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HOW MTSS AND UDL FRAMEWORKS CAN BE USED TO REACH ALL LEARNERS AND REDUCE  
UNNECESSARY SPECIAL EDUCATION EVALUATIONS

A MASTER'S THESIS  
SUBMITTED TO THE FACULTY  
OF BETHEL UNIVERSITY

BY  
MARWA SALLAM

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS  
FOR THE DEGREE OF  
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BETHEL UNIVERSITY

HOW MTSS AND UDL FRAMEWORKS CAN BE USED TO REACH ALL LEARNERS AND REDUCE  
UNNECESSARY SPECIAL EDUCATION EVALUATIONS

Marwa Sallam

November 2023

APPROVED

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### **Abstract**

The global COVID pandemic changed the educational landscape as we knew it in a drastic way. With the rise of special education evaluation requests and a need to strengthen the MTSS framework across schools, an urgency developed around the intersection of MTSS with interventions, including how accurately implementing UDL strategies could alleviate the pressure on the MTSS framework at schools. Many schools who were previously reactive to students who were struggling academically or behaviorally needed to take a more proactive and intentional approach. The author of this thesis reviewed a number of relevant literature that explored different examples of educational institutions with schoolwide structures where special education teachers and general education teachers work together and the MTSS process ended up being more inclusive and collaborative. This leads to better data gathering for students and stronger student outcomes. The purpose of this thesis is to explore best practices in supporting the development of a strong MTSS process and reducing the number of unnecessary special education evaluations.

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## CHAPTER I: INTRODUCTION

The focus of this thesis is centered around researching the ideal environment and attributes where Universal Design for Learning (UDL) and Multi-Tiered System of Supports (MTSS) complement each other to accurately identify the students who have been receiving solid interventions and which students would benefit from more intensive supports. The importance of addressing MTSS supports within a strong foundational UDL approach will also be explored in examining the comprehensive approach that makes this sustainable in an educational institution. To further understand the topic, it is this paper's intent to define and apply the definitions of terms to the world of special education as they relate to the topic.

### **Context and Theoretical Framework**

Since 2004, Response to Intervention, or RTI, was the most commonly recognized term when talking about identifying students' academic struggles early on and providing the impacted students with the support needed. RTI became a widely used educational term and the best practice way to deliver tiered interventions to students who needed them. Prior to the integration of MTSS, Response to Intervention (RTI) addressed academic needs, and Positive Behavior Intervention System (PBIS) addressed behavioral needs; both frameworks shared similar characteristics. The two programs attempted to coordinate and streamline schoolwide prevention systems and use universal screening and progress monitoring efforts (Harn et al., 2015). They both focused on professional development and on gaining leadership support in order to make headway in school-wide implementation. Educators learned a lot from



implementing RTI and PBIS supports and it slowly paved the path to what is currently known and understood as MTSS. The MTSS framework was a slightly more prescriptive lens than the one employed under the No Child Left Behind Act (NCLB) in which academic interventions were seen as separate and operated under a different scope than behavioral interventions.

With the enactment of the Every Student Succeeds Act (ESSA) in 2015, sweeping reforms to education closely followed. While these reforms have been in place for nearly a decade, the arrival and aftermath of the global COVID-19 pandemic placed stronger scrutiny on the implementation of these reforms and the implications of them in the existing school systems. Once ESSA was signed into law, the structure of a Multi-Tiered System of Supports (MTSS) became a crucial framework for schools to follow. Thomas et al. (2023) referenced the I-MTSS Research Network when defining MTSS as a comprehensive and equitable framework for improving the outcomes of all learners. A true MTSS framework, when used as intended, addresses both academic and behavioral supports for all students, including students who are at risk for disabilities. Looked at through a closer lens, the MTSS prevention framework can be viewed as a continuum of evidence-based, systematic, structured practices to enact transformative change for students on a wider scale (Slanda & Little, 2020). The origin of MTSS can be found in the three-tiered public health strategy that was employed and carried out by the Centers for Disease Control and Prevention (CDC). From there, it branched into educational institutions and became instrumental in providing a structure for identifying needs for special education (Sailor et al., 2021). The emphasis on prevention and differentiation is contrasted with historic and traditional models of placement and tracking that often provide inequitable

access to grade-level content. The traditional practice of tracking students did little to advance academic proficiency.

In contrast, the process of implementing the data-driven framework of MTSS involves increasing the intensity, frequency, and dosage of instruction/intervention to students based on their individual needs as determined through assessments and progress monitoring data. In fact, Coyne et al. (2022) further described the goal of MTSS as narrowing the opportunity gaps by increasing the aforementioned supports to students. The supports are described in a tiered system, in which Tier 1 is the core level instruction that all students are exposed to and in which the standards-based instruction takes place. Roughly 20% of students will need additional supports, which is where Tier 2 level supports come in. These are the intensive instructional practices and strategies that would be provided in a smaller setting to the students who require them. This intervention is often labeled as supplementary and supports the Tier 1 instruction, instead of replacing it. It is provided alongside the general, core instruction (Nelson et al., 2020). The last tiered support of the MTSS structure is the Tier 3 intervention, the most intensive of the supports. Students receiving this level of support require a higher dosage and intensity of support and may require additional means of engagement. Students in this tier may require a different continuum of intensive interventions that are used alongside other supports.

MTSS emphasizes the need for teams to consider the comprehensive and overall needs of the students and encourages collaboration and coordination across departments. Further, with MTSS, there is more of an emphasis on the integration of supports. In fact, the Kansas

State Department of Education (KSDE) was the first state in the country to launch a statewide initiative to combine tiered intervention strategies under the newly phrased Multi-Tiered Systems of Support (Sailor et al., 2021).

Another important framework to understand in order to frame the rest of this literature review is Universal Design for Learning. Universal Design for Learning (UDL) originated from the context of Universal Design, a movement in architecture and product design that sought to find innovative and efficient ways to maximize the use of buildings and products. Similarly, rather than focus on the deficits of individual students, UDL refocuses on designing educational spaces and curricula to include a wide range of learners from the outset by addressing representation, access, and engagement in individualized ways (Lambert et al., 2021). Lambert further states that instead of finding disability within individual students, disability is located in inaccessible classrooms, curriculum, and spaces which shifts the concept of a disability from an individual student problem to a social model. Amos et al., (2021) continue with a comparison of UDL to a conceptual framework and associated set of educational practices designed to improve learning outcomes for all students by recognizing that singular methods of delivery, assessment and engagement are insufficient and may lead to unnecessary inequitable hardships to minority students, especially students with disabilities.

## **Rationale**

With the interruption of traditional learning that happened worldwide during the global pandemic, there has been a large increase in special education referrals as the number of

students falling behind has multiplied. In a school where MTSS was implemented with fidelity, the number of students that have been identified with a Specific Learning Disability as a primary eligibility category has been estimated to be reduced by up to 25% (Webb and Michalopoulou, 2021). This speaks to the success of MTSS frameworks when implemented with fidelity within schools that also provided strong Tier 1 instruction. That is the primary reason why this topic is so crucial; by exploring the necessary characteristics and structure that need to be implemented in order to generate successful student outcomes within a tiered system, we can hopefully build on this topic by providing schools and districts with the blueprint for these successful attributes.

### **Definition of Terms**

Universal Design for Learning (UDL) was originated and coined by Rose, Meyer, and Gordon (2010) at the Center for Applied Special Technology (CAST; Edyburn, 2005). Ronald Mace's universal designs in architecture (Meyer, et al., 2014) were the inspiration for the application of this framework in the education sphere. The UDL framework was primarily proposed to address students in an average classroom who have backgrounds that differ in some way from the dominant language, culture, and history of the majority of students and who, therefore deal with the hurdles in accessing information presented in a one-size-fits-all manner among diverse students and may need multiple means of access, engagement and expression (Rose & Meyer, 2002).

ESSA (2015) describes MTSS as a comprehensive continuum of evidence-based, systemic

practices to support an immediate response to student needs through regular observation and data-driven instructional decision-making.

Every Student Succeeds Act is a federal K-12 education law of the United States was signed into law in 2015 and replaced the previous education law called “No Child Left Behind.”

Evidence Based Practices (EBP) are skills, techniques, and strategies that have been proven to and documented to work through experimental research studies or large-scale studies.

### **Global Context**

The arrival of the pandemic placed a sense of urgency on school district leaders and staff to address the gaps experienced by students as a result of the loss of learning during the pandemic years. Remote learning provides a complex set of expectations and realities for educators to navigate. How could they ensure they continue to meet the demands of diverse learners in a mainly remote setting? While the pandemic did present a unique set of challenges, it also opened a potentially lucrative space for reflection on the difficulties and opportunities for inclusive teaching and provided applications of technology that can assist in diminishing the gap between students. Barahona et al. (2023) set out to investigate how remote teaching could further continue the momentum of UDL principles in a qualitative study conducted in the sphere of higher education. What they sought to discover was if the use of technology in language teaching had the potential to enable a more inclusive language learning environment, potentially responding more effectively to different student learning needs and their

transforming conditions of learning, given the challenges of the pandemic. In a different qualitative study, Boothe et al. (2020) investigated the impact of providing choice to students in an online environment following the pandemic and the subsequent remote learning. In thinking creatively about how to provide multiple meaningful opportunities for engagement, the researchers found that through the unique challenges presented by the pandemic, instructors found more opportunities than typical to provide UDL options for learning. Forced by the unusual circumstances to think outside of the box, the researchers in both studies found that the expanded opportunities with a variety of students allowed students to continue to demonstrate their learning in an online environment, albeit in different ways.

