously mentioned and popular SEL assessment tools. Additionally, SELDDA will be reviewed for its ability to meet the needs of a digital SEL assessment tool.

Comparison of Different SEL Assessment Tools with SELDDA

As highlighted in the literature review of this study, previously developed SEL assessments have some internal limitations. The SELDDA design attempted to address most of these issues. For instance, the Devereux Student Strengths Assessment (DESSA) system is a popular SEL assessment tool with some stated challenges. The time to train and assess a group of 20 students in a classroom using the DESSA system requires more than five hours. For evaluation and analysis, additional time is needed (Merrell & Gueldner, 2010). However, for participating in an online SELDDA survey, individuals need to spend much less time, as only 10 to 30 minutes of guided training time is required.

Furthermore, the DESSA assessment is only an observational tool and does not involve any direct or self-report assessment, so limited information can be gained (Elliott et al., 2018). On the other hand, as SELDDA applies both self-report and direct assessment questions, various information related to SEL can be obtained from the participants. Additionally, SELDDA's multi-reporters allow a third person (e.g., parents, specialists, older students, or their peers) to review comparisons, helping reduce bias.

Similarly, Social Skills Improvement System (SSIS), another assessment, has its limitations as it depends on direct observation and is a costly assessment tool, making it

challenging to implement for schools with limited budgets (Garro, 2016). Direct observation might be affected by the observer's judgment and/or bias, which may affect the reliability of the assessment. SSIS costs $20 for each participant or $4,100 per school (Garro, 2016; SSISCoLabs, 2022). These limitations were addressed by SELDDA, which is free for individuals and educators. Moreover, SELDDA provides additional options, such as next-step recommendations for its users, and the reports generated can be easily shared with the principal, learning specialists, and parents. A teacher or student can use this SELDDA tool unlimited times, allowing progress monitoring with comparative results features over time. These features are not available in other SEL assessment tools like DESSA or SSIS.

The literature review has also highlighted the benefits and limitations of some other SEL assessment tools. For example, the Delaware Social-Emotional Competency Scale (DSECS-S) is a self-report scale based on CASEL's 2012 SEL competency framework. A significant limitation of self-reports is informant bias, especially the social desirability bias (Mantz et al., 2018). In addition, through DSECS-S, educators and school administrators cannot identify the relative strengths and weaknesses of the users in separate SEL domains. Instead, this tool only offers information on the general SEC of users. Hence, this tool suffers from a lack of effectiveness in assessing the different social-emotional competencies of users (Mantz et al., 2018). Meanwhile, SELDDA breaks down scores into six SEC competencies and 18 sub-competencies, which can be compared over time and with other populations.

Another tool, called Panorama Education's Social-Emotional Learning Measurement, is a newly developed online platform for assessing the SEL proficiencies of students in third to twelfth grades (Panorama Education, 2020). However, the reliability and validity of this tool were not confirmed by previous researchers. In addition, this tool uses a long form for responses

and does not employ an optimized user design (Evans, 2020), which may involve more significant reporting errors and create a cognitive overload. These challenges have been successfully overcome in the SELDDA tool through a user-centered design.

One of the newest SEL measurement tools is SELweb, which possesses many qualities like SELDDA. SELweb is a digital, internet-based, and self-administered social-emotional competency measurement tool that is reliable and valid (McKown, 2017a; Russo-Ponsaran et al., 2019). SELweb also follows the CASEL's five-competency model (McKown, 2017b). However, unlike SELDDA, SELweb is not free and is accessible to classrooms and schools at an average cost of $4 per user for an annual subscription (McKown, 2019a). SELweb also does not offer multi-reporter functions and parent engagement facilities, making it less effective. Moreover, this SEL assessment uses a game-based scenario, which can skew motivational measurements (Baidern et al., 2021; Nair & Mathew, 2021). SELDDA also reduces errors with a limited number of questions per screen (six for adults and one for children), and a user can easily restart the assessment at any time. Users can access SELDDA through any web-based computer or tablet. These options are not integrated into other SEL assessment tools like SELweb or DSECS-S.

