CHAPTER II
REVIEW OF LITERATURE

The review of literature is a critical and in depth evaluation of previous research. It is a summary and synopsis of a particular area of research, “The review is a valuable guide to defining the problem, recognizing its significance, suggesting promising data gathering devices, appropriate study design and source of data.” (Best and Kahn, 1996)

This chapter includes articles and studies documented in those areas that are considered related to the current research. The review of literature is divided into the following section:

- Literature related to RtI-emergence and benefits
- Literature related to Components of RtI
- Literature related to Teacher training
- Literature related to Strategies in RtI
- Literature related to Concept, Knowledge and Language development
- Literature related to Social Behaviour

2.1. Literature related to RtI-emergence and benefits

For the past few years educational communities have expressed “concerns about the continued use of an IQ-Achievement discrepancy model for diagnosing learning disabilities, and instead have proposed a model that is known as response-to-intervention RtI;” (Fuchs et al., 2003; Lyon et al., 2001 ) RtI approach is to “replace the aptitude achievement discrepancy formula that has traditionally been used to document the presence of a learning disability” (Fuchs, Fuchs, & Compton, 2004).

In an attempt to elaborate the service delivery nature of RtI to provide more uniformity among the literature Barnes and Harlacher,2008 have outlined, 5 key principles and 4 features of Response-to-intervention. In this RtI has been quoted as more than just a way to identify students with disabilities. Instead, it is a way to ensure better academic outcomes for all students.( Cummings, 2006). VanDerHeyden, Witt, & Barnett,( 2005), have concluded that the potential benefits of RtI include "increased achievement school wide, because struggling children are identified proactively and immediate help is provided to determine whether or not more intensive help is needed, as well as a coherent and flexible system of services" RTI approaches not only prevent academic failure, but also improve academic outcomes for students (Ardoin, Witt, Connell, & Koenig, 2005).
Mellard & Johnson, (2008) in their article have provided a framework for understanding how RTI fits as one LD determination component, outlining the research efforts to examine current RTI implementation in schools and model site selection where cognitive assessment and aptitude-achievement discrepancy becomes less important and RtI emerges as an important construct for assessing underachievement.

Emergent research on school-based multitier service delivery has been promising with respect to student outcomes. Hartman and Fay (1996, cited in Kovaleski et al., 1999) studied Instructional Support Teams (IST) implementation in 1,074 schools where the high-implementation IST groups showed greater gains than the non-IST groups on time-on-task, task completion, and task comprehension measures. The low-implementation IST group demonstrated lesser gains than the non-IST group, and often displayed declines between posttest and follow-up across the three measures. Thus there is clear evidence that students not referred or retained are successful in general education and respond to intervention.

Bollman and colleagues (2007) examined the effect of an RTI model on the rate of identification for special education services and reported that placement rates dropped from 4.5% to 2.5% over a 10-year period. They indicated that the statewide prevalence rate over the same time period dropped from 4% to 3.3%.

Callender (2007) reported that placements decreased by 3% for "districts with at least one school implementing an RTI model," whereas the state rate decreased by 1%.

Marston and his co-authors (2003) indicated that special education placement rates stayed constant over time for Minneapolis RTI schools, as did the rates for the district as a whole. Peterson et al. (2007) reported similar information: Referrals and placements stayed relatively stable over time after RTI implementation.

O'Connor et al. (2005) examined the effect of the tiers of reading intervention model on placement rates. They found that during the 4 years of implementation, rates fell to 8% compared to an historical contrast group (same schools, same teachers) for which the rate was 15%.

VanDerHeyden, Witt, and Gilbertson (2007) conducted an evaluation of an RTI model over multiple years. Instead of random assignment, their study used a multiple baseline design, which examines outcome data from an intervention with a staggered onset of implementation. The results of this comprehensive study indicated that the RTI model reduced the number of students evaluated for special education services,
essentially eliminated the disproportional rate at which ethnic minority and male students were referred for special education evaluations, and substantially reduced the amount of financial resources dedicated to unnecessary special education evaluations. Denton (2009) similarly reported that 91% of students in their study had WJ III Basic Skills standard scores ≥ 93, whereas 79% of students in the typical practice group met the benchmark. In the study by Mathes and coworkers, 75% of the intervention students met an ORF benchmark of 40 wcpm at the end of Grade 1 applying RtI.

2. 2. Literature related to Components of RtI

**Component 1: Tiered models of RtI:**

Two general models of RTI have been mentioned in the literature till date. One rooted in general education (Fuchs, 2003; Speece & Case, 2001) in which high-quality general classroom instruction is provided to at-risk students before the decision is made to implement more intensive intervention, the other conceptualizes RTI as response to intensive, preventative intervention where, students identified as ‘at risk’ immediately receive specialized intervention provided in small groups by a specialist (Torgesen et al., 2001). The use of multiple tiers is a frequently-referenced point of difference between various conceptions of the RTI approach, as various authors advocate for a two (Fuchs & Fuchs, 2005), three (Vaughn, Wanzek, Woodruff, & Linan-Thompson, 2007), or four tiered approach (Ikeda et al., 2002).

Fuchs and Fuchs (2002) have proposed and implemented a contrasting system, in which there are only two tiers. Parents are consulted during the second tier, and non-responders to the tier-two intervention are referred for IEP/Special Education evaluation.

A three-stage model in Minneapolis consisting of teacher-directed intervention (Stage 1), multidisciplinary team consultation (Stage 2), and special education consideration or referral (Stage 3) was investigated. Neither an increase in disability referral rates nor a reduction in performance growth rates for students participating in multitier services compared to those traditionally identified with a learning disability was observed. Marston, Meuystens, Lau, and Canter (2003), also found that the multitier services produced a positive impact on disproportionate placement of students from ethnic minority backgrounds.
4 tiered RtI models are also in practice. In a research by Tilly, (2003) in 121 Iowa schools of a four-level problem-solving model consisting of parent-teacher consultation (Level 1), within-school teacher collaboration (Level 2), extended consultation-team consultation (Level 3), and the application of special education services (Level 4), both substantial growth in early reading performance (e.g., phoneme segmentation, oral reading fluency) and reductions in special education referrals (39% in kindergarten, 32% in first grade, 21% in second grade, and 19% in third grade) over a 4-year period was found.

Klingner and Edwards (2006) proposed another four-tier RTI model which includes: (1) the first tier considers the quality of instruction within the general education classroom paired with ongoing progress monitoring; (2) the second tier provides intensive interventions; (3) the third tier consists of the use of a teacher teaming approach, such as Teacher Assistant Teams (TAT) or Child Study Teams (CST) that develop interventions for students who continue to display a need for individualized, direct support; and (4) the fourth tier addresses the assessment of the severity of academic skill deficit and evaluates the need for special education.

**Component 2: Protocol**

Protocol refers to the approach schools use when determining what resources and level of intervention a student needs. As students demonstrate a failure to respond adequately to a level of instruction or intervention, the protocol embodies how to respond to that student's need. Such a feature of RTI stems from several of the principles noted above, but it primarily involves the problem-solving orientation principle.

Standard protocol approach, as outlined by Fuchs and Fuchs (2005) and Vaughn and colleagues (2003) have been used by Ardoin et al. (2005) who have measured Mathematics outcomes (fluency, calculation). Fourteen 4th grade students from an elementary school serving 514 students in Grades K–5 participated in the study. With regard to the effectiveness of the classwide intervention, Ardoin et al. (2005) reported that 9 students made improvements over baseline, but that 5 showed little or no progress. When peer tutoring was used with these 5 students, they showed some progress but only showed adequate improvement when the CCC + instruction intervention was implemented.