The criticalness of all students receiving Tier 1 instruction at a foundational level has been recognized in multiple current studies (Boothe et al., 2020; Massengale et al., 2020; Sailor, 2017; Thomas et al., 2023). Quality indicators of Tier 1 core instruction include using scientific or evidence-based curriculum and instructional practices that are aligned with state or core standards and a variety of differentiation strategies to address individual student needs. Another indicator requires having strong classroom management with a schoolwide system of behavioral expectations in various common settings (Thomas et al., 2023). When students are provided with the opportunity to learn with their peers in the mainstream setting and receive qualified instruction at the Tier 1 level, they receive the foundational instruction that they need to improve their academic performance and get access to the mainstream curriculum. At the Tier 1 level, classroom instruction should follow a Universal Design for Learning format to provide students equitable access to the content (Thomas et al., 2023). Universal Design for

Learning (UDL) is a framework recognized to help optimize how students receive instruction and how they express their learning. Students are afforded multiple means of accessing content, various ways to process information, and given differentiated options to express their knowledge (Thomas et al., 2023). Teachers who adopt the UDL framework in Tier 1 are able to engage in data-driven decision-making and employ varied instructional practices to meet the diverse learning needs of students, both typically developing and at-risk (Slanda & Little, 2020). In addition, UDL principles aim to eliminate barriers to learning by ensuring all students have equal access to the instructional materials that they need.

The two frameworks of MTSS and UDL converge to provide students with the most increased opportunities to improve their academic and behavioral outcomes. As Thomas et al. (2023) have found in their research, a salient focus of improving the effectiveness and fidelity of MTSS is to implement differentiated Tier 1 instructional practices with a UDL focal point in order to increase accessibility to the greatest number of students. Furthermore, as Massangale et al. (2020) emphasized in their study, many students referred for special education could have been successful in the general education classroom had they been provided with appropriate core instruction and early intervention first in order to address the students' diverse needs. Massangle continues to express that the efficacy of the entire system rests on the foundation of the Tier 1 core instructional program.

### **Equitable Outcomes**

The widening experiences of students during the pandemic and the glaring differences

in educational opportunities have shed light on the need to develop these systems of support in order to provide equitable outcomes for students of various backgrounds (Sailor, 2017). The basis of inclusive education lies in the equitable opportunities that are provided. There has been a shift from looking at the physical space of inclusiveness to examining the distribution of available evidence-based supports and practices to students who need them in order to fully engage in the learning processes. Schools are also looking at what inclusive opportunities and practices look like in their setting and how UDL can be used to achieve that overarching goal. In a qualitative study conducted by Boothe et al. (2020), researchers studied how to enhance student learning in an online environment in a university setting and were tasked with providing students with equitable opportunities to demonstrate their learning. The researchers decided to focus on engagement, the first principle of UDL, by empowering student choices and allowing students to demonstrate understanding of content through the method that they prefer, within established boundaries. In doing so, they found that the students became more strategic and goal-oriented in expressing their knowledge in an equitable method. The implications of this study could be extended to K-12 teachers by providing their students with multiple means to demonstrate their understanding of the core content and engage with the curriculum.

Equity-based inclusion does not entail using the same instructional strategies and approaches with all students and is supported by the principles of MTSS and UDL of utilizing differentiated instruction to meet the diverse educational needs of all students (Choi, Meisenheimer, McCart, & Sailor, 2017; Nelson, 2014; Novak, 2014). MTSS provides a framework to extend evidence-based instruction and supportive interventions to serve all students,



including those who need extensive academic or behavioral supports and those who are assessed with alternate assessments using alternate achievement standards. It can be argued that providing a UDL framework and implementing it with fidelity is an equitable approach to learning that teachers can enforce (Super et al., 2021).

### **Research Focus**

As a special educator, I am interested in this topic as there are direct implications to my work that I wish to utilize. The purpose of the thesis is to explore research in the attributes of robust MTSS programs and how UDL can help pave the way for strong tiered intervention support. The research question is how can a comprehensive approach that combines a Multi-Tiered System of Supports (MTSS) and Universal Design for Learning (UDL) be implemented to effectively support all learners in a diverse classroom setting in order to reduce the number of unnecessary special education evaluations?

## **CHAPTER II: LITERATURE REVIEW**

### **Literature Search Procedures**

Chapter II reviews the published literature on the successful intersection and implementation of MTSS and UDL. It will examine the characteristics of successful implementation, along with prerequisites that must be in place. Chapter II will also examine examples of lucrative implementation across various settings, the role the pandemic has played on school-wide systems of support, and how schools can use strong systems of MTSS and the guiding principles of UDL to support all learners in getting what they need. The guiding question is: How can a comprehensive approach that combines Multi-Tiered System of Supports (MTSS) and Universal Design for Learning (UDL) be implemented to effectively support all learners in a diverse classroom setting in order to reduce unnecessary special education evaluations?

To locate the literature for this thesis, searches of Education Journals, ERIC, Academic Search Premier, and EBSCO MegaFILE were conducted for publications from 2011-2023. This list was narrowed by only reviewing published empirical studies from peer-reviewed articles that focused on Multi-Tiered Systems of Supports, Universal Design for Learning, and the characteristics needed of each to support all aged learners in a diverse setting. The keywords that were used in these searches included “MTSS,” “UDL,” “professional development UDL,” “professional development MTSS,” and “school-wide systems of support.” The structure of this chapter is to review the literature on MTSS and UDL in four sections in this order: Background and Teacher Preparation; Different forms of MTSS; Successful Implementation across Various Ages; and Other Countries’ Trials with UDL.

## **Background and Teacher Preparation**

The pandemic exposed a lot of cracks within the educational system that needed to be addressed in an efficient manner. Schools everywhere saw a rise in special education evaluation requests; despite the fact that all students were impacted by the nature of learning during the pandemic, special education evaluations tripled in some districts once students returned to in-person learning. The rise in special education evaluations pointed to a need within districts to concentrate on implementing UDL strategies and strengthening MTSS frameworks across schools. This was necessary in order to determine which students actually needed the additional support and services as identified through a special education evaluation. Many schools were forced to be more reactive to students who were struggling academically when a different, more proactive and intentional approach was needed. By creating school-wide structures where special education teachers and general education teachers work together, the MTSS process can end up being more inclusive and collaborative which will lead to better data gathering for students who need it.

One school system in Sanger, California, tackled this very issue within their school district of 12,000 students across 21 schools, as described by Massengale, et al. (2020). What the school district found was that many students referred for special education following the pandemic could have been successful in general education classrooms had they been provided with appropriate core instruction and early intervention supports necessary to address their specific needs. The school district found that the foundational bedrock to creating a strong system that would support all students was a three-step process that would provide powerful

building blocks of the current MTSS framework. First, the school system used professional learning communities (PLCs) as paths for building teacher and administrator capacity, developed a common language and practice of teaching and learning through explicit direct instruction, and built on a system of interventions and supports for struggling students that followed the principles and tiered approach of Response to Intervention. Aligned with these instructional and behavioral supports, the Tier 1 block also used UDL-based instruction to increase student engagement, increase access to Tier 1 curriculum, and improve academic and behavioral outcomes. The combined efforts of this school district have produced improved outcomes with stronger and fewer special education referrals, more targeted services, and increased system efficiency.

Another study that emerged from the pandemic was carried out by Lambert et al. (2021) and examined teachers' understanding of applying UDL principles, along with Design Thinking in the online courses that they were delivering to students during the pandemic. Specifically, the researchers wanted to study what teachers did when they were taught the tools of Design Thinking, along with the theoretical framework of UDL. Forty-five K-12 math instructors who agreed to undergo the six-week course were selected. The participants represented a diverse background and were overall a highly experienced group of educators. Qualitative (teacher surveys and interviews) analysis was mainly used to decipher findings from the study. The researchers found that empathy appears to be an integral characteristic in teachers applying UDL and Design Thinking. While empathy is not traditionally a core feature of UDL, Lambert et al. (2021) stress that, based on their study, UDL's origins in Universal Design are grounded in an

empathetic quality. Math instructors who used empathy as a guiding principle deepened their understanding of both UDL and Design Thinking and began to see how they might interact to produce positive results for their students. The study was limited in that the participants only had six weeks to design their courses based on their understanding of UDL and Design Thinking but the testing and refinement of the math instructor-created courses were not observed during the time frame of this study.

Perhaps the biggest challenge many educators faced in the online teaching environment was engaging students in the content. Hollingshead et al. (2022) and Boothe et al. (2022) found that teachers who had a more substantive knowledge of UDL going into remote learning were better prepared to design flexible online learning environments that provided multiple opportunities for access and engagement for students. Hollingshead et al. (2022) focused on K-12 educators who employed UDL principles in online environments while Booth et al. (2022) studied the effects on college students. Hollingshead conducted a pilot study with six special education teachers in the Northwest region, which was an extension of a previous study. Survey participants were presented with 13 predetermined items and asked to rank them in order of significant challenges presented during online learning. Once the questions were deemed to be reliable and clear, three phases of the study were conducted in which 561 teachers participated in the survey. Both qualitative and quantitative analyses were used to interpret the data results. The top three instructional challenges that teachers ranked were inexperience teaching online, engaging students in an online environment, and students not being adequately available to participate in the course for various reasons.