Effectiveness and Usability of SELDDA as an Online SEL Assessment Tool

The current literature review has emphasized the value of using technology in education. Kassymova et al. (2019) argued that education technology enhances individuals' cognitive, intrapersonal, and interpersonal abilities. Through technology, educators and learners can easily interact, which helps them develop skills like collaboration and communication (World Economic Forum, 2015). The internet has offered the opportunity to learn and teach from any place and time (Hamidi & Chavoshi, 2018). Technology also allows for greater access to diverse

learners through universal learning design (UDL; Morra & Reynolds, 2010), cognitive theory of multimedia learning (CTML; Mayer, 2011), and the enhancement of the user experience through the human-computer interaction (HCI) framework (Dobbins & Denton, 2017).

The World Economic Forum (2016) mentioned that technology could play an essential role in fostering SEL cost-effectively and efficiently by integrating the physical and virtual worlds and facilitating forms of human interaction. Different crucial 21st-century skills, such as collaboration, persistence, and communication, can be facilitated by technology, which is also at the core of SEL (World Economic Forum, 2016). At the same time, several SEL assessment tools use technology to measure individuals' SEL competency efficiently and cost-effectively (McKown et al., 2016; Panorama Education, 2020).

SELDDA is a digital, internet-based SEL assessment tool that can determine individuals' strengths and weaknesses regarding their social-emotional skills (Strut Learning, n.d.). By analyzing six SEL competencies and 18 sub-competencies, SELDDA can provide related recommendations and suggest targeted activities (Strut Learning, n.d.). The majority of the participants of this study (98.33%) using this tool opined that they had an increased understanding of their emotions and behavior after participating in the SELDDA survey. Moreover, 95% of the respondents indicated that it was not difficult to use the SELDDA questionnaire and to navigate from one question to the next due to its simplistic design. These have confirmed the effectiveness and usability of this newly developed digital SEL assessment tool. Some other advanced features of SELDDA, like the auto-forwarding system, a limited number of questions per screen, audio narration, prevention of making unnecessary response changes, and notifications to enhance engagements, etc., have made this tool unique, efficient, and user-friendly (Strut Learning, n.d.).

Furthermore, except for users' email addresses, SELDDA does not gather personal identifiable information and meets the Family Educational Rights and Privacy Act (FERPA) and I.L. privacy standards (Yau, 2021). This aspect is vital for ensuring the privacy and confidentiality of the users in a digital world. In today's COVID-19 or post-COVID-19 world, it is necessary to have self-directed, remote, and hybrid technology options – all of which SELDDA provides.

Discussion of the Results in Relation to the Theoretical Framework

According to Goleman (1995), “emotional intelligence is the capacity for recognizing our feelings and those of others, for motivating ourselves, and for managing emotions well in ourselves and in our relationships” (p. 316). Goleman's model of emotional intelligence included five categories: self-awareness of emotional responses, self-regulation to manage emotional expression, motivation of self, empathy towards others, and understanding others' emotions and social skills (Goleman, 1995; Valler-Gorfien, 2019). Again, Collaborative for Academic, Social, and Emotional Learning (CASEL) proposed and popularized a five-competency framework (CASEL-5), which includes self-awareness, self-management, social awareness, relationship skills, and responsible decision-making (CASEL n.d.-b, para. 2). SELDDA is also based on Goleman's theory of emotional intelligence and focuses on all the five competencies proposed by CASEL. Besides, SELDDA focuses on an additional complementary sixth competency, motivation, which many experts deem an equally important SEL competency (Zins et al., 2007).

While designing the SELDDA instrument, the theory of human-computer interaction (HCI), which focuses on how humans design, interact with, and use technology, was fully integrated (Carroll, 2013). In addition, the cognitive theory of multimedia learning (CTML) (Mayer, 2011) was also considered in this regard concerning graphic use, content reinforcement,

and the reduction of stimuli to prevent a cognitive overload (Yau, D., 2021). HCI can play an essential role in improving users' engagement and retention using effective technology designs, enhancing their social-emotional competencies (Dobbins & Denton, 2017). HCI mainly concentrates on the design of the graphical user interface (GUI) or the front-end that is facilitated by the user interface (UI) and the user experience (UX) design (Carroll, 2013). Again, CTML provides information about the best possible ways to reduce cognitive overload and enhance engagement through multimedia technology (Greer et al., 2013). In this study, HCI and CTML have provided foundational frameworks for integrating SEL and technology, as implemented within the SELDDA assessment tool.

