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Specific Learning Disabilities: Response to Intervention

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Abstract

The content included in the current chapter centers around the screening and identification of students who experience learning challenges in an educational setting in the United States of America. The specific learning challenges discussed will focus on students who may have a specific learning disability (SLD). Legislation that brought about concepts such as response to intervention (RTI) is discussed in detail. The various levels of intensity of interventions, or tiers, provided to students are explained by more than one discipline. The new regulations guiding access to special education services are based on the identification, intervention, and close monitoring of student progress. The overarching goal of RTI is to provide support to students who may be experiencing difficulty, before they experience failure by falling too far behind their peers.

Keywords: response to intervention, evidence-based intervention, instruction, monitoring, dynamic assessment, multitiered system, educational legislation

1. Introduction

This current chapter provides an overview of the historical background of specific learning disabilities (SLDs) in the United States of America. A SLD is a developmental disorder that begins by school age, although it may not be recognized until later [1]. It involves ongoing problems learning key academic skills, including reading, writing, and math. SLDs may also affect the way an individual is able to write, spell words, reason, recall, or organize information. SLDs are a lifelong condition that comes with varying levels of challenges unique to each individual. The impact that a SLD has on an individual can be minimized based upon the early detection and treatment of the condition. The treatments provided should be evidence based and selected as a result of the individual's learning needs, preferences, and background [2]. Evidence-based interventions are methods that have been scientifically confirmed with regard

to the selected treatment and proven effectiveness. In the current chapter, distinct types of SLDs will be emphasized. An overview of response to intervention (RTI), as well as an explanation of the multitiered system, will be illustrated throughout the chapter and within **Figure 1**. Progress monitoring is a key component to successful RTI implementation. This chapter will describe the assessments used to observe improvements. The benefits associated with RTI methods are discussed from multiple perspectives within this chapter. The role of speech-language pathologists (SLPs) and special educators is highlighted below.