Vaughn et al. (2003) who has measured the Reading outcomes (fluency, word attack, passage comprehension, phonological awareness, rapid letter naming). Examining the effects of
varying group size on the outcomes for first-grade students participating in the Reading Recovery (Clay, 2005) early intervention have used again standard protocol.  

In a synthesis of Tier 3 interventions with early elementary grade students, Wanzek and Vaughn (2007) identified no quasi-experimental or experimental studies that provided individualized interventions (e.g., teachers specifically selected and implemented materials/approaches to respond to students’ needs). All of the studies that met criteria used more or less standardized interventions. Similarly, in their synthesis of interventions with older students with reading difficulties, Scammacca, Vaughn, Roberts, Wanzek, & Torgesen (2007) reported that all of the studies used some variation on a standardized intervention approach.

The problem-solving protocol focuses on designing an individualized intervention for students. It appears that the problem-solving model is the more widely used of the two. (Fuchs et al., 2003) Other intervention studies have investigated the effects on student performance when providing interventions with increased individualization (Wanzek and Vaughn, 2007).

The problem-solving protocol focuses on designing an individualized intervention for students. It appears that the problem-solving model is the more widely used of the two (Fuchs et al., 2003). Other intervention studies have investigated the effects on student performance when providing interventions with increased individualization (Wanzek and Vaughn, 2007). In Bollman, Silberglit, and Gibbons (2007) problem-solving model School-based problem-solving teams (PSTs) are responsible for implementing the model. They consist of 5–10 staff members; membership of the PSTs reflects the staff at large but always includes the principal, the students’ general education teachers, and special education teachers. The PSTs meet once a week to examine student improvement and make decisions about adequate progress via a five-step, problem-solving process: a) problem identification, b) problem analysis, c) plan development, d) plan implementation, and e) plan evaluation. Data included a) percentages of passing reading CBM benchmark scores for all K–8 students, b) reading CBM scores falling in the 10th percentile or lower for all 1st–6th grade students, and c) prevalence rates of special education identification. data showed reductions of students scoring in the lowest achievement level, from 20% in 1999 to 6% in 2005
The Idaho results-based model (RBM) is a combination of a problem-solving model and a standard-protocol model. Its purpose is to provide strategic interventions (standard protocol) and intensive interventions (problem solving) Callender (2007) reported on data gathered by the Idaho State Department of Education in a 5-year evaluation report on the RBM Data were collected on special education placements across the entire state from 1999 to 2004. During this same time frame, 1,400 K–3 students from 150 schools were divided into two groups: a) RBM with intervention plan and b) non-RBM with like reading performance but no intervention plan. With regard to student reading outcomes, the author reported that RBM students with an intervention plan progressed significantly more in reading than did their non-RBM counterparts.

**Component3: Progress Monitoring:**

An important component of RtI approaches is to monitor students' academic progress throughout the school year. (Henley, Furlong 2006). An RTI model uses assessment in order to place students into appropriate tiers and to progress-monitor students to determine how well they are responding to their current instruction (Coyne & Harn, 2006; NASDSE, 2006). RtI used CBM for progress monitoring—a measurement model that can provide educators with a means of evaluating the effectiveness of instruction. Fuchs and Fuchs (2002) conducted an analysis of research on student progress monitoring that considered only experimental, controlled studies. These researchers concluded that when teachers use systematic progress monitoring to track their students' progress in reading, mathematics, or spelling, they are better able to identify students in need of additional or different forms of instruction, they design stronger instructional programs, and their students achieve better.

Christ (2006) conducted a research to determine the influence of a variety of progress monitoring durations and measurement conditions on measurement error in order to select optimal durations and conditions for minimizing error. Three studies in the PsychINFO database that reported the Standard Error of the Estimate (SEE) of oral reading fluency growth were used. The findings indicate that when R-CBM is being used to inform major educational decisions, practitioners should pay careful attention to testing conditions and test two times per week for eight or more weeks in order to minimize error in the results.

Over the past 25 years, more than 400 studies have been published on the technical adequacy and use of Curriculum-Based Measurement (Espin & Wallace, 2004). In a study by Henley and Furlong, 2006 it is shown that regular education based, universal CBM procedures can
be implemented at a school, but these efforts will require additional district, Special Education Local Plan Area (SELPA), and State support if they are to have continuity across time.

Right from the studies in 1996 to till date the findings have uniformly shown the importance of progress monitoring. Fuchs, Roberts, Fuchs, & Bowers, (1996) report a study that evaluated the short- and long-term effects of three variants of a case-by-case process for readying students to move successfully from resource rooms to regular classrooms for math instruction. Preparation for this transition included use of curriculum-based measurement and transenvironmental programming, each alone and in combination. Teachers using the more complex variants of the case-by-case process were more successful at moving students across settings and fostering greater math achievement and positive attitude change, especially while the students were still in special education. At 1-year follow-up, about half of the students either never were reintegrated or were moved to the mainstream temporarily, only to be returned to special education.

Stecker & Fuchs (2000) examined the importance of designing students’ programs based on individual progress-monitoring data, using curriculum-based measurement. The purpose of this study was to examine the importance of designing students' programs based on individual progress-monitoring data. For 20 weeks, 22 special education teachers monitored the mathematics progress of 42 students with mild to moderate disabilities, most of whom had learning disabilities, using curriculum-based measurement (CBM). For these 42 students in Grades 2 through 8, teachers made instructional adjustments based on CBM data. In addition, for each of the 42 students, teachers made the same instructional adjustments for a matched partner. Results indicated that students for whom teachers tailored instructional adjustments based on those students' own CBM data performed significantly better on a global achievement test than did their partners whose instructional adjustments were not based on their own assessment data.

The purpose of a study by Fuchs, Fuchs, Karns, Hamlett, Dutka, & Katzaroff, (2000) was to examine the effects of providing students with background information about the structure and scoring of mathematics performance assessments (PAs). Stratifying by grade, they randomly assigned 16 Grade 2 through Grade 4 classrooms to 2 conditions. In one condition,
l87 students took an initial PA, received a brief orientation on the structure and scoring of PAs, and then took a 2nd, alternate-form PA. In the other condition, l82 students took 2 alternate-form PAs with no intervening orientation. Analyses of variance revealed that Effects were statistically significant and dramatic for above- and at-grade level students but not for below-grade level students.

Deno, Fuchs, Marston, & Shin, (2001) examined the effects of curriculum-based measurement on academic growth standards for students with learning disabilities (LDs) in the area of reading. The reading abilities of 638 learning disabled students in grades 1–6 were evaluated. Results show that rate-of-growth differences existed at first grade concerning students with learning disabilities and general education control students, but by fifth and sixth grades, a sharp drop in the learning slopes for general education control students resulted in virtually identical growth rates for the two groups. The observed reading progress was similar to results reported in several previous studies. Findings suggest that it is possible to set growth standards for both general and special education students using CBM.

Hosp, & Fuchs, (2005) investigated whether R-CBM scores differ in their association with traditional reading assessment scores (e.g., Woodcock Reading Mastery Test-Revised) as a function of grade level. Additionally, the authors explored whether they could identify R-CBM cut scores that could serve as benchmarks of mastery on the WRMT-R subtests. The study focused on first through fourth grade, and a total of 310 students in four schools were involved. Results revealed that there relations between R-CBM and WRMT-R scores were strong at each grade level. While benchmarks could not be identified for specific reading subskills, benchmarks were identified that indicated overall reading mastery at each grade level.

Thus in progress monitoring a student's rate of progress is compared to an expected rate of progress, based on either a normative framework or to a criterion for acceptable growth. Those students who are not progressing at an acceptable rate are considered "non-responders" (Kaminski et al., 2006) and cannot reach the benchmark score.