HCI also emphasizes the users' needs (Neilsen & Wilson, 2019). Accordingly, the SELDDA designers have included user-friendly options like an auto-forwarding system, text-to-speech choice, and only six multiple-choice questions per screen. As a result, according to the current study participants, the SELDDA tool was straightforward and enjoyable for them to use. They also opined (100%) that with the design of the SELDDA questionnaire (layout, colors, and look), it was comfortable for them to navigate easily from one question to the next.

Recommendations for Future Studies

Additional studies on SELDDA's reliability, validity, and usability must be conducted to confirm its use as a universal SEL assessment tool. Future studies should look at larger and more diverse population samples. Additionally, SELDDA should be tested with other populations besides K-12, including college educators and students. Further, more studies on the impact of SELDDA or SEL assessments to impact SEC development without additional SEL interventions should be conducted. Lastly, longitudinal studies are necessary to measure SEC development's mid and long-term impacts.

More studies are necessary on SEL assessments, especially ones that focus on all elements of the larger education ecosystems: students, parents, and/or administrators, all of whom need to evaluate and practice their social-emotional competencies to create a robust SEC-focused culture. In addition, there should be studies focusing on making SEL assessments more user-friendly and interactive, including more mobile-focused frameworks. Further efforts at offering digital features and frameworks within SEL assessments that allow all learners, including, but not limited to, the visually impaired and mobility-impaired, should also be evaluated.

Lastly, more research is necessary to determine how SEL assessments need to be differentiated for different and diverse populations, whether by age, gender, or other demographics. Assessments need to be sensitive and culturally appropriate to prevent bias and produce meaningful results. With increased instructional differentiation and personalization, it is necessary to have individualized and personalized SEL development plans.

CASEL (2019e) highlighted that SEL development would significantly influence learners' social, emotional, academic, career, and lifelong success. Future studies can also focus on how new SEL programs are better aligned with the emotional intelligence of the individuals and enhance their social-emotional skills.

Implications For Future Research

Professional development is essential for all K-12 educators. With SEL being relatively new for educators, they must continue evaluating and becoming proficient with SEL. Many educators often find it hard to manage their emotions inside the classrooms and tackle different conflicts (Valente & Lourenço, 2020). Participation in an assessment like SELDDA can help them become more fluent with SEL and understand their own SEL strengths and challenges.

Consequently, they will be better equipped to help their students solve their social-emotional challenges. Further, SELDDA could be used as a universal SEL assessment tool for the classroom and the school to ensure individual SEC development and a positive prosocial culture.

As the SELDDA tool is recently published, understanding its effect as a diagnostic tool on educator SEL achievement, assessing its reliability, validity, and usability, as well as evaluating the impact of user experience design can add meaningful value to the SEL knowledge community. As a result, this study may provide foundational knowledge of how best to integrate SEL with digital technology and how SELDDA and digital SEL assessments can be effectively used to measure the SEL competency of educators.

Future researchers and assessment developers will find the results of this study helpful for designing more effective and user-friendly SEL assessment tools that will emphasize visual design. Eventually, this will ensure better SEL assessments that educators and students consider essential for enhancing engagement and managing emotions. Furthermore, using the current study results, future researchers and SEL assessment developers will be able to reduce the amount of time required for implementing and completing assessments.

Conclusions

It is evident from this study that SELDDA is an effective SEL assessment tool, and hence it should be widely used in K-12 schools in the USA. An assessment tool like SELDDA can play an essential role in enhancing educators' social and emotional skills. This can make them more capable of managing their emotions and make them more competent in coping with stresses in the workplace. These educators will be able to create a more conducive learning climate within schools and motivate the students to gain success in their schools and their lives. Hence, though SEL is currently taught separately in the majority of the schools, it needs to be integrated

throughout the curricula for greater effectiveness. This will also make SEL more practical, realistic, and pervasive to improve the world.