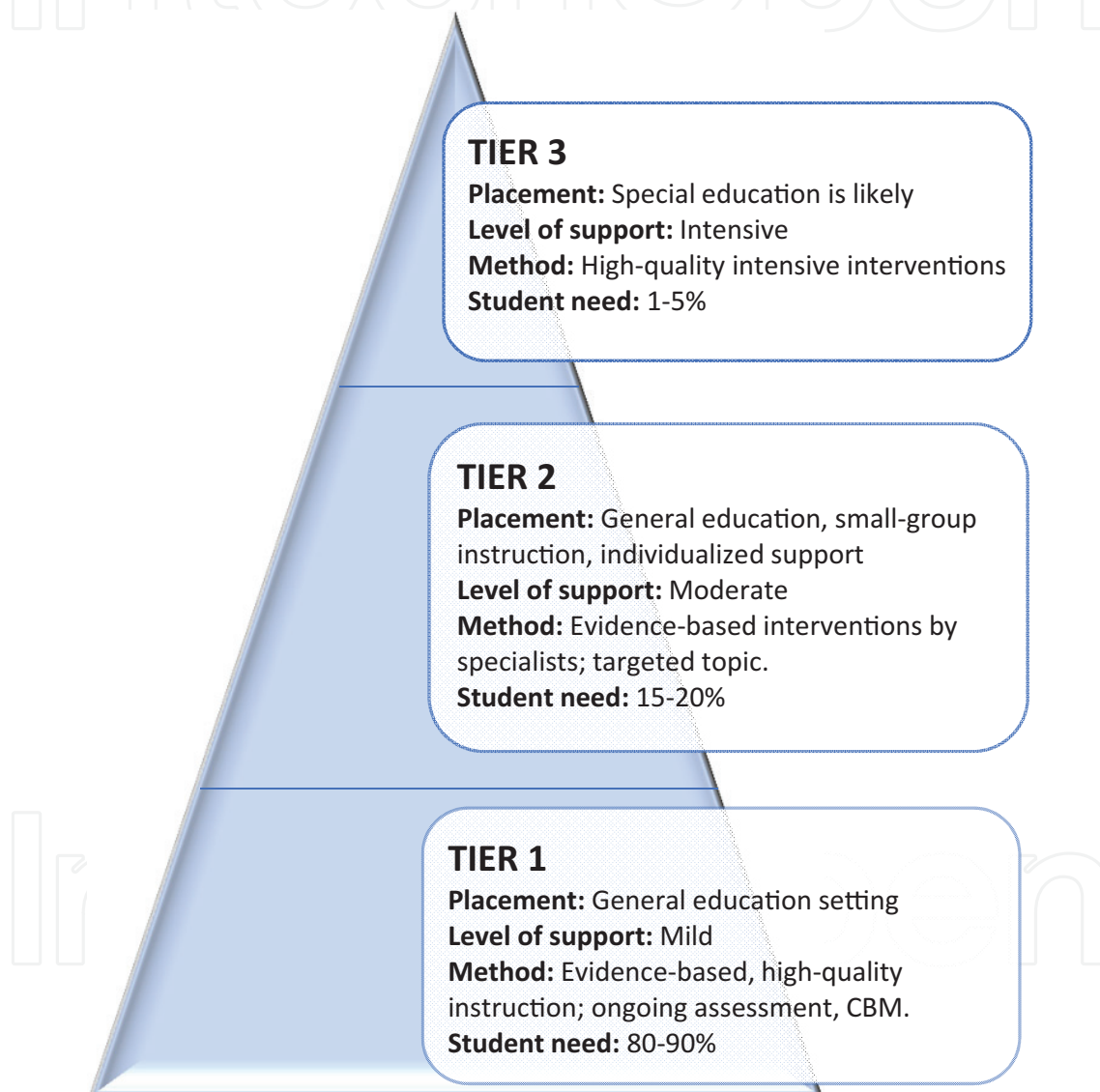


Figure 1. The figure presents each of the three levels (Tier 1, Tier 2, and Tier 3) of response to intervention (RTI). Each tier refers to the general descriptors of the strategies implemented in an increasingly intensive method [10]. Each tier presents the percentage of students requiring the specific tier's level of intervention and a description of each of the following: typical placement, level of support, method of intervention, and student need presented as a percentage of the student population requiring such interventions within each tier.

2. History of learning disabilities

This section provides a historical presentation of learning disabilities in the United States of America. Over the past few decades, students with learning disabilities have improved their ability to contribute to society as a result of receiving better services and a clearer diagnosis in relation to their deficits [3].

In the past, learning and attention issues were not on the public radar. In 1905, the first publication by W.E. Bruner reported about childhood reading difficulties. It was not until the 1930s that the term dyslexia was coined. In the 1960s, in the United States of America, professionals first started to recognize the term learning disability (LD), which is later regarded as attention deficit hyperactivity disorder (ADHD). At this time, inclusion of students with learning disabilities and their nondisabled peers was not practiced in the United States of America [4]. Instead, students with learning disabilities were educated separately. In 1963, Samuel A. Kirk was the first psychologist to use the term learning disability at a professional conference. It was around this time that public school and the federal government started paying attention to learning disabilities.

The Association for Children with Learning Disabilities (ACLD) was created in 1963. This organization is now known as the Learning Disabilities Association of America (LDA) and is spread across the United States of America. LDA's vision is that all individuals with learning disabilities are empowered to thrive and participate fully in the society; the incidence of learning disabilities is reduced; and learning disabilities are universally understood and effectively addressed. LDA's mission is to create opportunities for success for all individuals affected by learning disabilities and to reduce the incidence of learning disabilities in future generations. LDA provides a plethora of resources to educators, individuals, families, states, and professional resources.

In 1969, the first federal law was passed to mandate services for students with learning disabilities. In 1973, an act that prohibits discrimination against people with disabilities in programs receiving public funding was passed. This act is referred to as Section 504 of the Rehabilitation Act. The US Congress passed the Education for All Handicapped Children Act (EAHCA), which popularized Free Appropriate Public Education (FAPE) for all students living in the United States of America, in 1975. The National Center for Learning Disabilities was founded in 1977, which was the former Foundation for Children with Learning Disabilities. In the 1980s and 1990s, trends continued to progress for individuals with learning disabilities. In 1985, the first dyslexia state law was enacted in Texas requiring instructional interventions to be put in place for students. In 1996, the National Institute of Mental Health completed research that identified the regions of the brain affected when a person has a diagnosis of dyslexia. The first learning disability web source, for parents and teachers, was established this decade. In the year 2000 and beyond, the awareness and research of learning disabilities continued to grow. Public laws and policies provided individuals with more rights and guidelines were established for professionals responsible for educating students with disabilities.

Brain research became fundamental in understanding learning disabilities and their causes. In 2001, legislation known as No Child Left Behind Act (NCLB) enhanced the states and district's accountability for students' progress. In 2002, research completed at Yale University looked at the differences between non-dyslexic and dyslexic brains. The researchers were able to view how the brains of those with dyslexia worked differently than non-dyslexic peers using MRI technology. Later in 2005, Yale University identified a gene associated with dyslexia. The overall public view at this time was evolving with regard to the way people perceived individuals who have a learning disability.

The reauthorization of Individuals with Disabilities Education Act (IDEA) in 2004 increased responsibility of school districts and enhanced parental rights. Another important piece to the legislation is the alignment of IDEA and NCLB. As a result, response to intervention (RTI) was introduced to assist struggling students before they are referred for special education services. In 2007, researchers at the University College London used brain imaging to identify the areas of the brain that works differently when individuals have learning disabilities such as dyscalculia.