Booth's study focused on teaching the UDL framework to a class of 37 college students and then creating and distributing an online survey to students enrolled in order to gather data on what worked well from the course and what students will embed in their own teaching. The qualitative data collected showed that the participants plan to use UDL with their students and also when working with other adults within their schools.

Both studies demonstrated that when students were provided with choice in that manner, they were more likely to engage with the content in a way that advanced their learning. When students took ownership of a project, they were more engaged, exerted more effort, and were invested, which all resulted in improved outcomes. By applying UDL principles in their online courses, teachers helped students become more strategic and goal-oriented by providing options for expression, communication, and executive functions.

Other studies also examined the importance of using UDL principles, especially within online courses during the pandemic. Research has shown that more professional development is needed in comprehensive online pedagogies to support student participation and engagement. When instructors truly understand UDL principles and apply them in their course development, they enhance the learning experiences of their students. Barahona et al. (2023) examined teachers' attitudes toward UDL before and after they received specific training modules. The sample size was very small as only six foreign language teachers participated in this qualitative study. Participants embraced inclusive education as part of their responsibility as teachers of English. This study examined the perceptions and attitudes of a group of preservice teachers towards inclusion and how they employed the UDL framework in a remote teaching

setting. In effect, the chosen participants reported that they needed to incorporate strategies that promote inclusive environments to support all student learning. Previous to receiving UDL-specific training, participants experienced frustration and anxiety as they felt their practices were sometimes ineffective. The implementation of UDL after receiving the necessary training allowed participants to diversify the representation of contents and make language more comprehensible. In a similar study, Evmenova (2018) reviewed specific UDL guidelines and checkpoints educators recommended to address existing barriers and students' abilities and needs. Participants in her study consisted of seventy educators enrolled in two graduate programs from two public universities in the Northeast and also enrolled in asynchronous coursework on UDL. The educators were general and special education teachers across grade levels and subject areas. Both qualitative and quantitative data analysis were used to review what specific UDL guidelines and checkpoints the teachers in the study recommended using to address existing barriers to students' needs. The findings of the study point to teachers stressing the importance of activating prior background knowledge for students and fostering a collaborative classroom community. While UDL allows students with disabilities to thrive in their learning environments without standing out, it should be implemented for the sake of all learners and this was recognized by both general education and special education teachers. Teachers also stressed the criticalness of intentional planning, implementation, reflection, and revising for all students and the need for students to have as much choice as possible. In addition, the participants suggested additional checkpoints such as optimizing access to tools and assistive technologies and encouraging individual choice and autonomy in students. UDL

provides an opportunity for all students to engage in an inclusive environment. Furthermore, it has been suggested that effective implementation of UDL can not just merely reduce barriers to learning but can also increase support for all learners and encourage students to feel engaged and valued (Evmenova, 2018).

The global pandemic that hit educational institutions really highlighted the need for teachers to think outside the box in order to ensure their students continued to learn in an alternative environment. It is vital to take a pause and acknowledge the various struggles both teachers and students face during virtual teaching and learning. As Hollingshead (2022) reported in their study, teachers faced multiple barriers in an online learning environment. First, teaching virtually requires a different skill set from traditional face-to-face teaching; similar strategies cannot necessarily be applied to both settings. In fact, there is a difference in pedagogy, communication, and even resources used. Many teachers and students had to learn and use new resources at the same time, which was an obstacle that had to be overcome. There were also some structural components, such as internet accessibility, that impacted which students were able to access and keep up with the content virtually and which students could not and became further behind. Unfortunately, this increase in opportunity gaps led to a greater increase in achievement gaps during and immediately following the pandemic (Tillery et al., 2022). Students and families from privileged populations and increased access to supports and resources have been able to minimize the impact of the pandemic.

One high school in Richmond, Virginia decided to try something to reverse the trend of decreasing high school graduation rates following the pandemic. Virginia High School, a large



suburban high school where 80% of students identify as Black or African American, serves a little under 2000 pupils and has 112 classroom teaching staff. The school counseling department at VHS aligned its work with the MTSS group by having one member of the school counseling department, who was on the MTSS team, act as a liaison between the two groups, and by collaborating with the school administrators on the viability of tiered supports for high school seniors in particular. With the two departments' collaboration on a high level, the department acknowledged the importance of MTSS to support students. The counseling department's goal was to increase the graduation rate to 90% for the class of 2021, an increase of six percent from the previous year (Tillery, et al., 2022). By aligning the MTSS department with the counseling department and creating more robust Tier 1 supports as necessitated by the pandemic, the school recognized the importance of the roles of multiple practitioners collaborating on an ongoing basis. As is the case with any MTSS framework, some students needed additional Tier 2 and Tier 3 supports and received those through monthly goal-oriented meetings with the school counseling department to track their progress toward graduation. Although the overall on-time graduation rate did not reach the goal set by the counseling department, there were improvements in some subgroups, such as female students, Hispanic students, and English Language Learners. The researchers of this study did find MTSS to be a helpful framework that helped VHS gain awareness and organize racial justice supports. It also brought clarity to the fact that many marginalized populations have less access to educational and technological resources which made the pandemic much harder for them to stay on track with their goals.

One critical practice to note is the importance of aligning Tier 1 instruction vocabulary with Tier 2 and Tier 3 targeted interventions. Nelson et al. (2020) set out to explore how closely math core instruction aligned with tiered supports in schools. They selected two widely available elementary math intervention programs and compared the core program and intervention program available at each level. Nelson et al. (2020) focused on the elementary level as that is where tiered interventions are most widely implemented. In using coded math practices and vocabulary, they were able to use quantitative data to analyze the data separately for each grade by program. They found that there tends to be a degree of misalignment between the core instruction students receive and the targeted services a select number of students get. In fact, the percentage that the math vocabulary overlaps ranges from 6.3 to 24 percent. This lack of alignment contributes to some confusion for students and is mainly found in the vocabulary. It is vital for both the core and intervention teachers working with the students to collaborate on a regular basis on instruction delivery and how to align their vocabulary to create a more coherent, streamlined experience for the students who need it the most. This study does shed light on the reality that if students receive instruction in both core and intervention settings, they may experience different instructional practices and may need to have their practitioners communicate to a higher degree in order to address the gaps that may occur.

This speaks to the critical importance of all teachers receiving training on the MTSS process. MTSS is a transformational school reform that looks at the whole child approach; academic, behavioral, social-emotional. By having school-wide systems embedded within the

tiered supports, more substantive changes can be made. In doing so, there can be a more equitable distribution of specialized supports and services and a reduction of inappropriate referrals to special education by addressing barriers to learning early in the context of general education (Sailor et al., 2021).

### **Different Forms of MTSS**

Typically, when the term MTSS is used, the thought that comes to many is that MTSS is a structure for identifying academic tiers of supports for students. However, a truly comprehensive MTSS model considers both the academic and behavioral supports needed for the growth of the whole child. Many schools have supports that address behavior and a different set of supports that address academic needs. There has even been research to emphasize that students with co-occurring academic and behavioral problems may be at increased risk for long-term negative academic and behavioral outcomes. There needs to be continued research to examine the relationship between academic and behavioral problems. Although time-consuming and costly, the process of screening all students in a building for academics by using a district-wide measure or even a program such as AIMSweb, which has specific screening and benchmarking criteria, and BESS (the Behavioral and Emotional Screening System) will possibly save the school time in the long run (King et al., 2015). The AIMSweb program is widely used in many schools and helps assess students' levels in areas of academic achievement. While schools are more likely to purchase academic screeners, there is less widespread consumption of behavior screeners.

However, if a child is experiencing difficulty in both areas, employing a segregated approach to MTSS can be difficult in determining whether the root of the challenge is a behavioral skill deficit or an academic skill deficit. In fact, “The process of identifying children with concurrent behavioral and academic risk, and developing applicable interventions based on risk status, is impeded when separate ‘behavior’ and ‘academic’ data teams are established” (King et al., 2015, p. 54). In the study conducted by King et al., 517 third graders were administered academic and behavior screening assessments via AIMSWeb screening programs in the fall and again in the spring. The purpose of doing so was to determine if co-occurring academic and behavioral problems can be identified at the start of the school year using the school’s screening measures. Tiered decisions were made according to the AIMSWeb scoring criteria cutoffs. Latent class analysis, which is a person-centered approach, was used to identify similar patterns of behavior and form groups based on this classification. The results of the study were analyzed in a quantitative manner and, interestingly, not one category had a majority of the children with behavioral problems. Thus, a determination could not be made in determining differences in academic risk among children with behavioral risk factors.