This study showed that SELDDA is an educator-focused, direct (scenario-based) and indirect (self-assessment), multi-rater (student and parent/teacher), CASEL- and standards-aligned, affordable, accessible (digital), and easy-to-use assessment. These qualities combined are not present in previously developed SEL assessment tools like SELweb, DESSA, or SSIS. Furthermore, as this study confirms the reliability, validity, and usability of SELDDA as a practical SEL assessment, school administrators and principals should come forward and adopt this tool for their respective educational institutions. Further research is needed to determine SELDDA's efficacy in measuring students' SEC.

The current worldwide COVID-19 pandemic has posed severe challenges in social-emotional development for educators and students. Issues like these raise the need for SEL assessments and tools to help individuals evaluate, understand, and address their social-emotional needs, such as anxiety and depression. SELDDA is one of many complementary tools, which can be leveraged to help foster positive mental health practices.

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Appendix A: SEL Academic Study: Online Consent Form

Investigator: Mitch Schneider (researcher and doctoral candidate)

Study Title: First Steps in Social Emotional Learning Technology: A Digital Diagnostic Assessment's Impact on Educator Social Emotional Learning Development

Study Summary:
I am asking you to join in a research study about social-emotional learning (SEL) assessments for teachers. You will be asked to take two online assessments and watch three SEL professional development videos. This will take about 4-5 hours over four weeks. This includes watching three – 1-hour SEL professional development on-demand videos, taking a 30-minute SEL assessment, and taking a 10-minute survey. The entire process is online and self-directed from an instruction guide. The study may cause a risk to privacy and confidentiality if there is a breach of data. This study will involve risks related to data security, loss of time, frustration, and social. Although you may not benefit, it will help expand our knowledge about SEL. It can provide knowledge to improve SEL assessments and the SEL development of teachers. As a result, you will be offered professional development credit, additional access to 60+ on-demand workshops, and greater knowledge within SEL.

** Please take your time to read the entire document. Feel free to ask any questions before signing this document. **

Study Details:

Purpose:
This study aims to measure the impact of a diagnostic Social-Emotional Learning (SEL) assessment on educator SEL professional development while also assessing the efficacy of the SEL assessment tool.

Procedures:
The study involves two (2) online assessments (an SEL Assessment and a Google Form Survey) and watching three (3) one-hour SEL on-demand professional development videos. Both assessments follow a standard 5-point scale. These assessments are not knowledge-based, and there is no right or wrong answer. Involvement is estimated at 4-5 hours over four weeks and in a self-directed (you can follow the instruction sheet with all relevant information and access) manner.

The first survey is an online SEL assessment called the Social-Emotional Learning Digital Diagnostic Assessment (SELDDA). SELDDA is academic and Collaborative for Academic Social-Emotional Learning (CASEL) aligned. It asks a series of questions in six areas of SEL: self-awareness, self-management, social awareness, relationship development, responsible decision-making, and motivation. SELDDA takes about 30 minutes. The second survey is a Google Form survey about your experience with SELDDA and SEL. The survey seeks to evaluate your perception of the usability, validity, and reliability of SELDDA. The Google form also follows a 5-point scale and is estimated to take 10 minutes.

60 teachers from U.S. K-12 schools are asked to join in this study. Participants are recruited through Facebook direct messages and public groups, and LinkedIn direct messages. They will be divided equally into a control and an intervention group. All activities are online and will take about 4-5 hours over a 4-week period. During the four weeks, you may choose when to engage in the study activities.

** The control group will not take any initial SEL assessment. They will watch three one-hour, on-demand SEL professional development workshops and then take the assessments (SEL assessment and Google Form survey). After the consent form is filled out, engaging in the videos can begin. After the videos, the SEL assessment and then the Google Form survey should be accessed.