In 2013, the *Diagnostic and Statistical Manual of Mental Disorders-5* (DSM-5) broadened the definition of learning disability (LD) to specific learning disorder (SLD) [1]. In 2015, NCLB was repealed, and the US Congress enacted new legislation referred to as Every Student Succeeds Act (ESSA). This law provided each state within the United States of America to set their own goals for student achievement within a flexible federal framework. The ways in which students are identified as having a learning disability have changed over the years. Until recently, the most common approach to diagnose a student with a learning disability was to use a "severe discrepancy" formula. This referred to the gap, or discrepancy, between the child's intelligence or aptitude and his or her actual performance. In the 2004, reauthorization of IDEA changed how LD is determined. IDEA now requires that states adopt criteria that must not require the use of a severe discrepancy between intellectual ability and achievement in determining whether a child has a specific learning disability. In addition, states must permit local educational agencies (LEAs) to use a process based on the child's response to scientific, research-based intervention and allow the use of other alternative research-based procedures for determining whether a child has a specific learning disability.

To summarize the new practices, instead of using a severe discrepancy approach to determine a learning disability, school systems must provide the student with a research-based intervention. The student's performance must then be closely monitored related to their response to the selected interventions.

3. Types of learning disabilities

The most common types of SLDs affect the areas of math, reading, and writing [1]. Learning disabilities can be best described as having difficulties in academic achievement and related areas of learning and behavior. There is more than one cause for SLDs. Often, learning disabilities are a result of an individual's genetic makeup. The other cause may be from a stroke or traumatic brain injury that occurs later in an individual's lifetime.

This section of the chapter outlines several types of LDs. Some of the SLDs listed below are of high incidence, and others are of low incidence. It is also important to note that students who have a diagnosis of a SLD may have a comorbid diagnosis of another disability such as dyspraxia and attention deficit hyperactivity disorder (ADHD) or have patterns of weakness in executive functioning, which will impact the treatment they receive [2].

3.1. Dyslexia

Dyslexia is a learning disability categorized by deficits in learning to read or understand words, letters, and other symbols of a learner's native language. Dyslexia is caused by neurobiological dysfunctions in the brain. It may be inherited from parents or be a result of a traumatic brain injury, stroke, or dementia. A person who has a diagnosis of dyslexia may have difficulty in understanding letters, groups of letters or symbols, sentences, or paragraphs [2]. Dyslexia can be diagnosed through a battery of assessments including memory, vision, spelling, and reading tests.

3.2. Dysgraphia

Dysgraphia is a type of learning disability that impacts an individual's writing ability. Students who have dysgraphia may have difficulties that range from inability to formulate thoughts into text, illegible handwriting, inconsistent mix of print and cursive, upper and lower case, and unbalanced size, shape, and slant of letters. In addition, an individual with dysgraphia may display difficulties in copying words, may show poor spatial planning, may use inconsistent spacing between letters or words, or may not complete letters or familiar words. Dysgraphia may also impact an individual's ability to think and write at the same time; making note taking challenging [1].

3.3. Dyscalculia

Dyscalculia involves frequent difficulties with everyday arithmetic tasks, such as telling time, following directions, adhering to and creating schedules, and sequencing events [1]. Individuals with dyscalculia make mistakes with distinguishing between left and right. In addition, students with dyscalculia face challenges with consistently solving addition, subtraction, division, and multiplication problems. The knowledge of budgeting, financial planning, and estimating numbers is a daily challenge for individuals with dyscalculia.

4. Overview of response to intervention

Response to intervention's (RTI) foundation is rooted in prevention of science and evidence-based practice. This approach embraces special and general education through the use of three target areas: (a) effective curriculum that provides opportunity for the majority of students to progress at the expected rate, (b) universal screening for early identification at-risk students so that these students may be provided additional, focused, intensive instruction while their progress is monitored, and (c) intensive interventions to aid students with learning difficulty [3].

RTI emerged in the field of education based on research on specific learning disabilities (SLDs) and reading interventions. The results of SLD research influenced education laws and classroom practice [4]. In the United States of America, special education is governed by IDEA 2004. IDEA 2004 encouraged schools to use research-based interventions to differentiate between students struggling due to poor instruction or to a disability [5]. Prior to the reauthorization of IDEA 2004, a student may qualify for services under the SLD category by showing a discrepancy between achievement and aptitude on a qualified assessment. As a discrepancy model, SLD is the term used to describe a student performing at average or higher intelligence on a standardized test and performing at a significant discrepancy (usually two standard deviations) in one or more academic areas. Shortcomings of the discrepancy model led leaders in the field of SLD to propose RTI as a valid method of identifying a student with a learning disability [4]. Through the use of powerful, scientific-based procedures for decision making, RTI focuses on improving the outcomes in both general and special education [5].

RTI is more than a method of identifying students with learning disabilities; it is a way to ensure better academic outcomes for all students. RTI shifts the focus from individual intrinsic abilities and characteristics to environmental variables and instruction [6]. The shift also requires a closer look at individualizing instruction within the classroom and consistent monitoring of progress through validated, research-based techniques [5]. Further, RTI encourages educators to be proactive in identifying learning delays, ideally to prevent those delays from becoming learning disabilities. Educators can intervene as early as preschool and kindergarten. This model differs from the past practice of allowing the opportunity for students to fail in middle-elementary grades (e.g., second and third grades) before intervening with special education services [3].