Harn et al. (2015) address this matter in their research by examining the integration and coordination of support systems for first to third-grade subjects within two suburban school districts in the Pacific Northwest. The researchers partnered with school districts that had implemented PBIS for more than three years and were willing to pilot the new intervention of SWRM (Schoolwide Reading Model). Other schools that had implemented SWRM previously demonstrated significant and positive outcomes in students with reading deficits. SWRM is

characterized by three foundational features: establishing systems of supports to meet the needs of individual students, implementing a prevention-oriented intentional approach designed to accelerate learning, and enacting data-based decision-making. A cohort of students were identified as at risk for reading in first grade and their progress was followed through their third-grade year to evaluate how they responded to implemented interventions. The first year focused on documenting the nature of instructional supports, the second year worked to identify and coordinate instructional supports with the intention of accelerating learning, and the third year looked at aligning and intensifying identified supports. Third grade was the intended target research subject due to the pivotal element of introducing high-stakes testing in that grade when academic achievement is assessed statewide. The authors took a look at the necessary components to align the systems of support. Namely, these common features include coordinating schoolwide prevention efforts and systems, universal screening and progress monitoring, the use of evidence-based practices, ongoing professional development to target these practices, and data-based decision-making. The results of the study showed that the efforts to align interventions with recommendations did, in fact, increase reading achievement in students and decrease the percentage of students who need to receive special education services to approximately 7% in the schools. Both King et al. (2016) and Harn et al. (2015) stress the importance of coordinating both behavior and academic supports and not compartmentalizing them. Both studies looked at early elementary school-aged students. According to King et al. (2015), schools often examine the area of deficit, whether it be behavioral or academic, without considering compounding factors that may be impacting

student outcomes. One reason this may happen is that school personnel are often trained to screen for specific skills in order to gather data and evidence in those skill areas. However, the factors associated with academic and behavioral risk can be identified early in a child's life and are predictive of later skill deficit which is why having a more coordinated approach to MTSS in schools is essential.

Schools need to continue to have teams work together to develop more integrated systems in order to promote the development of the whole child. The overall needs of the students need to be considered and taken into account and that can start with increased collaboration among the specialists working with the students (Harn et al., 2015). Within both academic and behavioral tiered systems, universal screening is critical in quickly identifying which students may benefit from more targeted interventions and focused support. The screeners that are used within the universal screening models help determine the intensity of interventions that are needed. Thus, students at more severe risk of behavior or academic failure are allocated more intense interventions (King et al., 2015). However, many schools struggle with implementing universal screeners that are behavioral and may resort to a reactive approach with students displaying behavior deficits.

Bradshaw et al. (2021) took a look at the MTSS Behavioral model at high schools in 58 secondary schools across 12 Maryland school districts. The significance of this study being conducted in Maryland cannot be overstated; Maryland is considered the national pilot for the successful implementation of Tier 1 elements within the MTSS-B framework. PBIS (positive behavioral intervention supports) originated in Maryland and is now used in hundreds of

schools nationwide. In fact, the context of this research was done in the background of a state-wide PBIS scale-up effort, thus implementation was managed by the state along with the research team. However, PBIS implementation was mainly done at the elementary and middle school levels and not very much research was done at the high school level. The study looked at intervention at the high school level, and comparison schools were monitored over the same 3-year period. Data was collected at the baseline year and then each spring, going forward for a total of four data points per school. Bradshaw et al. (2021) found that when high school staff received targeted training and coaching for their teenage students, implementation and understanding of Tier 1 supports in the high schools increased. As part of the training staff received, they had access to a menu of evidence-based Tier 1 supports such as Olweus Bullying Prevention Program, LifeSkills Training for High School, and Check in/Check out. The fidelity of implementation at the first tier also improved as an increased number of staff used the evidence-based interventions which is necessary. The training served a greater purpose in building a strong infrastructure to support sustained usage of the menu of evidence-based strategies and coaching techniques. By building infrastructure, staff capacity around behavior was also built. However, the study indicated that it may take three or more years to examine implementation at all the tiers and that further studies were needed to determine implementation practices at the Tier 2 and Tier 3 supports.

Another factor in having a strong MTSS infrastructure is considering the unique characteristics of a certain population. Teachers need support in implementing MTSS frameworks within the cultural and linguistic contexts of the student populations. Students who

are acquiring a second language benefit from having educators that understand the language acquisition process and are able to select instructional and behavioral interventions that are sensitive to linguistic and cultural characteristics. Hoover and Soltero-Gonzalez (2018) approached this research by enacting an ELL-focused MTSS framework at participating schools in a rural mountain school district with a 40% increase in EL students in a span of a few years. The focus of the research was on increasing teacher use of bilingual/ELL best practices in literacy instruction, improving EL learners' reading achievement, and identifying a clearer special education referral process. K-3 teachers at participating schools receive 30 hours of relevant professional development on these three focus areas a year and one-on-one coaching with experts, along with classroom observations and self-assessments. The specific professional development centered around educators who participated in the project demonstrated increased daily usage of several important best practices for teaching literacy to ELs, including five of the more essential practices: (a) making connections to prior or background knowledge and experiences, (b) word walls or as they are commonly called now, concept maps, (c) strategic native language use embedded within the curriculum, (d) posted sentence stems to support student extended verbal exchanges, and (e) students' interactions using academic language so that students received increased exposure of it (Hoover and Soltero-Gonzalez, 2018).

The integrated approach to an EL-focused MTSS demonstrated a school-wide improvement in reading skills for students and a decrease in unnecessary or inappropriate special education referrals. In fact, EL learners who participated in the project for three years demonstrated a significant positive improvement in reading achievement over students who



were in the program for only one or two years. More significantly, there was a narrowing of the gap between the number of EL learners achieving at benchmarked measures compared with non-EL learners. Additionally, special education staff were able to help general education staff implement necessary interventions, and the school-wide system seen at the school improved sustainability of these practices.

### **Examples of Successful Implementation at Various Levels**

Universal Design of Learning has been implemented successfully within the MTSS framework at various levels of the education system, from early childhood all the way to postsecondary. This section will examine the implementation practices that have resulted in successful results at the different institutions around the country. MTSS, when enacted with fidelity and with collaboration amongst the different departments, presents schools with an innovative pathway to the goals of inclusion. Tiered instructional supports are quickly becoming widely used in many institutions in the country. So far, this thesis has examined teacher preparation efforts along with exploring academic and behavioral MTSS supports. Next, this paper will take an in-depth look at different schools and the practices they have undertaken to advance the framework of a comprehensive MTSS framework, while also employing UDL.

Before MTSS became the more utilized educational framework in many schools to provide accessibility for students, Response to Intervention (RTI) was the name of Tier 2 interventions that students received when they needed additional supports. RTI differs from MTSS in that it focuses particularly on the academic needs of the student and sometimes does

not do justice in considering the whole child or the systematic barriers that prevent this model from being successful. In Carta et al.'s research in 2014, the researchers sought to understand why approximately 30% to 35% of preschoolers were identified for higher tiers of support rather than the typical 20% often identified for RTI models implemented in K-12 settings. Most of the students who were identified for higher tiers of support were students who were eligible for eligible programs or were EL learners. A major challenge that was identified was the lack of robust, evidence-based Tier 1 curricula available and the subsequent inconsistent and infrequent implementation of evidence-based curricula that promoted early literacy. One of the questions the researchers in this study sought to answer in their quantitative study is the question of what they similar attributes across measures were in identifying individual children for higher tiers of language/literacy support. Six hundred and fifty-nine preschoolers from programs across four states participated in the study. Children whose home language was not English were identified at a much higher rate. A striking finding was that more than 81% of ELL children were identified by the Picture Naming subtest, speaking to possible low exposure to English vocabulary for many students. In addition, children without classroom instruction in early literacy, specifically, may have a higher likelihood of getting identified through a screener than students who had received that formal early literacy instruction. Carta et al. (2014) noted that the proportion of children needing more intensive tiers of support revealed in the study pointed out a flaw in an RTI model in terms of how it is implemented with the early grades of students who had not received schooling previously. The study also emphasized the importance of beefing up Tier 1 instruction, evidence-based practices, and progress monitoring tools so that

all students, regardless of their linguistic or cultural background, receive a strong foundation for early literacy.

Greenwood et al. (2019), which was composed of many of the same researchers as the earlier study, sought to explore the link between language and literacy-based instruction in preschoolers and academic engagement in the classroom. This study, which was conducted five years after the previous study, defined 'academic engagement' as the compilation of writing, reading words or letters out loud, academic manipulation, and academic verbal response. For the purposes of this quantitative study included 354 children who underwent observation and screening data. Ecobehavioral observation data, which is known as CIRCLE or Code for Interactive Recording of Children's Learning Environments, was used to provide the needed information on a child's instruction-behavior co-occurrence. CIRCLE basically states that a child's behavior can be influenced and respond differently based on situational and environmental stimuli. In essence, a student experiences the highest learning growth when combining the opportunity to learn, child behavior given the environment, and individualized approaches to child risk characteristics. Key findings indicated that children in most classrooms received low exposure to literacy-focused instruction, prior to interventions being implemented. Interestingly, academic engagement was noted to be increased during the following classroom activities: story time, individual activities, and large groups. Centers and small groups saw the least amount of academic engagement. The researchers recommended future experimental research to continue to demonstrate that using CIRCLE in the MTSS process leads to more aggressive growth in achieving literacy outcomes. The study also points to instructional

practices that will likely generate higher academic achievement in preschoolers, such as increased story times or increased and more frequent independent work time.