** The intervention group will take the SEL assessment as the initial activity. Then they will follow the same process as the control group by watching three videos and taking additional assessments (SEL assessment and Google Form). After the consent form is filled out, engaging in the SEL assessment can begin. Afterward, the videos, SEL assessment, and Google Form survey should be accessed.

Compensation:
1. You will receive a certificate for each of the 1-hour SEL workshops you completed. This can be used for the Illinois State Board of Education (ISBE) Professional Development credit for the Professional Educator License.
2. You will receive free access to an additional 60+ SEL on-demand workshops for four weeks after the study is complete. They can be used for professional enrichment.

Risks to Participants:
There are some risks associated with this study:
1. There is a risk of data security. The study involves collecting data through online forms for recruitment, SEL assessment, and Google Form survey. This information is collected and stored in digital files. As a result, data security could be lost through a data breach or hacking. This could cause access to your study data.
2. There is a risk of a loss of time. The entire time is estimated at 4-5 hours over four weeks and therefore requires your personal time.
3. There is a risk of frustration. Since the SEL assessment asks you to think and reflect about your motivation and emotions, it may cause frustration. Also, engaging in surveys may cause frustration.
4. There is a possibility of social risk. With recruitment through social media, there is no expectation of confidentiality. This may result in some participant interactions or identification.

Measures to Minimize these Risks:
The study is entirely online. There will be no hard paper copies with any personal or confidential information. The loss of digital data security will be addressed in several ways:
1. Your personal information will be recorded but kept confidential. It will not be directly associated with any study data. It will only be accessible by myself.

2. All research responses and notes will only use your User ID and pseudo name. No file will exist with your personal information and your response data.
3. All files with survey data but without personal information will be secured on a private, encrypted cloud folder, accessible only by myself.
4. A master file that links participant information and user Id and pseudo name will be encrypted, password-protected, and stored offline. This file will only be accessible by myself.
5. I will be the only individual contacting participants and collecting data. I will guard all materials.
6. During the study, participants will be asked not to communicate with each other.

Benefits:
Although you may not benefit, it will help expand SEL knowledge. By joining this study, you may have a greater awareness and understanding of your SEL and SEL development. You will also receive three hours of SEL professional development. Further, you will have free access to SELDDA but with the option of exclusive enhanced reports. Additionally, more may be learned about SELDDA's ability to be a meaningful SEL assessment tool, the value of an educator SEL assessment, and frameworks for accessible, digital SEL assessments.

Alternatives to Participation:
Involvement in this study is voluntary. You may withdraw from the study at any time without any penalty.

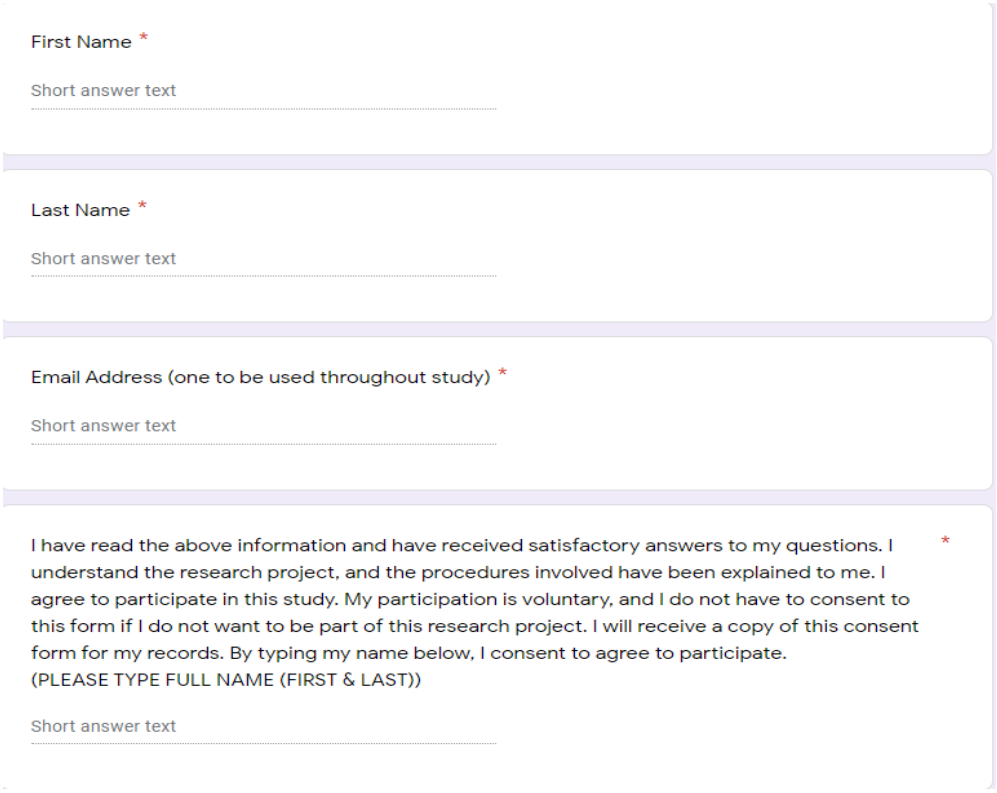
Confidentiality:
During this study, information will be collected about you for this research. This information includes name, email address, age bracket, language spoken at home, highest degree, marital status, and zip code. All identifiable information will be password-protected, encrypted, and stored in a private, unshared/ not networked folder on my personal computer. Only I will have access to these files. However, I will keep general digital research files, without identifiable information, in a private Google Drive folder. After the study is completed, research reports and data, without any identifiable information, will be shared with my dissertation committee and participants who requested a report copy. Please note, it is possible that there would be a loss of confidentiality if my computer is hacked and encrypted files were decrypted.