In a study by Vaughn, Linan-Thompson, & Hickman-Davis, (2003) where the cut point was a standard score of 85 on the Word Attack and Passage Comprehension subtests of the Woodcock-Johnson Reading Battery. 66% of the students who received 20 weeks of
intervention continued to "thrive" in the general education classroom without supplemental instruction.

Bollman et al. (2007) reported overall improvement in student reading outcomes as indicated by an increase in percentages of passing CBM benchmark scores (from 35% in 1995–1996 to 70% in 2005–2006).

Madelaine, & Wheldall (2004) reviewed the previous decade’s research on R-CBM, particularly oral reading fluency. Included in the review are studies on technical characteristics of R-CBM; development of R-CBM norms; and the use of R-CBM for screening or classification, instructional decision-making, and progress monitoring. The authors discuss the face validity of R-CBM measures, along with other issues that make acceptance by teachers problematic. Research on students’ perceptions of R-CBM is reviewed, particularly as it relates to goal-setting and motivation. Finally, R-CBM implementation procedures, including passage selection issues, is discussed.

The frequency of assessment may vary between schools and is affected by school resources and the severity of the student's academic difficulties. Benchmarking may occur three or four times a year (Good & Kaminski, 2002). In a model of RtI students in tier-II are progress monitored twice a month and students in tier-III are monitored weekly (Vaughn and colleagues, 2007). In another model, students in tier II are assessed one to two times a month and students in tier III are assessed two to four times per month (Kame’enui and colleagues, 2005). In The Exemplary Model of Early Reading Growth and Excellence (EMERGE) model by Gettinger and Stoiber (2007), classroom teachers are responsible for Tier 1 and Tier 2 instruction. Progress is monitored once a month and the bottom 50% of all students receive small-group, Tier 2 intervention.

In another model by Rockley and colleagues (2007) the special education teachers were responsible for data collection, and each student receiving supplemental support in instruction (i.e., students in tiers II or III) was assessed either weekly or bi-weekly. Team leaders, special education teachers, and district level literacy coaches worked from a collaborative, problem-solving orientation in this model.
Marston (2007) describes a model in which general education teachers were primarily responsible for progress monitoring individual students, but special education teachers, Title I teachers, and school psychologists all partook in progress monitoring students and the coordination of collecting school-wide data. In this model, the district used Curriculum-Based Measurement and early literacy measures that it developed to assess students. This data was reviewed at either 6 or 8-week intervals to determine if the current instruction is working or not for the student.

Students with low scores prior to treatment are the students who typically make the lowest gains over time (Chapman, Tunmer, & Prochnow, 2001; Vaughn Linan-Thompson, & Hickman, 2003; Vellutino, Scanlon, & Lyon, 2000).

2.3. Literature related to Teacher Training:
In a study (Cawley, Hayden, Cade, Baker-Kroczynski, 2002) concerning including students with disabilities into the general education science classroom, the study demonstrates that it is possible to narrow the longstanding gap between research and the schools, where the combinations of outcomes and classroom observations indicate that the teachers did implement a program based on their training as a team and that the students actively participated (Piccillo, 1994). It demonstrated that teachers of different disciplines can work together to enhance student performance, provided the training is of a sufficient magnitude to develop proficiencies and opportunities to "bond" together to implement the framework of the training program. A training program based on the research, when accompanied by easily utilized classroom materials and practices, thus serves to translate research to practice.

There is lack of transportability of research-based interventions into educational environments. (Kratochwill et al. (2007)). In Ohio Intervention-Based Assessment (IBA) a problem-solving model by Telzrow, McNamara, and Hollinger (2000) a multidisciplinary team (MDT) is responsible for implementing problem-solving procedures and consists of the school principal, the school psychologist, and a general, and special education teacher. The authors conducted the study to discover the level of fidelity with which the IBA model was being implemented, as well its relationship to student outcomes. The finding was regarding the lack of implementation of strategies recommended by problem-solving teams in actual classroom use.
In another study (Walsh, Glaser, and Wilcox (2006), where the extensive variability among colleges of education in training teachers in the big ideas of reading was documented. It was seen that some university programs show no (0%) coverage of these concepts and skills, whereas others have high rates of coverage (to 100%). There is also the “antiscience” stance of many educators, which further impedes efforts to implement research-based practices in the schools. (Kratochwill et al. (2007)).

In a study by Bissel in 2012 the questions were focused on K-2 teachers' perceptions of contributing factors associated with the implementation of RtI, Qualitative case study design was used to implement the project study. Six K-2 reading teachers from the district participated in in-depth interviews, and district documents were reviewed. Data analysis strategies included thematic development of potential solutions related to teachers' training needs. The findings revealed a need for quality, sustained training, and accountability measures.

In The Albany Response to Intervention (ARTI) model, a standard-protocol model in which Vellutino et al. (2008) conducted the study to discover the impact of the ARTI model on literacy outcome certified classroom teachers are responsible for both the kindergarten and 1st grade intervention components. These teachers are trained and supervised by research project staff. Teacher training consists of a 5-day workshop followed by bimonthly group meetings and one-to-one supervisory meetings that are held approximately every 6 weeks. Fidelity of treatment is ensured through monitoring of tape recordings of treatment sessions by project staff.

In a study by Diane Myers et al.(2007) researchers used an RTI model to give teachers the opportunity to practice important skills and to get feedback. The training teachers received as part of the school's move to SWPBS was considered by researchers to be Tier 1 or the primary-prevention effort of a 3-tier RTI model. Seven teachers who had unusually high rates of problem behavior in their classrooms self-nominated for more support (tier 2 and tier 3 interventions); 4 were able to complete the study. The authors conclude “Although a functional relationship between teacher behavior and the level of professional development feedback was not established in the current data-based case study, the results do describe an application of an RTI approach to teacher training and suggest that a relationship may exist
between the level of teacher support and a change in rates of teacher praise, indicating a direction for future research,”

It is thus essential to view RtI as an educational change initiative rather than as an educational program or curriculum that is in vogue. Such a perspective necessitates that schools foster a structure that builds the capacity of the educational professionals and the system in which they work to sustain effective practices (Schaughency & Ervin, 2006).

But even though staff may learn how to use RtI and the skills it calls for, they will likely need ongoing professional development to understand the why behind it. (Barnes, Harlacher, 2008.) Understanding the rationale behind RTI is considered just as vital to implementation as learning how to do RTI (Ikeda et al., 2002; MASDSE, 2006). Thus training efforts need to be frequent and of sufficient intensity to allow teachers to build the requisite skills (Glover and DiPerna, 2007).

Rockley and colleagues (2007) establishes a model where school staff receive initial trainings at the beginning of the year, and then weekly or monthly meetings are held in which district-level staff provide trainings and support to their special education teachers and schools. Such ongoing support and training helps to ensure that school staff understand the concepts behind RTI and to secure integrity of implementation (Ikeda et al., 2002).

In a study by Brown-Chidsey and Steege (2005) The three essential elements pertaining to training educators to use RTI methods were schedule, teacher learning outcomes, and indicators of mastery of RTI methods. The authors recommend scheduling several sessions for RTI training for school personnel. The first session may be the longest and would include an overview of RTI methods for all school personnel; this approach ensures that everyone is aware of the plans and expectations regarding RTI. Subsequent sessions cover more detailed components of RTI, such as how to identify and choose effective instructional methods. Separate sessions that address curriculum and benchmark training should be conducted. Objectives for each session should be clearly stated at the beginning and end of the training, which the authors refer to as "learning outcomes." Finally, some measurement of implementation integrity should be used to determine whether teachers are implementing the
RTI methods and interventions as intended. Integrating integrity training into the sessions can help reduce teacher anxiety regarding integrity measurement.