A different study that examined preschoolers' academic success in the classroom took a look at the rate of progress achieved by the students compared with the standard expected growth in vocabulary interventions. The intervention used for the study conducted by Kong et al. (2021) is called StoryTime and is a supplemental intervention used amongst students who are scoring below expected benchmarks in the area of vocabulary. StoryTime is an intervention conducted in a small group that incorporates explicit teaching of academic vocabulary with basic concept words and with follow-up comprehension questions, within a 10-min prerecorded, interactive storybooks for preschoolers. Interventionists could choose to further intensify the intervention by conducting this in one-on-one sessions to increase engagement. The participants in this study consisted of two preschool classrooms from the same early childhood center in an urban district, which provided children with a half-day Pre-K program. The comparison study was conducted one at a time with the classrooms. One classroom received just the standard Tier 1 early literacy instruction with small group centers for StoryTime instruction. The other classroom received additional intervention features and components of the StoryTime program. The results of the study indicated that students who received the additional components of the intervention saw a dramatic improvement in their vocabulary acquisition. This supports practitioners' use of more intense instructional supports when needing to increase the rate of progress among students. If a student needs more

individualized supports they should receive it instead of waiting for the completion of the basic intervention, especially at the early literacy stage which is critical to future literacy instruction.

The majority of research around the implementation of the MTSS framework has been conducted at the elementary school level. MTSS has been used to provide a more targeted focus in many areas from behavior and self-regulation to math skills and vocabulary. Previously in this literature review, the works of Harn et al. (2015) and King et al. (2016) were reviewed to demonstrate the emphasis placed on the early elementary years in trying to create coordinated systems of support. Both studies stressed the importance of universal screening in academic and behavioral areas within tiered models. Employing universal screening measures allows school personnel to quickly and accurately determine student needs and is pivotal to the early implementation of intervention and prevention efforts necessary for students' academic and behavioral success later in their academic careers. Simply focusing on academics may not always optimize student success, as underlying socio-emotional or behavioral concerns may need to be addressed before academics can be. Another reason universal screeners are critical is that they help allocate resources to students with more intense needs (King et al., 2016).

An example of a study that was used to demonstrate the power of coordinating academic and behavioral tiered supports can be found in the Losinski et al. (2021) study. In this quantitative study, the researchers were seeking answers to the question of whether students performed differently when presented with fraction instruction at the Tier 1 level vs. those who were solving the same complexity and number of fraction problems but with the added intervention of a self-regulation strategy development (SRSD). Self Regulation Strategy

Development is an instructional strategy for strategy acquisition in areas such as self-regulation, goal setting, and self-monitoring. Students who need instruction with these strategies may struggle with executive functioning and need additional support in these areas in order to accomplish their academic goals. This strategy is explicitly taught and includes the following components: developing background knowledge, teaching the specific strategy, modeling the strategy, memorizing the strategy, supporting the strategy, and independent practice of the strategy. Students who successfully learn these self-regulation strategies are shown to have increased motivation and self-efficacy in completing academic tasks more independently. For this particular study, 60 fourth-grade students in a school in the midwestern U.S. assented to participate. The school was already implementing an MTSS framework for students based on their current levels of need, and this study was conducted within that context. A pre-assessment was given to the students, and anyone who received a score below 30% was assigned to be in the group that would utilize the SRSD intervention. The other students were in the control group, receiving no intervention support. All students received the standard mainstream math instruction and the experimental group received SRSD instruction as well, using the steps outlined above. The intervention took place over a period of 6 days for a total of 240 min. The lessons were delivered three days a week over a 2-week period. The findings pointed to significant gains made by the group of students receiving the intervention. By explicitly learning and utilizing a self-regulation strategy, this group of fourth graders made aggressive growth in their math conceptual understanding, as demonstrated by a post-test. This study was significant in that it addressed academic deficiencies by focusing on a self-regulation

strategy first, thus showing how integrating the tiered interventions can be used in practice in order to maximize student outcomes (Losinski et al., 2021). Given that the time frame of this study was relatively short, it is theorized that a more substantial gain could be anticipated if the intervention timeline was longer. The researchers emphasized increasing the dosage of the intervention in any future studies that take place.

A similar study exploring themes related to Tier 2 remedial vocabulary supports within an MTSS framework was executed in a different geographic location than the previous study. Vocabulary instruction is critical to future reading success in areas of fluency and comprehension (Coyne et al., 2022). In completing this study, Coyne et al. desired to address differences in vocabulary knowledge among Kindergarten students by considering the effects of the vocabulary intervention implemented within a multi-tiered system of supports and comparing the results of at-risk students with the rate of growth of non-at-risk students. Their research was conducted in 48 urban, suburban, and rural schools across the Pacific Northwest. One hundred and sixty-four classrooms participated in the study. The intervention used followed the research that direct and extended vocabulary instruction, including explicit teaching of target vocabulary through multisensory approaches, optimizes learning opportunities for students. Using such an intentional approach allows students the opportunity to hear and use new vocabulary in a variety of contexts.

An important aspect stressed in the study is the interventionist's ability to intensify or otherwise adjust the intervention based on the responses of the at-risk students. All students in the study were screened and similar to the Losinski et al. (2021) study, students who received a score of below 30% were placed in the group needing targeted support. There was typically one or more at-risk groups of students at each school represented in the study. All classrooms participated in the core vocabulary instruction, provided through the program Elements of Reading Vocabulary. Students who were considered at risk also received supplemental, targeted instruction through the Tier 2 instruction in the program identified for usage. Results of the study found that at-risk students who received the vocabulary intervention experienced increased vocabulary learning compared with at-risk students who only participated in the Tier 1 classroom vocabulary instruction. The supplemental vocabulary intervention was associated with narrowing the vocabulary learning differences between the at-risk students and their peers.

Both the Losinski et al. (2021) and the Coyne et al. (2022) studies explored the increased learning effects once Tier 2 targeted supports are implemented in a strategic way within a strong MTSS framework. An essential component of a strong MTSS framework is that nearly all students are exposed to solid foundational core instruction prior to receiving intervention support. Both groups of elementary students participating in the studies demonstrated accelerated growth when the interventions were implemented with fidelity. Similarly, when the staff implementing the targeted interventions received the training and administrative support they needed (i.e., time, resources, etc), they were more likely to provide the intervention using



the dosage, frequency, and guides recommended. Thus, the researchers received a more reliable measure of the students' skill acquisition of the instructed skills.

Although not as common, MTSS has been used as a framework at the secondary level as well. The following section will explore examples of how MTSS was addressed at the high school level, for both academics and behavior. At one high school, UDL was considered first before the implementation of an MTSS framework. The key research question for one study was whether and to what extent adolescents with and without learning disabilities improved vocabulary performance in social studies following instruction (Kennedy et al., 2014). This question was explored in light of students utilizing CAPs or content acquisition podcasts in the Tier 1 environment. This study was a critical one in determining if UDL was enough for students with learning disabilities. Explicitly, the researchers wanted to know what conditions were necessary for the instructional conditions of UDL to be used successfully with students with disabilities. CAPs, which are evidence-based, were an important element in this study as they are a multimedia instructional module that fits in well with UDL's principles of multiple means of representation, engagement, and expression (Kennedy et al, 2014). For this study, researchers recruited a social studies teacher who taught five sections of history, for a total of 141 10th-grade participants. Approximately 30 of those students had identified disabilities, mainly in the area of reading. Students watched CAPs with each introduction to a new vocabulary word. The CAPs were used intentionally with a series of thoughtful supplemental materials that focused on vocabulary retention. Curriculum Based Measures or CBMs were then developed to monitor the progress of students' knowledge of the vocabulary words.

Several theories and practices were embedded into this study which added a layer of complexity in the interpretation of the results. Results of this study demonstrated that, when instructed with CAPs constructed with valid instructional design principles and evidence-based instructional methods, students with learning disabilities learned vocabulary terms and concepts at a faster growth rate than if they had not been exposed to CAPs. The CBMs provided the evidence for this conclusion, which shows that thoughtful implementation of multimedia instructional strategies when embedded in the classroom using UDL principles are beneficial to students with disabilities. This study adds to a growing field of research on the critical importance of students having access to robust Tier 1 instruction with embedded UDL principles.

Similarly, when evidence-based practices are implemented at the high school level in behavior within the MTSS framework, positive results are seen. The Bradshaw et al. (2021) study wanted to address gaps in behavior by testing the extent to which training and coaching in a behavior MTSS model resulted in the implementation of a continuum of evidence-based social and behavioral practices at the classroom level. Schools were offered a menu of behavior interventions to choose from. The interventions included the following core components: training beyond the PBIS training offered by the state, coaching, and assistance provided to staff implementing the training using data to inform decision-making, and the integration of evidence-based behavior/social practices at Tier 2 and 3 levels. This quantitative study pointed to the strength and power of using evidence-based practices with behavioral interventions at the high school level. Further, when practitioners received the training and coaching they

needed, students demonstrated an accelerated rate of acquisition of desired behaviors. The findings of this study suggested training in the MTSS-B framework leads to the implementation of Tier 1 elements in high schools, increased usage of Tier 2 and 3 evidence-based practices, and subsequent measurable impacts in the classroom.