It is possible that your data, without your personal information, may be used for future research or distributed to another researcher without your consent. Also, your research records may be reviewed by federal agencies whose responsibility is to protect human subjects participating in research, including the Office of Human Research Protections (OHRP) and by representatives from The Chicago School of Professional Psychology Institutional Review Board, a committee that oversees research.

Questions/Concerns:
If you have questions about the procedures described in this document, please contact me: Mitch Schneider, mschneider@ego.thechicagoschool.edu. If you have questions about the research or research participant right, you may also contact my Doctoral Chair- Dr. Katherine Green, at kgreen1@thechicagoschool.edu.

If you have questions concerning your rights in this research study, you may contact the Institutional Review Board (IRB), which is concerned with protecting subjects in the research project. You may reach the IRB office Monday-Friday by calling 312.467.2335 or writing: Institutional Review Board, The Chicago School of Professional Psychology, 325 N. Wells, Chicago, Illinois, 60654.

Consent to Participate in Research requested by researcher Mitch Schneider:



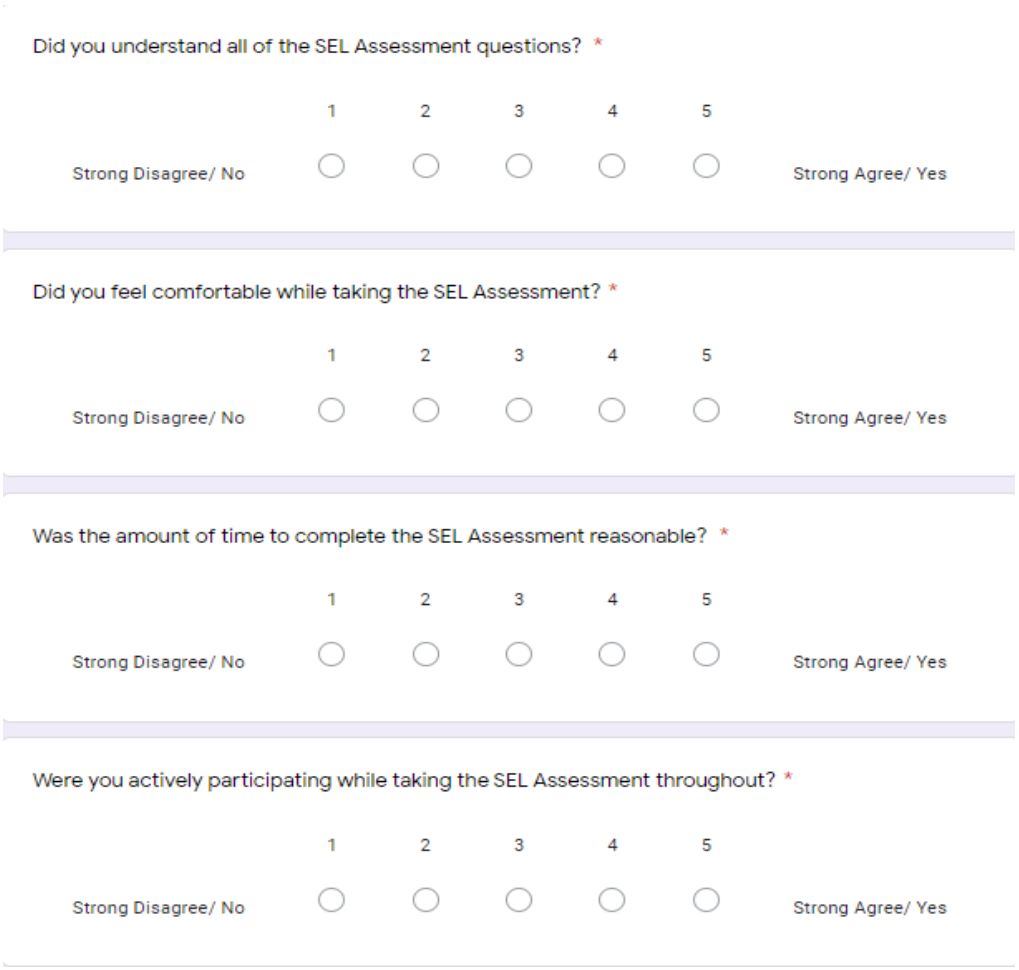
Appendix B: SELDA Questionnaire

Demographic pre-assessment:

- What is your age?
- Which language is primarily spoken in your home? English, Arabic, Chinese, French(/Creole), German, Hindi, Italian, Japanese, Korean, Polish, Portuguese, Russian, Spanish, Tagalog, Vietnamese, Other, Prefer not to say.
- What is the highest degree or level of education you have completed?
- What is your marital status?
- What country is your ZIP code in?

Regular assessment: (omitted)

(scroll to the next page)



Perception of Validity:

Do you think the questions asked in the SEL Assessment help you better understand your motivation, emotions, and behaviors? *

	1	2	3	4	5	
Strong Disagree/ No	○	○	○	○	○	Strong Agree/ Yes

Do you think if you better understood your motivation, emotions, and behaviors (social-emotional learning), it might improve your teaching/ classroom management? *

	1	2	3	4	5	
Strong Disagree/ No	○	○	○	○	○	Strong Agree/ Yes

Do you think if you better understood your motivation, emotions, and behaviors (social-emotional learning), it might help you to feel happier/ more satisfied? *

	1	2	3	4	5	
Strong Disagree/ No	○	○	○	○	○	Strong Agree/ Yes

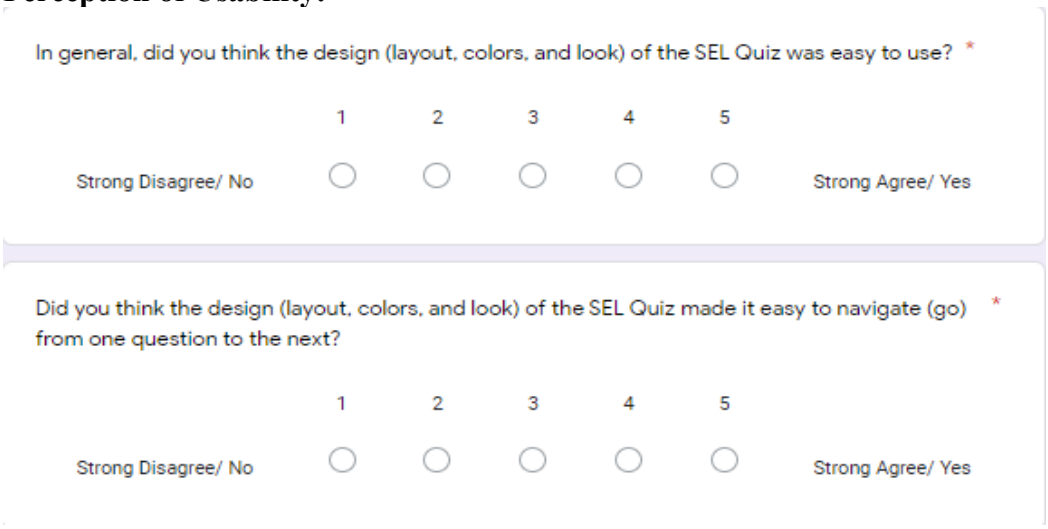
Do you agree with your EQ score from the outcome of the SELDDA questionnaire? *