RTI's proposed models involve two critical components: (a) evidence-based instruction and interventions implemented and (b) ongoing monitoring of student progress and responses throughout intervention. Valid instruction and interventions are defined as those leading to positive, reliable results for students with similar characteristics [5]. Thus, using RTI to identify students with SLD requires showing not only that a student demonstrates educational need but also an inconsistent response to high-quality general education instruction [7].

5. Explanation of a multitiered system

As mentioned in the overview, RTI is a multitiered system. Although variations of multitier instructional systems exist, this chapter discusses the use of three-tier models. Various school systems nationwide have discussed and adopted the use of the three-tier model. Barnes and Harlacher [6] describe a typical implementation of the three-tier RTI system, which includes 60 minutes of core instruction for all students (Tier 1), 30 minutes of supplemental instruction for those students requiring additional interventions (Tier 2), and additional specialized instruction for those requiring maximum additional support (Tier 3). Therefore, as a student changes tiers (Tier 1 to 2 or Tier 2 to 3), the interventions' intensity increases. This intensity is measured using several factors, including physical features of the intervention (duration, session frequency, and length) and the student-to-teacher ratio. As the student-to-teacher ratio decreases in size, interventions become more intense [8].

Though most illustrations and descriptions of multitiered systems depict a triangle or pyramid as three or more distinct levels, other models have been presented. One such visualization depicts the RTI model in a series of interconnected circles in order to emphasize the relationship and overlap of each targeted intervention. In either depiction, a pyramid or a circle, an effective three-tier model must provide instructional programming in a dynamic and fluent manner across all three levels [9].

Although the number of tiers and what interventions are provided at each tier may differ between different models, they all implement the general concepts of RTI by providing levels of increasingly intensive instruction and interventions with the same end goal: promoting positive academic outcomes. According to these models, approximately 80–90% of the students will be successful with just high-quality general education instruction, while 15–20% will need some form of targeted supplemental instruction. Only 1–5% will require intensive interventions [9].

5.1. Tier 1

In Tier 1, general education teachers rely on the core curriculum and provide students with evidence-based, high-quality instruction. Students are regularly assessed using a variety of methods, including Curriculum-Based Measurements (CBM) to ensure that the students are responding to the instruction. Students who may need additional support are identified in Tier 1 and provided with alternate methods of instruction or interventions within the classroom setting [4]. As shown in **Figure 1**, Tier 1 instruction meets the needs of about 80% of the students within the general education setting; however, approximately 20% of the students do not reach grade-level standards within the core program under Tier 1. Therefore, additional instruction and intervention should be implemented [5]. The expected outcome for Tier 1 is for students to receive quality instruction and achieve expected academic and behavioral goals within the general education setting [9]. If the expected outcome is not attained, Tier 2 instruction and interventions are implemented.

5.2. Tier 2

When a student does not respond to additional instruction and intervention within the general education classroom in Tier 1, Tier 2 interventions are implemented. Thus, the intensity of interventions is increased (**Figure 1**). Tier 2 interventions can be provided within the school day, such as support from a reading specialist or through a specific research-validated intervention. Tier 2 interventions could also occur after school, such as tutoring [10]. In addition, the supplemental instruction is targeted to the specific areas of need and directly complements the core instruction [9]. These interventions may require small-group instruction (four to five students) or one-to-one tutoring and more regular (biweekly) progress monitoring. Often taking 20 minutes per day to implement, Tier 2 interventions are implemented for up to 20 weeks. Students can exit Tier 2 services, if they meet grade-level benchmarks. Some students may continue for the full 20 weeks in order to make sufficient progress [5]. The documentation of a student's responses is critical within Tier 2 interventions. The data collected can be used to determine whether a more formal special education assessment is necessary [6].

The expected outcome of Tier 2 is for students to receive more targeted instruction after not meeting general class expectations and exhibiting the need for supplemental support. Targeted Tier 2 instruction can take place within the general education classroom or in other settings in the school, such as pullout situations. Students' instruction and interventions should be modified and differentiated while providing more specialized equipment and technology, as needed, to target each individual student's instructional needs. Students who make insufficient progress in Tier 2 then are considered for Tier 3, intensive intervention. There should be evidence-based documentation and evaluation to support evidence of insufficient progress [9].