Although much less common as there are fewer opportunities for widespread training at the post-secondary level, there are examples of professors and instructors implementing a UDL approach with their college and university classes. With the onset of the pandemic several years ago, many classes adopted a UDL model for their online classes and since then there has been a call for a broader adoption in the higher education setting. While federal legislation has emphasized the need for schools and districts to utilize a Multi-Tier System of Supports (MTSS) to address gaps in student achievement, there is no similar legislation at the higher education level. There has been limited research on the impact of teacher preparation on the postsecondary level in supporting the enactment of UDL approaches in the classrooms which would strengthen an MTSS model as well. Since UDL fits within the MTSS framework and provides the foundational instruction needed at the Tier 1 level before interventions are considered, the two are intricately connected. There is a need to start at the college level with this model so as to model for future K-12 educators how they may employ UDL approaches in their own classrooms. Future educators in college training programs need knowledge and expertise in universal design for learning (UDL) and how to make data-driven decision-making to provide targeted and focused instruction to assist students in reaching increasingly rigorous standards set in schools (Slanda and Little, 2020; Boothe et al., 2020). In a qualitative study

done at the collegiate level, a pair of researchers explored the characteristics necessary to make teacher preparation programs focus on enhanced content, performance tasks, and resources to prepare teachers with intensified pedagogical knowledge on differentiation of instruction through UDL and varied instructional practices to meet diverse learning needs of students. In this particular research, teachers in training who were enrolled in online courses completed a two-week module on UDL principles and how to embed these same principles into their classrooms once they received their teaching licenses. A similar study was done at a different university in order to examine the effects of optimizing the learning experience of students by allowing them the opportunity to engage and express themselves in the curriculum using multiple modalities (Booth et al., 2020). Instructors in the course modeled how they may use UDL principles for final projects, then distributed, collected, and analyzed survey results from students on how they believed the project went on preparing them for incorporating similar principles in their own classrooms. The responses from the student teachers were favorable in that nine of the twelve respondents significantly felt the project impacted their learning positively and provided them with the tools they would need to provide similar projects to their students on a smaller scale in the K-12 setting.

By having the students engage in a UDL final project, they were able to experience how such a project may be carried out in the classroom setting. Students were provided multiple opportunities to engage in their work and express their knowledge in the way that made the most sense for them. The college students and future educators were able to be strategic and goal-oriented in their education and optimize their learning by making autonomous choices. In

addition, having flexibility and choice in how they demonstrated their learning on certain topics naturally led to more engagement in the material as students were more likely to align their learning style with the content and had more control over the outcome of their learning. This does not mean that all assignments should be choice assignments; however, it does give opportunities for teachers to embed more into their content in order to reach all learners and provide more accessible learning, a critical UDL component. Additional research in this area of student-teacher preparation at the college level could include face-to-face classes as well as undergraduate-level courses. Further, future research may possibly include existing K-12 educators to better understand the impact teacher education practices have on classroom instructional practices.

One of the essential pieces that needed to be addressed in exploring how UDL is used in the higher education environment is how understood this concept is amongst faculty and identifying what the barriers are that exist for more widespread implementation. As the number of students with disabilities in post-secondary continues to rise, UDL is widely recognized as a best practice for post-secondary learning. While many faculty members understand this and value inclusive education, this understanding sometimes does not translate to practice (Hills et al., 2022). A qualitative study, which consisted mostly of interviews, conducted at a Canadian university, selected participants who had specific expertise in UDL as well as diverse experiences with students and faculty in their various instructor and student support roles. Participants were interviewed for 45-85 minutes and the responses were transcribed and analyzed. Currently, UDL implementation at many universities relies on individual faculty members to seek relevant

training and implement UDL, rather than embedding the beliefs of inclusive education into the broader institutional culture. There are no requirements or widespread expectations that faculty members receive the training; thus, it is up to individual faculty to view the value of such training and take the initiative in completing it. Hills et al. (2022) also found through their research that frequently mentioned barriers to implementing UDL principles were time/workload constraints (62%), followed by a lack of knowledge and awareness of such tenets (43%). The emerging finding from this study supports the need for a broader implementation of UDL practices into the institutional fabric. It is not only necessary that faculty have widespread access to UDL development and training but that they are afforded the time and resources necessary to effectively implement the training principles. This would be a shift from the more conventional down-top approach to a more top-down initiative to better embed learning strategies and principles into the culture of higher education. More research is needed to develop quality strategic frameworks for implementing university-wide adoption of UDL and to evaluate outcomes from the perspectives of faculty members and students.

There have been examples of a UDL approach being implemented with specific content areas at the university level with undergraduate students who have disabilities. As of 2019, The National Center for Education Statistics reported 19% of undergraduates self-disclosed having a physical or cognitive disability. Examples of physical or cognitive disabilities include some type or combination of visual, hearing, speech, or mobility impairment or a learning disability or mental health condition that impacts the learning process. For the purposes of one study on how students with disabilities in engineering courses benefit from a UDL framework in their

courses, researchers studied the results of surveys that employed the survey methodology MUSIC inventory (Amos et al., 2021). This survey method explores five primary components of the MUSIC Model of Motivation: eMpowerment, Usefulness, Success, Interest, and Caring. The components of the MUSIC model have been used for the past decade in multiple contexts to identify factors that motivate students. Three hundred and three students across 49 engineering courses filled out the survey, expressing their preferences with different modalities of instruction received and how frequently they used each one. What was found was interesting in that while certain students needed certain modalities to access the content (an example is closed captioning for hearing-impaired students), this same text representation of the audio stream benefited the class as a whole. Students who received a choice when interacting with the content were more likely to be more engaged in their learning and take in more knowledge than other students. Furthermore, the study found students with disabilities had the highest satisfaction with audio transcriptions and textbooks, both which included a text-based narrative. This result seems to lead to the impression that students with disabilities benefit from having access to both video and text-based modalities. The findings also support the use of Universal Design for Learning as an appropriate educational framework by engineering (and other) educators to support inclusive and accessible education outcomes.

### **Role of School Psychologists and Counselors**

Traditionally, classroom teachers, support teachers, and administrators have had the primary role of running MTSS supports in the school setting. However, there has been a growing

understanding of the vital role that school psychologists and school counselors play in supporting the social-emotional well-being of the student population. This was brought to light more recently with the huge impact COVID had on existing supports that students received. Although the roles of the school counselors and psychologists are not well defined within the MTSS practice and service delivery, they are well-versed in interpreting data to make informed decisions about a student's progress within the school environment. By bringing in the expertise of school counselors and school psychologists, MTSS can place a greater emphasis on providing culturally responsive supports. Specifically, school counselors serve students' academic, career, and social/emotional needs through a comprehensive school counseling program and in doing so, can align their support within the school's multi-tiered systems of supports (Tillery et al., 2022). School counselors provide supports across tiers, which has been especially necessary, given the pandemic and racial inequities highlighted during 2020 and 2021. As more schools are integrating the school counseling program into the existing MTSS model, they are allowing for more frequent collaboration amongst departments and embedding social/emotional learning within the academic approach. The research done at Virginia High School was really the first of its kind in acknowledging the relevance of MTSS and its usefulness in improving school culture and procedures during online learning. By fully integrating with MTSS, the counseling department at the high school ensured a more equitable approach during a year in which many students experienced inequities in learning through online platforms (Tillery et al., 2022).

Similarly, school psychologists can help school districts understand barriers, help disseminate research-based practices, and develop innovative approaches to improve



implementation. In regards to barriers, rural school districts may experience unique obstacles to implementation, such as difficulty recruiting highly qualified teachers or other specialists, access to effective staff development, and resource limitations. Webb and Michelopoulou (2021) set out to explore how a school psychologist might mitigate some of the barriers listed above in a small rural school district in Pennsylvania consisting of 1500 primarily Caucasian students. The school district employed an MTSS coordinator who was a certified teacher and oversaw schools with the implementation of universal academic and behavioral screenings three times a year. The school psychologist's primary role in the MTSS process was to interpret the collected data to determine if a change or addition of interventions was needed based on the results and determine the dosage of any additional interventions. Often there were external environmental factors that influenced the student's academic progress and, as such, the school psychologist played a vital role in providing insightful interpretations that take into consideration these factors in order to provide the best possible plan for the student. The school psychologist also attended relevant training and professional development and then trained the rest of the staff on important updates and knowledge necessary for the robust implementation of MTSS. With the implementation of MTSS at the elementary school buildings with the active involvement of the school psychologist, special education referrals related to specific learning disabilities (SLD) have been reduced over the past 5 years by up to 25%. More importantly, the success in implementing evidence-based targeted interventions and adjusting the frequency and dosage of the interventions has improved students' academic achievements as evidenced by assessment data. By integrating the school psychologist's expertise into the existing MTSS

model, the Pennsylvania school district demonstrated the critical role this valued team member played in training staff, interpreting data, and supporting team members with the next steps (Webb and Michalopoulou, 2021). Universal support within the classroom and intense tiered support, as provided by MTSS if needed, is crucial in allowing students to be instructed in materials that have not been taught or taught as intended due to the school closures and remote learning without unnecessarily identifying them with a special education disability, such as SLD. School counselors and school psychologists, when integrated into this model, can lend a lot of support in considering all factors and interpreting what the data says about the student.