In a study concerning professionals of 3 schools individuals and small groups of teachers who identified specific areas of need in relation to the implementation of RtI requested ongoing professional development offerings. (Henley and Furlong, 2006) including components on (1) beliefs and attitudes in education (e.g., discussing the rationale behind a problem-solving approach), (2) the knowledge base needed to translate that information into practice (e.g., knowing the relationship between assessment and instruction within RtI), and (3) the skills needed to implement RtI (Barnes & Harlacher 2008.) What seems clear from the analysis of emerging models of professional development is that training on RtI cannot be looked at as a function of the educational process distinct from other elements of schooling such as schedules, structures for collaboration, curriculum selection, and instructional leadership. If professional development activities are to change perspective then what needs to be done---incomplete sentence (Kratochwill, Volpiansky, Clements, Ball, 2007.)

2.4. Literature related to RtI in Middle School Settings:

While the components and potential challenges of the RtI model have been described and debated in the literature, fewer empirically-based studies have investigated the implementation of RtI in authentic school settings, particularly schools in rural areas (Dexter, Hughes, & Farmer, 2008; Kovaleski, 2007).

Research on universal screening within an RTI framework focuses predominantly on children in kindergarten through second grade (Compton, Fuchs, Fuchs, & Bryant, 2006; Speece & Case, 2001). Although RtI seeks to meet the needs of all students, extant practices have occurred largely within primary grades (Bender & Shores, 2007). As such, there appears to be a general lack of field-based applications of RtI in secondary settings. (Windram, Scierka, & Silberglitt's 2007).

Findings of a study by Sansosti, Telzrow, and Noltemeyer (2010) reveal that although high-quality teaching, tiers of interventions, and progress monitoring tools were indispensable for the successful implementation of RTI, systematic and experimental application of these approaches was missing at the practice level. In this study the findings of Sansosti, Telzrow, and Noltemeyer (2010) reveal that to implement RTI successfully it is imperative that the principals and the top level management must be convinced about its success.
They also concluded that School principals should become familiar with the type of progress monitoring tools available; the need for evidence-based interventions within secondary settings; and decision rules of how systems could be modified (e.g., scheduling, students earning credits toward graduation) to ensure sustainability of RTI approaches. This information feedback facilitates the implementation of treatment plans. (e.g., Noell & Gansle, 2006), Such work can inform principals as they review lesson plans (the practical daily equivalent of treatment plans), observe teachers delivering lessons, and provide feedback, all of which are traditional, if not well-directed, administrative functions. (Kovaleski, 2007).

Though there is no research basis of barriers to Rti in middle school setting, the inherent features of a secondary setting (i.e., structured class periods, rigid schedules, requirements for graduation, high population of students in a high school) were described as major barriers to bringing Rti to fruition by Sansosti, Goss, Shannon Noltemeyer (2011) in the study mentioned above.

Several barriers to RTI implementation in middle school settings, including a lack of differentiated instruction in the general education classroom and limited numbers of evidence-based interventions (especially to support writing and mathematics) (Johnson and Smith, 2008) have been noted. Findings reported by three studies, respectively by Win dram et al. (2007), Sansosti et al. (2010), and Sansosti, Noltemeyer, Goss (2011) verify that scheduling and structural factors are major obstacles to the application of RTI within secondary settings.

Few Studies concerned with secondary and middle school that the researcher has come across are given below:

A recent study directly contrasted more and less individualized interventions for middle-school students with reading difficulties. Vaughn and Wexler (2009) examined the relative effects of two intervention treatments with students in Grades 7 and 8 with reading disabilities. Students had participated in a year-long intervention the previous year in which they were provided large-group (i.e., 10–15 students per class) reading intervention for 50 minutes daily by trained reading specialists (Vaughn et al., 2008). Students who demonstrated low RTI continued in the study the following year and were randomized to one of two treatment conditions: standardized intervention or individualized intervention. Findings from
the study indicated Although all effect sizes comparing the two approaches were small, they were in favor of the individualized condition.

An experimental study by Wanzek, Vaughn, Roberts & Fletcher, 2011 reports findings on the effects from a year-long reading intervention providing daily 50-min sessions to middle school students with identified learning disabilities (n = 65) compared with similar students who did not receive the reading intervention (n = 55). All students continued to receive their special education services as provided by the school. Statistically significant results favored the treatment group for sight word reading fluency following intervention. Small effects were found for phonemic decoding fluency and passage comprehension. No other statistically significant differences were noted between groups. The findings suggest that although gains on word reading fluency resulted from the additional reading treatment, accelerating the reading performance of students identified with learning disabilities may be unlikely to result from a 1-year daily intervention provided in groups of 10 to 15 students.

Examination of RTI implementation in two secondary schools in Minnesota suggest that a tiered model of intervention support can be successful at the secondary level to address reading and math concerns.

2.5. Literature related to Strategies in RtI:
Mellard, (2006) in a paper on RtI identifies the following Research Elements of RtI: Two or more tiers of increasingly intense scientific, research-based Systematic interventions embedded in general education curriculum, interventions and Implementation of a scientifically-based, differentiated curriculum with different instructional methods.
Stecker, Pamela, Fuchs, Douglas, Fuchs, Lynn, (2008) proposes Tier 1 must necessarily involve implementation of instructional practices that have been tested empirically. Schools must be able to defend that the core programs and instructional procedures used by their teachers have been generally effective in promoting student achievement or that specific instructional components within these programs have empirical validation for improved achievement. The second tier is used as small-group or embedded interventions following class-wide intervention to address children's additional needs (Daugherty, Grisham-Brown, & Hemmeter, 2001; Wolery, 1994) and include increasing opportunities to practice academic, language, or social skills.
Edmonds et al. (2009) and Scammacca et al. (2007) found overall intervention effects that were higher. Most of the interventions synthesized by Edmonds et al. (2009) and Scammacca et al. (2007) were provided for less than 2 months. Three-students-to-one-instructor model would be best for providing Tier 2 intensive literacy development intervention. (Elbaum, Vaughn, Hughes, & Moody, 1999; Vaughn, Linan-Thompson, Kouzekannani, Bryant, Dickson, & Blozis, 2003; Vaughn et al (2010)

Studies by Wanzek and Vaughn (2007), in which standard protocol interventions have been empirically evaluated of Tier 2 and 3 interventions, but still there is no idea about what it will take to get the core curriculum to work at Tier 1 (Kovaleski, 2008).

In a study with a sample of 104 school districts across 12 states, only 19% of district coordinators indicated the schools actually implemented a research-based curriculum. The potential limitations to implementation of prevention programs in this domain were (a) the lack of teacher training materials, (b) the lack of required training in teaching strategies, and (c) failure to deliver age-appropriate instructional procedures. (Hallfors and Godette, 2002).

There are several research based strategies that could be followed to bring in effective intervention within the RtI model starting from level 1.

a. Graphic Organiser:
Graphic organiser is used to enhance effective storage and retrieval of information. Knowledge is stored in a scaffolded hierarchy as a way of organizing information. The findings of studies on the use of gráfico organisers are given below:

Graphic organizers make it easier to ink new information to existing knowledge and help students build the schema they need to understand new concepts (Guastello, Beasley, & Sinatra, 2000). Graphic organizers “enhance the development of non-linguistic representations in students and therefore enhance the development of that content (Marzano, Pickering and Pollock (2001)) the use of graphic organizers also helps students generate linguistic representations.

The following highlight the importance of graphic organiser in computer assisted presentations: Herl et al. (1999) tested the effectiveness of two, computer-based knowledge mapping systems in a population of middle and high school students. These findings indicate that a computer-based system can be successfully used to instruct students on how to develop
concept maps. They also suggest that web searching methods may improve students' abilities to develop sophisticated maps.