5.3. Tier 3

If a student does not make acceptable progress within provided supplemental instruction and intervention within Tier 2, they can then be referred to Tier 3. Tier 3 includes more intense, specifically designed instruction and/or special education services [4]. Tier 3 is a high-quality, intensive intervention that includes interventions that are individualized to meet significant needs, including various disabilities. About 2–5% of the students who did not respond as expected to Tier 1 and Tier 2 interventions are provided more intensive interventions within Tier 3. The length of time required to implement Tier 3 interventions will often replace some portion of the core curriculum, at least temporarily. Depending on the district or school policy and decision-making process, Tier 3 interventions may or may not include special education services (**Figure 1**). Through continued progress monitoring of the documentation of interventions and further evaluation, often students within Tier 3 will be referred to special education and may qualify for special education services [5]. However, to assume that Tier 3 is only for special education is a myth. In RTI, it is expected that students with learning disabilities of all kinds are represented in all tiers of intervention, including students who are not classified as special education students. This expectation depends on universal screening of the particular skill domain, behavior, and outcome of interest [3]. The expected outcome for Tier 3 is to provide students who have more significant needs with intensive, evidence-based interventions within a range of educational settings [9].

6. Progress monitoring

A key component to successful RTI implementation is a formal and organized assessment system. This component is crucial in the decision-making process when determining what tier to place students. Assessment, progress monitoring, and instruction are intricately tied together within the RTI model. Students are usually placed into their initial tier through the results of benchmark assessments, though teacher observations can be considered as well. Once students are placed in their appropriate tiers, they are progress monitored to track how well they are responding to their current instruction. If the student is not progressing at the expected rate, a change in instruction, interventions, or possibly their tier needs to be considered [11]. Ongoing progress monitoring serves two purposes: (a) the data collected is used to make decisions about instruction, interventions, and placement within tiers by evaluating the students' strengths and needs, and (b) continual progress monitoring determines whether the student is

responding to the intervention. The data collected from continual progress monitoring aids in the decision-making process whether a student needs to continue receiving intensive intervention services with Tier 2 or Tier 3 or can be exited from the tier they are currently placed [5].

It is important that students are assessed and monitored frequently and continually, in order for schools to identify and respond quickly when students are not meeting academic standards or the aligned goals for intervention [6]. With RTI, decisions regarding progress are more high stakes and less self-correcting. Failure to progress monitor and respond to students that are not meeting the targeted goals can potentially cause them to be referred for special education services, resulting in a special education label and placement. With that, a more intensive intervention is implemented and often comes with well-known special education side effects such as reduced time with nondisabled peers, stigmatization, and so forth [7].

For all students in Tier 1, benchmark assessments should be taken three to four times per year. Often, schools throughout the United States of America follow a fall, winter, and spring benchmark time frame. RTI models differ on recommended frequency of progress monitoring within each tier. Most often, it is suggested for students in Tier 3 to be monitored weekly. Some models suggest two to four times per month, which on the high end of the suggested times equates to weekly monitoring. Suggestions for Tier 2 include twice a month and one to two times per month. When choosing a progress monitoring schedule, consider the possibility of a student in Tier 2 or Tier 3 being referred for special education services. It is encouraged to have a minimum of six to eight data points that show a student's lack of response to interventions and/or instruction and need for more intensive interventions. Although schools throughout the United States of America may use different assessment systems, procedures, and progress monitoring time lines, the two purposes of RTI are met by using data from formative assessments (i.e., ongoing assessment used to monitor student progress while the instruction is occurring) in order to guide the decision-making process about instructional placements and decisions [6].

7. Benefits of response to intervention

The RTI framework as a whole is beneficial in that it evaluates the external factors that may be impacting a student's progress before determining if the struggling student has an intrinsic learning deficit or disability. Further, the RTI framework evaluates instruction and interventions, discourages giving up or labeling a child after just one intervention, and encourages schools and educators to use creative strategies to meet individual student needs while moving toward more intense interventions, as needed [4]. Though there are many benefits of RTI, this chapter will focus on three primary benefits of the framework: (a) reduction of inappropriate special education referrals, (b) student benefits, and (c) benefits to schools and teachers.

7.1. Reduction of inappropriate special education referrals

The number of students who are referred and who qualify for special education services is reduced when RTI is implemented effectively, as found in several studies [5]. If effective interventions are implemented within Tier 1 and Tier 2, inappropriate special education referrals

and the need for extensive Tier 3 instruction are reduced [6]. Numerous studies have shown the utility of RTI programs. One study showed consistent decreases in special education placements. In particular, that study showed a 39% decrease in special education placements in kindergarten, a 32% decrease in special education placements in the first grade, a 21% decrease in special education placements in the second grade, and a 19% decrease in special education placements in the third grade. Another study reported that engagement in Tier 1 interventions reduced the percentage of students going to special education by 12%. Participation in all three tiers reduced the rate of students placed in special education by 8% [12]. Because RTI helps ensure that all students receive quality instruction and proper supports, it lessens the likelihood that a student will be misdiagnosed with a disability and placed in special education [4].

7.2. Student benefits

One study on the barriers and benefits of RTI sought feedback from special education teachers about the benefits that students experience from RTI [13]. A majority of responses from the surveyed teachers showed that students were receiving better instruction that more quickly identified and addressed problems so that students did not fall further behind waiting for necessary assistance. Other responses indicated that teachers found the RTI process to help correctly identify students with learning disabilities during the special education referral process so that students without special needs are not improperly shuffled into special education programs. However, the study noted that many teachers found the benefits of RTI to extend beyond special education programming, for teachers noted that the one-to-one intervention strategies of RTI assisted students across the learning spectrum [13].