### **An International Approach**

The United States and Canada are not the sole countries that have been heading in the direction of applying frameworks that lead to inclusive education. Several countries, such as Australia, the Philippines, Turkey, and Greece have also, in recent years, intentionally introduced the UDL framework in select teacher preparation programs and in certain areas of higher education to potentially explore the impact of UDL in eradicating the barriers in educational institutions. With the increase of more diverse students at international universities, many countries have recognized the need to address the differences in students, from varying disabilities to different cultural and linguistic backgrounds, by including more intentional instructional design to promote greater access to the learning material (Garrad & Nolan, 2023; Bedir, 2022). For some international educational institutions, the COVID pandemic and the resulting school closures prioritized the need for these institutions to find ways to provide

equitable access to the learning content. However, while numerous schools internationally recognize the advantages of UDL, lack of necessary training, lack of technological resources, and limited infrastructure are often obstacles in the way of applying the UDL framework across educational institutions (Bedir, 2022; Markou and Diaz-Noguera, 2022).

In fact, one of the studies that will be reviewed in this section examined the particular topic of how higher education institutions benefited or not from employing UDL principles in their online courses (Garrod & Nolan, 2023). In a university in Australia, a study was conducted in which 107 student teachers enrolled in the Bachelor of Education program agreed to participate. Online courses were designed and categorized into pre-UDL and post-UDL and students were placed in either based on their cohort. Pre-UDL courses included pre-recorded lectures of oral materials, weekly release of unit materials, and two written assignments on predefined topics. In contrast, the post-UDL courses included pre-recorded lectures with supplemental videos and visuals, closed captioning, lecture transcripts, self-paced learning, checkpoint quizzes along the way, one written assignment with a choice of topic, and one assessment that students could present using any modality (essay, oral presentation, Prezi, handout, etc). The results of the study were determined by way of student survey responses and an examination of course interactions. The implementation of UDL as the unit design framework in an inclusive education context resulted in a significant increase in student engagement rates. Furthermore there was a significant decrease in student attrition rates in courses that utilized UDL principles and components when compared to the pre-UDL cohort. The difference in engagement rates was remarkable given that pre-UDL students logged into

and interacted with the unit resources a total of 29,739 times compared with the post-UDL total of 72,951. The favorable results of the study stress the significance of the fact that this framework improves students' engagement in learning in higher education online learning environments. By having the course materials presented in different formats (multiple representations), students were more likely to be engaged in the course content (multiple means of engagement) and were able to express their knowledge in the modality they chose at least some of the time (multiple means of expression).

Other institutions also sought to implement into practice what is widely recognized in theory. Studies on the benefits of UDL are incredibly limited in scope and number. Markou and Diaz-Noguera (2022) aimed to change that trajectory by researching what needs to be highlighted to enact more systematic change and widespread effective UDL implementation across educational contexts. In a qualitative study, twenty-five teachers, including fifteen secondary school teachers, were asked to keep reflective journals on their journey into learning about and implementing UDL principles into their teaching practices. Specifically, the journals' purpose was to show teachers' attitudes and general thoughts towards UDL, their feelings, the obstacles they faced in applying principles, and the results of every implementation. When Markou and Diaz-Noguera analyzed the teachers' reflective journals, they found that, in general, teachers favored UDL as a learning practice with positive outcomes for all students. Many did not feel confident to implement UDL lessons due to a lack of relevant pedagogical training, a lack of time and necessary resources, and a feeling of confinement to existing curricula. Finally, teachers believed that new technologies could be an effective tool for implementing innovative

practices, yet there was difficulty in accessing that new technology in the existing infrastructure. The Greek educational system recognizes the need to apply innovative practices to meet its role and modern demands, especially when considered next to other countries on the world stage that are already doing so. The researchers of the study identify the following criteria as necessary in order to implement the philosophy of UDL in a more widespread manner in Greece: modifying or updating outdated curricula, providing appropriate teacher training, and updating technological equipment (Markou and Diaz-Noguera, 2022).

Another country that took a deep look at how their teachers viewed UDL practices and which components they implemented in their instruction is Turkey. Similar to the study conducted in Greece, teachers in Turkey were interviewed on their views of UDL and were questioned on what factors prevented them from applying the principles they know of (Bedir, 2022). Overall, the general view of UDL practices was high, and most teachers recognized that UDL lends support for individual differences in education, contributes to versatile learning, and facilitates increased access to quality education. Some teachers also recognized that it increased the ability of students to express themselves in multiple ways. However, even though teachers agreed with and understood the theoretical principles of UDL, many teachers expressed that there was no connection between theory and practice due to a lack of training and resources. Similar to their Greek peers, there was a recognized gap between teaching and applying due to obstacles and deep infrastructure inequities (Markou and Diaz-Noguera, 2022; Bedir, 2022). Teachers in both countries were aware that flexibility (in representation, engagement, and expression) is the key to self-efficacy in learning; however, more work needed to be done in to

ensure the teachers had what they needed to make this a reality in their classrooms. Based upon the results of the study, Bedir suggests there may need to be more courses in teacher training programs to train teachers on how to apply UDL principles and incorporate more flexible options in their practices to make them more inclusive of all students. Preparing teachers before they enter the classroom, universities and colleges will ensure teachers will be better equipped to make inclusive decisions that have positive and impactful results in their classroom.

When teachers are provided the opportunity to receive training on how to implement UDL principles, they are more likely to use that knowledge to apply similar practices in their own classrooms. In an example of a country that turned quickly to the UDL framework as a response to the COVID pandemic, the Philippines emerged as that country that responded the best it could, given its resources. Before COVID-19, many schools in the Philippines were barely surviving due to scant funding, inadequate facilities, and rising enrollments of students. It was predicted that the pandemic would deepen these problems, which critics blame on years of under-investment and under-funding in public education (Leonardo & Cha, 2021). When the government announced the plan to prepare and implement a series of online teacher professional development activities aimed at improving science teachers' self-efficacy for teaching science post pandemic, this raised concerns for the researchers. Traditionally science has not been seen as an important subject in a country where daily survival is a struggle and more than a quarter of the population lives beneath the poverty line. Promoting science instruction and literature has thus been seen as a challenge and something Leonardo and Cha

wanted to change. In taking the government webinars and aligning them with the UDL framework, the researchers were hoping to give science teachers an avenue for teaching science online to their students using a similar framework.

In a quantitative study, more than three hundred junior high school science teachers filled out questionnaires and participated in the research to determine the effectiveness of the government-sponsored webinars. In participating in UDL webinars, teachers were exposed to ways they could create accessible and flexible learning content for their students in online educational contexts. Online courses and webinars that were intentionally designed and constructed using UDL principles further maximized educational advantages, including improving teachers' positive self-efficacy and confidence in using digital forms of education and the awareness to expand accessibility and diversifying instructional strategies online (Leonardo and Cha, 2021). The results of the study supported the premise that when the science teachers observed how a UDL-aligned webinar worked, they gained necessary tools and training to implement similar online practices in their own classrooms. To this end, it was of great significance in professional development and training to help science teachers understand how to incorporate the features of UDL principles into their instructional strategies and make them more practical and real for them.

As can be seen with the many international examples that were provided above, when teachers are provided with the training, tools, and resources they need to implement UDL practices within their classrooms in various educational contexts, they are able to apply the important principles of flexible representation, engagement, and expression in their classrooms.

The arrival of the COVID pandemic hastened the necessity of educational institutions worldwide to find solutions for their students to continue accessing their learning in flexible ways and in an increasingly virtual environment. Countries such as Greece, Australia, Turkey, the Philippines, and many others prioritized preparing teachers and reducing systematic barriers to learning so that students were able to maximize their learning outcomes through flexible opportunities in online settings.



## CHAPTER III: DISCUSSION AND SUMMARY

### Summary of Literature

This literature review has provided a comprehensive analysis of the current research on the successful crosswalk and implementation of UDL and MTSS. A crosswalk is defined, in terms of educational frameworks, as examining where the characteristics of the two frameworks overlap in complementing each other. The reviewed studies consistently indicate a positive correlation between a foundational UDL framework implemented in the school setting and an MTSS model that supports that UDL framework. As the literature has demonstrated, when educational institutions use comprehensive approaches to their tiered intervention model and have a foundational instructional component, all learners are more supported in the diverse classroom. This became even more of a necessity with the educational inequities that the pandemic exposed globally. Schools saw a rise in special education evaluations and struggled to support students who were impacted by the pandemic and the subsequent school closures. The rise in special education evaluations obligated schools to shift their focus on strengthening their tiered intervention supports and bolstering their core instruction to students.

A necessary component of successful implementation was providing teachers with the training and professional development needed. School districts invested in creating foundational supports that aimed at supporting all students, regardless of where they were in the tiered interventions and thus employed a UDL framework to meet that goal. ( Evmenova, 2018; Hollingshead, 2022 et al.; Lambert et al., 2021; Massengale, 2020). Specifically, various educational institutions attempted to get educators the training they needed when the

shutdowns occurred. While UDL allowed students with disabilities to thrive in their online learning environments, it had the added benefit of all learners in accessing the content. Teachers who were more knowledgeable in UDL principles were likely to feel comfortable when they had to transfer their teaching to an online format. Teachers faced many barriers to the online learning environment, including access to online pedagogy and a variety of resources. Thus, the teachers who had the support and resources they needed for the effective application of the framework saw more successful results with their students. Perceptions and attitudes toward UDL went up when teachers had more pre-service knowledge of the UDL framework as applied in a virtual format (Barahona et al., 2023; Boothe et al., 2022; Hills et al., 2022; Hollingshead et al., 2022).