Findings by Anderson-Inman et al. (1996) found substantial variability in the adoption of computer-based graphic organizer study strategies.

**b. VAK and Experiential Learning**

Gloria, (2001) in a study on Including Students with Down Syndrome in General Education classes found that the most effective materials reported by the teachers for all of their students were "hands-on" activities or computer-assisted instruction.

Holahan and DeLuca (1993) conducted a 10-week theme-based intervention with three classes of SWDs. The intervention focused on two themes, structure and change, which were presented in a "hands-on" manner to the students 4 days per week. Posttest scores on four measures were near double or double the pretest scores, and these scores were maintained on a 13-week followup. DeLuca (1997) followed up on the theme-based approach and compared the performance of two self-contained classrooms for students with serious EDs. One class utilized a textbook approach and the other a "hands-on" approach. Students in the "hands-on" classroom performed higher than those in the textbook classroom.

Scruggs et al. (1993), in a study with students with LDs from four classrooms study two science units using either an activity-based or a textbook approach. Students in the activity-based program performed significantly higher on immediate and delayed unit tests than did the students using the reading approach. Students reported a preference for activity-based learning.

**c. Scaffolding**

Scaffolding is providing assistance to novice learners by minimizing concepts and extraneous material in the learning context and then gradually removing these limits as learners gain understanding and confidence through the learning process. (Dabbagh, 2003).

In a study by Natalie McCosker and Carmel Diezmann (2009) on scaffolding in Maths they concluded that Scaffolding in mathematical investigations benefits both students and their teachers. Scaffolding can foster students' creative and divergent thinking skills, and enhance their independence, sense-making and self-confidence in mathematics. By noting students' responses to scaffolding, the teacher is able to identify future topics for mathematical instruction.
Flexible curriculum would allow students of varied skills, to receive instruction to meet their needs (Bauder, Debra, Abell, Michael Penrod, William, 2008.) In a study with a sample of 104 school districts across 12 states, only 19% of district coordinators indicated the schools actually implemented a research-based curriculum. The potential limitations to implementation of prevention programs in this domain were (a) the lack of teacher training materials, (b) the lack of required training in teaching strategies, and (c) failure to deliver age-appropriate instructional procedures. (Hallfors and Godette, 2002).

In a study by Mannheimer (2005), Sixty students from four earth science classes taught by the same teacher in a New York City public school were included in the sample for this study. The classes were randomly assigned to one of four comparison groups who each received different treatments of the software. The different treatments included varying types of scaffolding to help the students define the problem. The preliminary findings indicated that the organization scaffold was most effective in helping students to understand the problem, develop hypotheses, and ask more specific questions inside the problem domain. The higher-order thinking scaffold was most effective at helping students grasp the multiple perspectives of the problem.

In a study by Englert & colleagues(2007), an experimental and control group of a total of 35 elementary-age students with disabilities participated in the study, 20 students in the experimental condition and 15 students in the control condition. Students were drawn from six special education classrooms across five urban schools. Students planned and organized their ideas in order to write expository papers about self-selected topics. The experimental group used a web-based environment that scaffolded performance by prompting attention to the topical organization and structure of ideas while students were in the situated act of composing their papers. Control students used similar writing tools, but in traditional paper-and-pencil print formats. The results of the quasi-experimental study revealed that the students in the web-based scaffolding condition produced lengthier pieces and received significantly higher ratings on the primary traits associated with writing quality.

d.Instructional Match

Since at level 2 it is essential to work on learner’s strengths and minimise deficiencies instructional strategies beneficial for learners must be applied. In a study by Lenz, et al. (2007) on 30 students with learning disabilities evaluated the effects of two types of explicit instruction, curriculum maps and guiding questions, compared to the use of simple reviews of repeated information. Each was used to teach core curriculum content in a group-instruction
format. Results of the comparison of student test scores associated with the three interventions indicated that the use of the curriculum maps significantly enhanced learning for students with learning disabilities more than guiding questions, and the use of guiding questions enhanced learning more than simple reviews of repeated information. Based on these findings, core curriculum general education teachers may be able to begin making their instruction more explicit and powerful by incorporating simple routines comprised of the use of curriculum maps to depict the importance and structure of the content and using these maps to lead and review learning through guided and interactive questioning. Mathes and colleagues (2005) and Denton and coworkers (in review) studied the effects of supplemental reading intervention provided for 24 (Denton et al. (year)) to 30 (Mathes et al.) weeks beginning in the fall of Grade 1. Mathes and colleagues evaluated two intervention approaches, and Denton and coworkers evaluated one. Both compared the progress of students in intervention to that of students who received typical school instruction (i.e., classroom reading instruction along with whatever interventions were typically provided to at-risk first graders in their schools). In the study by Mathes and colleagues, few students in the comparison group received school-provided intervention, whereas in that by Denton and coworkers, approximately 40% of comparison group students received an alternate intervention not provided by the researchers. In both studies, students received daily intervention in 40-minute sessions in groups of three to four children with one certified teacher. Results of both studies indicated that students who received supplemental intervention had significantly higher year-end outcomes on multiple measures of reading and spelling than did those who received typical school instruction.

Peer tutoring can be an effective strategy to ensure that higher rates of student learning occur. (Sherrill, Heikinaro-Johansson, and Slininger, 2009) Cooperative learning experiences have been activities that allow appropriate learning experiences for students with diverse needs. Cooperative activities foster cooperation by minimizing or eliminating competition. Peer mentors and peer tutors are effective and enjoyable alternatives. and small rewards were most effective for motivating all students. (Gloria, 2001)

e. Modelling And Demonstration

These are explicit teaching strategies. Mathes and colleagues (2005), who contrasted the effects of two first-grade interventions. Both interventions were completed in groups of three to four for 40 minutes per day, 5 days per week, over a 30-week period. Teachers in both
conditions provided explicit instruction in phonics and phonemic awareness along with practice in reading connected text, but their instructional approaches differed in important ways.

In this intervention, teachers implemented fully scripted lessons that were based on a carefully developed scope and sequence, in which the majority of each lesson was spent in word-level instruction and practice with daily application of skills in fully decodable text. In the second teachers did not follow a script, but selected from a set of well-described teaching activities as they designed individualized lessons based on daily diagnostic assessment.

The researchers concluded that both approaches to reading instruction were effective and that characteristics that were shared by the two interventions may be important to their success. These included explicit, systematic instruction in phonemic awareness and phonics, high levels of active student engagement in hands-on activities, extended opportunities for practice with feedback, and daily text reading with feedback.

**f. Teacher Coaching**

In another study (Scruggs and Mastropieri (1994)) where the construction of scientific knowledge by students with mild disabilities using the Full Option Science System (FOSS) Environmental Unit was evaluated showed that structured coaching by teachers is related to knowledge construction.

Vaughn et al. (2003) measured the Reading outcomes (fluency, word attack, passage comprehension, phonological awareness, rapid letter naming) using standard protocol, examined the effects of varying group size on the outcomes for first-grade students participating in the Reading Recovery, early intervention. The authors conclude, “In summary, the results suggest that the same outcomes of RR can be achieved by struggling readers taught in pairs as by those taught individually by increasing the duration of the lesson an average of only 9 minutes”.

Individual studies of math (Crawford & Snider, 2000) and reading (Foorman, Francis, & Fletcher, 1998) have used strong research designs and found that the quality of the curriculum and the explicitness of the instruction led to improved student learning and reduced future student failures.