7.3. Benefits to schools and teachers

RTI has also been found to lead to other benefits for schools and teachers, including better data collection on student growth and achievement [13]. Furthermore, teachers have disclosed that the individualized nature of RTI has helped general education teachers and educational teams more precisely and accurately identify individual skill areas or behaviors in which a student is struggling. Finally, many educators have noted that RTI has increased collaboration between teachers and parents [13].

8. Speech pathology and RTI

The American Speech-Language-Hearing Association (ASHA) defines RTI as an increasingly intense, multitiered system to providing services and interventions to struggling students and encourages speech-language pathologists (SLPs) to assist in identification. As mentioned before, this approach incorporates increasingly intensive levels of intervention, meeting the student where they currently are, in terms of academic success. Universal speech screenings, frequent progress monitoring, high-quality and evidence-based interventions, and response data are the core foundations of RTI that are utilized, in an attempt to identify students early and provide them with the support to be successful.

8.1. Identifying students at risk

Speech-language pathologists play a vital role in identification of students with needs, both those with speech-language impairments and those students presenting with specific learning disabilities. Prior to the introduction of RTI, students were found eligible for special education services based on discrepancies between performances on standardized tests and performance in the classroom. In hearings related to the reauthorization of IDEA, the US Congress found that using these measures was insufficient to identify learning disabilities, as the IQ-achievement discrepancy formulas that had previously been utilized cannot be applied in a reliable and valid manner. In addition, students living in poverty or students from culturally and linguistically diverse backgrounds may be mistakenly viewed as having intrinsic intellectual limitations, although their differences on such tests are really reflective of a lack of experience or educational opportunity.

With RTI in place, students are able to access these services based on their personal performance or response to increasingly intense interventions provided to them in their area of deficit. Speech-language pathologists can be integral to successful RTI initiatives in a school [14]. In Tier 1, they should be providing consultation services regarding possible disorders and impairments within their scope of practice and dissemination of information regarding speech-language disabilities and how they interplay with curriculum, assessment, and instruction.

8.2. SLPs and their role in the school

According to ASHA, there are many ways in which speech-language pathologists can make unique contributions to RTI in their school. They can explain the role that language plays in curriculum, assessment, and instruction, as a basis for appropriate program design, as well as explain the interconnection between spoken and written language. They can identify and analyze existing literature on scientifically based literacy assessment and intervention approaches and make recommendations on their implementation in the school. Speech-language pathologists can also assist in the selection of screening measures and plan for and conduct professional development on the language basis of literacy and learning [15].

Trainings that include information regarding typical articulation/phonological errors and the ages when they should no longer occur could be appropriate trainings for a school-based speech-language pathologist to provide to his/her colleagues. By informing classroom teachers of these developmental norms, it is likely that more students will be properly identified through screenings and assessments and that interventions will be implemented for the students who need it most. Furthermore, evidence supports the use of dynamic assessment for reducing over-identification and identifying students for small-group language intervention [16].

Speech-language pathologists should be presenting information on a variety of speech-language disorders including but not limited to language impairments, speech disorders, phonological impairments, dysfluency (stuttering), and voice production problems/vocal abuse. Another important component of Tier 1 is the instructional information that speech-language pathologists can provide to their colleagues including special education teachers, teachers,

and other support staff in the school, who may be making referrals [17]. Providing other professionals with strategies to address general speech-language difficulties can increase the effectiveness of general teaching procedures and assist all students in the classroom.

8.3. SLP implementation of RTI

Many techniques can be implemented quickly in the classroom and can support improved student performance. For example, students demonstrating difficulty learning-related vocabulary may benefit from direct and explicit strategies, such as teaching the vocabulary in context, using word webs, pre-teaching key words and concepts, and using visuals (gestures/pictures) to teach meaning. Other strategies that are effective across subjects and grade levels include stating the objectives; providing direct instructions; utilizing multiple modalities; engaging students in group activities; using feedback, reinforcement, and recognition; highlighting similarities and differences; and utilizing advanced visual organizers [18].

8.4. SLPs and Tier 1

As previously mentioned, RTI also provides schools with an opportunity to take preventative steps by providing evidence-based practices to groups of students that are at risk. Reading is a fundamental skill for academic success, and it is closely linked to phonemic awareness. Phonemic awareness is the ability to understand that words are composed of individual sounds (phonemes) and manipulate those sounds, sound sequences, and sound structures in a syllable or word. It may be difficult to develop for many groups of students, including those with phonological impairment, speech impairment, students learning English as a second language and those from low-income households [19]. Strong phonemic awareness has been found to be a predictor for reading skills, and in its absence, students will struggle with reading [20]. The curriculum for upper grades relies heavily on independent reading skills, and students who have struggled to build a solid foundation in the early grades will begin to demonstrate difficulties in all academic areas based on their reading difficulties. Speech-language pathologists can assist by providing classroom teachers with evidence-based strategies for teaching phonemic awareness. For example, students struggling with literacy skills have been found to benefit from structured teaching activities such as name writing, alphabet recognition, and phonological awareness activities. If incorporating these supports into the curriculum class-wide does not prove to be intense enough, and the student continues to perform below curriculum-based measures and/or benchmarks, he/she will be referred for Tier 2 of RTI to be provided with need-based learning in intensive small groups.