Multiple studies conducted at the university level during the pandemic pointed to the importance of employing UDL principles in online classes to provide targeted and focused instruction (Amos et al., 2021; Boothe et al., 2020; Slanda & Little, 2020). When professors provided flexibility and choice in their teaching, students became more engaged and demonstrated knowledge of the content in a way that helped them learn the material. Consequently, students had more control over the outcome of their learning and the learning was made more accessible. Schools that employed the use of Universal Design for Learning as an appropriate educational framework supported inclusive and accessible educational outcomes.

One of the areas that teachers and school districts needed support it was the alignment of the core program and the corresponding interventions in that subject area. Schools that

aligned their approach and expanded their MTSS to look at the whole child were able to cast a wider net that ensured all of a student's needs were being addressed (Nelson et al., 2020; Sailor, 2021). Having school-wide systems that aligned also helped support more substantive change that reduced the amount of inappropriate special education referrals. Several of the reviewed literature took a look at what the outcomes looked like when the supports in place for academic and behavior interventions were integrated together (Harn et al., 2015; King et al., 2016; Losinski et al., 2021). Schools that aligned their systems of support and coordinated their universal screening and progress monitoring processes were then able to utilize data-based decision-making that impacted the targeted supports students received. Oftentimes by looking at both, an intervention in one area, such as executive functioning and self-regulation, this may help provide support needed to accomplish goals and increase growth in another area, such as math or reading. Thus, both King et al.(2016) and Harn et al. (2015) stressed the importance of coordinating both behavioral and academic supports and not compartmentalizing them. In doing so, schools consider compounding facts that may be impacting student outcomes.

When considering evidence-based instructional strategies or intervention supports, schools that saw more success in implementation targeted interventions to their specific student population. For example, both Carta et al. (2014) and Hoover & Soltero-Gonzalez (2018) had an integrated approach to an EL-focused MTSS in order to tackle an increase in special education referrals amongst the ELL population. Both studies stressed the importance of bolstering robust, evidence-based literacy curricula in Tier 1 that focus on the characteristics of EL learners. In fact, early high literacy-based instruction in preschoolers and kindergartners can

be an important indicator of future academic success, especially when students receive supplemental instructional practices such as increased story times or additional vocabulary acquisition strategies (Coyne et al., 2022; Greenwood et al., 2019; Kong et al., 2020). These studies point to the significance of targeted supports being provided concurrently with strong Tier 1 instruction. In fact, an essential component of a strong MTSS framework is that all students are exposed to solid foundational core instruction first.

Although less common, there are several studies that outline the importance of employing an MTSS framework at the high school level to accelerate the rate of acquisition of desired behaviors and academic skills (Bradshaw et al., 2021; Kennedy et al., 2014; Tillery et al., 2022). In fact, when employing an MTSS framework and integrating other departments (such as counseling) into the model, districts and schools were able to embed social/emotional learning within the academic approach. School counselors and school psychologists play an important role in helping districts understand barriers and develop innovative approaches to improve the comprehensive implementation of strategies.

Finally, it is important to note that applying an inclusive and equitable framework such as UDL is not limited to the United States. In fact, several other countries, such as Australia, the Philippines, Turkey, and Greece have recently introduced the UDL framework in teacher preparation programs and schools in an effort to address existing barriers. The obstacle in employing UDL in other countries is often highlighted by many challenges, especially in a lack of training, resources, and infrastructure (Bedir, 2022; Leonardo & Cha, 2021; Markou & Diaz-Noguera, 2022). Nonetheless, these countries are able to see progress in student

outcomes when they address the challenges; however, they can and apply the important principles of flexible representation, engagement, and expression in their schools. By doing so, these countries are prioritizing reducing systematic barriers to learning so that students are able to maximize their learning outcomes through flexible opportunities in online settings (Bedir, 2022; Garrad & Nolan, 2023; Leonardo & Cha, 2021; Markou & Diaz-Noguera, 2022).

### **Limitations of the Research**

This literature review is limited in its scope as it did not dig deeper into specially designed instructions that may have been used in the Tier 3 level of the MTSS framework. Understanding the effects of Tier 3 interventions that were specially designed would have been helpful in identifying the impact on students receiving those support. The research was also limited to the last six or seven years; thus, the focus was on the specific MTSS model and not what was known previously as the RTI (Response to Intervention) framework. The biggest difference between the two frameworks is that the RTI model is primarily geared towards academic outcomes for at-risk students, while the MTSS framework is a more comprehensive one that examines the broader implications of social/emotional learning as it connects to academic outcomes.

The literature review revealed a significant gap in research when it comes to exploring the convergence of Universal Design for Learning (UDL) and Multi-Tiered Systems of Supports (MTSS). While there is a substantial body of literature on each of these frameworks individually, there is a lack of empirical research that specifically examines the integration between UDL and

MTSS. This seems to be a field that is growing and gaining momentum but has not been extensively studied yet. Both frameworks share a common goal of ensuring equitable access and success for all students, regardless of their backgrounds or any disabilities. However, despite their shared goal, there is limited research on how the two frameworks can be effectively integrated with each other to provide and enhance the instructional and behavioral supports learners may need.

### **Implications for Future Research**

While the research on UDL and MTSS as separate topics is significant, understanding how UDL and MTSS can work together and complement each other would be innovative and necessary. The intersection of these two frameworks would have practical implications for all levels of educators, from teachers to administrators. Incorporating the principles of UDL with the tiered interventions and supports of MTSS would allow educators to broaden their scope and enact systematic and institutional changes in their educational institution. Furthermore, it would provide a more personalized approach to learning and promote both academic and social-emotional growth for all students. Educators would benefit from further research in this area and how it may benefit them in implementing strategies in an intentional and strategic way within the frameworks of the school. In addition, addressing this research gap would provide

reinforcement for educators as they continue to find novel ways to create inclusive and supportive learning environments for all learners, regardless of background.

### **Professional Application**

Through a thorough literature review on the subject of UDL and MTSS, I gained a comprehensive understanding and knowledge of the theoretical frameworks and practical applications of UDL and MTSS for the ultimate goal of addressing the needs of all learners. A key piece I learned through my research is the critical importance of all teachers receiving training on what UDL means and on the MTSS process. MTSS can be a positive transformational school reform, when used within the context of a strong UDL framework . By having school-wide systems embedded within the tiered supports, more substantive changes can be made. In my profession, I noticed that many teachers were unfamiliar with the concept of UDL and why it is so pivotal to reach all learners in the way they learn best. Quite a few times, as a special educator, I would receive requests for special education evaluations when there was no evidence of strong instruction or interventions happening first. Because this issue was exacerbated by COVID and the huge increase in requests by teachers for students to receive a special education evaluation, I was curious to learn more about what better systems can be put into place to have substantive evaluations.

The literature review in Chapter 2 was greatly insightful in exploring the essential components of Universal Design for Learning (UDL) and the Multi-Tiered Systems of Support (MTSS) and what successful implementation of each looks like. There are numerous benefits for schools adopting a strong foundational curriculum and embedding social-emotional learning into the foundational level of instruction. By addressing the needs of all learners in the school, through multiple means of representation of content and engagement opportunities and allowing multiple ways to express learning, schools are setting solid supports in place that promote learning for all. This would allow for a strong Universal Design for Learning applications to be embedded in the school, which would limit the need for unnecessary special education evaluations. Having a strong foundational level of instruction would also be beneficial in ensuring a more robust Multi-Tiered System of Interventions.

A third practical application that I can be mindful of when working with teachers, beyond teacher preparation and a strong foundational level of core instruction, is the necessity of implementing universal academic and behavioral screeners with all learners in order to start targeted and focused interventions on students who are identified as 'at risk' early on. When implementing the interventions, I need to consider selecting from interventions that align with the core curriculum, are evidence-based, and can be progress monitored regularly. I believe that these main big ideas that emerged from the literature of: teacher preparation, robust core



instruction for all, universal academic and behavioral screeners, and interventions that are aligned with curriculum standards and can be regularly progress monitored will be important and pivotal for me to take into my practice as an educator and help me become a better one.

### **Conclusion**

This literature review was sparked by a single guiding question which was: How can a comprehensive approach that combines Multi-Tiered System of Supports (MTSS) and Universal Design for Learning (UDL) be implemented to effectively support all learners in a diverse classroom setting in order to reduce unnecessary special education evaluations? That question led to a review of multiple pieces of literature on the topic that really expanded my viewpoint and provided me with a deeper understanding of how UDL and MTSS can complement each other to address the needs of all learners. Furthermore, when the two frameworks work hand in hand, the possibility for transformational change is increased immensely. Decisions become more data driven and students get the supports they need to be successful, regardless of their background or abilities. The results of this research have far-reaching implications and multiple pathways to practical applications in the school setting, whether that is K-12 or post secondary. It is my hope that the research gap that demonstrates how MTSS and UDL can successfully intersect can be addressed in future research which would provide increased support for educators as they continue to find novel ways to create inclusive and supportive learning environments for all learners.

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