The few meta-analyses of small-group interventions that have been conducted found moderate to strong effects of daily Tier 2 instruction (Elbaum, Vaughn, Hughes, & Moody,
2000). However, a panel convened by the Institute for Education Science (IES) found strong evidence for the effectiveness of providing small-group interventions as supplemental instruction to support the Tier I core curriculum (Gersten et al., 2009a). According to the panel, small-group supplemental instruction should a) target the components of reading instruction in which the student needs additional support, b) be implemented three to five times each week for approximately 20 to 40 minutes each session, and c) build skills gradually with high student-teacher interaction and frequent opportunities to practice the specific skill and receive feedback.

**Guided Notes:**

Cawley, Hayden, Cade, Baker-Kroczenski, (2002) worked with 114 students in a junior high school containing both general and students with special needs. The special considerations extended to the SWD were the use of teacher-made study guides and extra study sessions. The principle followed was that teachers could help motivate their students by helping them prepare for tests and assessments by providing tutors, study skill lessons, non-graded tests and quizzes, and advanced organizers (Rieg, Sue A.2007) should be followed before evaluating them.

Lazarus (1991) examined the effectiveness of guided notes on test scores of 10 students with learning disabilities in a regular-curriculum science class. With guided notes the quiz scores of all 10 students with learning disabilities improved. In addition, the use of guided notes produced gains in all students with learning disabilities and less significant, yet mentionable gains, from a control group of students without disabilities.

The guided notes improved the students daily quiz scores, and note taking accuracy. Hamilton, Seibert, Gardner, and Johnson, (2000) also found that guided notes improved students quiz scores of nine students of a special classroom for incarcerated juvenile offenders.

A recent study by Mastropieri, Scruggs, Spencer, and Fontana, (2003) compared guided notes to peer tutoring in a high school history class. Fluency in reading, comprehension strategies, and content test scores of 16 students with mild disabilities were measured. Students who participated in peer tutoring significantly out performed the students taught by guided notes.
on exam performance. These data indicated that peer tutoring rather than teacher directed guided notes may provide more opportunities for students to respond which improved their test performance.

2.6: Concept Development

RtI puts emphasis upon utilizing scientifically-based interventions and ongoing systematic progress monitoring to demonstrate improvements in outcomes (Brown-Chidsey & Steege, 2005). Instructional features associated with positive academic outcomes, such as high rates of opportunities to respond, immediate corrective feedback, and groups differentiated by skill level, are components of the instruction within RTI models (Brophy & Good, 1986; Kame'enui et al., 2005; Vaughn et al., 2007).

Most of the researches in RtI till date has been on reading interventions and a few with Maths. The researcher has not come across researches on concept development in other academic subjects like science, English and social sciences like History and Geography. The studies quoted in concept and knowledge development thus reveal findings in the areas of reading and Maths.

The National Reading Panel (2000) and National Mathematics Advisory Panel (2008) have both conducted meta-analyses to determine what constitutes quality instruction in those core areas. Individual studies of math (Crawford & Snider, 2000) and reading (Foorman, Francis, & Fletcher, 1998) have used strong research designs and found that the quality of the curriculum and the explicitness of the instruction led to improved student learning and reduced future student failures. are the two studies related to concept development.

The few meta-analyses of small-group interventions that have been conducted found moderate to strong effects of daily Tier 2 instruction (Elbaum, Vaughn, Hughes, & Moody, 2000). However, a panel convened by the Institute for Education Science (IES) found strong evidence for the effectiveness of providing small-group interventions as supplemental instruction to support the Tier I core curriculum (Gersten et al., 2009a). According to the panel, small-group supplemental instruction should a) target the components of reading instruction in which the student needs additional support, b) be implemented three to five times each week for approximately 20 to 40 minutes each session, and c) build skills gradually with high student-teacher interaction and frequent opportunities to practice the specific skill and receive feedback. It is also important to note, that the instruction provided within Tier 2 needs to focus on an aspect of reading (e.g., decoding) and that students need practice in that specific skill. This is on small group instruction.
Meta-analytic research has found several effective interventions for students with severe learning difficulties and identified learning disabilities including mnemonic strategies, explicit reading comprehension instruction (e.g., vocabulary, pre- and mid-reading, and direct instruction of strategies), behavior modification, and direct instruction (Kavale & Forness, 2000). Moreover, several components of effective interventions for students with learning disabilities that could inform Tier 3 interventions were identified with meta-analytic research (Swanson & Sachse-Lee, 2000) and a research synthesis (Burns, VanDerHeyden, & Boice, 2008).

VanDerHeyden, Witt, and Gilbertson (2007) conducted an evaluation of an RTI model over multiple years. Instead of random assignment, their study used a multiple baseline design, which examines outcome data from an intervention with a staggered onset of implementation. Data gathered before and after implementation of the intervention can then be used to determine the impact of the intervention. The results of this comprehensive study indicated that the RTI model reduced the number of students evaluated for special education services thereby indicating that concept development is facilitated through RTI.

Vellutino et al. (1996) found performance benefits among at-risk kindergarten students who received 30 min of intervention twice a week for as brief as one semester of instruction. This intervention using standard protocol resulted in a significant reduction in the number of students who, without intervention, would likely have been identified with a learning disability. Positive results from studies in which extensive interventions (i.e., standard protocols) have been used have shown to increase students' skill on essential basic skills (Wanzek & Vaughn, 2007).

A range from low to high sensitivity and specificity for third- to fifth-grade CBM reading and mathematics measures in predicting scores on the Pennsylvania System of School Assessment was found by Shapiro, Keller, Lutz, Santoro, and Hintze, (2006). Strong support was found for the sensitivity, reliability, and concurrent validity of first-grade mathematics CBM measures in conducting within-year analyses (Clarke and Shinn 2004).

In the first of two RTI math studies by Ardoin, Witt, Connell, and Koenig (2005), implementing the standard protocol mathematics model to ascertain whether a Tier 2 classwide intervention (i.e., explicit instruction) and a Tier 3 intervention consisting of individualized instruction and peer tutoring would improve the math performance (i.e., fluency and calculation) of 15, low-performing 4th graders it was found that 5 students did not respond adequately to Tier 2 instruction and were provided the Tier 3 instruction and...
only one student did not respond adequately to the individualized instruction. (here it the mode of teaching)

Duhon, Mesmer, Atkins, Greguson, and Olinger (2009), determined if the application of the increased frequency of a fluency-based intervention package on the mathematics performance of poorly responding students would result in performance levels similar to that of typically responding peers it was found that out of 35 students identified as at-risk, 32 were able to reach benchmark after the Tier 1 intervention. The remaining three students were able to reach benchmark after varying levels of intensity of intervention in Tier 2. While these three students met benchmark after intense interventions, the authors reported that they regressed to baseline for maintenance.

Not much is known about the applicability of RTI for children who experience difficulties in other domains, such as math (and other academic subjects), social-emotional development, behavior, and for other precursors of learning disabilities that have been identified in the literature for younger children, including language delays, attention, and self-regulation difficulties (McCardle, Scarborough, & Catts, 2001). The limitation of RTI research in the major content areas and in middle and high school have been noted by many.(Division for Learning Disabilities, 2007; Fuchs & Deshler, 2007; National Joint Committee on Learning Disabilities, 2005).

2.7. Literature on Knowledge Development:

It is essential to understand through progressive evaluation when and whether knowledge development has taken place. Knowledge development can thus be correlated with the decrease in the number of children going for tier 3 that is for special education services. Evaluation in RtI have essentially been through the use of CBM principally in the areas of reading and Maths and within small group. The review of literature done by the researcher in the areas of knowledge development is thus broadly subdivided into two subsections-studies related to the decrease in special education placement which indirectly indicated that knowledge development has taken place and secondly the studies on CBM.