8.5. SLPs and Tier 2

Tier 2 intervention typically is provided in collaboration with the general education teachers. It usually consists of small groups of students being provided with high-quality, but specific and explicit, short-term instruction in the area of difficulty. This Tier is the most important in terms of using clinical expertise and data from performance during Tier 1 to identify students that need these groups. Dynamic assessment can take place over a relatively brief period, and his/her response to intervention can be an indicator of their ability to progress academically throughout the school year [21].

Intervention at this stage will vary greatly depending on the nature of the difficulty that the student is having. For example, if the student is struggling in the area of articulation (the actual production of sounds based on place, manner, and voicing) and is stopping his/her /s/ sounds (replacing the /s/ sound with a sound like /d/ or /t/), the speech-language pathologist may provide the classroom teacher and parents with specific strategies for practicing and producing the correct /s/ sound. Articulation strategies can include word lists with the target sound, modeling, and descriptive instruction for production and embedding “traditional” articulation therapy techniques, such as sound discrimination and correcting productions until the sound can be produced in all contexts and speaking situations [22]. If progress is not made and/or the misarticulated sounds further impact the student’s academic and/or social/emotional functioning in the classroom, a referral to Tier 3 may be warranted.

Students experiencing dysfluencies (stuttering) may also require Tier 2 if their dysfluency is impacting their academic progress or their social/emotional functioning in the classroom, but it is unclear whether there is an obvious disorder. The speech-language pathologist should identify one to three possible strategies that the classroom teacher can implement such as modeling, providing think-time (for the student before providing a verbal response), refraining from interrupting [23], and decreasing stress in the classroom. If dysfluent behaviors become pervasive across environments, the student may need to be referred to Tier 3 and/or require therapy provided by a speech-language pathologist with expertise in treating stuttering [24].

Speech-language pathologists may also receive referrals to Tier 2 for students experiencing voice difficulties, such as hoarse voice, problems with nasality, or decreased volume. Recommendations for the classroom may include reviewing good vocal hygiene such as the importance of hydration and appropriate volume/loudness but may also implement self-monitoring strategies for the student, such as charting appropriate vocal productions throughout the school day.

8.6. SLPs and Tier 3

Tier 3 provides the most support prior to a referral to special education. Where oftentimes the small groups in Tier 2 may meet two times a week for 30 minutes, the students identified as needing Tier 3 may receive up to double the amount of time previously allotted in Tier 2. Tier 3 instruction is characterized by more explicit, individualized, and systematic instruction to support students’ speech-language skills in addition to indirect activities that may include helping to select research-based interventions, completing student observations, assisting with frequent progress monitoring, and helping the team make decisions regarding referral for special education evaluation.

Speech-language pathologists may need to complete a detailed and individualized language/literacy battery of formal, informal, and curriculum-based assessments, including assessment of receptive and expressive vocabulary and language, articulation, phonology, pragmatics, reading, and written language, as well as the speech components of voice, fluency, and resonance. Interpretation of these assessment results will further assist in determining if the student has special education needs, and if indicated, the basis for the Individualized Education Plan (IEP) goals [25].

Many school-based speech-language pathologists often have heavy caseloads, overflowing with mandated individual and group sessions and making the task of being involved in RTI a seemingly impossible one, but as an integral part of the multidisciplinary educational team, their therapeutic interventions are critical to student success. Prevention of speech, language, and communication disorders is one of the key roles and responsibilities of school-based speech-language pathologists and as such can complement and augment RTI services..

9. Conclusion

In summary, RTI has changed the way educators and clinicians identify and support students who may be experiencing difficulty, in an educational setting. The intention of intervening early on with a treatment-oriented diagnosis process is to prevent students from falling too far behind their peers, requiring special education services. The reauthorization of IDEA (04) has changed the landscape for educators and SLPs, alike. RTI is a multitiered approach that allows students to receive support at a level that is optimal and individualized for their specific learning needs or deficits. In Tier 1, students receive instruction within the general education setting [9]. In Tier 2, interventions can be provided from a specialist during the school day or from a tutor [4]. In Tier 3, intensive instruction and/or special education services are individualized to meet significant needs of a student [4]. **Figure 1** provides an illustration of RTI and an overview of each tier. The emphasis on evidence-based interventions, constant monitoring, and systematic support remains the primary focus of RTI methods.