	1	2	3	4	5	
Strong Disagree/ No	○	○	○	○	○	Strong Agree/ Yes

Do you believe that the COVID-19 situation has had a strong influence on your social emotional learning/ emotional intelligence? *

	1	2	3	4	5	
Strong Disagree/ No	○	○	○	○	○	Strong Agree/ Yes

Perception of Usability:

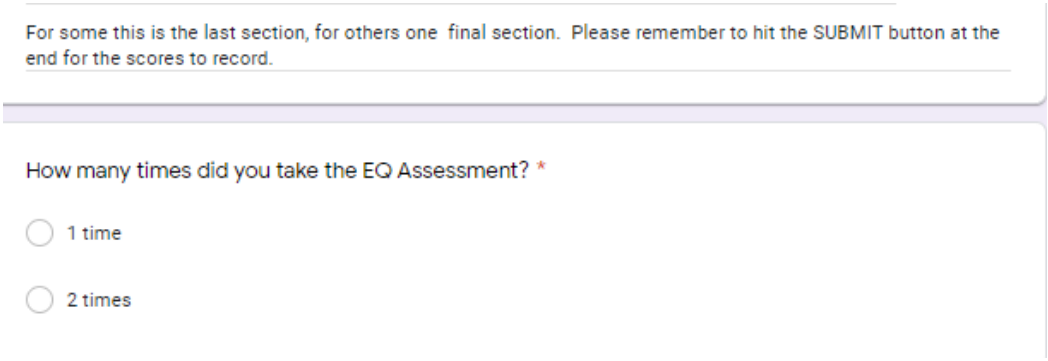

In general, did you think the design (layout, colors, and look) of the SEL Quiz was easy to use? *

	1	2	3	4	5	
Strong Disagree/ No	○	○	○	○	○	Strong Agree/ Yes

Did you think the design (layout, colors, and look) of the SEL Quiz made it easy to navigate (go) from one question to the next? *

	1	2	3	4	5	
Strong Disagree/ No	○	○	○	○	○	Strong Agree/ Yes

Number of times EQ Assessment taken:


For some this is the last section, for others one final section. Please remember to hit the SUBMIT button at the end for the scores to record.

How many times did you take the EQ Assessment? *

- ○ 1 time
- ○ 2 times

[Please see the next page for the remainder of the Google Form questionnaire]

THIS LAST SECTION is if you took the SEL Assessment a second time (two times):

This helps me to understand if found it helpful to take the quiz a second time.

Do you think your SEL Assessment score is similar to last time? *

	1	2	3	4	5	
Strong Disagree/ No	○	○	○	○	○	Strong Agree/ Yes

Do you think the SEL Assessment was easier than compared to the first time? *

	1	2	3	4	5	
Strong Disagree/ No	○	○	○	○	○	Strong Agree/ Yes

Did you like the features of the SEL Assessment such as 1) text to speech, 2) auto-forward, 3) messages...? *

	1	2	3	4	5	
Strong Disagree/ No	○	○	○	○	○	Strong Agree/ Yes

Do you think you have an increased understanding of your motivation, emotions, and behaviors (social-emotional learning) after this second SEL Assessment? *

	1	2	3	4	5	
Strong Disagree/ No	○	○	○	○	○	Strong Agree/ Yes