The findings of the studies conducted in U.S.A indicate that the special education placement had decreased considerably on implementing RtI. Rate of identification for special education services and placement rates dropped from 4.5% to 2.5% over a 10-year period(Bollman and colleagues, 2007). Findings indicate that the statewide (U.S.A) prevalence rate over the same time period dropped from 4% to 3.3%. b. Placements decreased by 3% for "districts with at
least one RBM school," whereas the state rate decreased by 1%. (Callendar, 2007) c. Special education placement rates stayed constant over time for Minneapolis problem-solving model schools, as did the district as a whole. (Marston and his co-authors, (2003), Peterson, Prasse, Shinn, and Swerdlik (2007) reported similar information: Referrals and placements stayed relatively stable over time after RTI implementation.

On examining the effect of the tiers of reading intervention model on placement rates by VanDerHeyden and colleagues, (2007) , it was found that during the 4 years of implementation, rates fell to 8% compared to an historical contrast group (same schools, same teachers) for which the rate was 15%.. For the four schools included in the study, there was a decrease in referrals and an increase in placements. The authors interpreted this pattern as an indication of more appropriate referrals.

A 3 tier model studied by OConnor(2003) revealed that 15% of the control group required special education, while only 8 % of the experimental group using RTI model required special education.

A three-stage model in Minneapolis by Marston, Meuystens, Lau, and Canter (2003) , consisting of teacher-directed intervention (Stage 1), multidisciplinary team consultation (Stage 2), and special education consideration or referral (Stage 3) was investigated. it was found that the multitier services produced a positive impact on disproportionate placement of students from ethnic minority backgrounds.

The question is how should knowledge development be measured. A substantial number of studies have investigated the psychometric properties of CBM approaches for evaluating student performance and progress.Other studies have evaluated the use of CBM to discriminate between groups of students. In a study by Deno et al. ,2001 different rates of growth between students who were typically achieving and those identified with learning disabilities were seen in investigating expected rates of progress on CBM reading assessments with 638 elementary-age students.

While administering CBM in oral reading fluency passages to 309 elementary students 2-3 weeks apart, strong test-retest reliability and criterion validity with measures of reading achievement was found ( Hosp and Fuchs,2001). Co relational support with primary students (Grades 1-3) for the predictive validity of oral reading fluency over either 12 or 30 weeks when using a norm-referenced general achievement test as the criterion was also seen in a study by Fuchs and Hamlett (1997).
2.8. Literature related to language Development:

Most of the studies of RtI have been in the area of reading. A number of studies have explored the predictive validity of specific reading assessments with respect to their ability to accurately identify children with reading challenges (Catts, Petscher, Schatschneider, Bridges, & Mendoza, 2009; Walker-Dalhouse et al., 2009). Higher reading outcomes for students in the Idaho results-based model (RBM) program who had reading intervention plans than for students who did not have reading plans have been reported. (Callender, 2007).

In a study investigating the effects of Tier 2 and Tier 3 reading interventions on a variety of reading skills where Tier 2 instructions consisted of small-group instruction (10–20 minutes per session) delivered three times per week and Tier 3 intervention consisting of five daily, 30-minute sessions that incorporated group and individualized instruction students who had received tiered instruction performed higher on all reading measures when compared with an historical contrast group. (O’Connor and colleagues (2005)

Jenkins et al. (2004) demonstrated small to moderate (0.31) to large effects (1.11) of intervention provision on student prereading and reading performance when implementing a standard-protocol, first-grade phonics-based intervention.

A standard protocol intervention by Vaughn et al., 2003). involved providing students with universal instruction for at least 90 min per day along with supplementary secondary or tertiary interventions. Secondary intervention included small-group instruction targeting phonics or word recognition, fluency, and comprehension for at-risk students for at least 20-30 min a day for 10-12 weeks. Tertiary intervention was a more intensive variation of instruction provided in smaller groups (2-4) of students. It was found that among 45 second-grade students who received secondary intervention, 20 students met benchmark criteria within 20 weeks (10 students after 10 weeks; 10 additional students after 20 weeks). Participating students' prepost standardized mean effect sizes ranged from 0.53 to 6.06 on measures of word attack, comprehension, fluency, and phonological awareness.

Strong effects on word recognition and spelling performance for need-based phonics and supported reading instruction conducted with low standardization with students for 40 minutes, 4 times a week for a year was found by Miller,(2003). Using a similar intervention approach, large effects (effect sizes range from 0.69 to 0.91) on word recognition, word attack, spelling, and reading comprehension was found by Morris, Tyner, and Perney,(2000).

A 3 tier RTI model used for primary students struggling in reading was conducted on 45 students in 2nd grade who have reached 2nd tier of RTI due to non response to the general
intervention. The results indicated that minimum of 20 weeks of intervention at Tier II to determine if Tier III is necessary Vaughn (2003).

Vaughn and colleagues (2003) conducted a study in which second-grade students at risk for reading difficulties were randomly assigned to one of three grouping conditions: one teacher with one student (1:1), one teacher with three students (1:3), and one teacher with 10 students (1:10). All students received the same reading intervention treatment for the same amount of time (approximately 30 minutes daily) for the same time period (58 sessions on average). Findings from this study indicated no statistically significant differences between outcomes of students in the 1:1 and 1:3 conditions. Effect sizes indicated that students in all groups made notable progress in reading comprehension, but that these effects were weaker for the 1:10 condition than for the other two groups.

Another study was conducted by Torgesen and his colleagues (2001), who provided intervention to a group of students in Grades 3–5 who had severe reading difficulties (i.e., with average word-reading pretest score in the second percentile) and had identified disabilities and received their primary reading instruction in learning disability resource rooms. Intervention was provided one on one by experienced teachers in a clinical setting over an 8-week period. Each day, students received two 50-minute intervention sessions separated by a 10-minute break. This instruction replaced their resource room reading instruction. This 8-week intervention was followed by an 8-week generalization period in which the interventionists worked with students for 50 minutes 1 day per week in the resource room settings, prompting the students to apply what they had learned in intervention and, at the same time, modeling instruction for their special education teachers. The results were dramatic, as students made large gains in word reading and reading comprehension over this 8-week intervention and maintained these gains over a 2-year period. Although students still performed below grade level in ORF, probably because they needed more practice reading text, 40% of the students were removed from special education following the intervention.

Simos and colleagues (2002) provided 8-week intervention schedule and level of intensity within the context of a brain-imaging study. In this study, eight adolescents who had severe reading difficulties (pretest word reading 1st to 18th percentile) received one-on-one tutoring in a clinical setting for nearly 2 hours per day over 8 weeks, with brain scans before and after the intervention period. These adolescents made impressive gains in word reading, with posttest word-reading scores in the 38th to 60th percentiles. Interestingly, the brain imaging
also revealed dramatic pre–post changes in the way their brains processed information during reading activities.

2.9: Literature related to Social Behaviour and RtI

Learning and social behaviour are intricately linked. It is the healthy functioning of cognitive as well as affective domain that determines the true development of the individual. Bloom (1974) estimated that 20% of student variance in achievement is accounted for by active participation in the learning process. Participation in class discussion entails competence in a number of social interaction skills. This incorporates when, whom and what to talk about as well as attend to information and selectively process them to achieve the task.

Peterson, Prasse, Shinn, and Swerdlik (2007) established the Illinois flexible service delivery system (FSDS) model which is a problem-solving model that includes collaborative consultation. The FSDS is built on the principle that student academic and behavioral difficulties are, at least in part, due to interactions between the child and the classroom. Within this model, general education teachers are responsible for implementing strategic interventions in the classroom.