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References

- [1] Cortiella C, Horowitz S. The State of Learning Disabilities: Facts, Trends and Emerging Issues. 3rd ed. 2014. p. 2-45
- [2] Howarth RA. Examining the Neurocognitive Profile of Dysnomia: A Comparison of School-aged Children with and without Dyslexia Across the Domains of Expressive Language, Attention/Memory, and Academic Achievement. Ann Arbor: The University of Iowa; 2010

- [3] Coleman M, Roth F, West T. Roadmap to pre-K RTI: Applying Response to Intervention in Preschool Settings. National Center for Learning Disabilities. 2009;(1):2-24
- [4] Samson JS. Evidence-based Reading Practices for Response to Intervention: A Practical Guide for Every Teacher. Harvard Educational Review. 2009 Spring;**79**(1):148-159
- [5] Richards C, Pavri S, Golez F, Canges R, Murphy J. Response to Intervention: Building the Capacity of Teachers To Serve Students with Learning Difficulties. Issues in Teacher Education. 2007 Fall;**16**(2):55-64
- [6] Barnes AC, Harlacher JE. Clearing the confusion: Response-to-intervention as a set of principles. Education & Treatment of Children. 2008 Aug;**31**(3):417-431
- [7] Shinn MR. Identifying students at risk, monitoring performance, and determining eligibility within response to intervention: Research on educational need and benefit from academic intervention. School Psychology Review. 2007 Dec;**36**(4):601-617
- [8] Legere EJ, Conca LM. Response to intervention by a child with a severe reading disability: A case study. Teaching Exceptional Children. 2010 Sep;**43**(1):32-39
- [9] Hoover JJ, Patton JR. The role of special educators in a multitiered instructional system. Intervention in School and Clinic. 2008 Mar;**43**(4):195-202
- [10] Morrison D, Hessler T. Teaching the teachers: Eliminating gaps to better serve children with dyslexia. Perspectives on Language and Literacy. 2016 Fall;**42**(4):7-8 13
- [11] Gore N, Hastings R, Brady S. Early intervention for children with learning disabilities: Making use of what we know. Tizard Learning Disability Review. 2014;**19**(4):181
- [12] Marston D. Tiers of intervention in responsiveness to intervention: Prevention outcomes and learning disabilities identification patterns. Journal of Learning Disabilities. 2005 Nov;**38**(6):539-544
- [13] Werts MG, Carpenter ES, Fewell C. Barriers and benefits to response to intervention: Perceptions of special education teachers. Rural Special Education Quarterly. 2014 Summer;**33**(2):3-11
- [14] Justice LM. Evidence-based practice, response to intervention, and the prevention of reading difficulties. Language, Speech, and Hearing Services in Schools. 2006;**34**:284-297
- [15] Ehren B, Montgomery J, Rudebusch J, Whitmire K. Responsiveness to Intervention: New Roles for Speech-language pathologists [Internet]. 2017. Asha.org. Available from: <http://www.asha.org/SLP/schools/prof-consult/NewRolesSLP/> [Accessed: April 7, 2017]
- [16] Spencer T, Petersen D, Adams J. Tier 2 language intervention for diverse reschoolers: An early-stage randomized control group study following an analysis of response to intervention. American Journal of Speech-Language Pathology. 2015;**24**(4):619
- [17] American Speech-Language-Hearing Association, ASHA. Response to Intervention (RTI) [Internet]; Available from: <http://www.asha.org/slp/schools/prof-consult/RtoI/> [Accessed August 21, 2017]

- [18] Special Education Guide. Response to Intervention Strategies | A Guide for Teachers [Internet]. Available from: <http://www.specialeducationguide.com/pre-k-12/response-to-intervention/effective-rti-strategies-for-teachers/> [Accessed April 20, 2017]
- [19] Koutsoftas A, Harmon M, Gray S. The effect of Tier 2 intervention for phonemic awareness in a response-to-intervention model in low-income preschool classrooms. *Language Speech and Hearing Services in Schools*. 2009;**40**(2):116
- [20] Catts H, Fey M, Zhang X, Tomblin J. Estimating the risk of future reading difficulties in kindergarten children. *Language Speech and Hearing Services in Schools*. 2001;**32**(1):38
- [21] Gottwald S, Reeves N. Response to intervention: How do fluency disorders fit in? *Perspectives on Fluency and Fluency Disorders*. 2011;**21**(1):6
- [22] Van Riper C. *Speech Correction*. 1st ed. Englewood Cliffs, NJ: Prentice-Hall; 1978
- [23] Kelly E, Conture E. Speaking rates, response time latencies, and interrupting behaviors of young stutterers, nonstutterers, and their mothers. *Journal of Speech Language and Hearing Research*. 1992;**35**(6):1256
- [24] Petersen D, Allen M, Spencer T. Predicting reading difficulty in first grade using dynamic assessment of decoding in early kindergarten: A large-scale longitudinal study. *Journal of Learning Disabilities*. 2014;**49**(2):200-215
- [25] Long E. Integrating dynamic assessment and response-to-intervention in reading instruction. *The ASHA Leader*. 2012;**17**(4):27-43