Based on school personnel surveys over the first 2 years of evaluation, Peterson et al. (2007) reported that students improved both academically (mean of 3.6, with 5 being "strongly agree" and 1 being "strongly disagree" with the statement “the FSDS resulted in improved academic performance for my students”) and behaviorally (mean of 3.4, with 5 being "strongly agree" and 1 being "strongly disagree" with the statement “the FSDS resulted in improved behavioral performance for my students”).

Pearce (2009) introduced the The South Dakota Behavior Model (SDBM), which is also a problem-solving model that includes group collaboration to promote successful student behavioral outcomes. A school-based problem-solving team (PST) is responsible for implementing the model. The PST consists of the building-level principal, classroom teacher, school counselor, school psychologist, special education teacher and aides, and parents.

Within this model, Pearce evaluated the implementation of an RTI model in the treatment and identification of students in kindergarten through 5th grade who experienced significant emotional and behavioral problems. Specifically, a school-wide intervention was evaluated in Tier 1 and six separate interventions applied within Tier 2 and Tier 3 which included a) applied behavior analysis, b) social skills training, c) counseling, d) differentiated instruction,
e) cognitive behavioral interventions, and f) increased parental involvement. Data were collected for nine students across two successive academic years Overall, the number of maladaptive episodes decreased over the two years for each of the nine students participating in the SDBM.

Fairbanks, Sugai, Guardino, and Lathrop (2007) designed The Behavior Support Model (BSM) which is a standard-protocol model focusing on classroom behavior support. Its purpose is to provide increasingly intensive interventions prior to referral for special education eligibility evaluation. Within this model, general education teachers are responsible for implementing the universal (Tier 1) and strategic interventions (Tier 2) in the classroom. If these interventions prove unsuccessful, general education teachers, the school counselor, and other school personnel develop a “function-based individualized behavior support plan” for a more intensive intervention (Tier 3). Ten students between the ages of 7 and 8 years from one elementary school participated in the study. Study 1 examined CICO implementation and effectiveness. The check in- check out or CICO intervention is built on a daily cycle in which students a) check in with a designated adult in the morning to develop behavioral goals, b) carry a point card that is used to provide opportunities for adult feedback throughout the day, and c) review how well they met their goals with a designated adult at the end of the day. Time-series data were collected on each of the 8 students across five phases: baseline and CICO 70%, CICO 75%, CICO 80%, and CICO 90% of points. With regard to the relationship between percentages of intervals engaged in problem behavior, 4 out of the 10 students were responsive to the CICO intervention. Six out of the 10 students were designated nonresponsive to the CICO intervention. Of the 6 students who did not achieve the desired results in response to the CICO intervention, 2 dropped out of the study because of parental concerns. The remaining 4 received an FBA-based plan and were doing as well as their peers. After “leveling out” compared to peers, the FBA-based plans were modified to increase self-management expectations. This reduced the percentage of intervals of problem behaviors to less than that of composite peers.

Kovaleski, Gickling, Morrow, & Swank, (1999) examined academic performance, specifically the academically related behaviors of time on task, task completion, and task comprehension. It was found that students who were receiving high implementation of the model did better on all measured variables than did students in the low implementation situation as well as those students who did not receive IST services.
The promise of a response to intervention (RTI) framework stems from its focus on prevention, empirically based and sequentially designed interventions, progress monitoring, and data-based decision making. Prevention is used in two ways: (a) long-term prevention of risk and (b) specific prevention of challenging behaviors through instructional and antecedent environmental interventions (Neilsen & McEvoy, 2004).

Barnett and colleagues (2006) talk about how response to intervention can be used to intervene challenging behaviours. Tier 1 includes classwide interventions and teachers’ efforts to supplement core curriculum as needed and to manage PBS programs. These may include interventions to increase active engagement or instructional modifications and interventions for students that are teacher managed. Agency supports include helping a teacher to implement curriculum successfully, PBS, and effective management. Teacher support may include problem solving and progress monitoring for low intensity interventions (i.e., typically found ineffective classrooms).

Barnett, Elliott, Wolsing, Bunger, Haski, McKissick, Vander Meer, (2006) used decreasing intensity design, which showed how tiered decisions were made in a RTI model for challenging behaviors. Robin, age 4, was referred for dangerous behaviors (i.e., jumping off furniture, elopement), peer aggression, and noncompliance. The outcomes pertaining to independence, self-control, following rules, and sustained positive interactions were operationalized and assessed through teacher daily report and consultant observations (e.g., teacher managerial tactics, active engagement). For Tier 1 intervention selection, positively stated rules were selected, posted, taught, practiced, and reviewed before center time. For Tier 2 intervention selection, embedded skills practice was planned and implemented through teaching routines throughout the school day, providing additional opportunities for practicing and generalizing social problem solving. Tier 3: A social story (Gray, 2000) was developed for addressing Robin's behavior when redirected for not following rules or requests. Progress was monitored using the observation code (sampled throughout center time by planned 15-min sessions) along with a teacher daily report for Robin's dangerous and aggressive behaviours. Consultant observations showed that dangerous or aggressive behaviors continued to remain at 0% for both Robin and her peers. The maintained components were indicative of high-quality classrooms based on local norms.

In another study by Fairbanks, Sugai, Guardino, Lathrop, (2007) RTI principles have been applied to reduce problem behaviours. Ten children between the ages of 7 and 8 participated...
in the study. All participants received instruction in a general education setting in one of two second-grade classrooms. Six of 10 participants met DIBELS standard benchmarks for fall (i.e., 44 words read correctly = low risk) and 5 of 8 participants (2 participants had moved) met benchmarks for spring (i.e., 90 words read correctly = low risk). A descriptive quasi-experimental design was used. The behaviours chosen were (a) inappropriate physical contact, (b) talk-outs, (c) inappropriate placement, (d) noncompliance, (e) nondisruptive off-task behavior, and (f) academic engagement. Observational data was collected. All 10 participating students experienced the CICO (Check In Check out) intervention. The problem behaviors of four of these students were responsive to CICO and did not require more intensive, tertiary level interventions. Of the 6 students whose behaviors were not responsive to CICO, 4 students received more individualized function-based interventions. Two students remained in the CICO condition and served as peer controls.

Muyskens, Marston, Reschly, (2007), research findings reveal that a response-to-intervention model promotes the early identification of students' academic and behavioral difficulties and provides interventions and monitoring with increasing intensity until effective interventions and environments are formulated. Participants in this study were 22,056 kindergarten through 8th grade students in the Minneapolis Public Schools. Teachers completed a 12-item behavior screener for each student in the fall. The scores on this measure were significantly correlated with suspensions, achievement scores and attendance data over the course of the school year. The Classroom Behaviors section included four items: evaluating student attention, following directions, completing work, and class involvement. The Externalizing Behaviors section included: physical behavior toward others, verbal behavior toward others, physical behavior toward property, and out of place. The last section of the BSC, Socialization, also had four items: adult interactions, peer interactions, coping with change, and projected self-image. Behavior Screening Checklist data was collected.

Thus it is seen that RTI addresses reform for educational services to children identified as emotionally disturbed (Gresham, 2005) before a classification of emotional disturbance, behaviour disorders, or psychiatric diagnosis, effective interventions are tried, and the results are used to help clarify needed intervention qualities to promote change and to make identification and service delivery decisions (Gresham, 2005). The RTI logic can be identified as a promising approach to improving the identification of students who might require more intensive instructional support. In this approach, a failure to respond to typically
effective interventions is used as a marker for more intensive interventions, and may assist in identifying students who might require specially designed, individualized education programs. Most aspects of the intervention development and implementation can be conducted and informed by the classroom teacher and counsellor. (Fairbanks et al, 2007)